

UNIVERSITY OF TEXAS RADIOCARBON DATES V

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This list reports routine measurements made at this laboratory since the preparation of Texas IV. Samples numbered through Tx-309 were counted under the supervision of Pearson, who left the laboratory early in 1966. Valastro, Associate Director since August, 1966, is responsible for samples beginning with Tx-310. Laboratory administration and sample screening have been handled by Davis. M. A. Tamers, formerly Director, resigned in 1966.

Ages are calculated using a C^{14} half-life of 5568 yr with 1950 the reference year. Modern standard used for all samples is 95 percent of NBS oxalic acid. The deviations reported are based on the counting statistics of the sample, background, and modern, and are $\pm 1\sigma$ except that when the sample count approaches either the modern or the background, 2σ limits are reported.

The laboratory continues to use liquid-scintillation counting of benzene. Techniques of preparation (using Li_2C_2 and vanadium activated catalyst) and of counting are the same as described in Texas IV.

Benzene syntheses were carried out by R. B. Wiggins. We acknowledge the assistance of Jo Anne N. Wiggins, Natalie M. Hayes, Leo A. Andron II, and Kathy L. Corbin.

I. GEOLOGIC SAMPLES

A. Texas

St. Joseph's Island series

Samples from N end St. Joseph's Island, Aransas Co., Texas, from subaerial hurricane washover fan on bay side of this barrier island, taken to determine date of beginning, and rate of progradation, of fan and age of associated features. Coll. summer 1965 and subm. by P. B. Andrews, Dept. Geol., Univ. of Texas. Shell identifications and comments by P. B. A.

Tx-281. St. Joseph's BG-2c **450 ± 90**
A.D. 1500

Infaunal mollusk shells including genera *Phacoides*, *Taegelus*, and *Chione* from 50 yd inland from bay edge of fan ($28^{\circ} 06' N$ Lat, $96^{\circ} 54.5' W$ Long), 35 in. beneath present surface. $\delta C^{14} = -55 \pm 10 \text{‰}$.

Tx-278. St. Joseph's HE-2f **1440 ± 100**
A.D. 510

Same shell assemblage as Tx-281 from $\frac{3}{4}$ mi inland from bay edge

* Present address: U. S. Geol. Survey, Albany, New York.

of fan (28° 05' N Lat, 96° 53.5' W Long), 31 in. below present ground surface. $\delta C^{14} = -164 \pm 11 \text{‰}$.

Tx-282. St. Joseph's GK-1f

1660 ± 110

A.D. 290

Same shell assemblage as Tx-281 from 1½ mi inland from bay edge of fan (28° 05' N Lat, 96° 52.5' W Long), 40 in. below present ground surface. $\delta C^{14} = -187 \pm 12 \text{‰}$.

Comment on Tx-281, -278, -282: all from top of *in situ* bay-margin sediments, immediately overlain by base of fan. They suggest progradation began ca. 1700 B.P., probably was rapid initially, and had virtually ceased by 400 to 500 B.P.

Tx-280. St. Joseph's GK-1e

1710 ± 80

A.D. 240

Mixture of transported Gulf and bay-margin mollusk shells including *Donax*, *Mellita*, *Anadara*, *Crassostrea*, *Dinocardium*, *Taegelus*, and *Mulinia*. From 1½ mi inland from bay edge of fan (28° 05' N Lat, 96° 52.5' W Long), 30 in. below present surface. $\delta C^{14} = -192 \pm 9 \text{‰}$. *Comment:* from washover-sand unit at base of fan overlying *in situ* bay margin sediments (*i.e.*, 10 in. above Tx-282). Identity in age of *in situ* (Tx-282) and transported (Tx-280) shells confirms that progradation began ca. 1700 B.P.

Tx-279. St. Joseph's IJ-5d

1265 ± 110

A.D. 685

Mixture of transported Gulf mollusk shells including *Donax*, *Mellita*, and *Dinocardium*, from ¾ mi E of Cedar Bayou (28° 06' N Lat, 96° 51' W Long), 14 in. beneath present surface. $\delta C^{14} = -146 \pm 11 \text{‰}$. *Comment:* from distinctive washover-sand unit confined to N part of fan. Date confirms that unit is stratigraphically above unit from which Tx-280 was taken.

Tx-283. St. Joseph's JA-3f

2410 ± 90

460 B.C.

Mollusk shells including *Crassostrea* (dominant), *Aequipecten*, *Bra-chiodontes*, *Chione*, and *Cerithium* from brush-covered mound ½ mi inland from bay edge (28° 07' N Lat, 96° 52.5' W Long), 76 in. beneath surface. Shells reworked from Aransas and Mesquite Bays into a storm ridge. $\delta C^{14} = -260 \pm 8 \text{‰}$. *Comment:* mound lies in middle of tidal delta, which grades into washover fan. Date shows tidal delta probably antedates fan and supports theory that the two features are not genetically related.

Tx-277. Deweyville Terrace, Dolen

20,200 ± 1000

18,250 B.C.

Wood fragments from reject pile of gravel washer at Texas Const. Material Co. pit near Dolen, Liberty County, Texas (30° 25' N Lat, 94° 53' W Long); reported original depth of samples was 15 to 25 ft below surface of Deweyville terrace. Other samples from terraces identified as

Deweyville are Tx-266, $25,700 \pm 800$; Tx-267, $19,900 \pm 500$; Tx-268, $13,250 \pm 250$ (Texas IV). Coll. 1965 and subm. by Saul Aronow, Dept. Geol., Lamar State College, Beaumont, Texas, via P. T. Flawn, Bur. of Economic Geology, Univ. of Texas, Austin. $\delta C^{14} = -919 \pm 10 \text{‰}$. *Comment* (S.A.): this and other dates are pre-Two Creeks, suggesting terraces are late Pleistocene rather than early Recent.

B. Submarine Core Samples, California

Dates from 4 core samples from Santa Cruz submarine canyon, near Gull and Anacapa Is., Santa Barbara County, California. Samples are listed in order of increasing depth below top of core. Coll. 1964 and subm. by M. Felsher, Dept. Geol., Univ. of Texas, Austin (present address: Dept. Geol., Hamilton College, McMaster Univ., Hamilton, Ontario). Comments by M. F.

Santa Cruz Core 9273 series

Bulk CaCO_3 (except where noted) from core sample 9273, taken from fan at mouth of Santa Cruz submarine canyon, 5.1 naut mi, 164° true from Gull I, Sta. Cruz I ($33^\circ 52' 08''$ N Lat, $119^\circ 48' 00''$ W Long), in 750 fathoms water.

Tx-292. Core 9273, 45.8-71.2 cm	3480 ± 150
$\delta C^{14} = -352 \pm 12 \text{‰}$	1530 B.C.
Tx-293. Core 9273, 135.4-155.7 cm	9130 ± 160
$\delta C^{14} = -679 \pm 6 \text{‰}$	7180 B.C.
Tx-294. Core 9273, 255.4-273.2 cm	$12,650 \pm 280$
$\delta C^{14} = -793 \pm 7 \text{‰}$	10,600 B.C.
Tx-295. Core 9273, 409.9-431.5 cm (org)	$19,400 \pm 750$
Bulk organic; $\delta C^{14} = -911 \pm 8 \text{‰}$	17,450 B.C.
Tx-296. Core 9273, 409.9-431.5 cm	$26,600 \pm 1800$
$\delta C^{14} = -963 \pm 8 \text{‰}$	24,650 B.C.
Tx-297. Core 9273, 431.5-448.0 cm (org)	$22,000 \pm 1100$
Bulk organic; $\delta C^{14} = -935 \pm 8 \text{‰}$	20,050 B.C.

Comment on Tx-292 through Tx-297 (core sample 9273): coupled dates Tx-292 and Tx-293 show rate of deposition of 15.4 cm/1000 yr including turbidite layer 6 cm thick. A much higher and probably more realistic rate of pelagic sedimentation, 33.1 cm/1000 yr, derives from coupled dates Tx-293 and Tx-294, although no sand layers are present in this interval. For comparison, Tx-295 and Tx-297 were determined using

organic fractions, and the usual carbonate fraction was dated for Tx-296, which is stratigraphically between them. Tx-296 coupled with Tx-294 indicate rate for lowest portion of core is 11.3 cm/1000 yr. This lowest segment represents material deposited during the Pleistocene, when sea-level was considerably lower. This portion of submarine fan, then, received much less material than it did more recently.

Santa Cruz Core 9258 series

Bulk CaCO₃ samples from core sample 9258, recovered from axis of Santa Cruz submarine canyon, 4.1 naut mi, 141° true from Gull I, Santa Cruz I (33° 53' 48" N. Lat, 119° 46' 45" W Long), in 630 fathoms water.

Tx-298. Core 9258, 0.0-28.0 cm **5820 ± 130**
3870 B.C.
 $\delta C^{14} = -515 \pm 8 \text{ ‰}$.

Tx-299. Core 9258, 28.2-33.3 cm **14,400 ± 600**
12,450 B.C.
 $\delta C^{14} = -883 \pm 12 \text{ ‰}$.

Tx-300. Core 9258, 33.3-38.4 cm **20,200 ± 1000**
18,250 B.C.
 $\delta C^{14} = -919 \pm 10 \text{ ‰}$.

Comment on Tx-298 through Tx-300 (core sample 9258): lower portion of core, clearly one sedimentation unit, was divided into two portions dated separately as Tx-299 and Tx-300. Discrepancy between the two dates shows pitfalls in interpreting dates. Sediments of this unit are coarser extensions of finer material dated as Tx-298; therefore, we think entire core, except uppermost portion, was deposited by turbidity current at ca. time of Tx-298. Since this core was from canyon axis, its uppermost portions may contain numerous "unconformities" due to subsequent scour and deposition as generations of flows swept past this axis position.

Santa Cruz Core 9257 series

Bulk CaCO₃ samples from core sample 9257, recovered from fan of Santa Cruz submarine canyon, 22.4 naut mi, 246° true from Anacapa Light, Anacapa I (33° 51' 26" N Lat, 119° 45' 37" W Long), in 840 fathoms water.

Tx-301. Core 9257, 21.2-27.5 cm **11,750 ± 300**
9700 B.C.
 $\delta C^{14} = -768 \pm 9 \text{ ‰}$.

Tx-302. Core 9257, 33.9-54.2 cm **5300 ± 200**
3350 B.C.
 $\delta C^{14} = -483 \pm 13 \text{ ‰}$.

Tx-303. Core 9257, 74.5-94.8 cm **5830 ± 210**
3880 B.C.
 $\delta C^{14} = -516 \pm 13 \text{ ‰}$.

Tx-304. Core 9257, 110.1-145.3 cm **7630 ± 210**
5680 B.C.
 $\delta C^{14} = -613 \pm 10 \text{ ‰}$.

Tx-305. Core 9257, 145.3-165.3 cm **22,500 ± 800**
20,550 B.C.
 $\delta C^{14} = -939 \pm 6 \text{ ‰}$.

Comment on Tx-301 through Tx-305 (core sample 9257): Tx-301 is essentially a date for shell hash that formed organic turbidite in this core. As such, it gives an anomalous older date, since material is reworked from much older material. Tx-302, taken from material directly beneath organic turbidite, is more realistic date. Since it indicates that turbidite was deposited no earlier than 5300 ± 200 yr B.P., upper portion of core (0 to 54.2 cm) averages out to deposition rate of 8.3 cm/1000 yr. Tx-302 and Tx-303 are essentially the same, indicating unusually high (76.3 cm/100 yr) rate of pelagic sedimentation that began with graded terrigenous turbidite layer directly beneath Tx-303. Tx-304 includes material directly above a thick 116-cm turbidite. Granulometric and mineralogic analyses have shown that Tx-304 is genetically related to Tx-305, and the much older date for the latter must be due to "old" carbonate material. Younger date is more likely for the thick turbidite.

Santa Cruz Core 9272 series

Bulk $CaCO_3$ samples from core sample 9272, recovered from fan of Santa Cruz submarine canyon, 4.1 naut mi, 184° true from Gull I, Santa Cruz I ($33^\circ 53' 13''$ N Lat, $119^\circ 49' 50''$ W Long), in 550 fathoms water.

Tx-306. Core 9272, 25.3-53.3 cm **12,500 ± 300**
10,550 B.C.
 $\delta C^{14} = -790 \pm 8 \text{ ‰}$.

Tx-307. Core 9272, 70.4-90.7 cm **19,500 ± 500**
17,550 B.C.
 $\delta C^{14} = -912 \pm 5 \text{ ‰}$.

Tx-308. Core 9272, 204.2-232.1 cm **24,000 ± 1000**
22,050 B.C.
 $\delta C^{14} = -950 \pm 6 \text{ ‰}$.

Comment on Tx-306 through Tx-308 (core sample 9272): Tx-306 and Tx-307 surround two graded sand layers and indicate turbidite deposition rate of 1 turbidite/3500 yr. Coupled dates Tx-307 and Tx-308 indicate rate of 30.8 cm/1000 yr for this portion of fan. The fact that entire core, save uppermost portion, is Pleistocene deposit indicates that this area of fan has undergone considerable scouring, caused by (a) sheet erosion by flows passing this point, (b) distributary-channel development on fan and subsequent removal of overlying sediment, or (c) protracted non-deposition on this part of fan.

II. ARCHAEOLOGIC SAMPLES

A. *Amistad Reservoir, Texas*

The following samples are from sites in Amistad Reservoir area, on Rio Grande and its tributaries in vicinity of mouth of Pecos R, Val Verde County, Texas. For other series of C¹⁴ dates from area, see Texas II and Texas III. A C¹⁴ chronology is beginning to emerge for Amistad area, but most parts of cultural sequence are as yet imperfectly dated. All samples subm. by J. R. Ambler, Texas Archeol. Salvage Project, Univ. of Texas, Austin.

Arenosa Shelter series

Charcoal from Arenosa Shelter (41 VV 99), on right bank of Pecos R, 1 mi upstream from confluence with Rio Grande (29° 42' N Lat, 101° 22' W Long); a deep terrace-fill site with long stratigraphic sequence of occupational zones, which are numbered from surface downward. Coll. 1965-66 by D. S. Dibble. Samples are listed in order of increasing depth.

1970 ± 110
20 B.C.

Tx-284. Arenosa 3

From Feature 2, hearth resting on surface of Stratum 7; stratum contains predominantly Ensor points plus a few Frio points and is thus considered Late Archaic. $\delta C^{14} = -216 \pm 12 \text{‰}$.

2070 ± 140
120 B.C.

Tx-285. Arenosa 2

From lower part of Stratum 9, yielding predominantly Frio, Marcos, and small Shumla points. $\delta C^{14} = -227 \pm 14 \text{‰}$.

2410 ± 140
460 B.C.

Tx-286. Arenosa 1

From charcoal concentration resting on surface of Stratum 11; stratum contains high percentage of Montell points. $\delta C^{14} = -259 \pm 13 \text{‰}$.

2440 ± 140
490 B.C.

Tx-311. Arenosa 161

Charcoal from middle to basal portion of Stratum 11, yielding predominantly Montell points. $\delta C^{14} = -262 \pm 10 \text{‰}$.

4080 ± 380
2130 B.C.

Tx-287. Arenosa 50

From charcoal concentration in upper portion of Stratum 23, an Early and/or Middle Archaic zone with mostly Langtry points, plus Val Verde and Almagre points and a relatively large form of Shumla points. Stratum rested on a steeply sloping erosional surface and appears to be at least partly redeposited. $\delta C^{14} = -398 \pm 28 \text{‰}$.

4100 ± 150
2150 B.C.

Tx-324. Arenosa 168

From charcoal concentration in Stratum 23d, which contained Pan-

dale points and is considered on this basis to be Early Archaic. $\delta C^{14} = -400 \pm 9 \text{‰}$.

Tx-312. Arenosa 166

**4790 \pm 140
2840 B.C.**

Charcoal from base to top of Stratum 25, which also contained Pandale points. $\delta C^{14} = -450 \pm 8 \text{‰}$.

Tx-313. Arenosa 165

**5360 \pm 170
3410 B.C.**

From various charcoal concentrations occurring near base of Stratum 32 and slightly into underlying layer. Stratum yielded a few triangular, barbed projectile points resembling "Early Barbed" form at Devil's Mouth and Devil's Rockshelter sites (see below, Tx-314). $\delta C^{14} = -487 \pm 9 \text{‰}$.

General Comment (D.S.D.): series is in proper order with respect to stratigraphic position of samples, and all dates but Tx-313 are within expected limits in terms of current thinking regarding associated diagnostic artifacts. Tx-313 is younger than expected (see Tx-314, below).

Tx-314. Devil's Rockshelter 47

**7430 \pm 240
5480 B.C.**

Charcoal from Zone V in Test Pit 2 of Devil's Rockshelter (41 VV 264) on left bank of Devil's R at its confluence with Rio Grande (29° 27' N Lat, 101° 03' W Long). Zone V contained "Early Barbed" points similar to those in the nearby Devil's Mouth site (Johnson, 1964, p. 33) and in Stratum 32 at Arenosa Shelter (above, Tx-313). Date should be similar to Tx-313. Site has been reported by Prewitt (1966). Coll. 1965 by E. R. Prewitt. $\delta C^{14} = -604 \pm 8 \text{‰}$. *Comment* (D.S. Dibble): date is significantly older than Tx-313, but corresponds to expectations based on stratigraphic position of "Early Barbed" points at Devil's Mouth site; Tx-314 believed to be nearer true age than Tx-313.

B. West Texas

Tx-291. Felton Cave, Midden 1

**2560 \pm 100
610 B.C.**

Charcoal from general deposit in central depression and part of south rim of Midden 1 near Felton cave, 13 mi S of Sonora, Sutton County, Texas (30° 26' 30" N Lat, 100° 37' 00" W Long). In terms of projectile point type sequence in this area, this is earliest midden circle now known, since it dates from end of Montell-Marshall times or beginning of Ensor-Frio times, and is thus middle Late Archaic. Coll. 1965 and subm. by J. W. Greer, Dept. Anthropol., Univ. of Texas, Austin. $\delta C^{14} = -273 \pm 9 \text{‰}$. *Comment* (J.W.G.): date supports previous estimates of time ranges of point types concerned.

Andrews Lake series

Charcoal from Andrews Lake B (41 AD 2) and Andrews Lake C (41 AD 3), on southern Llano Estacado in Andrews County, Texas (ap-

prox. 32° 25' N Lat, 102° 30' W Long). Sites have crude masonry structures and Southwestern pottery, principally Ochoa Indented Brown Ware (Leslie, 1965), El Paso Brown, and El Paso Polychrome. They are tentatively assigned to Ochoa phase of Eastern Jornada branch of Mogollon. They are more than 100 mi E of known range of Ochoa phase, which is dated by trade pottery at A.D. 1300-1450 (Corley, 1965). Samples were dated to check Ochoa phase relationship and to date occupation of southernmost High Plains by puebloan peoples. Coll. 1965 and subm. by M. B. Collins, Dept. Anthropol., Univ. of Texas, Austin.

420 ± 100

Tx-319. Andrews Lake B/15 **A.D. 1530**

From hearth at top of Zone IIIa, overlain directly by Zone IIIb. A sherd of Ochoa Brown Ware was in hearth. $\delta C^{14} = -51 \pm 9 \text{ ‰}$.

370 ± 100

Tx-322. Andrews Lake B/16 **A.D. 1580**

From wall of pot-hole in squares N150/W90 and N150/W95, in lower Zone IIIa. $\delta C^{14} = -44 \pm 11 \text{ ‰}$.

180 ± 200

Tx-318. Andrews Lake B/17 **A.D. 1770**

From wall of same pot-hole as Tx-322 (above), adjacent to that sample, in lower Zone IIIa. Error quoted is 2σ . $\delta C^{14} = -26 \pm 10 \text{ ‰}$.
Comment on Andrews Lake B samples (M.B.C.): Tx-319 and Tx-322 are compatible with recent part of present dating of Ochoa phase. Tx-318 is later, although it agrees within 1σ with Tx-322. Possibly these sites represent late survival of Ochoa phase in Andrews County. (S. V., E. M. D.): Possibility that dates are altered by DeVries effect should also be kept in mind (Damon, 1966).

210 ± 100

Tx-317. Andrews Lake C/2 **A.D. 1740**

A composite of 9 samples from vertical range of 2 ft just above floor of an adobe structure. No diagnostic artifacts were in this fill. Floor rested on midden soil containing Harrell points. $\delta C^{14} = -26 \pm 9 \text{ ‰}$.
Comment (M.B.C.): date is compatible with archaeological evidence.

C. Central Texas

Evoc Terrace series

Charcoal from Area B of Evoc Terrace site (41 BL 104), S bank of Lampasas R, $\frac{3}{4}$ mi NE of Youngsport, Bell County, Texas, in Stillhouse Hollow Reservoir basin (30° 59' N Lat, 97° 39' W Long). This is stratified terrace site with pottery and arrowpoints in highest zone, expanding-stem dart points in middle zones, and rectangular-stem dart points in deepest zones. Coll. 1966 by W. M. Sorrow; subm. by J. R. Ambler.

Tx-340. Evoe Terrace B6-3**1050 ± 90****A.D. 900**

From top of Zone 2, which contained arrowpoints (mostly Scallorn) and Darl and Fairland dart points. $\delta C^{14} = -123 \pm 8 \%$. *Comment* (W.M.S.): date agrees with artifact evidence that certain dart point forms continued well into Austin focus.

Tx-339. Evoe Terrace B1-11**4430 ± 240****2480 B.C.**

From Zone 7, a deep zone containing relatively small rectangular-stem and slightly expanding-stem dart points resembling Nolan and Bulverde points. Zone is stratigraphically below Bulverde points and is considered to be Early Archaic. Large error quoted is due to small sample size. $\delta C^{14} = -424 \pm 10 \%$. *Comment* (W.M.S.): date more recent than expected, but there has been so little C^{14} dating of central Texas Archaic components that it is difficult to evaluate discrepancy.

Tx-289. Landslide 18-117**>3520**

Bison bone (*B. bison*) from Landslide site (41 BL 85), S side Lampasas R, 2 mi E of Youngsport, Bell County, Texas, in Stillhouse Hollow Reservoir basin (31° 00' N Lat, 97° 40' W Long). In this site Stratum IIIa contained Bulverde, Pedernales, and Travis points; Stratum IIIb (deeper than IIIa) had points of general "Early Barbed" category; Stratum IV had only a few random flakes; Stratum V had Gower and Martindale points. Bones of present samples were from concentration of burned rocks associated either with IIIb or with IV into which concentration intruded. Coll. 1964 by R. E. Ross; subm. by J. R. Ambler. Age reported is lower limiting (2σ) age based on organic fraction of bone (Tamers and Pearson, 1965). $\delta C^{14} = -371 \pm 8 \%$. *Comment* (J.R.A.): date does not conflict with archaeological evidence.

Tx-323. Pecan Springs 83**1950 ± 130****1 B.C.**

Charcoal associated with Burial 3, a cremation, at Pecan Springs site (41 EL 11), S side Waxahatchie Creek, 4 mi SW of Ennis, Texas, in Bardwell Reservoir basin (32° 34' N Lat, 96° 41' W Long). Site was occupied at different times by peoples from north, central, and east Texas (Sorrow, 1966). In same excavation unit as Burial 3, and probably associated stratigraphically, were two Montell points, probably representing Late Archaic people from central Texas. Sample should provide an additional date for the currently poorly dated Edwards Plateau aspect (central Texas Archaic). Coll. 1965 by W. M. Sorrow; subm. by J. R. Ambler. $\delta C^{14} = -215 \pm 10 \%$. *Comment* (W.M.S.): only other dates for Montell points are from two sites 350 mi distant from Pecan Springs: Bonfire shelter, Tx-106, 2780 ± 110 (Texas II) and Tx-131, 2510 ± 100 (Texas III); and Arenosa shelter, Tx-286, 2410 ± 140, and Tx-311, 2440 ± 140 (this date list). These dates are significantly older than Tx-323, but since we have only single date from Pecan Springs and association of sample

with Montell points is not direct, it would be premature to attach significance to the difference in age.

Tx-329. Kretschmar Shelter A **Modern**

Fragment of log from Sq. H-12, elev 47.05 above site datum, in Kretschmar Shelter (41 TV 45), ca. 10 mi NW of Austin, Texas, near Cypress Creek arm of Lake Travis (37° 27' N Lat, 97° 51' W Long). Log was in stratified deposit, in gray stratum below brown zone. Artifacts apparently associated were of Middle and Late Archaic types. No evidence of intrusion was detected in the field, although wood should not survive long in moist shelter environment. Sample was dated to test possibility of intrusion. Coll. 1959 by A. Crider and E. M. Davis; subm. by Davis. $\delta C^{14} = +2 \pm 15 \%$. *Comment* (E.M.D.): sample evidently intrusive; fill probably disturbed.

1000 ± 190

Tx-334. Hitzfelder's Cave A **A.D. 950**

Charcoal from Test Pit 1, 6 to 18 in. below surface, in Hitzfelder's Cave (41 CM 34), a vertical limestone cave ca. 10 mi W of New Braunfels, Comal County, Texas (29° 43' N Lat, 98° 20' W Long). From zone in which numerous human burials were placed; date should be average age of burials. Subsequent to burials, users of cave filled shaft with earth; date should provide maximum age for that occurrence. Only diagnostic artifact from burial zone was a Clear Fork gouge. Above this zone, but at bottom of filled shaft, were Ensor and Frio projectile points. Artifacts suggest early Archaic time for burial zone. Coll. 1965 and subm. by R. A. Benfer, Dept. Anthropol., Univ. of Texas, Austin. $\delta C^{14} = -116 \pm 14 \%$. *Comment* (R.A.B.): date much later than expected; possibly artifacts entered as part of fill.

D. East Texas

Jones Hill series

Charcoal from Jones Hill site (41 PK 8), in Trinity R valley 6 mi WSW of Livingston, Polk County, Texas, in Livingston Reservoir basin (30° 41' N Lat, 95° 03' W Long). Five strata are distinguished at site: Zone I (lowest) without significant artifact content; Zone II, stained dark with organic material, abundant artifacts including plain sand tempered pottery and dart points, mostly of Gary type; Zone III, lighter in color, few artifacts which are a mixture of types from zones above and below; Zone IV, stained dark, many arrow points, pottery mostly plain sand tempered but also some brushed and incised pottery with wide variety of tempering agents; Zone V, partially disturbed surface zone. Coll. 1965 by B. B. McClurkan; subm. by J. R. Ambler.

970 ± 120

Tx-325. Jones Hill A **A.D. 980**

Zone II, from directly under a vessel in Sq. S5-10/E25-30, elev 94.50 ft. $\delta C^{14} = -113 \pm 10 \%$.

Tx-336. Jones Hill 022 **1410 ± 190**
A.D. 540

Zone II, from Feature 8, a child cremation. $\delta C^{14} = -161 \pm 14 \text{ ‰}$.

Tx-330. Jones Hill 021 **390 ± 100**
A.D. 1560

Zone IV, from Feature 12, large hearth area. $\delta C^{14} = -48 \pm 9 \text{ ‰}$.

Tx-335. Jones Hill 017 **810 ± 80**
A.D. 1140

Zone IV, from Feature 4, a hearth area. $\delta C^{14} = -97 \pm 8 \text{ ‰}$.

General Comment (B.B.McC.): dates are consistent with stratigraphy. Tx-330 and -335 provide later dates than expected for Zone IV, but expectations were guesses since no previous C^{14} dating has been done in this area or on comparable materials in adjoining areas. Hopefully, we can obtain more datable samples from this area.

E. North Texas

Upper Rockwall series

Charcoal from Upper Rockwall site (41 RW 2) on E Fork of Trinity R NW of Rockwall, Texas, in Forney Reservoir basin (32° 57' N Lat, 96° 30' W Long). This site (reported by Ross, 1966) is assigned to Wylie focus. Principal structural feature is large artificial depression of unknown function filled with stratified deposits, of which Stratum V contained most of cultural material found. Coll. 1965 by R. E. Ross; subm. by J. R. Ambler.

Tx-315. Upper Rockwall 179 **930 ± 90**
A.D. 1020

From Stratum V of fill of depression. Archaeological evidence suggests that sample is same age as, or slightly older than, Tx-320 (below). $\delta C^{14} = -109 \pm 9 \text{ ‰}$.

Tx-320. Upper Rockwall 94 **650 ± 120**
A.D. 1300

From Burial Pit 1, Sq. N496-500/W520-525; Level #8; elev 92.10. Burial contained vessel tentatively identified as Sanders Engraved. Burial should be later than the depression, but sample should help date depression. $\delta C^{14} = -77 \pm 11 \text{ ‰}$.

General Comment (J.R.A.): dates are consistent with archaeological evidence, both within the site and in comparison to other sites, and provide a start for more accurate dating of this type of site than has been possible in the past.

F. Other United States

Middle Klamath River series, Oregon

Charcoal from three sites on middle Klamath R just N of California-Oregon border, in Secs. 3 and 12, Twp 41 S, R 6 E, Klamath County,

Oregon (42° 01' N Lat, 122° 06' W Long). This area has as yet seen little archaeological work. There are at least two early occupational horizons (the earlier is possibly mid-Hypsithermal), followed later by a house-pit horizon guess-dated at A.D. 1500 and having affinities with N California (Trinity Lake) and Klamath Basin. Subm. by LeRoy Johnson, Jr., *Mus. Nat. Hist.*, Univ. of Oregon, Eugene; comments by L. J., Jr.

Tx-326. 35KL16/2

Modern

From a post representing earliest occupation (Floor 3) of House Pit No. 1, site 35KL16, on NW side Klamath R. A previous C¹⁴ date of 540 ± 120 (I-1337, Isotopes, Inc., unpub.) is from the same occupational level of this house. Sample should date house-pit horizon, and should be in general agreement with Tx-316 (below). Coll. 1963 by A. Anderson. $\delta C^{14} = -13 \pm 10 \%$. *Comment*: modern date is in conflict with I-1337 and Tx-316. However, there were no obvious indications in the field of recent intrusion or contamination.

510 ± 110

Tx-316. 35KL18/1

A.D. 1440

From floor fill of House Pit No. 3 in site 35KL18, on N bank Klamath R. Sample should date house-pit horizon. Coll. 1961 by J. E. Wells. $\delta C^{14} = -61 \pm 10 \%$. *Comment*: date is in agreement with guess-dates for house-pit period and with C¹⁴ date of 540 ± 120 from same cultural horizon as 35KL16 (I-1337; see Tx-326, above).

990 ± 110

Tx-321. 35KL21/4

A.D. 960

From middle occupation levels, 60 to 100 cm below surface, at site 35KL21, on S bank Klamath R. Occupation represents second major cultural horizon in area, and should antedate house-pit occupation, which it underlies at this site. One other C¹⁴ date has been obtained from this occupation level at this site: 1280 ± 125 (I-502, Isotopes V). Coll. 1961 by J. E. Wells. $\delta C^{14} = -116 \pm 10 \%$. *Comment*: date is only relatively close to I-502; however, both are composite samples, and cultural period which they represent may be extremely long. Tx-321 is, as it should be, earlier than C¹⁴ dates (see above under Tx-316) and guess dates (A.D. 1500-1600) for middle Klamath R house-pit horizon, and later than the single C¹⁴ date from the underlying, earliest horizon from this same site (6065 ± 400; I-807, Isotopes, Inc., unpub.).

515 ± 65

Tx-290. Louden site, Colorado

A.D. 1435

Charcoal from total excavated deposit in midden circle at Louden site, 45 mi E of Trinidad, Colorado, S of Mesa de Maya, in Purgatoire R drainage (37° 14' N Lat, 103° 44' W Long). Site is assigned to undefined Neo-Indian occupation. Coll. 1965 and subm. by J. W. Greer. Date is average of two counts: $\delta C^{14} = -82 \pm 9 \%$ and $-42 \pm 12 \%$. *Comment* (J.W.G.): date is slightly earlier than expected, but is compatible with archaeological evidence.

Tx-333. Red Smoke 1076, Nebraska **7970 ± 210**
6020 B.C.

Charcoal from Zone VI of Red Smoke site (25 FT 42), N side Lime Creek ca. $1\frac{1}{3}$ mi W of junction with Medicine Creek, ca. 12 mi NW of Cambridge, Nebraska ($40^{\circ} 23' N$ Lat, $100^{\circ} 12' W$ Long). Sample is from Feature 867, at grid point 10S/90E, 88.89 to 89.60 ft above site datum. Zones VI, VII, and VIII, probably representing one component, are the most recent cultural strata at site (called Zones 90, 91, 92 in Davis, 1953, p. 383; see also Wormington, 1957, p. 117-118). Grinding stones (probably for ocher), a crude stemmed point, and a pentagonal flake point came from these zones. The deeper Zone V, containing Plainview points, is distinct culturally from Zones VI-VIII and an erosional unconformity intervenes. One C^{14} date has previously been determined from site, 8862 ± 230 from Zone VIII (C-824; Libby, 1955, p. 110); Tx-333 should be about same age. Coll. 1951 and subm. by E. M. Davis, this lab. $\delta C^{14} = -629 \pm 6 \%$. *Comment* (E.M.D.): date differs from C-824 by more than 2σ . Non-Paleo-Indian stemmed point in Zone VIII makes more recent date seem more likely. Obviously, we need more dates.

G. *Latin America*

Coahuila hearth sites series, Mexico

Charcoal from two sites on Torreon-Salttillo highway, Coahuila, Mexico. These were surface sites with very few artifacts and a number of fireplaces consisting of concentrations of burned rocks. Charcoal was collected from beneath rocks of two fireplaces at each site to obtain estimate of time of occupation and to see whether more than one occupation might be represented. Coll. 1965 by D. M. Varner; subm. by J. F. Epstein, Dept. Anthropol., Univ. of Texas, Austin; comments by J. F. E.

Tx-331. Coahuila C103.1 **1230 ± 90**
A.D. 720

From Hearth 1 at Site C103, 250 yd N of hwy at km 618, $\frac{1}{2}$ mi E of Cuchillos, in Laguna de Mayran (approx. $25^{\circ} 38' N$ Lat, $102^{\circ} 50' W$ Long). One point similar to Gary type was on surface near hearth. $\delta C^{14} = -141 \pm 8 \%$.

Tx-332. Coahuila C103.2 **1250 ± 90**
A.D. 700

From Hearth 2 at Site C103 (see Tx-331, above). No artifacts were found nearby. $\delta C^{14} = -145 \pm 8 \%$.

Comment on Tx -331 and -332: dates indicate contemporaneity of hearths and suggest relatively recent occupation, not related to Gary point.

Tx-337. Coahuila C105.7 **140 ± 140**
A.D. 1810

From Hearth 7 at Site C105, N side of hwy at km 576, ca. 25 mi E of Cuchillos (approx. $25^{\circ} 40' N$ Lat, $102^{\circ} 35' W$ Long). Near hearth

were found one percussion biface and one heavy percussion flake. Error quoted is 2σ . $\delta C^{14} = -17 \pm 7 \text{‰}$.

Tx-338. Coahuila C105.24 **540 ± 80**
A.D. 1410

From Hearth 24 at Site C105 (see Tx-337, above). Near hearth were found two heavy percussion flakes and a heavy percussion biface. $\delta C^{14} = -65 \pm 8 \text{‰}$.

Comment on Tx-337 and -338: dates differ by more than 2σ , but it seems likely that one very recent occupation is represented. Heavy percussion tools, thought to be early, seem to be recent here.

Vereda de Palmaseca series, Colombia

Charcoal from El Tulipan and El Llanito sites, Vereda de Palmaseca, Municipio de Palmira, Depto. del Valle del Cauca, Colombia ($3^{\circ} 31' \text{ N Lat}$, $76^{\circ} 26' \text{ W Long}$). Samples were associated with ceramics and tools related to upper Rio Bolo complex of Ford (1944, p. 22-37, 72). Coll. 1965 and subm. by Julio César Cubillos-Chaparro, Univ. del Valle and Museo Departamental de Hist. Natural, Cali, Colombia.

Tx-274. El Tulipan **<210**

From a possible burial fire pit in Trench 5, depth 0.4 to 1.0 m, at El Tulipan site. Another C^{14} date from this site, 810 ± 180 (SI-254; Cubillos, pers. comm.), is from Trench 4, ca. 25 m NE of Trench 5, also associated with upper Rio Bolo complex. $\delta C^{14} = -4 \pm 11 \text{‰}$.

Tx-275. El Llanito **335 ± 135**
A.D. 1615

From Mound A, Trench 8, Level 1, depth 0.25 m, at El Llanito site, ca. 1 km W of El Tulipan. $\delta C^{14} = -41 \pm 16 \text{‰}$.

Comment on Tx-274 and -275 (J.C.C.): dates are inexplicably recent in view of SI-254 date and lack of evidence of European contact. Further research is necessary.

H. Africa

Tx-228. Zhizo Hill **910 ± 130**
A.D. 1040

Charcoal from Zhizo Hill site, southeastern Matopos, ca. 30 mi SE of Bulawayo, Rhodesia ($20^{\circ} 12' \text{ S Lat}$, $28^{\circ} 13' \text{ E Long}$). Sample was 12 to 28 in. below surface, resting on granite bedrock and sealed by broken hut remains, associated with glass beads, pottery, and other materials of Phase I of Leopard's Kopje culture, probably the equivalent Matabeleland culture to the Phase II building at Zimbabwe. At Zimbabwe acropolis, ware believed to be contemporary of this has been C^{14} dated at A.D. 1085 ± 150 (M-914, Michigan VI). Present sample will provide first date for ancestral Sotho type pottery from Matabeleland. Coll. 1964 by K. S. R. Robinson, Natl. Monuments Comm., Southern Rhodesia;

subm. by J. Desmond Clark, Dept. Anthropol., Univ. of California, Berkeley. $\delta C^{14} = -107 \pm 15 \%$. *Comment* (J.D.C.): date is as expected.

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