Chicago Radiocarbon Dates, IV

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THE DATES OBTAINED since the publication of our first three date lists (*1–4*) are presented below. This list covers the period September 1, 1952, to September 1, 1953. The dates quoted are based on 5568 ± 30 years as the half-life of radiocarbon (*3*). The number of runs is indicated by the number of dates listed, unless they were merely remeasurements of the carbon obtained from an earlier combustion, in which case brackets are placed around the set of dates involved. Remeasurement always involved rewashing the sample with acid for cleaning; otherwise, separate portions of the original samples were processed and measured. Counting time has been limited to 48 hours except in the case of the sample from Nippur.

The numbering of samples and the file names we have used (which appear in parentheses when two names are given) are entirely our own and not those of the donors and collaborators. We prefix "C" to our numbers to distinguish them from the sample numbers from other laboratories.

RADIOCARBON DATES

Our No.	Sample	Age (years)
I.	*Mesopotamia and Western Asia* (Principal collaborator: R. J. Braidwood)	
	A. Egypt	
C-810	*Nagada (Predynastic Hair I)*: Human hair weighing about 3 ounces, found in a cemetery at Nagada in Southern Egypt in 1896. This material belongs to Predynastic Egypt, that is, is older than about 5000 years. The British archaeologist W. Flinders Petrie constructed a scheme of what he called Sequence Dates, on the basis of changing pottery styles, dividing the Predynastic period of Egypt into 80 Sequence Dates. This sample consisted about half of material from Grave 1592 with a Sequence Date of 34; one-quarter from Grave 1487 with a Sequence Date of 38; and the rest from Graves 1562 (Sequence Date 35) and 1816 (Sequence Date 35). Submitted by Miss Margaret Armit, Department of Archaeology and Ethnology, Cambridge University, England.	5744 ± 300
C-814	*Nagada (Predynastic Skin)*: Human skin weighing about 2 ounces, found in a cemetery at Nagada in Southern Egypt in 1896, as in the case of Sample 810. This material came from Grave 1609 with a Sequence Date of 34 to 38. Submitted by Miss Margaret Armit.	5577 ± 300
	C. Iraq	
C-752	*Nippur (Nippur I, II, III)*: In the case of this sample a serious attempt was made to test the limit of sensitivity of the radiocarbon dating method. An important subject, the time of Hammurabi of Babylon, was selected and the sample, which consisted of a charcoal beam from the roof of a house definitely fixed in the Hammurabian calendar, was divided into 3 equal portions and each portion measured as a separate individual for nearly one month of steady counting time. The total time of 3 months spent in this investigation we hope has served to establish the true limiting accuracy of the method as now developed. The dating of the time of Hammurabi of Babylon is approached by dating the associated kings Ibi-Sin and Shu-Sin, who lived about 250 years before Hammurabi, but at a time accurately known on the Babylonian calendar. Hence a date for Ibi-Sin or Shu-Sin correspondingly fixes the date of accession of Hammurabi.	3945 ± 106

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Our No.	Sample	Age (years)
	The material used was charcoal which was excavated in Nippur by Donald E. McCown of the Oriental Institute, University of Chicago, in March, 1950, at Area TB, locus 195, level IV, floor 2. The charcoal came from a roof beam of a house of level IV, floor 2. The archaeological situation of dated tablets makes it highly probable that this building was constructed not later than Year 3 of Ibi-Sin or earlier than Year 1 of Shu-Sin (a range of 12 years). The point at issue chronologically is that while the Mesopotamian king list on the Babylonian calendar is internally reliable, it is in itself a floating chronology. Hence, for example, the dates for the accession of Hammurabi of Babylon as currently given by various authors cover a range of at least 350 years. The date is thought to be important historically, not only for strictly Mesopotamian problems but for the whole interwoven fabric of historic interrelationships of western Asia and Egypt in the early part of the second millennium B.C. The results for the 3 portions of charcoal were 4.029 ± 0.05, 4.085 ± 0.07, and 4.156 ± 0.13 counts per minute. Modern wood gives 6.68 counts per minute. The question one considers first is whether the 3 determinations agree within the counting errors, for the errors indicated above are calculated solely on the basis of the square root of the total number of counts taken, this being the standard deviation within which the true value has a two-thirds probability of being found. It certainly is a minimum error. These are the errors quoted above. It does seem that the 3 determinations do agree within their individual counting errors and that therefore the samples are uncontaminated by extraneous radioactivity. If one were certain that the errors lay principally in the counting, the mean of the 3 determinations should be taken by using the inverse square of the counting errors as weighting factors. The weighted average taken in this way is 4.060 ± 0.042, for an age of 4004 years ± 106 years, or 2052 ± 106 B.C.	

RADIOCARBON DATES—(*Continued*)

Our No.	Sample	Age (years)
	It is probably better, however, to take the arithmetical average since there are undoubtedly other errors than the counting errors. The arithmetical average is 4.090 ± 0.04. In striking this average we use the same calculation for the error used for the weighted average, since the errors quoted throughout are determined solely by the counting error. The latter mean corresponds to an age of 3945 ± 106 years, or 1993 ± 106 B.C. The error 0.04 corresponds to 80 years in itself, but an estimated 0.54% error in the half-life of radiocarbon and 0.67% in the assay of modern wood must be included. Combining, we obtain 106 years. Our conclusion is that this sample of charcoal came from wood which was cut or ceased to live about 3945 years ago. More definitely, we conclude that for 2 chances out of 3 it died between 2100 and 1887 B.C., and for 19 chances out of 20 it died between 2205 and 1781 B.C. Since the allowable range from other evidence seems to be 2375 to 1975 B.C., we conclude that the younger of the possible calendars is strongly favored by the radiocarbon dating. The odds against a result 130 years higher than the mean are about 9 to 1. Sample submitted by Donald E. McCown.	
C-818	*Hazer Merd*: Charcoal ash sample from the "Mousterian" level of the Hazer Merd cave in Sulimaniyah, Iraq. This cave was excavated by Miss Dorothy Garrod in 1928 (*Bull. Am. School Prehist. Research,* 6, 24–37 [1930]). The sample was collected by Mrs. Linda Braidwood and Bruce Howe in April, 1951, from Layer C of the exposed trench face which still showed the dark ash lines shown in Miss Garrod's published section. One of these ash lines was cleaned and the sample taken from it. Submitted by R. J. Braidwood, Oriental Institute, University of Chicago.	Older than 25,000
	G. Afghanistan	
C-815	*Mundigak* (*Afghanistan Bronze Age*): Charcoal from the prehistoric site of Mundigak in the province of Kandahar, excavated by the expedition headed by M. J. M. Casal. Came from	4720 ± 270 4439 ± 280 Av 4580 ± 200

Our No.	Sample	Age (years)
	Layer 23, which is certainly at the very beginning of the Bronze Age and possibly a little earlier. The Afghanistan chronology is unknown prior to the Hellenistic contact (Alexander the Great). The painted pottery of the basal levels is similar to the late prehistoric pottery of Iran in a general way. A date for this material would add to the general understanding of the area itself, which is otherwise undatable, and to a better grasp of Near East-Indus Valley relationships, which will probably be cleared up best by understanding the intervening regions of Baluchistan and Afghanistan. Submitted by Daniel Schlumberger, Director of the French Archaeological Expedition in Afghanistan, Kabul, Afghanistan.	
	H. Lebanon	
C-819	*Byblos*: Wood from a house in the ancient Lebanese city of Byblos. This sample comes from a level identified as "First Urban Installation" of Byblos, which is to be taken as being roughly equivalent to what is called the Early Bronze Age I in Palestine, which should be about the time of the Late Predynastic-Early Dynasty I of Egypt. The port of Byblos was probably an important trading center at that time. There is evidence of trade contact between Egypt and Syria. This material is expected to be roughly contemporaneous with Sample C-627, Hemaka, which dated 4883 ± 200. Submitted by M. A. Dunand, French Embassy, Beirut, Lebanon, via R. J. Braidwood.	5317 ± 300
III.	*United States*	
	(Principal collaborators: E. S. Deevey, Jr., R. F. Flint, J. B. Griffin, R. F. Heizer, F. Johnson, F. H. H. Roberts, and W. S. Webb)	
	B. New York State	
C-794	*Pt. Peninsula*: Charcoal from the Hunter Site on Red Lake in Jefferson Co., N. Y. This charcoal represents a residue of a crematory fire. Small bits of what appear to be burned leather shroud fragments are included. The particular grave yielding the samples submitted	4881 ± 400 3920 ± 300 Av 4400 ± 260

Our No.	Sample	Age (years)
	was one of several closely clustered on a sand ridge adjacent to a group of stone crematories. The cremated bones, charcoal, offerings, etc., had been scooped from the crematories and buried in graves ranging in depth from 30" to 74". This sample occurred in burial No. 1 at depths from about 25" to 30" from the surface, in direct association with cremated bones and grave goods, and was covered by clean, moist, undisturbed sand. There is no doubt as to its source or provenience. The total assemblage in the light of diagnostic grave goods is Pt. Peninsula 2 Focus, or classic Pt. Peninsula in New York, Ontario, and elsewhere in the northeast. (See Ritchie, W. A. *American Antiquity*, **17**, No. 2, Oct., 1951, pp. 130–136). This material was collected and submitted by W. A. Ritchie, New York State Museum, Albany.	
	C. Illinois, Indiana, Iowa, Kentucky, Ohio, and Pennsylvania	
C-759	*Kentucky Adena I*: Charcoal from an Adena mound at Dover, Mason Co., Ky., Site Ms 27. The charcoal came from a large heavily burned area near the top of the mound core. It bears the donor's sample No. 117 (V 42). Collected and submitted by W. S. Webb, University of Kentucky.	2650 ± 170
C-760	*Kentucky Adena II*: Charcoal associated with Burial No. 55 in the Adena mound at Dover, Mason Co., Ky., Site Ms 27. Burial No. 55 was a redeposited cremation near the mound base outside the skirt of the mound core, and was all covered by a heavy earth mantle. This sample bears the collector's sample No. 148 (V 38). Collected and submitted by W. S. Webb.	2260 ± 220 2078 ± 290 Av 2169 ± 175
C-801	*Glenwood*: Wood from beach deposits apparently of the Glenwood stage of glacial Lake Chicago, found 1 mile west of Dyer, Ind., NE ¼ Sec. 30, T35N, R15E, Ill. The specimens were found at a depth of 8′ in a deposit of beach ridge sand and gravel containing associated lagoonal depos-	10,661 ± 460 11,284 ± 600 Av 10,972 ± 350

Our No.	Sample	Age (years)
	its. The thickness of the deposit ranges from 6′ to 18′, and has a composition dominantly of inclined beds of sand and gravel with thin interbedded layers of silt and fine sand. Following Bretz, the deposits of the Glenwood stage are considered to be late Cary age. Collected and submitted by Leland Horberg, University of Chicago.	
	E. Louisiana, Mississippi, Missouri, Nebraska, and Texas	
C-822	*Cedar Canyon*: Charcoal from "soil" and hearth at the base of Terrace 1 fill from site Sx-107, Cedar Canyon area, Sioux Co., Neb. This charcoal was collected in 1951 by Tanner, Lueninghoener, and Schultz. It should furnish a date for the basal part of the Terrace 1 fill. The earlier Sample 469 from the same locality, which dated 2379 ± 430 and 1993 ± 190, was from the middle of the Terrace 1 fill. The exact location from which the charcoal was taken was near the center of Sec. 16, T33N, R53 W. (See Fig. 26, p. 186 and plate XV, p. 192, of "Pleistocene and Postglacial Mammals of Nebraska," by E. H. Barbour and C. B. Schultz, in: *Early Man*, Lippincott, 1937.) Submitted by C. B. Schultz, University of Nebraska Museum.	2049 ± 180
	F. Arizona, California, Colorado, and New Mexico	
C-763 C-764 C-771 C-777 C-787	*Rotten Modern Wood*: The question of alteration of the radiocarbon assay by rotting and putrefaction processes was tested by measuring these samples, submitted by Dr. Ernst Antevs, The Corral, Globe, Ariz. The modern world-wide assay on our counters is 6.68 counts per minute.	
		Assay
C-763	Dead branch from a live mesquite tree.	6.73 ± 0.2 cpm
C-764	Same dead branch as 763, but burned to charcoal.	6.39 ± 0.5
C-771	The decomposed interior of a Gambel oak tree from Lakeside, Ariz.	6.76 ± 0.17
C-777	The decayed center of a Ponderosa pine.	6.83 ± 0.12
C-787	Partly decomposed root of a Ponderosa pine.	6.73 ± 0.14

Our No.	Sample	Age (years)
C-691	*Johnson Site*: Charcoal from the Johnson Mound Site near Sacramento, Calif., Sac-6, Trench Z, Excavation Unit 8, depth 36″ to 48″. The charcoal sample actually came from a burned post embedded in the floor of a house. This site is a Late Horizon site and the period covered by this culture has been assumed to be included in the past 1500 years. Submitted by R. F. Heizer, University of California, Berkeley.	2360 ± 400 2460 ± 165 Av 2410 ± 200
C-690	*Coyote Hills*: Charcoal from a refuse midden in the Coyote Hills site near Newark, Alameda Co., Calif. This was Site Ala-328, and the midden was located in Pit 5A at the base of the culture deposits at a depth of 11′ from the surface. The culture affiliation is Middle Horizon, as defined by R. K. Beardsley in an article in *Am. Antiquity*, 1948. Submitted by R. F. Heizer.	2588 ± 200 2090 ± 220 Av 2339 ± 150
C-616	*Searles Lake*: Sample C-615 consisted of organic matter from a mud seam separating the upper and lower salt deposits of Searles Lake, Calif. It is believed that the layer of organic matter was deposited by flood waters during the recession of the glaciers. The organic matter was extracted with acetone and evaporated to a thick syrup, and the resinous material precipitated by adding distilled water. Sample C-615 dated at least 16,000 years old. The present sample was prepared in the same way, but from mud just below the lower deposit of soluble salts, and therefore, of course, should be considerably older than Sample C-615. Collected and submitted by W. A. Gale, American Potash and Chemical Corporation, Trona, Calif.	Older than 19,000
C-823	*Burnet Cave*: Charcoal from Burnet Cave, Guadalupe Mountains, Eddy Co., N. M. The sample came from the 8′ to 9′ level in the fill of this cave. The sample should aid in determining the time of the extinction of the horse, the bison, the camel, the cave deer, the 4-horned antelope, and the musk oxen in the southwestern region of the Great Plains.	7432 ± 300

Our No.	Sample	Age (years)
	The animals found in this cave are northern forms which had been driven south by the advance of the Mankato ice sheet. The cave is described in Schultz and Howard, "The Faunas of Burnet Cave, Guadalupe Mountains, New Mexico," (*Proc. Acad. Natl. Sci. Phil.* **87**, 273 [1935]). The sample was collected in 1937 by E. B. Howard, R. M. P. Burnet, and Mr. and Mrs. C. Bertrand Schultz. Submitted by C. B. Schultz.	
	H. Minnesota, Wisconsin, and Wyoming	
C-702	*Muddy Creek*: Charcoal from an ancient hearth in a camp site found near the mouth of Muddy Creek, a tributary of the Big Horn River just above Boyson Dam, Wyo. The material was found in Site 48Fr 34 at the location NO37.3x EO36.6 in the Lower Level. The site is in the Shoshoni Basin. Submitted by William Mulloy, University of Wyoming.	3540 ± 220
C-711	*Upper Muddy Creek II*: Charcoal from an ancient hearth found on Muddy Creek several miles above Site 48Fr34 (cf. Sample C-702). The number of the hearth was 35, and the site is numbered 48Fr33. Submitted by William Mulloy.	3350 ± 250
C-712	*Poison Creek*: Charcoal from a hearth found in an ancient camp site at the mouth of Poison Creek, a tributary of the Big Horn River just above Boyson Dam in Wyo. The hearth was No. 1 in Site 48Fr5. Submitted by William Mulloy.	3506 ± 220
C-715	*Wind Creek*: Charcoal from a hearth in an ancient camp site found between Wind Creek and Mule Creek near the mouth of Mule Creek, which is a tributary of the Belle Fourche River just above Keyhole Dam in Wyo. The site was 48Ck7, the hearth was No. 23, and the charcoal came from the Upper Level. Submitted by William Mulloy.	3287 ± 600
C-790	*Grasshoppers*: Grasshoppers found frozen in Grasshopper Glacier, Yellowstone National Park, Wyo. They occurred well down towards the central and bottom portion and were removed and melted out by Irving Friedman of the U.S. Geological Survey. These grasshoppers were first reported in 1898 by Kimball. They are identified as *Melanoplus mexicanus mexicanus* (Sauss.), which is widely distributed and is the common grasshopper pest. In the 1870's and 1880's this species was particularly destructive on the Great Plains and in the northern Rocky Mountain region. It was very conspicuous because of pronounced migratory habits. In recent years it has migrated very little, presumably due to changing agricultural practices. The specimens preserved in the glacier apparently are of the migratory sort. Submitted by Irving Friedman.	45 ± 150
C-795	*Horner Site*: Charcoal from the Horner Site (Sage Creek Site), Park Co., Wyo. (cf. Sample C-302, which dated 6876 ± 250 years). This sample was collected in a heavily burned area which probably represented a hearth or fireplace. It was located in Square 9L-D. The site number is 48PA29. The Horner Site located near Cody, Wyo., was a butchering site of the ancient Indians. By August 1950 about 180 bison skeletons had been recovered. Apparently the animals were slain in the fall of the year. The stone projectile points found in this site were of the Scotts Bluff and Eden types. Collected by the Princeton-Smithsonian Expedition in the summer of 1952. Submitted by Waldo R. Wedel, Smithsonian Institution.	6151 ± 500 7690 ± 850 Av 6920 ± 500
C-800	*Appleton*: Pleistocene wood from Appleton, Wis., SE ¼ Sec. 28, T21N, R17E, found below plain of glacial Lake Oshkosh, embedded in a diagonal position in clayey red Valders till. The bark still remained on some of the log. From this Professor Read of Lawrence College, who collected the material, concluded that the wood could not have been transported very far before burial. Associated deposits include proglacial lake silts and sand and gravel. It was identified as spruce (*Picea*) by L. R. Wilson, Uni-	11,471 ± 500 10,241 ± 650 Av 10,856 ± 410

RADIOCARBON DATES—(*Continued*)

Our No.	Sample	Age (years)
	versity of Massachusetts. It was found at a depth of 14′ below the plain of Lake Oshkosh. Submitted by Leland Horberg.	
	J. Alaska	
C-792	*Denbigh Flint I*: Charcoal from the Denbigh Flint Complex in the site at Iyatayet, Alaska. The layer from which the sample came was covered at the point of sampling by sterile sandy silt, a layer of peaty material, and then by silt loam containing "palae-Eskimo" and "neo-Eskimo" materials. The depth of the layer in this section was between 6½′ and 7′. The sample was scraped from the Complex in place in Section IYZ-5B near the middle of the terrace. It was collected and submitted by J. L. Giddings, University of Pennsylvania Museum.	3477 ± 310 3541 ± 315 Av 3509 ± 230
C-793	*Denbigh Flint II*: Charcoal from the Denbigh Flint Complex in the site at Iyatayet, Alaska (cf. Sample C-792). The layer at this point was covered by 4½′ of soil including Eskimo materials above the usual sterile layer. This section, labeled Section IYR, is high on the terrace slope where later cultural materials were thinly deposited. It is about 50′ from the section in which Sample C-792 was collected. Collected and submitted by J. L. Giddings.	4253 ± 290 5063 ± 340 Av 4658 ± 220
V.	*Central and South America*	
C-799	*Guatemala*: Charcoal from a log at the base of a very thick deposit of pumice laid down by glowing volcanic avalanches in Guatemala. The material was collected by Edwin Shook of the Carnegie Institution of Washington. It was found on the west edge of the highway between Patzun and Godinez, Department of Chimaltenango, above Rio Chocoyos at the 6000′ level in Chocoyos Cañon in Guatemala. The sample was from a location near the bottom of a deposit of fine to thumb-size white pumice. It was 15 cm in diameter and 8 m long. The importance of the specimen is that it serves to date the colossal glowing avalanche deposit west of Lake Atitlan. Similar deposits probably of about the same age, to judge by their degree of erosion, are widespread north of Lake Atitlan, also in the great valley around Guatemala City, and in the valley extending west from Totonicapan and in the valley north of Quetzaltenango. In brief, many of the largest valleys of Guatemala were inundated to a great depth by these avalanches during post-Pleistocene times. It is the opinion of Howel Williams that dating of the sample will serve to date, if only approximately, all the other valley fills. L. C. Stuart says the nonoccurrence of charcoal above this sample indicates that no major eruptions have occurred there since. Submitted by Howel Williams, University of California.	Older than 16,000
VII.	*Other Areas*	
C-688	*Chaney Seeds*: Wood (*Torreya nucifera*) from a canoe found about 20′ below the surface in Kemigawa in 1948. This site is 8 miles east of Tokyo. The interest in this wooden canoe stems largely from the fact that Dr. Ichiro Ohga found 3 viable lotus seeds (cf. Sample C-629) associated with the remains of the canoe. In addition to the viable seeds he found many lotus receptacles. Ohga's discoveries were made in April, 1951. The samples were submitted by R. W. Chaney, University of California, Berkeley.	3052 ± 200 3277 ± 360 Av 3075 ± 180
C-661	*Barotseland*: Charcoal from newly developed pit in the Lonze Forest, Barotseland, taken at a depth of 10′ to 10′ 4″ at the site from which Sample C-660 was taken. Sample C-660 dated 3585 ± 260. Collected by Desmond Clark, Livingstone, Northern Rhodesia. Submitted by H. L. Movius, Jr., Harvard University.	3210 ± 250 4300 ± 500 Av 3500 ± 225

References

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3. ———. *Radiocarbon Dating.* Chicago, Ill.: Univ. of Chicago Press, 1952.
4. ———. *Science* **116**, 673 (1952).