U. S. Geological Survey Radiocarbon Dates I*

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A PRECEDING paper (*1*) described the technique and equipment used at the U.S. Geological Survey for radiocarbon measurements by acetylene counting in the proportional region and the results of test measurements on acetylene prepared from modern and "infinitely" old material. The following table lists the radiocarbon dates obtained by this method for samples of unknown age. It covers the period from the time when these measurements were begun in October 1953 to 30 April 1954.

The dates given are based on 5568 ± 30 yr as the half-life of radiocarbon (*2*). To exclude any possibility of effects from artificial-coal combustion on the specific activity of atmospheric CO_2, wood grown in the 19th century was used for determining the counting rate for modern material from which the ages of organic samples were calculated. All dates on sea shells were obtained from comparison with modern shells from the same locality. Four samples of modern shells, W-14, W-39, W-25, and W-73, were investigated for this purpose and gave the same carbon activity as modern wood within an error of ±1 percent, contrary to what was expected from C^{13} measurements (*3*).

The error listed is composed of (i) the standard counting error due to statistical fluctuations in the radioactive decay, (ii) the uncertainty in the background and modern standard measurements, and (iii) isotope separation effects during the preparation of the acetylene samples. The listed errors are equal to or somewhat greater than the standard error σ conventionally assigned to radiocarbon measurements (*2*). The errors do not take into account possible field contamination of the samples with carbonaceous materials of a different age. From experience, however, it is known that such contamination is in general negligible, except perhaps for very old samples of an age of more than 32,000 yr, where the observed activity could have originated from the addition of a fraction of a percent of modern carbon.

The samples are numbered in sequence of their preparation and measurement. Numbers missing in the list were assigned to measurements on "dead" or on contemporaneous materials or to test runs on material of precisely known age. The prefix W, for Washington, distinguishes our numbers from those of other laboratories.

The ages of most of the samples were determined for the purpose of dating pre-Mankato substages of the last glaciation. Most of the samples dated in this connection were selected and made available to us by Richard F. Flint, Yale University (*4*). The dates on these samples show that a major glacial advance took place on the North American continent some 20,000 yr ago. The advance reached its maximum extent between 18,000 and 19,000 yr ago, penetrating, at least in Illinois, farther south than any other previous substage of Wisconsin glaciation. Comments on the other groups of measurements are given in the table.

Wood, peat, and other organic samples were washed with hydrochloric acid in order to remove carbonates before burning. The counting time ranged from 30 to 60 hr for each sample with 48 hr of counting for the average run.

The list contains sample descriptions as obtained from the submitter. Our own comments, if any, are given in short preambles to groups of determinations.

Corrinne Alexander carried out the conversion of the samples to carbonate. Since 1 December 1953, Meyer Rubin assisted me in the technologic procedure of the acetylene preparation and, as a geologist, gave valuable advice on the selection of samples and interpretation of results.

RADIOCARBON DATES

No.	Sample	Age (yr)
I.	*Samples with oceanic implications* A. *Baja California sea shells* Assembled by C. L. Hubbs, University of California, for the purpose of finding evidence of changes of water temperature with time along the California coast. The O^{18} temperature of these shells was determined by H. C. Urey *et al.* at the University of Chicago (unpublished). These O^{18} determinations further show that no CO_2 exchange has taken place between the atmosphere and the shells. The series was measured to provide an example of consistent shell dates. The shell-charcoal pair, W-26 and W-27, shows excellent agreement. The shell ages are computed using W-25 (*1*) as the modern standard.	
W-29	*Tivela stultorum* Mawe: Near top of grade toward San Quintín on north side of Socorro Cañon along "highway." Collectors, A. A. Allanson and James Valentine, University of California. The smaller size of shells suggests a warmer sea temperature than at present. O^{18} temperature, 17.8°C.	330 ± 160

RADIOCARBON DATES—(*Continued*)

No.	Sample	Age (yr)
W-31	*Tivela stultorum* Mawe: On sand dunes at San Antonio del Mar (Johnson Ranch), close to ocean beach. The smaller size of shells suggests a warmer sea temperature than at present. Collectors, A. A. Allanson and James Valentine. 0^{18} temperature, 18.2°C.	300 ± 160
W-32	*Cryptochiton stellifer* Middendorff: Midden near coast on alluvial flat, eroded from about 2 ft below surface; 0.1 to 0.2 mi south and southeast of large ancient sand dune just south of mouth of Rosario Cañon. The abundance of *Cryptochiton* suggests temperatures lower than present. Collectors, Carl L. and Laura C. Hubbs, University of California. 0^{18} temperature, 16.7°C.	650 ± 200
W-26	*Mytilus californianus* Conrad: Rim of cliff on most prominent point between Punta San Isidro and the first main point south of Punta Cabras. Taken from midden at a depth of between 3 and 4 ft in relatively uniform midden 4 to 5 ft deep. Collectors, Carl L. and Laura C. Hubbs and A. A. Allanson, University of California. 0^{18} temperature, 17.1°C.	2540 ± 200
W-27	*Charcoal*: Taken from the same place as W-26 for the purpose of checking its C^{14} age against that of the shells. Fragments in good condition obtained by flotation. Collectors same as for W-26.	2500 ± 200
W-30	*Mytilus californianus* Conrad: On west side of Punta Baja, in midden opposite north end of wide reef; in cliff face about 5 ft below crest; from a definite hearth about 2.5 ft in diameter in old sand-dune material, lying above 1 ft of sand without shells and below 2 ft of sand without shells. Expected to be relatively old. Collectors, Carl L. Hubbs and Laura C. Hubbs. 0^{18} temperature, 17.1°C.	4030 ± 200
	B. *Sea-level changes and strand lines* A plan to investigate late Pleistocene sea-level changes was begun by the determination of the following six samples from America, northwestern Greenland, and Australia. Samples W-74 and W-75 are of methodologic interest, because determinations on them show that in more than 32,000 yr no exchange with younger carbonate has occurred to an extent that could influence the accuracy of radiocarbon dates.	
W-40	*Shells, Sagadahoc Bay, Maine*: Mya shells from a more or less continuous, extensive layer approximately 3 ft below the present flat on the coast of Maine. According to W. H. Bradley, U.S. Geological Survey, who collected and submitted this sample, this layer was caused by a catastrophic event such as the combination of an earthquake and big storm at high tide.	1050 ± 160
W-48	*Whale baleen*: From the Thule area, northwestern Greenland. The whale was buried under 8.5 ft of permafrost in beach deposits at an elevation of 43.6 ft, 76 ft below the highest beach in this area. Collector, D. B. Krinsley, U.S. Geological Survey.	8500 ± 200
W-72 W-74 W-75	*Shells, Saunders Island*: *Mya truncata* (*artica*) from raised marine deposits on the north coast of Saunders Island, northwestern Greenland. Collector, D. B. Krinsley.	
	W-72: collected 80 ft above present strand line.	8570 ± 200
	W-74: collected 50 ft above present strand line.	Older than 32,000
	W-75: collected 15 ft above present strand line.	Older than 32,000
W-95	*Wood, Yarra River* (*Eucalyptus rostrata*) excavated during the building of the Spencer Street Bridge in Melbourne, Australia. Part of a large stump that was in position of growth 63 ft below the present low-water mark. The sea must have been at least 10 ft lower than this level at the time that the tree grew. Submitted by E. D. Gill, National Museum of Victoria, Australia.	8780 ± 200
II.	*Glacial samples*	
	A. Eastern United States	
W-44 W-45 W-46	*Durham Meadows Lake deposits*, from the valley of the Coginchaug River approximately 8 mi southeast of Middletown, Conn. The samples come from a section with three organic zones lying on a bed of gravel and sand, overlain by 1 m of sandy clay and clay. The stratigraphy of this section is now being studied by pollen analy-	

RADIOCARBON DATES—(*Continued*)

No.	Sample	Age (yr)
	sis at Yale University. Collected by Estella B. Leopold and submitted by G. E. Hutchinson, Yale University.	
	W-44: log from upper peat horizon at 1 m depth.	4800 ± 400
	W-45: upper peat, sampled at about 1 m depth.	7570 ± 250
	W-46: gyttja from depth of 2.8 to 3.0 m, the lowest of the three organic layers resting on sand and gravel.	12,700 ± 280
W-66	*Bridgeville, Pennsylvania*: Peat from beneath 5 m of alluvium just west of Bridgeville, Pa. The section is described by J. M. Schopf and A. T. Cross in *Am. J. Sci.* **245,** 426 (1947). Believed by these authors to represent an interglacial deposit, most plausibly from the Tazewell-Cary interval. Dated by Libby (C-438) as older than 16,000 yr. Submitted by E. R. Eller, Carnegie Museum, Pittsburgh.	23,000 ± 800
W-87	*Otto, New York*: Peat from the east bank of South Branch Cattaraugus Creek, Cattaraugus quadrangle, N.Y., about 0.2 mi south of the village of Otto, at the base of a 70- to 80-ft stream bank on the outside of a bend and close to normal stream level. The section is described by P. MacClintock and E. Apfel in *Bull. Geol. Soc. Amer.* **55,** 1143–1164 (1944). Collector, C. S. Denny, U.S. Geological Survey.	Older than 35,000
	B. Ohio	
W-33	*Cleveland*: Wood from a stratigraphic horizon between deposits of Lake Arkona and Lake Whittlesey. Predicted date, "Late Cary." Collector, G. W. White, University of Illinois.	13,600 ± 500
W-37	*Camden moraine*: Wood from a locality, 6 mi south of Dayton, overlain by 16 ft of Cary till. Identical with C-508, dated by Libby as older than 17,000 yr. Collected by R. P. Goldthwait, Ohio State University.	20,700 ± 600
W-71	*Cleveland varved silt and clay horizon*: Wood from the pit of the Cleveland Sand and Gravel Co. The varved horizon from which the wood came immediately overlies 1.5 ft of yellow loess, which in turn overlies a dark brown loess correlated with the Farmdale by G. W. White and A. B. Leonard. The varved lake beds are under 7 ft of till. Section described in *Am. J. Sci.* **251,** 363 (1953). Collector, G. W. White.	24,600 ± 800
W-88	*Newark*: Wood from a horizon of twigs and logs between 40 and 60 ft deep in excavations for deep building foundations for the Kaiser Aluminum and Chemical Corp., 0.3 mi west of state highway 79, 0.2 mi east of the Bucyrus line of the New York Central Railroad, and 0.1 mi south of Ramp Creek. Predicted age: Tazewell. Collector, R. P. Goldthwait.	21,400 ± 600
W-92	*Oxford*: Butler County, Oxford Township, NE¼SW¼sec. 26, at north edge of the Hamilton quadrangle, (USGS map, reprinted 1942). One of dozens of similar logs that protrude end-on from till at depths of 30 to 60 ft below the original till surface on a branch of Talawanda Creek. This one protruded from 5 ft above the till base and 50 ft below the till surface. Here till overlies laminated greenish-gray lake beds 2 to 5 ft thick resting on bedrock, but 200 yd downstream the lake beds overlie a second lower till. In places a thin seam of leaf litter with a 6-in. leached zone has been observed buried on the lower till. Similar to C-465 dated by Libby as "at least 15,000 yr old." Collector's interpretation: upper till, Cary; lower till, Tazewell. Collector, R. P. Goldthwait.	19,980 ± 500
W-96	*Twin Creeks*: Log from peat bed under 90 ft of till on Twin Creek in Montgomery County, German Township, sec. 18 SE near Germantown. Section described by F. Leverett in *U.S. Geol. Survey Mon.* **41,** 363–366 (1902). Organic layer rests on deep gravel fill. Submitted by R. P. Goldthwait.	Older than 34,000
W-91	*Chillicothe*: Log projecting from till bank along Biers Run in Ross County, South Union Township, 5½ mi northwest of Chillicothe. Overlain by 2 ft of fine sand and 3 ft of till. Prior to an earlier stream cutting, sample was covered by at least 20 ft of additional till. Predicted age: Tazewell. Collector, R. P. Goldthwait.	18,050 ± 400
	C. Indiana	
W-57	*Steuben County*: Fibrous, woody peat with twigs, conifer	12,380 ± 370

RADIOCARBON DATES—(*Continued*)

No.	Sample	Age (yr)
	needles, and wood fragments from a location in the NE¼-NE¼sec. 2, T37N, R14E. From surface downward the section includes 3.5 ft clay, 2 to 3 ft gravel and sand, 4 in. peat layer (sample horizon), 9 in. marl resting on calcareous till. Correlated with "Late Cary" by the collector, W. J. Wayne, Indiana Geological Survey.	
W-65	*Steuben County*: Another sample from same location as W-57 was collected by Wayne in order to exclude the possibility of the presence of any modern rootlets.	13,020 ± 400
W-58	*Noble County*: Wood from a section in the SW¼SE¼sec. 12, T33N, R11E, resting on contact of calcareous gravel (Tazewell?) and beneath 2 ft of a black, fossiliferous (Mollusca), peaty clay. The organic bed underlies 3 ft of calcareous gravel and sand; 3 ft of alluvial sand and silt caps the exposed section. The organic bed is now believed to represent a deposit in a lake dammed by ice or a valley train when the ice stood at the Wabash moraine in late Cary time. Collector, W. J. Wayne.	12,380 ± 360
W-59	*Porter County*: Fragments of a log, collected in the SW¼NW-¼sec. 5, T32N, R5E, buried in calcareous gravelly sand about 5 ft below the surface of an outwash along the Kankakee River valley in an abandoned pit. Was believed to be of middle to late Cary age. According to collector W. J. Wayne, the date indicates a postglacial reworking of the gravel and sand, made possible by the combined volume of the Kankakee and St. Joseph rivers, the latter now flowing northward to Lake Michigan.	7990 ± 200
W-61	*Noble County*: Gyttja, SE¼-SW¼sec. 27, T35N, R11E. A noncalcareous, black, laminated lake deposit collected from beneath 10 ft of marl. It represents the first organic deposit after the melting of an ice block. Collector, W. J. Wayne.	6720 ± 200
W-64	*Wabash County*: SE¼NE¼sec. 9, T29N, R6E. Gyttja, black to dark gray, generally noncalcareous but containing some proken mollusk shells. Collected from beneath 12 ft of marl.	13,140 ± 400

RADIOCARBON DATES—(*Continued*)

No.	Sample	Age (yr)
	From the bottom deposit of a kettle lake formed by an ice block from the Packerton moraine. Predicted correlation: Early post-Cary maximum. Collector, W. J. Wayne.	
	D. Illinois	
W-67	*Lake Bloomington Spillway*, McLean County: Wood fragments from a discontinuous peat layer separating an oxidized upper gray till from a middle gray till. Above the upper gray till is 12 ft of Normal till underlain by 6 ft of Bloomington till. Collected by Leland Horberg and J Harlen Bretz, University of Chicago.	Older than 34,000
W-68 W-69	*Farm Creek*: Two wood samples from the "Farmdale" loess, previously dated by Libby (C-509 and C-510) as older than 19,000 and 20,000 yr. Collector, Guy D. Smith, U.S. Department of Agriculture.	
	W-68: from 0 to 1 ft below surface of loess.	22,900 ± 900
	W-69: from 3 to 4 ft below surface of loess.	25,100 ± 800
W-79	*Wedron*: Wood from Lake Kickapoo deposits at Wedron. From dark peaty silt occurring in a bedrock valley in St. Peter sandstone. The wood horizon is overlain by periglacially deformed sand and dark silt, which in turn underlie laminated clay (Lake Kickapoo deposits). Lake Kickapoo is now regarded as being "Farmdale" in age by the Illinois State Geological Survey. Tazewell tills overlie the lake beds. Similar to C-575 determined by Libby to be "older than 17,000." Section described by H. B. Willman and J. N. Payne, in *Illinois State Geol. Survey Bull.* No. 66, p. 307, sec. 68. Collector, J Harlen Bretz.	24,000 ± 700
	E. Minnesota	
W-99	*Redwood Falls*: Spruce wood from depth of 9 ft in till on stream bank, sec. 3, T112N, R35W, Paxton Township, Redwood County, 3½ mi east of Redwood Falls. The till is presumed to be Mankato age, in the heart of the Des Moines lobe. The wood is probably transported and conceivably came from an older drift. Submitted by H. E. Wright, Jr., University of Minnesota.	Older than 31,000

RADIOCARBON DATES—(*Continued*)

No.	Sample	Age (yr)
W-101	*Ironton*: Spruce wood from silt at a depth of 108 ft in the Manuel mine on the Cuyuna iron range, near Ironton. In the immediate area, there are two drifts of Mankato age and one or two drifts of Cary age. Collector, H. E. Wright, Jr.	Older than 32,000
W-102	*Bronson*: Wood taken from a well at a depth of 88 ft at Bronson, Kittson County, in the region of Mankato drift. Section described by C. O. Rosendahl in *Ecology* **29**, 291–296 (1948) consists of (from surface down) 20 ft of Lake Agassiz sediments, 46 ft of till, 22 ft of gravel, sand, and clay, 3 ft of peat (sample horizon), and 16 ft of clay (lacustrine). Boring stopped at 107 ft. Similar to C-496 determined by Libby to be "older than 19,000." Collected by C. O. Rosendahl, submitted by W. S. Cooper, both of University of Minnesota.	Older than 36,000
	F. Canada	
W-100	*Port Talbot, Ontario*: Gyttja from the base of a modern cliff of Lake Erie. Gyttja is overlain by 100 ft of till, which consists of two divisible beds. Collector, A. Dreimanis, University of Western Ontario, London.	Older than 32,000
	G. Alaska	
W-43	*Healy Creek*: Healy D-4 quadrangle, SE¼NW¼sec. 20, T-12S, R6W, Fairbanks meridan. Driftwood log from 40 to 50 ft below top of 80 to 100 ft terrace on Healy Creek, which is correlated with the Carlo deposits of the Nenana River. According to the collector, the wood does not necessarily date the Carlo glacial advance. Collector, C. Wahrhaftig, U.S. Geological Survey.	3500 ± 200
W-49	*McKinley Park*: Peat from pond formed by damming by terminal moraine of Riley Creek glaciation and stagnant ice; should date from just slightly after Riley Creek glacier maximum advance. Collector, C. Wahrhaftig.	10,560 ± 200
W-53	*Slana-Tok Highway*: ⅛ mi east of Ahtell Creek bridge. Wood from peat at base of interbedded blue till, peat, and outwash of drift of "Wrangell glaciation." Wrangell drift rests unconformably on hill slope cut into brown gravels of "Ahtell glaciation." Predicted correlation: Late Wisconsin. Collector, H. E. Wright, Jr. Comment by collector: Date is too young for geologic correlation . . . conceivably that peat was part of postglacial slump sequence. . . .	3300 ± 200
W-62	*Denali Highway area*: 1.4 mi north of mouth of Raft Creek. Trunk and root stumps of presumed black spruce. Wood rests in outwash of Hatchet Lake glacial age at inner edge of the Hatchet Lake moraine, in deformed layer. Comment by collector: Improbable that this dates the Hatchet Lake glacier moraine. Possibility exists that the stream undercut its bank, depositing the wood and causing deformation. Collectors, D. M. Hopkins and D. R. Nichols, U.S. Geological Survey.	1100 ± 200
W-78	*Bartlett Valley*: Wood from the lower of two till units separated by a buried forest zone ½ mi from present front of Bartlett glacier at the head of Placer River valley in the North Kenai Mountains area. Upper till unit has incipient soil development. Collector, T. N. V. Karlstrom, U.S. Geological Survey.	2370 ± 200
W-76	*Tustumena*: Partly lignitized wood from outwash sands in bluffs on northwest shore of Tustumena Lake, Kenai Peninsula. This sample should have been identical with L-117J dated 15,800 ± 400 yr by J. L. Kulp. Collector, T. N. V. Karlstrom.	Older than 32,000
W-77	*Goose Bay*: Wood from buried peat overlying glacial outwash deposits and underlying till, near Goose Bay, north shore, Knik Arm. Should have been identical with L-117A dated 19,100 ± 900 yr, by J. L. Kulp. Collector, T. N. V. Karlstrom.	Older than 32,000
	H. Comparison with European samples	
W-42 W-83	*Two Creeks Forest, Manitowoc County, Wis.*: Two determinations on wood from the type locality of the "Two Creeks Forest Bed" were carried out for direct comparison with samples from the Allerod-Younger Dryas boundary in Denmark. Five previous determinations	

RADIOCARBON DATES—(*Continued*)

No.	Sample	Age (yr)
	on wood from this locality by Libby (C-308, 365, 366, 536, and 537) gave an average of 11,404 ± 350 yr. Collector, F. T. Thwaites, University of Wisconsin.	
	W-42: weathered appearance, identical with Y-141.	11,350 ± 120
	W-83: well-preserved appearance, identical with Y-227.	11,410 ± 180
	Average: 11,370 ± 100	
W-81 W-82 W-84	*Ruds Vedby, Denmark*: Two samples from the pollen-zone boundary IIc/III denoting the beginning of the colder climate of the Younger Dryas and the end of the relatively warm Allerod fluctuation. Collected by Johs. Iversen, Geological Survey of Denmark, and previously dated in Copenhagen [*Science* **118**, 6–11 (1953)].	
	W-81: peaty lake mud. Copenhagen date K-102. 10,500 ± 400 yr.	11,170 ± 180
	W-82: wood identical with K-101 dated 10,890 ± 240 yr in Copenhagen.	10,260 ± 200
	W-84: identical with W-82	10,510 ± 180
	Average W-82–84: 10,400 ± 160	
III.	*Other geologic samples*	
W-47	*Twin Lakes, Colo.*: NE¼SW¼-sec. 23, T11S, R80W. Peat from between two tills believed to be of Cary age. Same exposure as W-35. Collector, G. M. Richmond, U.S. Geological Survey, Denver. Comment by collector: Radiocarbon age and further field evidence indicate earth movement.	980 ± 150
W-35	*Twin Lakes, Colo.*: NE¼SW¼-sec. 23, T11S, R80W. Same exposure as W-47. Wood from Cary till. Collector, G. M. Richmond.	Less than 200
W-7	*McDowell County, N. C.*: Buried log from base of peaty sandy clay at 7-ft depth, on North Muddy Creek, 5.2 mi east of Marion. The section shows 5 ft of reddish-brown and brown sandy silt overlying 2 ft of peaty blue-gray sandy clay that rests on basal gravel. The section represents two units of the Recent deposits on the Piedmont; the "modern" (0 to 5 ft) deposited since agriculture was introduced into the area, and the "premodern" (below 5 ft) deposited during post-Wisconsin time. Submitted by W. S. Overstreet, U.S. Geological Survey.	2270 ± 200

RADIOCARBON DATES—(*Continued*)

No.	Sample	Age (yr)
W-28	*Cleveland County, N. C.*: Log buried in peat and muck beneath 15 ft of colluvial sediment, from a gully on the W. Lattimore farm, 2 mi north of Lawndale. The colluvial sediments are an intermediate host for monazite between the crystalline source rocks below and the Recent stream deposits. Submitted by W. C. Overstreet.	Older than 30,000
W-36	*Lakeland, Fla.*: Wood from above a phosphatic pebbly and clayey sand, Pauway mine. Submitted by Z. S. Altschuler, U.S. Geological Survey.	2700 ± 200
W-50	*Mexico, D.F.*: Bellas Artes core. Carbonate from depth of 5.7 to 5.9 m. Believed to represent a moist period. Collector, P. B. Sears, Yale University.	4900 ± 250
IV.	*Archeology*	
W-85 W-86 W-89 W-97 W-98 W-104	*Haua Fteah Cave, Cyrenaica, North Africa*: Samples of cave earth with traces of charcoal, collected by C. B. M. McBurney Cambridge University, England, and submitted by H. L. Movius, Jr., Harvard University. According to McBurney, the cave deposits constitute one of the longest and most complete archeologic sequences so far known in North Africa (C. B. M. McBurney, J. C. Trevor, and L. H. Wells, *Nature* **172**, 889 (1953). A Neandertaloid jaw was excavated at a depth of 23 ft. The uppermost layers contain Roman pottery. According to R. W. Hey (Cambridge, England), the lower sections in the cave, ranging from about 16 to 28 ft in depth, were deposited under damp temperate conditions without appreciable winter frosts. The nature of the deposits from 10 to 16 ft below the present surface indicate a sharp and prolonged increase in the incidence of winter frosts. The layers above this indicate a gradual transition to the climate of the present day. The change to the colder climate at the 16-ft level coincides approximately with the end of the Mousterian culture and the beginning of the Upper Paleolithic in that area. W-85 is the first absolute date ever obtained for Livalloiso-Mousterian material. Although not quite conclusive by itself, it constitutes together with W-86 a strong indication for	

RADIOCARBON DATES—(*Continued*)

No.	Sample	Age (yr)
	a survival of *Homo neandertalensis* in that region until about 30,000 yr ago. The large difference between the dates W-97 and W-86 indicate erosion or a change in the rate of deposition.	
	W-98: 6.5- to 7.3-ft depth (collector's reference letter: B_1). Undisturbed traces of a primitive "Neolithic"—presumably food-producing—culture; the first of this kind in the area.	6800 ± 350
	W-89: 7.3- to 8.0-ft depth (C). Evolved blade industry; microlithic and other culture elements new to area. No traces of pottery or other definite indications of Neolithic, yet this culture may be ancestral to true Neolithic and shows less resemblance to the industries immediately underlying.	7300 ± 300
	W-104: 9.4- to 10.0-ft depth (F). Evolved blade and burin industry, essentially upper Paleolithic in character.	10,600 ± 400
	W-97: 11.2- to 12.0-ft depth (I). Industry approximately as for W-104.	12,300 ± 350
	W-86: 15.5- to 16.0-ft depth (N_2). This sample came from small hearth containing insufficient archeologic material for a cultural diagnosis. The hearth occurs immediately below a suspected disconformity, immediately above which occur the earliest remains indicating a blade and burin industry in this section. Since a percentage of the specimens show exceptional degree of chemical weathering, it is likely that they were deposited at a period when little or no sedimentation was taking place at this locality in the cave.	28,500 ± 800
	W-85: 19.0- to 19.7-ft depth (O_2). Hearth deposit associated with true Mousteroid (Levalloiso-Mousterian) industry.	34,000 ± 2,800 (or possibly Older)
W-93	*Poggenwisch, Holstein, Germany*: Calcareous lake deposit (gyttja) from a glacial kettle 15 km northeast of Hamburg, between Meiendorf and Ahrensburg. The deposit should date an Upper Paleolithic culture of reindeer hunters, somewhat younger than that of the Meiendorf type locality, and should be of "Older Dryas" age. Expected age 15,000 yr or possibly older. Collected by A. Rust, Ahrensburg, and obtained through H. L. Movius, Jr., Harvard University.	15,150 ± 350

References and Notes

* Publication authorized by the director, U.S. Geological Survey.

1. H. E. Suess, *Science* **120**, 5 (1954).
2. W. F. Libby, *Radiocarbon dating* (Univ. of Chicago Press, Chicago, 1952).
3. H. Craig, *J. Geol.* **62**, 115 (1954).
4. In particular, we are indebted to Dr. Flint for samples 33, 35, 37, 44, 45, 46, 47, 50, 57, 58, 59, 61, 64, 65, 66, 67, 68, 69, 71, 79, 83, 88, 91, 92, 93, 96, 100.

Purity and Adequacy of Foods*

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THE Federal Food and Drug Administration is the agency responsible for enforcing the Food, Drug and Cosmetic Act of 1938, as it was for the preceding law enacted in 1906. It is of prime significance from the standpoint of public relations that each of these laws in turn have often been referred to in common parlance as the "Pure Food Law."

It has been my good fortune to have enjoyed a personal acquaintance with every person who has so far held the position of Commissioner of Food and Drugs. They have been men of varied temperaments, interests, and professional trainings, yet we are fortunate that all of them have been persons of highest integrity with a genuine zeal for protecting the public against both deliberate frauds and confusion of counsel. The needs of the country have, of course, changed with the progress of industry and of public understanding of the need for safeguarding the food supply.

At the time of Harvey Wiley's initiation, a considerable practice of food adulteration and sophistication had grown up, and the zeal of a reformer was required to attack it—sometimes fanatical zeal. However, American food industry as a whole was quick