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OHIO WESLEYAN UNIVERSITY NATURAL RADIOCARBON MEASUREMENTS IV

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INTRODUCTION

The following list of dates is compiled from samples prepared since publication of our last date list (Radiocarbon, 1967, v. 9, p. 316-332) and includes determinations through June, 1968. Equipment and operating procedures are the same as described in OWU-III.

Unless noted otherwise, all samples are pre-treated with hot 2% NaOH and 10% HCl. Samples of archaeological charcoal are subjected to an additional pretreatment to remove rootlet cellulose following the method of Haynes (1966). Purity of sample CO_2 and CH_4 is checked with a gas chromatograph. Methane samples are stored for one month to permit decay of radon prior to counting.

Ages are quoted with a 1σ counting error which includes the statistical variation of the sample count as well as that for background and for the contemporary standard. The half-life value is 5568 yr, and the reference year is 1950.

ACKNOWLEDGMENTS

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SAMPLE DESCRIPTIONS

I. GEOCHEMICAL SAMPLES

Silver Lake, Ohio, Oak Tree series

Tree rings from large oak tree (*Quercus alba* L.) in grove of oak and hickory trees at Silver Lake, Ohio (40° 21′ N Lat, 83° 48′ W Long). These dates form part of an extensive study of vegetational and geochemical history of this lake and its vicinity (Ogden, 1966, 1967, see p. 138).

II. GEOLOGIC SAMPLES

OWU-190. Akron Mastodon **15,315 ± 625**
13,365 B.C.

Spruce wood (id. G. W. Burns) from beneath partial skeleton of mastodon excavated during building construction near Akron, Ohio. Remains were found in homogeneous lake clay with scattered organic material. Wood may be associated with entrapment of mastodon in clay. Pollen in the clay is sparse and is principally spruce, pine, and sedge. Coll. and subm. by P. Wingard. *Comment* (J.G.O.): another piece of this log dated 13,300 ± 600 (M-1971). Although difference is within 2σ, additional material is available and sample will be rerun.

Sample No.	Tree-ring age	Sapwood Heartwood	NaOH	HCl	N_2 pyrolysis	Age years B.P.	Age, years A.D./B.C.
266	1743-1753	Heartwood	+	+	+	385 ± 210	A.D. 1565
222	1763-1773	Heartwood	+	+	+	525 ± 107	A.D. 1425
285	1773-1783	Heartwood	+	+	+	1275 ± 180	A.D. 675
221	1803-1813	Heartwood	+	+	+	560 ± 110	A.D. 1390
267	1813-1823	Heartwood	+	+	+	δC^{14} 9.0 ± 1.32	
284	1883-1893	Heartwood	+	+	+	50 ± 100	A.D. 1900
273A	1913-1923	Heartwood	+	+	—	95 ± 130	A.D. 1855
273B	1913-1923	Heartwood	+	+	+	δC^{14} 0.07 ± 5.5%	
273C	1913-1923	Heartwood	+	+	—	δC^{14} 0.93 ± 1.14%	
273D	1913-1923	Heartwood	+	+	+	δC^{14} 0.79 ± 1.15%	
274A	1923-1933	Sapwood	+	+	—	265 ± 90	A.D. 1685
274B	1923-1933	Sapwood	+	+	+	600 ± 85	A.D. 1350
274C	1923-1933	Sapwood	+	+	—	25 ± 90	A.D. 1850
274D	1923-1933	Sapwood	+	+	+	25 ± 90	A.D. 1850

OWU-256. Fayette County, Ohio B-9 **17,340 ± 390 / 15,390 B.C.**

Black organic clayey silt with plant fragments from test boring for Interstate Bridge Fay-71-0205 under Twp. Rd. 83 (39° 36′ N Lat, 83° 38′ W Long). Core no. B-9c; S-2B, sample depth 45.9′, absolute alt. 1007.8′. Sample believed to be buried topsoil at surface of paleosol. Sample contains 0.8% calcite; 4.7% dolomite; 5.9% $CaCO_3$ equivalent; 13.5% organic carbon; 23.2% organic matter. Coll. and subm. by M. H. Moos. *Comment*: (see OWU-257).

OWU-257. Fayette County, Ohio B-16 **19,735 ± 475 / 17,785 B.C.**

Black organic clayey silt with plant fragments from test boring for Interstate Bridge Fay-71-0731 at overpass for D.T. & I. R.R. (39° 38′ 42″ N Lat, 83° 33′ 2″ W Long). Core no. B-16, S-10B, sample depth 40.8′, absolute alt. 998.4′. Sample is buried topsoil overlying paleosol. Sample contains 0.5% calcite; 8.5% dolomite; 9.7% $CaCO_3$ equivalent; 15.9% organic carbon; 27.3% organic matter. Coll. and subm. by M. H. Moos. *Comment* (J.G.O.): pollen samples recovered from core slugs include *Polygonum* cf. *amphibium, Cerastium* cf. *alpinum, Dryas*-type, *Saxifraga* sect. *oppositifolia, Thalictrum* spp., *Epilobium* spp., and much grass and sedge pollen to NAP total of nearly 50%, and implies a nearly treeless condition. Of the tree pollen, only spruce, pine, and ash contribute substantially to the tree-pollen totals. One sample contained 2.0% of fir pollen. Samples indicate a much more arctic environment than previously described for Ohio (Ogden, 1966).

OWU-260A. Ross County Mastodon site **12,835 ± 275 / 10,885 B.C.**

First half CO_2.

OWU-260B. Ross County Mastodon site **12,685 ± 244 / 10,735 B.C.**

Second half CO_2.

OWU-260C. Ross County Mastodon site **13,695 ± 520 / 11,745 B.C.**

Second sample burned (same log). Spruce wood from extensive marl deposit near Hallsville, Ross County, Ohio (39° 27′ N Lat, 85° 50′ W Long) which has yielded remains of several mastodons. An earlier sample (OWU-220) dated 13,180 ± 520 (Radiocarbon, 1967, v. 9, p. 321). OWU-260A and B were prepared to test for fractionation in freeze-thaw purification of CO_2 and methane in sample preparation. Coll. and subm. by O. H. Prufer. *Comment* (J.G.O.): dates accord with previous determination and also show that no fractionation occurs during preparation. Particular interest attaches to samples from this area, since fluted points are found in abundance around the shores of extinct lake marked by marl deposit. None have been found assoc. with large mammals, however.

2500 ± 270
OWU-275. Terwilliger's Pond, Ottawa County, Ohio 550 B.C.

Gymnosperm wood from 3.08 to 3.12m in core (1.17m water depth) from Terwilliger's Pond, Put-in-Bay, South Bass Is., Lake Erie (41° 39′ N Lat, 82° 49′ W Long). Coll Sept., 1967 by W. S. Benninghoff, A. Stevenson, and J. L. Forsyth; subm. by J. L. Forsyth. *Comment* (J.L.F.): lake level at alt. 571.13 ft. Sample believed to be from subaerial peat and to represent time when late post-glacial isostatically controlled rising lake level reached ca. 561 ft. In our many attempts to determine time and depth of late-glacial low-water level of Lake Erie and also rate of isostatic rise of lake level, this date is 1st concrete evidence: lake level was ca. 10 ft lower 2500 yr ago. The date is acceptable.

18,400 ± 430
OWU-286. Brown's Creek, Butler County, Ohio 16,450 B.C.

Spruce wood (id. by G. W. Burns) from log 11.0 ft from base of sec. in till exposed in S bluff of Brown's Creek valley in SE ¼ Sec. 33, Madison Twp., Butler County, Ohio. Coll. and subm. by L. Struble. *Comment* (J.G.O.): date relates to arrival of late Wisconsin Miami glacial lobe near boundary of Wisconsin drift.

Titusville, Pennsylvania series

Peat from exposure in gravel pit 1.6 mi S of post office in Titusville, Pennsylvania, along Hwy 8 (41° 37′ N Lat, 79° 39′ W Long). Coll. and subm. by G. W. White.

+2385
35,000
−1835
OWU-315. Titusville Peat 33,050 B.C.

Oxidized peat 24′ below surface of gravel pit. Prior date was 39,900 +4900, −2900 yr (I-1845).

OWU-316. Titusville Peat >37,500

Peat 27′ below surface of gravel pit. Unpubl. Groningen date 40,450 ± 890 yr.

General Comment (G.W.W.): dates confirm previous determinations and show that Titusville till is late Altonian rather than Illinoian as previously inferred. For stratigraphic details see White and Totten (1965).

OWU-317. Plant opal δC^{14} + 6.67 ± 4.6‰

Opal phytoliths extracted from surface horizon (0 to 18 cm) of well-drained Brunizem soil (Warsaw silt loam, Site CH-34, Lab. no. 10539) from terrace along Mad R. Valley, W-central Ohio. Previous sample reported by Wilding (1967) had extensive pretreatment with chromic acid which reduced carbon content of opal phytoliths to 1.30% carbon and dated 13,300 ± 450 yr (I-2277). OWU-317 received only mild peroxide pretreatment and showed 4.75% Carbon (from original sample of 4.95%

Carbon). Coll. and subm. by L. P. Wilding. *Comment* (L.P.W.): comparison of OWU-317 with I-2277 suggests extensive oxidation treatment is necessary to remove occluded contemporary carbon. A 3rd sample with intermediate oxidation pretreatment (2.97% Carbon) is being prepared to test this possibility.

Lake Erie series

Core samples of detritus peat from 10 to 11′ below mud-water interface in 30 to 31′ of water found in several cores from near S Bass Is. on S side of Lake Erie (41° 36′ N Lat, 82° 56′ W Long). Samples presumed to represent land surface during lower lake level. Coll. 1967 by Ohio Geol. Survey and sub. by J. L. Forsyth.

OWU-318. Station WR-31J **4335 ± 135 / 2385 B.C.**

Sample from 10.6′ below bottom in 30.4′ water. Pollen (J. G. Ogden) indicates strongly oxidized and fragmented detrital material, pine oak, and a few spruce grains with some grass and sedge pollen with poor preservation.

OWU-319. Station WR-32J **9115 ± 210 / 7165 B.C.**

Sample from 10.6′ below bottom in 30.5′ water. Pollen similar to OWU-318, but with slightly higher proportion of pine to oak. No significant difference in pollen spectra from the 2 sites.

General Comment (J.G.O.): wide discordance between dates indicates that organic layers do not represent former lake level, or more probably that wave action resulted in differential erosion and deposition. Additional core samples from same area will be analyzed to resolve the problem. If the latter interpretation is correct, then younger date will more closely approximate true age of flooding and eventual burial.

III. GEOLOGIC SAMPLES—LAKE AND BOG SEDIMENTATION

Silver Lake series, Ohio

This report continues studies on the paleoecology and geochemistry of Silver Lake (Radiocarbon, 1964, v. 6, p. 340-348; 1965, v. 7, p. 166-173; Ogden, 1966; 1967). The lake occurs in lime-rich clay till of central Ohio (40° 21′ N Lat, 83° 48′ W Long). The data are summarized in Table 1. Coll. 1966 and subm. by J. G. Ogden, III. *Comment* (J.G.O.): organic and marl carbon dates are highly variable in hard-water lakes. It would appear from these determinations that a sample error of at least ± 500 yr must be assigned to radiocarbon dates from hard water lakes. The mean "Old Carbon" age of the surface sediments from this lake is 1200 yr, which has been subtracted from all long-core age determinations. Surface sample ages in this lake are also diminished by the amount of post-1950 bomb carbon in the sediments. Values as high as + 94% (OWU-107, reported in Radiocarbon, 1965, v. 7, p. 169) for contemporary

rooted aquatic vegetation are recorded for this lake. The effects of bomb carbon are being studied further in short cores from soft water lakes. See Seth's Pond series in this paper and Ogden (1967). Although most of the marl determinations are older than the organic carbon ages, the only consistent pattern to be observed in these determinations is that there is apparently more "old" carbon in the post-*Ambrosia* rise sediments than earlier. This may be due to land clearance assoc. with the introduction of European agriculture in the early part of the 19th century.

TABLE 1

Radiocarbon Determinations from Short Cores at Silver Lake, Ohio

Depth cm.	Sample OWU-	Core no.	Marl carbonate age*	Organic carbon age
0-10	73**	SL-2		725 ± 172
10-20	31**	SL-2		820 ± 84
5-20	268	SL-3	1740 ± 140	1045 ± 205
5-20	278	SL-4	1305 ± 80	1030 ± 130
20-30	269	SL-3	1135 ± 150	920 ± 140
30-40	279	SL-4	485 ± 235	335 ± 145
40-50	270	SL-3	2260 ± 180	1145 ± 200
50-60	226	SL-3		1288 ± 167
50-60	280	SL-4	2050 ± 120	1135 ± 110
60-70	38†	SL-2		1306 ± 100
60-70	271	SL-3	2170 ± 175	1570 ± 165
70-80	227	SL-3		976 ± 120
70-80	281	SL-4	1145 ± 110	795 ± 130
75-85	40	SL-2		1182 ± 105
80-90	272	SL-3	965 ± 210	880 ± 150
80-90	282	SL-4	640 ± 130	1255 ± 100
95-105	41	SL-2		1753 ± 189

* Where both organic carbon and marl carbonate ages are reported for a single laboratory number, the marl dates are identified by the letter "A" following the number; organic carbon dates by the letter "B".

** OWU I, p. 347, 1964.

† OWU II, p. 169, 1965. Rise in *Ambrosia* pollen occurs at 65 to 75 cm.

Seth's Pond, Massachusetts series

These dates continue short-core radiocarbon and pollen studies in soft-water lakes previously reported (Radiocarbon, 1964, v. 6, p. 340-348; Ogden, 1967). There is no detectable limestone in till surrounding this lake, in a kettle 1 mi E of Lambert's Cove, Martha's Vineyard, Massachusetts (41° 18′ N Lat, 70° 46′ W Long).

OWU-123-bis. Seth's Pond, Massachusetts $\delta C^{14} + 39.0 \pm 1.2\%$

Re-run of OWU-123 from large surface sample (0 to 5 cm) near center of pond in 4.50m water. Value close to contemporary (1965 levels) vegetation OWU-127, Radiocarbon, 1965, v. 7, p. 171).

OWU-228A. Seth's Pond, Massachusetts $\delta C^{14} + 2.40 \pm 1.8\%$

Surface sample 5.1 from 0 to 5 cm in 4.85m water.

OWU-228B. Seth's Pond, Massachusetts 479 ± 197 **A.D. 1471**

Surface sample 5.1 from 0 to 5 cm in 4.85m water. Sample OWU-228A from upper half of sect. 5.1. Slight stratigraphic distinction between upper and lower half of sample prompted division into A and B samples. Upper sect. friable on drying, yellowish brown, lower half dark homogeneous gyttja.

OWU-310. Seth's Pond, Massachusetts δC^{14} **5.0 ± 2.98%**

Short core (85 cm) 4.1. Sample from 3 to 10 cm in gyttja.

OWU-312. Seth's Pond, Massachusetts 375 ± 135 **A.D. 1575**

Sample from 50 to 60 cm (below *Ambrosia* rise) in core 4.1.

General Comment (J.G.O.): this forms part of a series of studies contrasting sample variability in hard-water and soft-water lakes in Ohio and New England. (See Silver Lake series, this date list.) Although it appears that surface samples from soft-water lakes are as variable as hard-water lakes, (resolution ± 500 yr) the contemporary mud/water interface is unsuitable for reference dating due to post-1950 atomic bomb-produced Carbon. An additional source of error is possible mixing with older sediments by bottom-burrowing organisms. Rise in *Ambrosia* pollen, a striking stratigraphic marker in NE N. America, at least removes the variability introduced by post-1950 bomb Carbon.

Pretty Lake, Indiana series

Extensive studies on the geology, hydrology, and physical limnology of Pretty Lake, Indiana (41° 35′ N Lat, 85° 15′ W Long) are being conducted by the U. S. Geol. Survey in collaboration with Indiana University. Four-in. cores obtained by the U.S.G.S. have been analyzed for radiocarbon and pollen content. Core A, from which the following list of dates (Table 2) was obtained is 5.26m long and was coll. in 28m of water. The core consists of marly gyttja grading downward through clayey gyttja to clay. Core E, from a marl "island" has been sampled for radiocarbon and C^{12}/C^{13} by the Yale Geochronmetric lab whose results will be reported elsewhere. Pollen analysis of all the cores is reported by Mrs. Alice S. Jones (Indiana Univ., Ph.D. dissertation, unpubl.). A comparison of radiocarbon and pollen stratigraphy of Pretty Lake and Silver Lake, Ohio is presented in Ogden (in press). Coll. U. S. Geological

Survey and subm. by D. G. Frey and A. S. Jones. *Comment* (J.G.O.): the extraordinary correspondence between Pretty Lake and Silver Lake, Ohio, pollen records indicates that present vegetational differences between the 2 areas have existed for at least 10,000 yr and that vegetational changes have been in phase and apparently synchronous. The Pretty Lake core bottomed in wood (OWU-242). All other dates include a correction of −920 yr (from surface sample, OWU-230) as estimate of Paleozoic carbonate contribution to the lake ecosystem. The close correspondence of corrected basal-gyttja date (OWU-241) with uncorrected wood date (OWU-242) confirms validity of core-sample correction by surface-sample determinations.

TABLE 2

Radiocarbon Dates and Major Pollen Types from Core A, Pretty Lake, Indiana

OWU Sample no.	Depth cm	Major Pollen Types	Radiocarbon age	A.D./B.C.
230	0-6	oak-hickory-beech-*Ambrosia*	920 ± 210*	
231	51-56	oak-hickory-beech	720 ± 160	A.D. 1230
232	101-107	oak-hickory-beech	1830 ± 270	A.D. 120
262	125-130	oak-hickory	2695 ± 320	745 B.C.
233	145-150	oak-hickory	3585 ± 290	1635 B.C.
263	181-186	oak-hickory	3865 ± 360	1915 B.C.
234	201-206	oak-hickory-beech	3820 ± 305	1870 B.C.
235	251-256	oak-hickory-beech	4340 ± 305	2390 B.C.
236	301-306	oak-hickory-beech-elm	5885 ± 340	3935 B.C.
237	351-356	oak-hickory-pine-elm	7495 ± 205	5545 B.C.
264	381-386	pine-elm	9295 ± 345	7345 B.C.
238	401-406	spruce-pine-oak	10,195 ± 215	8245 B.C.
239	425-430	spruce-oak	10,860 ± 270	8910 B.C.
240	451-456	spruce	11,750 ± 270	9800 B.C.
241	501-506	spruce	13,375 ± 610	11,425 B.C.
242**	520-525	spruce	13,265 ± 520	11,315 B.C.

* All core dates corrected for Paleozoic carbonate by subtracting 920 years from the raw radiocarbon date except OWU-242.

** Date determined on spruce wood at bottom of core and therefore not corrected for paleozoic carbonate.

Brown's Lake Bog series

As part of series of studies of late-glacial and post-glacial history of Ohio, a core 3 cm in diameter and 13.7m long was recovered with a Livingstone piston sampler from Brown's Lake Bog (40° 41′ N Lat, 82° 3′ W Long), in a kettle ca. 2 mi W of Shreve, Ohio; report to be published elsewhere. Table 3 lists dates and major pollen components of the core.

Coll. 1967 and subm. by J. G. Ogden, III. *Comment* (J.G.O.): Brown's Lake Bog profile contains a single beech-pollen maximum, between the 2 beech maxima recognized from Silver Lake, Ohio and Pretty Lake, Indiana (Ogden, in press). Further studies on similar bogs in NW Ohio will resolve whether difference in pollen records reflects edaphic differences between lake and bog records or whether vegetational boundary limiting the distribution of beech existed throughout central Ohio ca. 3000 yr ago.

TABLE 3

Radiocarbon Dates and Major Pollen Types for Core BLBG-1, Brown's Lake Bog, Wayne County, Ohio

OWU Sample no.	Depth cm	Major Pollen Types	Radiocarbon age	A.D./B.C.
289	95-100	Oak-hickory-*Ambrosia*	565 ± 105	A.D. 1385
291	295-300	Oak-hickory	1185 ± 100	A.D. 765
292	395-400	Oak-beech-hickory	1910 ± 170	A.D. 40
293	495-500	Oak-sedge-pine-beech	3145 ± 165	1195 B.C.
295	695-700	Oak-beech-hickory	4210 ± 145	2260 B.C.
297	895-905	Oak-pine-elm	8030 ± 185	6080 B.C.
299	1020-1030	Oak-pine-elm	8700 ± 175	6750 B.C.
300	1070-1080	Pine-oak	9670 ± 190	7720 B.C.
302	1160-1170	Pine-spruce-oak	10,915 ± 205	8965 B.C.
303	1180-1190	Spruce-pine-oak	9305 ± 355	7355 B.C.
304	1200-1210	Spruce-pine-oak	10,595 ± 370	8645 B.C.

IV. ARCHAEOLOGIC SAMPLES

O.C. Voss site—1966 series

The following determinations are part of a continuing series of investigations by the Ohio Historical Soc. into the Mound City Group Natl. Monument (39° 22′ N Lat, 83° 0′ W Long). All samples are wood charcoal and all but OWU-244 have been pretreated for removal of rootlet cellulose by the method of Haynes (1966). Coll. 1966 by R. S. Baby and M. Potter and subm. by R. S. Baby.

OWU-229A. Square 190L12 Upper sample δC^{14} **3.6 ± 1.20%** **1040 ± 215**

OWU-229B. Square 190L12 Lower sample **A.D. 910**

Sample divided into upper and lower portions because of suspicion of intrusive material in top of sample. Material was wood charcoal, probably ash or hickory (id. by G. W. Burns) in a midden area.

δC^{14} **0.50 ± 1.10%**

OWU-243A. Refuse pit. Feature IX **815 ± 220**

OWU-243B. Refuse pit. Feature IX **A.D. 1135**

Sample divided as in OWU-229 above. Sample consisted of oak charcoal with black walnut shell. Refuse pit contained 1 burial (fetus).

OWU-244. Post-hole (#87-9) Feature XI, House II **675 ± 90** **A.D. 1275**

Sample was quite small and showed no evidence under microscope of rootlet contamination. Pretreated with NaOH and HCl only.

517 ± 110

OWU-245. Feature XIX **A.D. 1433**

Wood charcoal of Feature XIX assoc. with House II. Feature XVIII.

387 ± 158

OWU-246. Feature XX **A.D. 1563**

Wood charcoal assoc. with House II. Feature VXIII.

General Comment (R.S.B.): OWU-229B, 243B and 244 are compatible with OWU-92A (Radiocarbon, 1965, v. 7, p. 172) which showed 970 ± 79 yr. Samples from plaza or ceremonial center of Cole Complex. OWU-245 and -246 represent intrusion of later refuse pits into post mold pattern of House II, Features XIX and XX. Later occupation is also reflected in late Cole complex ceramics included with these samples. Contemporary age of OWU-229A and 243A confirm field suspicion of late intrusion.

Blain's Village series

Baum focus Fort Ancient site near Chillicothe, Ross County, Ohio (39° 19′ N Lat, 82° 56′ W Long). Samples consisted of charred corn and charcoal. In OWU-247A, corn kernel charcoal was hand-picked to constitute a sample. Most of the corn charcoal was removed from OWU-247B. Coll. and subm. by O. H. Prufer.

405 ± 150

OWU-247A. Pit 4 **A.D. 1545**

Sample consisted of pure corn kernel charcoal.

970 ± 220

OWU-247B. Pit 4 **A.D. 980**

Sample mostly wood charcoal from sealed primary refuse pit 20 to 24″ deep.

1035 ± 155

OWU-248. Pit 2 **A.D. 915**

Sample of oak charcoal at depth 8 to 12″ in Pit 2.

General Comment (O.H.P.): OWU-247A is too late, presumably due to anomalous fractionation by corn. Dates for OWU-247B and OWU-248

are acceptable. Marks earliest Fort Ancient (Baum focus) manifestation in Ohio. Interestingly, pit contained Woodland vessel in addition to Fort Ancient materials.

Laboratory Comment (J.G.O.): if date for OWU-247A is normalized for anomalous Carbon isotope chemistry (−11.2‰), radiocarbon age becomes 645 ± 150 yr B.P. or more nearly in line with other dates.

OWU-249. Stanhope Cave, Jackson County, Ohio **2120 ± 240 / 179 B.C.**

Gymnosperm charcoal from Unit 13-3/F2, 10 to 14″ of Woodland site near Jackson, Ohio (39° 7′ N Lat, 83° 45′ W Long). Coll. and subm. by O. H. Prufer. *Comment* (O.H.P.): date is completely unacceptable. Assoc. cultural remains are late middle/early late Woodland. A similar sample gave 1205 ± 85 (GX-966) which is acceptable. Culturally, level from which both samples were taken represents Peters phase of Scioto tradition.

OWU-250. Leimbach site, Lorain County, Ohio **2460 ± 260 / 510 B.C.**

Oak charcoal from Feature 5, refuse pit (Sample #2) of early Woodland occupation site near Brownhelm, Ohio (41° 22′ N Lat, 82° 20′ W Long). Coll. and subm. by O. C. Shane, III.

OWU-251. Leimbach site, Lorain County, Ohio **1935 ± 240 / A.D. 15**

Gymnosperm charcoal from Feature 32, primary deposit of refuse pit. Coll. and subm. by O. C. Shane, III. *Comment* (O.C.S.): both dates are acceptable and consistent with OWU-185 which gave 2470 ± 309 (Radiocarbon, 1967, v. 9, p. 330). Material dates early Woodland occupation closely related to Adena phase of Scioto tradition. Further details may be found in Prufer and McKenzie (1967).

OWU-252. Rais Rock shelter, Jackson County, Ohio **1555 ± 155 / A.D. 395**

Gymnosperm charcoal from Unit E-3, 10 to 12′ below floor of Woodland occupation site near Jackson, Ohio (39° 7′ N Lat, 82° 45′ W Long). Coll. and subm. by O. C. Shane, III. *Comment* (O.C.S.): acceptable date for Hopewellian related level of Middle Woodland period.

OWU-253. Gabriel site, Athens County, Ohio **425 ± 155 / A.D. 1525**

Wood charcoal (ash or chestnut, id. by G. W. Burns) from sealed deposit in pit at Gabriel site near Dover, Ohio (39° 23′ N Lat, 82° 9′ W Long). Coll. and subm. by J. L. Murphy.

OWU-258. Wheelabout Rock shelter, Vinton County, Ohio **770 ± 215 / A.D. 1180**

Wood charcoal from Sq. 2-B, Sample 1, 15′ of Late Woodland occupation site (39° 15′ N Lat, 82° 22′ W Long). Coll. and subm. by D. H. McKenzie. *Comment* (D.H.M.): dates Late Woodland (Chesser phase) occu-

pation. This is not significantly different from A.D. 1070 ± 140 (OWU-180) date obtained for this phase as Chesser Cave (Radiocarbon, 1967, v. 9, p. 329).

OWU-259. Wheelabout Rock shelter, Vinton County, Ohio **4570 ± 240 2620 B.C.**

Charcoal from circular "pocket" of Sq. 3-B, Sample 2, 36 to 39″ of site of OWU-258. Coll. and subm. by D. H. McKenzie. *Comment* (D.H.M.): this sample was obtained from lowest level of shelter, and dates small Archaic occupation immediately about sterile sand and rock. There would appear to be a generally Laurentian affiliation. The Archaic occupation is not clearly separated stratigraphically from Woodland occupation above.

OWU-265. Seaman's Fort site, Erie County, Ohio **2955 ± 290 1005 B.C.**

Ring-porous angiosperm (ash or hickory) charcoal from Feature 5. Sample was quite small and diluted with "dead" methane to bring sample to optimum counter pressure. Sample should date Leimbach phase component, ca. 500 to 100 B.C. Site located at 41° 17′ N Lat, 82° 39′ W Long. Coll. by R. C. Vietzen and subm. by O. C. Shane, III. *Comment* (O.C.S.): date is possible, but in light of other dates on similar assemblages, seems to be too early.

OWU-276. Enos Holmes mound, Highland County, Ohio **815 ± 95 A.D. 1135**

Mixed wood charcoal, mostly oak and hickory from midden deposit on primary mound, Sq. 50, probably representing burned house structure. Sample location 39° 14′ N Lat, 83° 22′ W Long. Coll. and subm. by R. S. Baby. *Comment* (R.S.B.): date is well within range of Cole complex (late Woodland) and indicates emergence of Mississippian temple-mound building concepts in Ohio.

References

Date lists:

OWU I — Ogden and Hay, 1964
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