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Radiocarbon

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ARIZONA RADIOCARBON DATES VII*

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INTRODUCTION

The C^{14} measurements reported here were made in this laboratory between November 15, 1965 and June 15, 1966. Sample descriptions are classified as follows:

I. Geochemical Samples
II. Geologic-Paleoclimatic Samples
III. Early Man-Alluvial Stratigraphy Samples
IV. Archaeologic Samples

The use of CO_2 and the treatment of samples remains the same as reported previously (Arizona IV, V and VI). It has been found that some carbonate samples blacken upon pyrolysis and that a carbon slime can be recovered by acid decalcification. The Libby half-life of 5568 yr is still used in computing dates, and all statistical counting errors are reported as one sigma.

The standard CO_2 sample prepared from NBS oxalic acid used for results reported in Arizona IV and V was close to the average δC^{13} value for wet combustion of oxalic acid as determined by Craig (1961). Consequently, some Δ values reported in those date lists were normalized by use of Craig's average value of δC^{13}. A new standard CO_2 has since been prepared and this standard was used from January 1, 1965 to June 15, 1966. The average of four δC^{13} analyses for aliquots extracted at different times during that period is $-25.5‰$ ($\pm 0.5‰$ at the 95% confidence level). A number of samples reported in Arizona VI were not corrected for the fractionation of this standard. The corrected values are given in the Appendix. The correction for samples reported as B.P. dates is +90 yr. Samples reported as δC^{14} were decreased by $-12‰$, and samples reported as % modern were reduced by a multiplication factor equal to 0.988.

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has cooperated with us in our study of radiocarbon in aquatic plants. Austin Long has continued to cooperate in our study of the C^{14} content dendrochronologically-dated tree rings. The C^{12}/C^{13} measurements were made by A. Long. Johnna Johnston and Ralph Staudenmayer assisted in laboratory analyses.

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SAMPLE DESCRIPTIONS

I. GEOCHEMICAL SAMPLES

Las Vegas Valley series, Nevada

A-555. Fitzpatrick well water — **16,540 ± 1200 / 14,590 B.C.**

Dissolved carbonates from depth of 105 ft in windmill-operated well on Fitzpatrick Ranch, Las Vegas Valley, Clark County, Nevada (36° 18′ 55″ N Lat, 115° 15′ 15″ W Long). Coll. 1964 and subm. by C. V. Haynes, Jr. and P. J. Mehringer, Jr., Univ. of Arizona. *Comment:* equivalent to 12.8 ± 1.3% modern.

A-558. Corn Creek Springs water — **15,790 ± 450 / 13,840 B.C.**

Dissolved carbonates from spring pool on top of small mound on Corn Creek fault ca. 2000 ft SE of Desert Game Range Headquaters, Clark County, Nevada (36° 26′ 10″ N Lat, 115° 21′ 4″ W Long). Coll. 1964 by P. J. Mehringer, Jr. and W. G. Bradley, Univ. of Southern Nevada; subm. by C. V. Haynes, Jr. *Comment:* equivalent to 14.1 ± 0.7% modern.

A-651. Rainbow Canyon water — **1910 ± 120 / A.D. 40**

Dissolved carbonates from well water 35 to 100 ft below floor of tributary to Kyle Canyon, Spring Mountains, Clark County, Nevada (36° 16′ N Lat, 115° 37′ W Long). Coll. 1965 and subm. by C. V. Haynes, Jr. and R. Shutler, Jr., Nevada State Mus. *Comment:* equivalent to 79.6 ± 1.2% modern.

A-648. Gilcrease well water — **12,290 ± 700 / 10,340 B.C.**

Dissolved carbonates from 612-ft deep well (S-19-60), tapping several aquifers between 325 and 530 ft depth, on Gilcrease Ranch, Clark County, Nevada (36° 18′ 20″ N Lat, 115° 16′ 04″ W Long). Coll. 1965

and subm. by C. V. Haynes, Jr. and R. Shutler, Jr. *Comment:* equivalent to 21.8 ± 1.8% modern.

	δC^{14},‰	δC^{13},‰	Δ,‰
A-539. Fossil Creek, Arizona	**−767**	**−37.2**	**−761**

Modern aquatic plant, *Potamogeton foliosus* Rafinesque var. *marcellus* Fernald, from main stream near first spring above diversion dam that diverts water to flume, Fossil Creek, Yavapai County, Arizona (34° 24′ 25″ N Lat, 111° 37′ 13″ W Long). Plant grows completely submerged in water with its leaves and stems trailing downstream. Coll. July 16, 1963 and subm. by G. A. Cole, Arizona State Univ., Tempe. *Comment:* water contains 14.0 mg/L of silica and about 500 mg/L of total dissolved carbonates (Cole, 1963). Apparently the plant is obtaining most of its carbon from the water, which is strikingly deficient in C^{14}. The unusual C^{13} content has not yet been investigated. See Montezuma Well series (Arizona V, VI) for similar results on aquatic materials. Δ value is equivalent to an age of 11,400 B.P.

	δC^{14},‰	δC^{13},‰	Δ,‰
A-663. Tucson, Arizona	**763 ± 8**	**−23.0**	**759 ± 8**

Leaves from mulberry tree growing in residential area of Tucson, Arizona (32° 14′ N Lat, 110° 53′ W Long). Coll. May 5, 1965 and subm. by P. E. Damon. *Comment:* leaves are from same tree as L-253 (Lamont VIII) coll. April 4, 1959 (Δ = 187 ± 8‰), A-329 (Arizona IV) coll. May 20, 1962 (Δ = 303 ± 6‰) and A-446 (Arizona V) coll. April 7, 1963 (Δ = 508 ± 9‰).

Tucson Basin series, Arizona

CO_2 from ground and surface waters in Tucson Basin, Arizona (32° 15′ N Lat, 110° 55′ W Long). Coll. 1965 and subm. by Richmond Bennett to determine ground water velocities, residence time and relative contributions of recharge. C^{13} data by Roland Kologrivov, Isotopes, Inc., Westwood, New Jersey.

	Well No. or Location	δC^{13},‰	% modern
A-641.	Chem Lab tap	−9.0	60.9 ± 2.0
A-646.	B-8 (NS-12)	−11.0	46.4 ± 2.0
A-654.	B-11	−13.1	91.7 ± 2.1
A-655.	SS-16	−7.5	62.9 ± 2.3
A-657.	4000 Campbell Avenue	−14.1	99.2 ± 1.0
A-660.	C-68	−9.6	42.6 ± 1.9
A-661.	SC-7	−11.4	61.1 ± 1.3
A-662.	SC-13	−14.7	100.4 ± 1.1
A-664.	D-24	.....	70.1 ± 2.4
A-665.	TG&E #4	−11.4	48.9 ± 2.1
A-666.	TG&E #5	−8.0	14.8 ± 1.8
A-667.	C-7 (NS-21)	−12.0	60.8 ± 1.5
A-670.	A-31	−12.1	66.0 ± 2.5

	Well No. or Location	δC^{13},‰	% modern
A-671.	C-58	−12.7	77.7 ± 3.3
A-672.	D-7 P-8)	−11.6	74.5 ± 2.9
A-673.	B-50	−13.3	99.6 ± 3.5
A-674.	C-29	−11.5	74.2 ± 1.6
A-675.	B-54 (ES-2)	−11.0	88.7 ± 5.0
A-676.	Sabino Canyon #1	−13.6	164.2 ± 9.0
A-681.	B-76	−9.7	63.9 ± 3.0
A-682.	C-15	−10.0	58.2 ± 2.7
A-684.	D-25	−9.6	75.8 ± 2.5
A-686.	B3 (NS-3)	−9.0	97.2 ± 4.4
A-690.	U of A well	−11.4	69.4 ± 1.7
A-698.	Flowing Wells & Ft. Lowell Rd.	−10.7	90.7 ± 4.7
A-700.	Tucson Arroyo at Cherry Avenue	−12.3	80.5 ± 2.3
A-705.	Marshall Gulch	−15.9	142.6 ± 4.0

Christmas Mine series, Arizona

CO_2 from mine water, Christmas Mine, Winkelman, Arizona (33° 10′ N Lat, 110° 45′ W Long). Coll. 1964 and subm. by Richmond Bennett to determine relative ages of different water sources in mine. C^{13} data by Austin Long, Smithsonian Inst., Washington, D. C.

	Location in mine	δC^{13},‰	% modern
A-565.	67¾	−8.10	24.0 ± 2.0
A-566.	165	−8.09	19.3 ± 0.8
A-567.	DH-82	−8.34	24.2 ± 1.5

II. GEOLOGIC-PALEOCLIMATIC SAMPLES

A-472. Caliche, organic fraction **17,900 ± 1000 / 15,950 B.C.**

Wisconsin(?) caliche channeled into Illinoian(?) fan on Mount Lemmon-Oracle road at 4650 ft elev, Pinal County, Arizona (32° 30′ N Lat, 110° 38′ W Long). Coll. June 1963 and subm. by P. E. Damon and M. Melton. *Comment:* care was taken to avoid limestone fragments. Date confirms Wisconsin age for caliche.

A-473. Caliche carbonate **22,000 ± 600 / 20,050 B.C.**

Caliche cementing Illinoian(?) conglomerate from Catalina Wash on Mount Lemmon-Oracle road at 4400 ft elev, Pinal County, Arizona (32° 32′ N Lat, 110° 41′ W Long). Coll. June 1963 and subm. by P. E. Damon and M. Melton. *Comment:* conglomerate may be Illinoian but cementation is Wisconsin.

A-588. Potato Lake, Arizona **9900 ± 210 / 7950 B.C.**

Organic material from sediment core, Potato Lake, Coconino County, Arizona (34° 26′ N Lat, 111° 20′ W Long). 94 to 114 cm depth

in core. Coll. 1963 by G. A. Cole and Mel Whiteside; subm. by Mel Whiteside, Arizona State Univ., Tempe. *Comment:* 142 to 172 cm interval dated 14,400 ± 300 B.P. (A-513, Arizona VI, p. 11). Date supports interpretation of palynological studies that a transitional zone between the two dated intervals represents terminal Pluvial time.

Murray Springs Pollen Profile I series, Arizona

Samples coll. to provide geochronological control for renewed pollen investigations at location of Martin's pollen profile (Martin, 1963, p. 39-43), Murray Springs, Arizona (31° 34′ 28″ N Lat, 110° 10′ 7″ W Long). Coll. 1965-1966 and subm. by P. J. Mehringer, Univ. of Arizona. *Comment:* the only dates on residue and humate fractions from the same sample are discordant. Organic residue date is likely minimum because of contamination by younger vegetable matter not removed by washing and decantation. Humate dates are commonly too young because of contamination by later soils but can be too old if contaminating humic acids were carried by ground water.

1550 ± *90*
A.D. 400

A-617. Charcoal

Charcoal from hearth 1.55 m below surface, under two Cochise milling stones, and between pollen samples 14 and 15.

4230 ± 290
2280 B.C.

A-697B:1. Humates

Silty clay containing decomposed plant remains washed to decant rootlets and pretreated to yield organic residue and humate fractions. Residue (A-697A) yielded insufficient CO_2. Sample is equivalent to pollen sample 23 at 2.4 m below surface in unit G_{2b}.

4340 ± 250
2390 B.C.

A-696A. Organic residue

5890 ± 270
3940 B.C.

A-696B. Humates

Silty clay containing decomposed plant remains washed and treated to yield organic residue and humate fractions. Sample is equivalent to pollen sample 26 at 2.7 m below surface in unit G_{2b}.

8270 ± 180
6329 B.C.

A-580B. Humates

Silty peat occurring as discrete rounded lumps in channel gravel fill at base of unit G_{2a}. These "peat balls" are redeposited and therefore should yield maximum possible age for deposition of unit G_{2a}.

6990 ± 350
5040 B.C.

A-728. Osgood Swamp, California

Peat from pit on edge of Osgood Swamp, California (38° 50′ 45″ N Lat, 120° 02′ 30″ W Long). From 1 cm below volcanic ash and between

A-544 (2830 ± 200 B.P.) and A-549 (9900 ± 800 B.P.) (Arizona VI, p. 10). Coll. 1965 and subm. by David P. Adam, Univ. of Arizona.

A-787C. Willcox Playa carbonate, Arizona — **13,200 ± 300 / 11,250 B.C.**

CO_2 from soft carbonate layer exposed 2 ft below surface in commercial gravel pit N of Willcox Playa, Arizona (32° 17′ N Lat, 109° 54′ W Long). Coll. 1966 and subm. by A. Long.

A-739. Zuni Salt Lake, New Mexico — **23,000 ± 1500 / 21,050 B.C.**

Diatomaceous marl containing *Chara* stems from NE flank of W cinder cone, ca. 50 ft above present lake level, Zuni Salt Lake, Catron County, New Mexico (34° 27′ N Lat, 108° 46′ W Long). Marl zone is ca. 2.5 ft thick. Coll. June 1965 and subm. by J. P. Bradbury, Univ. of New Mexico, Albuquerque. *Comment:* Zuni Salt Lake contains a high chloride water which is precipitating halite at present. Sediments are indicative of substantially higher lake level than at present. C^{14} date is consistent with higher lake levels during Wisconsin pluvial period.

Karonga District series, Malawi, Africa

Under National Science Foundation sponsorship archaeological, paleontological, and geological investigations were conducted in northwestern Malawi in order to determine paleoecology of area in relation to Lake Nyasa history. Coll. 1965 by C. V. Haynes, Jr. and J. E. Mawby; subm. by J. D. Clark, Univ. of California, Berkeley.

A-701A. Chaminade Locality 1C — **10,400 ± 300 / 8450 B.C.**

Charcoal from displaced, red, arkosic soil overlying Middle Stone Age artifacts at Ch-1C (9° 56′ 30″ S Lat, 33° 52′ 40″ E Long).

A-702. Mwesia Locality 2 — **100.9 ± 1.0% modern / A.D. 1950**

Charred beans from hearth buried 16 in. below surface of 6-ft terrace fill of Mwesia River at Ms-2 (9° 56′ 55″ S Lat, 35° 50′ 20″ E Long). *Comment:* terrace had reached 5-ft level within Atomic age.

A-703. Mwanapasapa Locality 2 — **150 ± 90 / A.D. 1800**

Charred log 3 ft below surface of 12-ft terrace of Rukuru River at Mwanapasapa Village, Locality Mwm-2 (9° 56′ 55″ S Lat, 33° 47′ 55″ E Long). *Comment:* floodplain of Rukuru River stood at this level in historic time.

A-704. Mkungwe Locality 1 — **3300 ± 140 / 1350 B.C.**

Charcoal flecks immediately underlying volcanic ash exposed near middle of compound fill of 22-ft terrace of Mkungwe River at Locality Mk-1 (9° 56′ 45″ S Lat, 33° 50′ 15″ E Long). *Comment:* volcanic ash fell

on an early 12-ft level of terrace between Late Stone Age and Early Iron Age.

11,000 ± 300
9050 B.C.

A-782B. Ngara Court

Humates extracted from carbonized wood entrapped in pumiceous, agglomeratic tuff exposed at Ngara Court on right bank of Songwe River, northern Malawi (9° 36′ S Lat, 33° 48′ E Long). *Comment:* carbon residue (A-782A) was insufficient for analysis. If humates contain modern component, date is minimum for eruption of tuff.

III. EARLY MAN-ALLUVIAL STRATIGRAPHY SAMPLES

8980 ± 270
7030 B.C.

A-195. Naco Site No. 1, Arizona

Mammoth vertebra from original Naco archaeological site (Haury, Antevs, and Lance, 1953), in left bank of Greenbush Draw, Arizona (31° 20′ 59″ N Lat, 109° 57′ 23″ W Long). Bone organic matter recovered by pyrolysis method of May (1955). Coll. 1952 and subm. by J. F. Lance, Univ. of Arizona. *Comment:* date is inconsistent with both archaeological and geological estimates. Because sample did not contain collagen, contamination by younger humic acids is suspected.

3320 ± 220
1370 B.C.

A-591. Naco Site No. 2, Arizona

CO_2 from secondary carbonates encrusting mammoth bone and as irregular nodules in clayey sand exposed in right bank of Greenbush Draw, Naco, Cochise County, Arizona (31° 20′ 45″ N Lat, 109° 57′ 05″ W Long). Coll. 1964 and subm. by C. V. Haynes, Jr. and A. Johnson, Univ. of Arizona.

6420 ± 210
4470 B.C.

A-507B. Bates Creek, Wyoming

Humates extracted from carbonaceous silt alluvium of left bank of Bates Creek, Natrona County, Wyoming (42° 31′ 30″ N Lat, 106° 15′ 30″ W Long). Coll. 1963 and subm. by Denis Stanford, Univ. of New Mexico. *Comment:* geological estimate of age of unit containing non-diagnostic flint artifacts is ca. 10,000 B.P. Discrepancy is probably due to contamination by younger humic acids. Base-insoluble fraction (A-507A) was insufficient for C^{14} dating.

6370 ± 160
4420 B.C.

A-536. Blackwater Draw, Clovis, New Mexico

Mammoth rib from the type Clovis archaeological site, Roosevelt County, New Mexico (34° 17′ N Lat, 103° 19′ W Long). Bone organic matter recovered by pyrolysis method of May (1955). Coll. 1963 and subm. by C. V. Haynes. *Comment:* date is inconsistent with archaeological, geological, and other radiocarbon data. Because sample did not contain collagen, contamination by younger organic matter is evident.

Lehner Ranch series, Arizona

Lehner site, San Pedro Valley (31° 25′ 23″ N Lat, 110° 06′ 48″ W Long), Cochise County, Arizona, Ariz:EE:12:1, is elephant-kill site in which Clovis fluted points were found in association with charcoal, bones of nine immature mammoths, and remains of horse, bison and tapir (Haury *et al.*, 1959; Lance, 1959; Antevs, 1959). Pollen investigations are being conducted by P. J. Mehringer, Jr. and geochronology and geochemistry of sediments are being investigated by C. V. Haynes, Jr. Coll. 1965-1966 and subm. by C. V. Haynes and P. J. Mehringer.

A-571. Caliche **> 33,400**

Caliche nodules in red mudstone of unit A as exposed by Bulldozer Trench A. *Comment:* date is in accord with pre-Wisconsin age estimate.

A-715A. Organic residue **7390 ± 400**
5440 B.C.

A-715B. Humates, first extraction **7990 ± 500**
6040 B.C.

A-715BBB. Humates, third extraction **7890 ± 420**
5940 B.C.

A-715C. CO_2 from secondary carbonates **7070 ± 160**
5120 B.C.

Remnant of a possible A-horizon of truncated paleosol at top of unit F_3 exposed in E wall of Bulldozer Trench B.

A-746A. Organic residue **11,000 ± 1100**
9050 B.C.

A-746B. Humates **10,100 ± 700**
8150 B.C.

A-746C. CO_2 from secondary carbonates **5960 ± 200**
4010 B.C.

Azonal A-horizon of black wet-meadow paleosol of unit F_2 (Layer K of Antevs, 1959) exposed in E wall of Bulldozer Trench B.

A-632B. Calcareous sinter carbonate **11,100 ± 400**
9150 B.C.

Spring-deposited calcareous sinter was pyrolyzed and treated with HCl to yield CO_2 from carbonate (A-632B) and from carbon residue (A-632A). The latter dated 7900 ± 600 (Arizona VI, p. 12) and is possibly due to contamination by absorbed humic acids.

A-634. CO_2 from secondary carbonates **7580 ± 220**
5630 B.C.

Secondary calcium carbonate in clayey sand of unit G_1 exposed in E wall of middle fork of Lehner Ranch Arroyo.

Lindenmeier series, Colorado

Charcoal samples were re-collected from post-Folsom channel fill (unit F of Haynes and Agogino, 1960) to check earlier solid-carbon date of 5020 ± 300 B.P. (Libby, 1955, p. 133, C-451) and to determine rate of filling. Coll. 1965 and subm. by C. V. Haynes, Jr. and P. J. Mehringer, Jr.

7940 ± 250
5990 B.C.

A-711. Charcoal

Dispersed charcoal lumps in brown silt (eolian?) ca. 10 ft below surface in right bank of tributary arroyo at Locality 9; equivalent to pollen sample 9.

9440 ± 780
7490 B.C.

A-749AB. Charcoal

Dispersed charcoal lumps in brown sand ca. 3 ft above floor of tributary arroyo at Locality 6-7 (approx. location of C-451). CO_2 from charcoal and extracted humate fractions were insufficient for separate counts. *Comment:* the new dates suggest that solid-carbon date (C-451) is erroneous and that this channel fill is not of Altithermal age as previously suspected.

8590 ± 350
6640 B.C.

A-707. Hell Gap, Wyoming

Charcoal from Alberta cultural level, squares Q-15 and 17, T-9, and V-11, Locality 1, Hell Gap site, Wyoming (42° 24′ 31″ N Lat, 104° 38′ 15″ W Long). Coll. 1964 by P. Newcomer, D. Freidel and E. Werner; subm. by H. T. Irwin, Peabody Mus., Harvard Univ.

300 ± 90
A.D. 1650

A-781. Site BB:10:17, Pima County, Arizona

Charcoal from exposed hearth at Cochise surface site, Pima County, Arizona (32° 26′ N Lat, 110° 36′ W Long). Coll. 1966 and subm. by L. Agenbroad and J. Ayres, Univ. of Arizona. *Comment:* date is inconsistent with pre-ceramic artifacts suggesting that fireplace represents a minor historic occupation of site.

San Dieguito series, California

The C. W. Harris site (33° 02′ 30″ N Lat, 117° 08′ 55″ W Long), San Diego County, California is the type site of San Dieguito pre-ceramic complex (Rogers, 1939). Recent excavations by C. N. Warren and D. L. True (1961) and Paul Ezell and James Moriarty are more precisely defining the stratigraphic and archaeological position of San Dieguito complex in relation to California archaeology. Subm. by C. N. Warren, Idaho State Univ.

9030 ± 350
7080 B.C.

A-722A. Carbonaceous residue (No. 1)

Insoluble carbonaceous matter remaining after standard pretreatment may be fine charcoal because humic acid fraction (A-722B) was

only 0.01% of sample and insufficient for analysis. Coll. 1965 by P. J. Mehringer and C. V. Haynes. *Comment:* sample was 25 cm below erosional contact and predates San Dieguito artifacts which were immediately below contact.

A-723. Charcoal (No. 2) **7620 ± 360 / 5670 B.C.**

Fine-grained charcoal from brown sand alluvium and 20 cm above erosional contact. Postdates San Dieguito occupation of site. Coll. 1965 by T. Tearne and S. von Till, Idaho State Univ.

A-724. Charcoal(?) (No. 3) **8490 ± 400 / 6540 B.C.**

A-725. Charcoal(?) (No. 4) **8490 ± 400 / 6540 B.C.**

Charcoal lumps from alluvial sand and gravel unit were ca. 60% soluble in 2% NaOH which suggests that material dated was either partially pyrolyzed wood or was unpyrolyzed but partially decayed. Sample No. 3 was disseminated throughout alluvial sand and gravel. Sample No. 4 was confined to single sand lens. Coll. 1965 by C. Hogge and Y. Kotani, Idaho State Univ. *Comment:* both samples date San Dieguito artifact-bearing unit.

San Jon series, New Mexico

Three earth samples from locality of pollen profiles SJ-I and SJ-III, San Jon site, New Mexico (34° 50′ N Lat, 103° 00′ W Long). Coll. 1965 and subm. by Fred Wendorf, Southern Methodist Univ. *Comment:* samples are listed in stratigraphic order from top to bottom of section. Because no checks could be made between organic residue and humic acid fractions of same sample, all three dates are considered questionable.

A-713B. Soil humates **7300 ± 800 / 5350 B.C.**

Humates extracted from earth at top of unit 3 of San Jon formation ca. 1 ft above location of pollen sample SJ-I-28. Organic residue (A-713A) was insufficient for analysis.

A-740A. Organic residue **9700 ± 650 / 7750 B.C.**

Organic residue from earth at location of pollen sample SJ-I-15 ca. 10 ft above base of unit 3 San Jon formation. Soil humates (A-740B) were insufficient for analysis.

A-712A. Organic residue **2670 ± 380 / 720 B.C.**

Organic residue from earth at location of pollen sample SJ-I-8 30 in. above base of unit 3 of San Jon formation. Soil humates (A-712B) were insufficient for analysis.

Murray Springs Mammoth No. 1, Arizona

A-805A.	**Charcoal**		**11,150 ± 450** **9200 B.C.**
A-805B.	**Humates**		**11,300 ±500** **9350 B.C.**
		Average:	**11,230 ± 340** **9280 B.C.**

Charcoal from top of unit F_1 at Murray Springs Locality No. 1 (31° 34′ 15″ N Lat, 110° 10′ 38″ W Long), Cochise County, Arizona. Unit F_1 contained artifacts associated with bones of mammoth, bison, horse, and camel. Coll. 1966 and subm. by C. V. Haynes, Jr., D. Libby, L. Agenbroad and G. Kelso, Univ. of Arizona. *Comment:* date confirms correlation of Murray Springs stratigraphy with that at Lehner site 12 mi SE of Murray Springs.

IV. ARCHAEOLOGIC SAMPLES

A-606. Meinarti village site **1960 ± 130**
10 B.C.

Charred specimen of timber from stratigraphic level 18 which was incorporated in foundations of what appears to have been a temple, one of oldest buildings in village site of Meinarti (21° 52′ N Lat, 31° 16′ E Long) in Wadi Halfa district of Sudan. Coll. 1964 and subm. by W. Y. Adams, UNESCO Programme Specialist, P. O. Box 131, Wadi Halfa, Sudan. Village was occupied from late Meroitic period (first centuries A.D.) to end of Christian Nubian period, ca. A.D. 1400. The Meroitic temple(?) was deliberately destroyed by burning and razing one or two centuries after it was built. C^{14} date therefore serves to fix time of earliest settlement of village.

APPENDIX

Corrections to some Arizona VI radiocarbon dates for fractionation during preparation of standard:

Sample No.	Date	δC^{14},‰	δC^{13},‰	Δ,‰	% modern
A-497	1880±180 A.D. 70				
A-498	5830±230 3880 B.C.				
A-499	10,090±200 8140 B.C.				
A-500	10,240±300 8290 B.C.				
A-501	8690±380 6440 B.C.				
A-502	10,290±500 8340 B.C.				

Sample No.	Date	δC^{14} ‰	δC^{13} ‰	Δ ‰	% modern
A-503	10,930 ± 200 8980 B.C.				
A-504	10,690 ± 500 8740 B.C.				
A-512	8560 ± 350 6610 B.C.				
A-518	18,700 ± 1900 16,750 B.C.				
A-519	4050 ± 30 2100 B.C.				
A-520	3810 ± 80 1860 B.C.				
A-521	4110 ± 100 2160 B.C.				
A-525B	11,170 ± 300 9220 B.C.				
A-526	24,700 ± 1400 22,750 B.C.				
A-538		−852			
A-540		+9	−21.8	+2	
A-541		+1	−21.9	−5	
A-544	2920 ± 200 970 B.C.				
A-545	9990 ± 800 8040 B.C.				
A-548	990 ± 240 A.D. 960				
A-549	6490 ± 500 4540 B.C.				
A-550	1370 ± 120 A.D. 580				
A-554	4190 ± 800 2240 B.C.				
A-563	3430 ± 200 1480 B.C.				
A-569	4290 ± 90 2340 B.C.				
A-572	> 30,100				
A-573	15,540 ± 700 13,590 B.C.				
A-574	> 28,900				
A-575	10,340 ± 550 8390 B.C.				
A-576	7090 ± 300 5140 B.C.				
A-581	1190 ± 300 A.D. 760				

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Sample No.	Date	δC^{14},‰	δC^{13},‰	Δ,‰	% modern
A-583	760±160 A.D. 1190				
A-586		+81	—19.7	+69	
A-593	110±140 A.D. 1840				
A-595A					109
A-595B					116
A-605		+183	—22.0	+176	
A-608	410±250 A.D. 1540				
A-609	803±115 A.D. 1120				
A-610	390±90 A.D. 1560				
A-611	1550±120 A.D. 490				
A-612	560±90 A.D. 1390				
A-615A	3530±100 1580 B.C.				
A-615B	3140±250 1190 B.C.				
A-632A	7990±600 6040 B.C.				
A-633	2640±500 690 B.C.				
A-635	17,850±700 15,900 B.C.				
A-636A	17,100±4000 15,150 B.C.				
A-636B	15,100±500 13,150 B.C.				
A-637		+69	—23.7	+66	
A-638		+72	—23.0	+68	
A-639		+20	—21.2	+10	
A-669B	15,860±440 13,910 B.C.				
A-692					34.4
A-693					7.7
A-699*	1680±150 A.D. 270				
A-706	2990±140 1040 B.C.				

* Erroneously reported as A-669 in Arizona VI.

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