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UNIVERSITY OF TEXAS AT AUSTIN RADIOCARBON DATES XII

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This list reports certain ^{14}C measurements completed by November 1977; other projects completed by this time will be reported later. Age calculations are based on ^{14}C half-life of 5568yr and modern standard of 95% NBS oxalic acid, supplemented by tree rings of pre-industrial wood from a log cut in the 1850's (Tx-540; R, 1970, v 12, p 249). Deviations reported are based on counting statistics of sample, background, and modern, and are $\pm 1\sigma$, except that when sample count approaches either modern or background, 2σ limits are reported. Unless noted, $^{12}C/^{13}C$ measurements were not made and results are not corrected for ^{13}C fractionation. Our laboratory uses liquid scintillation counting of benzene, with Li_2C_2 and vanadium-activated catalyst in preparation; chemical yields range between 95% and 99%. Three counters are employed: a Packard Tri-Carb Model 3002 and 2 Beckman LS320 spectrometers obtained through a grant from the National Science Foundation.

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I. GEOLOGIC AND OCEANOGRAPHIC SAMPLES

Texas

Aransas Pass series, Texas

Shell samples from vicinity of Aransas pass, S coast of Texas. Subm to establish sea-level curve and growth of tidal delta. Coll 1974 by M Munson and subm by Michael Amdurer, Dept Geol, Columbia Univ, New York. In titles, depth in m below sea level follows sample no.

Tx-2310A. Aransas 5E,10.4m; white shell **6320 ± 210**

Mulinia Lateralis shell, Site 5E, 10.4m depth, from washdown rig boring on E Harbor I, 10km ESE of city of Aransas Pass (27° 51′ 36″ N, 97° 03′ 30″ W). At Holocene-Pleistocene boundary, base of barrier-island sand facies. This and Tx-2310B, -2310C (below) subm to examine effect of preservation and shell color on ^{14}C age.

Tx-2310B. Aransas 5E,10.4m; black shell **9740 ± 140**

All types of shell, from same sample as Tx-2310A.

Tx-2310C. Aransas 5E,10.4m; echinoids 7260 ± 150

Echinoid fragments (*Mellita* sp); from same sample as Tx-2310A. *Comment* (MA): black shells (Tx-2310B) were thought to be reworked; date relative to Tx-2310A verifies this. Echinoids (Tx-2310C) also were probably reworked since *Mellita* inhabits quiet lower shore face sandy bottoms where molluscan genera in sample do not occur. Disparities in these 3 dates show danger of dating whole samples without first removing pieces that may be reworked. Tx-2310A date is felt to be most nearly accurate; correlates with pub dates for initial sand deposition beneath Matagorda and St Joseph I (Wilkinson, 1973; Shepard and Moore, 1955).

Tx-2311. Aransas 2J,7m 5530 ± 90

From 7m depth, 8km ESE of city of Aransas Pass (27° 52′ 54″ N, 97° 03′ 06″ W), 2.5 to 3m above Holocene-Pleistocene contact, within lower open-bay mud facies. *Comment* (MA): slightly older than expected. May result from mixed sample that included echinoid fragments; see comment on Tx-2310, above.

Tx-2312. Aransas 2F,5.8m 4950 ± 60

From 5.8m depth, W Harbor I, 6km ESE of city of Aransas Pass (27° 53′ 06″ N, 97° 04′ 24″ W); just above Holocene-Pleistocene boundary, at base of open-bay mud facies. *Comment* (MA): dates initial Holocene deposition here; about as expected.

Tx-2313. Aransas D,2.1m 3410 ± 70

Chione and *Cerithium,* 2.1m depth, W Redfish Bay, NW of Harbor I, 3km E of city of Aransas Pass (27° 54′ 36″ N, 97° 07′ 06″ W). At Holocene-Pleistocene boundary, just above soil zone, base of grass-flat facies. *Comment* (MA): dates development of facies and indicates deposition rate of 2400mm/1000yr for open-bay mud facies.

Tx-2333. Aransas 5E,5.8m 4840 ± 70

Same site as Tx-2310 (above); 5.8m depth, top of barrier island sand lens. *Comment* (MA): dated to ascertain deposition rate of this unit (3100mm/1000yr). Correlative with Tx-2312 (above), 3km distant; agreement of date indicates synchroneity of deposition over this distance.

Tx-2334. Aransas G,2.7m 2180 ± 50

From 2.7m depth, Harbor I, 5km E of city of Aransas Pass (27° 53′ 54″ N, 97° 05′ 06″ W). Above Holocene-Pleistocene boundary, lower Holocene tidal delta, grass-flat facies. *Comments* (MA): date much younger than expected; we have no dates at this site shallower than this, though Tx-2312 (above) is nearby (2km), shallower, and considerably older. (SV,Jr): anomaly may result from leak in recovery system in lab.

Tx-1769. Flower Garden Bank Reef, Texas 4160 ± 110

Fossil *(Amphistegina gibbosa)* foraminifera from 60m below sea level, crest of W bank Flower Garden Bank reef, Gulf of Mexico, S of

Galveston I, Texas (27° 52′ N, 93° 49′ W). Subm to obtain chronology of Holocene sea level fluctuations in open Gulf based on assumption that *Amphistegina* is restricted to shallow water. Coll 1970 on Oceanography Cruise #70-A-13/25 and subm by C Lindau, Dept Oceanog, Texas A&M Univ, College Station, Texas. *Comment* (CL): agrees well with comparable sample TAMU-184, 4200 ± 150 (Lindau, written commun); however, dating did not provide indication of sea level transgression.

Central Texas Flood Deposit series

Samples from creek sites in central Texas, subm to establish age of flood deposits and frequency of flooding on small streams. Coll 1976 and subm by P C Patton, Dept Earth & Environmental Sci, Wesleyan Univ, Middletown, Connecticut.

Tx-2348A. PP BC#1, total organic **710 ± 60**

Tx-2348B. PP BC#1, humic fraction **770 ± 90**

Tx-2348C. PP BC#1, residue **370 ± 40**

Humus from upper soil #1, 50 to 60cm depth, Bleiders Creek, 500m upstream from Guadalupe R, 1.6km N of New Braunfels (29° 44′ N, 98° 08′ W).

Tx-2349A. PP BC#2, total organic **1000 ± 60**

Tx-2349B. PP BC#2, humic fraction **790 ± 150**

Tx-2349C. PP BC#2, residue **890 ± 60**

Humus from buried soil #1, 80 to 90cm depth, Bleiders Creek, same locality as Tx-2348, above.

Tx-2350A. PP EC#1, total organic **1300 ± 60**

Tx-2350B. PP EC#1, humic fraction **950 ± 70**

Tx-2350C. PP EC#1, residue **710 ± 50**

Humus from buried soil #1, 130 to 150cm depth, Elm Creek, 400m upstream from Guadalupe R, 6.4km N of New Braunfels (29° 45′ N, 98° 06′ W).

Tx-2351. PP CC#1 **610 ± 90**

Charcoal from alluvium, 50cm depth, Cibolo Creek, 1.6km downstream from Curry Creek Rd at Gosser Ranch, 16km SE of Boerne (29° 44′ N, 98° 37′ W).

General Comment (PCP): Tx-2348-2350 date recurrence of floods in area. Tx-2351 proves that sediment deposition is related to present hydraulic regime of stream and places maximum time limit on incipient soil formation on deposit.

Little Bahama Bank, West Indies

Jet core slurry samples from sites on Little Bahama Bank, 19km W of Walker's Cay, Bahama I, West Indies. Subm to reconstruct sea level flooding history of Little Bahama Bank. Coll 1975 and subm by A C Hine, Dept of Geol, Univ South Carolina, Columbia.

Tx-2267. Little Bahama, C-4 7521 I-9 **2460 ± 50**

Carbonate bioclastic sand, 1 to 2m beneath sediment/water interface, back reef seagrass beds (27° 16′ 30″ N, 78° 35′ 36″ W).

Lily Bank series

From Lily Bank site C-2 7521, NE margin of Little Bahama Bank (27° 14′ 48″ N, 78° 37′ 30″ W). Numbers in titles are depths beneath sediment/water interface.

Tx-2263. Lily Bank, 0-1.0m **1660 ± 60**

Oolitic sand.

Tx-2265. Lily Bank, 3.9-4.5m **2590 ± 50**

Carbonate bioclastic sand, 1.5 to 2.1m above bedrock. More ooids than in Tx-2264 (below); ooid shoal is nearer core site.

Tx-2264. Lily Bank, 4.5-5.0m **2780 ± 60**

Carbonate shell fragments, 1 to 1.5m above bedrock.

Tx-2266. Lily Bank, 6.0-6.1m **25,220 ± 630**

Carbonate rock fragments, from bedrock limestone beneath sediment.

General Comment (ACH): dates provide deposition rate prior to oolite shoal development and indicate upper limit for oolite shoal development. Sequence corresponds reasonably well with slowing of Holocene sea level rise.

Maine

Peat samples from cores in salt water estuary marshes in S Maine. Coll 1972 and subm by B S Timson, Maine State Dept Conservation, Augusta, Maine.

Tx-1645. Ogunquit R Estuary, Maine **730 ± 220**

Base of Core 1-5B, 80cm below marsh surface, above Pleistocene level, Ogunquit R estuary, by Furbish Rd (43° 16′ 50″ N, 70° 35′ 15″ W).

Wells Marsh series, Maine

Samples from Core 4-10, taken at approx high tide level on Webhannet estuary marsh, 0.4km E of Mile Rd in Wells, Maine (43° 19′ 30″ N, 70° 34′ 05″ W). Numbers in titles are depths below marsh surface.

Tx-1640. Wells BT-1, 20 to 23cm **1290 ± 110**

Tx-1641. Wells BT-2, 55 to 58cm **2340 ± 250**

Tx-1642. Wells BT-3, 80 to 83cm **2630 ± 190**

Tx-1643. Wells BT-4, 102 to 107cm **2860 ± 150**

General Comment on Tx-1645 and Wells Marsh series (BST): dates corroborate previous dating (Hussey, 1959) of formation of estuary lagoon, and define formation of Wells and Ogunquit barrier beaches ca 900 BC; previously thought to be much earlier (Hussey, 1970).

Utah, Idaho, Nevada

Fillmore Caliche series, Utah

Samples of caliche from lava flow near Fillmore, Utah. Coll 1970 and subm by F M Bullard, Dept Geol Sci, Univ Texas, Austin.

Tx-1304. Fillmore Caliche, 13 **11,460 ± 170**

From roadcut of jeep rd to crater, near N margin of Tabernacle flow, 17.7km SW of Fillmore (38° 56′ N, 112° 31′ W); in basin of extinct Lake Bonneville. Lava flow occurred before lake disappeared. *Comment* (FMB): dates volcanic activity in this area and contributes to our knowledge of history of Lake Bonneville.

Tx-1305. Fillmore Caliche, 14 **3600 ± 90**

From lava in and around entrance to Cold Tunnel (dug in one of more recent lava flows), 11.3km W of Fillmore (38° 59′ N, 112° 28′ W). Roots from tunnel gave date of 660 ± 70 (Tx-1166; R, 1972, v 14, p 470), but may have been contaminated by more recent material. *Comment* (FMB): date obviously much too young; sample was contaminated or was made of rootlets that grew on flow at much later date.

Tx-1418. Aberdeen, Idaho 15 **>44,000**

Wood from 2.5cm layer of shell and slimy wood beneath 24cm of hard lava in Snake River Plain; coll from well drilled through lava, Bruce Beck home, 1.2km NE of Aberdeen, Idaho (42° 56′ N, 112° 51′ W). Coll 1971 by James Papadakis and subm by F M Bullard. *Comment* (FMB): date gives age for this particular lava flow, but relation of this flow to others in Snake River lava plain is not known.

Tx-1736. Crystal Ice Cave 1001, Idaho **2170 ± 90**

Charred root projecting beneath lava flow at entrance to Crystal Ice Cave (Kings Bowl on some maps), 29km W of Aberdeen, Idaho (42° 56′ N, 113° 15′ W). Same sample as X-1001, 2130 ± 130 (5730 half-life; Prinz, 1970, p 946, citing Edwin Olson). Same loc and possibly same plant as Tx-1164, 2090 ± 470, and Tx-1165, 2360 ± 150 (R, 1972, v 14, p 470). Coll 1967 by E H Swanson Jr and subm by F M Bullard. *Comment* (FMB): lava flow, which buried roots, issued from Great Rift during final phase of volcanic activity in this area; sample dates last activity from Great Rift.

Arco Caliche series, Idaho

Caliche samples from lava flows near Arco, Idaho. Coll 1970 and subm by F M Bullard.

Tx-1302. Arco Caliche, 11 **14,260 ± 230**

From Snake R lava blocks along rd to Minodoka, 12km S of Arco (43° 30′ N, 113° 17′ W). Lava at Craters of the Moon rests on this lava surface. *Comment* (FMB): date should be maximum for Craters of the Moon lavas; how much younger those lavas are at this point has not been determined.

Tx-1303. Arco Caliche, 12 **3840 ± 130**

From road cut on "old" rd to Arco, Lava Creek flow, 8km NE of headquarters of Craters of the Moon National Monument (43° 32′ N, 113° 30′ W). *Comment* (FMB): Lava Creek flow is believed to be first lava to issue from Great Rift; date marks beginning of volcanic activity on Great Rift.

Pyramid Island series, Nevada

Samples from shore of Pyramid Lake, Nevada, 20.1km N of Nixon (39° 59′ N, 119° 30′ W). Coll 1976 and subm by J O Davis, Nevada Archaeol Surv, Univ Nevada, Reno.

Tx-2542. Pyramid I, JOD 27/3/76-F **33,650 ± 1720**

Compressed wood from shore scarp of Pyramid Lake, ca 500m SE of Pyramid I, 2m above water level, 43cm above base of clay of Lower Member of Sehoo Fm, alt 1158.2m; 25cm above Marble Bluff ash bed; ca 180cm below Timber Lake ash bed.

Tx-2596. Pyramid I, JOD 1/12/76-A **29,000 ± 980**

Black sulphurous clay, ca 500m SW of Pyramid I, near stake 30m S, 40cm above water level, 60cm below Timber Lake ash bed, ca 145cm above Marble Bluff ash bed.

Popcorn Rocks series, Nevada

Wood samples from wave-cut scarp at present shore, SW side of mouth of Truckee R, S extremity of Pyramid Lake (31° 51′ N, 119° 28′ W). Coll 1975 and subm by J O Davis.

Tx-2338. Popcorn Rocks, JOD 8/6/75-E **24,480 ± 430**

Juniperus sp from sulphurous clay (Lower Member of Sehoo Fm) conformably 10cm above Wono Bed of volcanic ash 5 to 10cm thick (Davis, 1977a). *Lab Comment*: sample counted 72hr.

Tx-2563. Popcorn Rocks, JOD 29/5/76-A **11,490 ± 130**

From top of same clay depositional unit as Tx-2338 (above), 50 to 100cm above Wono bed.

General Comment on Pyramid Island and Popcorn Rocks series (JOD): dates show Lower Member of Sehoo Fm (Lake Lahontan) deposited from ca 35,000 BP to ca 11,500 BP. Thus Lower Sehoo spans, rather than follows, Farmdalian Substage. Suggests most of Broecker's dates (Broecker & Orr, 1958; Broecker and Kaufman, 1956) are from end of, or later

than, Early Sehoo. Dates provide time control for series of ash layers in homotaxial succession in clay at several localities near Pyramid Lake and Fallon (Davis, 1977a;b;c). Marble Bluff bed may be unnamed St Helens ash ca 35,000 BP (W-2653, -2661; R, 1977, v 19, p 340-341).

Tx-2398. Rodgers Dam, Nevada **Modern**

Wood roots and rootlets (sp unid) from exposure in E bank of Humbolt R, 50m S of Rodgers Dam, 3.2km NE of Lovelock, Nevada (40° 12′ N, 118° 26′ W); in sandy alluvium over hackly organic-rich clay. Stratigraphic assignment uncertain. Coll 1975 and subm by J O Davis. *Comment* (JOD): although sample is modern, deposit appears much older. Suspect modern root grew laterally from river bank into older deposit.

Tx-2399. Weber Dam, Nevada **2000 ± 60**

Charcoal and soil from possible hearth 4m below surface in small alluvial fan truncated by road cut, W side Walker R, 1.25km SSW of Weber Dam, Mineral Co, Nevada (39° 02′ N, 118° 52′ W). Fan was graded to lowest terrace of Walker R. Sample underlies 2 layers of rhyolitic tephra (Salt Wells member; Davis, 1977a,b) correlated with tephra in "Turupah Fm" near Fallon. *Comment* (JOD): date supports tephra correlation that "Turupah Fm" near Fallon is late Fallon in age. Suggests Salt Wells Member correlates with Mono Basin tephra described by Wood (1977). Dates latest aggradational episode on Walker River.

II. ARCHAEOLOGIC SAMPLES

Wallisville Reservoir, Texas

Samples from sites in Wallisville Reservoir Basin, Trinity F estuary, E of Houston, Texas. Previous dates from this basin are in R, 1970, v 12, p 263-266; 1975, v 17, p 76-80. Sites and dates below are discussed in Dillehay, 1975.

Wallisville miscellaneous series, Texas

Rangia cuneata shell samples, coll 1973 and subm by T D Dillehay, Texas Archaeol Survey, Univ of Texas, Austin.

Tx-1891. 41CH46/1 **1070 ± 70**

Test Pit 1, hearth area at 50cm depth, level 4; 41CH46, 2km SE of Interstate Hwy 10 at crossing of Trinity R on NW shore of Round Lake (29° 49′ N, 94° 46′ W). Transitional between Wallisville Plain and early Goose Creek Plain. *Comment* (TDD): date fits relatively well with previous Goose Creek Plain date of 1330 ± 50 (Tx-1205; R, 1975, v 17, p 81).

Tx-1892. 41CH32/1 **2880 ± 110**

Test Pit 1, Area A, Level 8, Site 41CH32, 1.8km NE of Interstate Hwy 10 crossing of Trinity R (29° 50′ 55″ N, 94° 45′ 40″ W). From dense shell lens, assoc with bone fragments and coarse sandy-paste plainware ceramics. Level 8 exclusively contained Goose Creek Plain. *Comment* (TDD): date is unexpectedly early.

Tx-1893. 41CH32/2 **1870 ± 80**

Test Pit 2, Area B, Level 9, Site 41CH32 (see Tx-1892, above). Earliest ceramic level, assoc with early sandy paste and grog-tempered wates (San Jacinto Plain). *Comment* (TDD): date indicates beginning of manufacture of San Jacinto Plain in area.

Tx-1894. 41CH47/1 **1480 ± 80**

Test Pit 1, Level 2, Site 41CH47, 12.8km NE of Anahuac, 3.2km S of Interstate Hwy 10 and 1.8km W of Trinity R in Mayes Marsh (29° 50′ 00″ N, 94° 45′ 85″ W). Stratum between Goose Creek and Wallisville Plain ceramic types; assoc with early Goose Creek sherd and large mammal bones. *Comment* (TDD): date agrees with evidence for transition from Wallisville Plain to Goose Creek Plain (Ambler, 1967, p 74-76).

Tx-1895. 41CH47/2 **2230 ± 110**

Test Pit 1, Level 7, Site 41CH47 (see Tx-1894, above). Assoc with lithic debitage, no ceramics. *Comment* (TDD): agrees well with previous preceramic date of 2370 ± 80 (Tx-1067; R, 1975, v 17, p 82).

Wallisville 41CH110 series, Texas

Shell samples from Site 41CH110, 0.8km N of Interstate Hwy 10 (29° 50′ 32″ N, 94° 46′ 33″ W). Subm to supplement stratigraphic evidence in area where little is known about post-AD 800 sequence. Coll 1972 and subm by K Gilmore, Texas Archaeol Survey, Univ Texas, Austin.

Tx-2022. 41CH110/1 **500 ± 60**

N116 W102, SESE; upper shell zone.

Tx-2023. 41CH110/2 **390 ± 50**

N116 W102, NENE; 2nd shell zone.

Tx-2024. 41CH110/3 **800 ± 80**

N116 W102, SESE; 3rd shell zone.

Tx-2025. 41CH110/4 **760 ± 60**

N116 W102, NESE; 4th shell zone.

Tx-2026. 41CH110/5 **410 ± 60**

N116 W102, NESW; 10 to 20cm below surface.

Tx-2027. 41CH110/7 **740 ± 70**

N116 W110, NESW; 20 to 30cm below surface.

Tx-2029. 41CH110/8 **880 ± 60**

N116 W102, SWNE; 30 to 40cm below surface.

Tx-2030. 41CH110/9 **560 ± 50**

N116 W102, SWNE; 40 to 50cm below surface.

Tx-2031. 41CH110/10 **620 ± 60**

N114 W112, NESE; shell zone.

General comment (KG): with adjustment in shell dates by 150 to 250yr for established difference from charcoal samples in this area (R, 1975, v 17, p 76-77), these dates are consistent with early historic context of glass trade beads found in uppermost zones. Reversal of dates by depth, especially Tx-2030, may indicate shifting of occupation zones by physical processes subsequent to deposition.

Cooper Reservoir, Texas

Charcoal samples from sites in Cooper Reservoir basin on S Sulphur R, Delta and Hopkins Cos, NE Texas. Sites (except for Arnold site) are described in Hyatt *et al,* 1974. All samples coll by R D Hyatt and subm by Hyatt and R E Larson, Dept Anthropol, Southern Methodist Univ, Dallas, Texas.

Tx-1961. Lawson D **2080 ± 60**

Charcoal from hearth, Sq 9, 25cm level, Lawson site (X41HP7), 5.6km SE of Cooper, 200m S of S Sulphur R, 1.6km downstream from confluence with Moore Creek (33° 19′ 26″ N, 95° 38′ 53″ W). Coll 1972.

Tx-1962. Cox E **1110 ± 120**

Charcoal from Cox site (X41HP37), 6.2km SE of Cooper, 370m E of S Sulphur E, 0.4km downstream from confluence with Moore Creek (33° 18′ 52″ N, 95° 38′ 21″ W). Sq 145, 12 to 19cm level, stratum containing early Caddoan ceramics. Coll 1973.

Thomas site series

Charcoal from Thomas site (X41DT68), 4.8km SE of Cooper, 1.6km NE of Harper's Crossing, 91m N of S Sulphur R (33° 19′ 17″ N, 95° 38′ 38″ W). Coll 1972.

Tx-1958. Thomas A **1220 ± 350**

Sq 88, 25 to 30cm level, assoc with fire-cracked rock, lithic debris, Alto focus ceramics.

Tx-1959. Thomas B **1180 ± 220**

Sq 88, 85 to 92 cm level, Archaic, assoc with ash, fire-cracked rock, lithic debris.

Arnold site series

Charcoal from Arnold site (X41HP34), 7.7km S of Cooper, 0.6km SW of S Sulphur R (33° 18′ N, 95° 40′ W). Cultural remains are Gibson aspect Caddoan, possibly Alto focus. Coll 1974.

Tx-2041. Arnold 130-9 **970 ± 90**

Sq 130, 42.5cm.

Tx-2042. Arnold 161-7 **1410 ± 920**
Sq 161, 31cm. Large error due to small sample size.

Tx-2043. Arnold 115-10 **1010 ± 90**
Sq 115, 50cm.

Tx-2044. Arnold 219-6 **680 ± 100**
Sq 219, 27cm, near burial.

Tx-2045. Arnold 177-5 **730 ± 210**
Sq 177, 20 to 25cm, near skull of burial, Feature 177A.

Tx-2046. Arnold 72-5 **1690 ± 160**
Sq 72, 24cm.

Tx-2047. Arnold 145-11 **1040 ± 360**
Sq 145, 52cm.

Tx-2048. Arnold 117-6 **830 ± 110**
Sq 177, 25.5cm.

Tx-2049. Arnold 129-7 **510 ± 90**
Sq 129, 34.5cm.

General Comment on Cooper Reservoir dates (REL): dates are close to what was expected, except for Tx-2049 which is a bit more recent than anticipated.

Other Texas Samples

Steadman site series, Texas

Charcoal in soil from Steadman site (41FS2) 16km NW of Noodle, Texas (32° 41′ 30″ N, 100° 09′ 00″ W). Sample is from large feature which is either assoc with a Folsom component or is of later origin. Coll 1970 and subm by C D Tunnell, State Archaeologist, Texas State Hist Comm, Austin.

Tx-1171. Steadman #2 **2200 ± 110**
Test Pit #9, Profile 1 in SW corner.

Tx-1172. Steadman #1 **2150 ± 90**
Test Pit #9, depth 22cm.

General Comment (CDT): feature is evidently of much later origin than Folsom component.

Tx-1928. Hogge Bridge, Texas **950 ± 70**

Charcoal from Hogge Bridge site (41COL1; Stephenson, 1952), E fork Trinity R, ca 5km NE of Wylie, Texas; ca 60km SE of Hogge Bridge crossing (33° 02′ 45″ N, 96° 30′ 00″ W). From Trench Sec A-2, 30 to 45cm below ground surface, in midden next to main pit structure, ca 12.2m SE of pit rim; assoc with Wylie focus material. Coll 1951 by R L Stephen-

son; subm by W S Marmaduke, Dept Anthropol, Univ Texas, Austin. *Comment* (WSM): supports estimated age of AD 1000 for Wylie focus (Marmaduke, 1975).

Sister Grove Creek series, Texas

Charcoal from Sister Grove Creek site (X41COL36), W bank of Sister Grove Creek, 800m S of Hwy 380, 9.6km W of Farmersville, N Texas (33° 09′ N, 96° 26′ W). Subm to establish age of Wylie focus ceremonial pit and assoc features. Coll 1974 and subm by M J Lynott, Archaeol Research Prog, Southern Methodist Univ, Dallas, Texas.

Tx-2033. Sister Grove Creek 226 **360 ± 70**

Hearth in pit, 48N/20E; should date use of ceremonial pit.

Tx-2034. Sister Grove Creek 227 **970 ± 200**

Hearth from lowest level in pit, 39N/27E; should date construction of ceremonial pit.

Tx-2036. Sister Grove Creek 229 **570 ± 80**

From concentration of oxidized clay and fire-cracked rocks, 54N/24E; should date use of ceremonial pit.

Tx-2037. Sister Grove Creek 238 **770 ± 70**

Hearth in ceremonial pit, 42-44N/18-20E; should date use of pit.

Tx-2038. Sister Grove Creek 241 **1000 ± 240**

Hearth in pit, 45N/28E; should date use of ceremonial pit.

Tx-2039. Sister Grove Creek 242 **620 ± 80**

Trash pit, 90-95S/55-60E; outside ceremonial pit.

Tx-2040. Sister Grove Creek 246 **790 ± 90**

Burial, 86S/52E; ca 100m S of ceremonial pit.

General Comment (MJL): dates (discussed in Lynott, 1975, p 69-70) indicate Wylie focus occupation occurred earlier than previously estimated. Dates agree with bone dates from same site (*ibid,* p. 70).

Hopewell School series, Texas

Charcoal from Hopewell School site (X41SV30), on first terrace 10m above Squaw Creek, 6.5km NE of Glen Rose, ca 70km SW of Fort Worth, Texas (32° 17′ 30″ N, 97° 45′ 20″ W). Late Edwards Plateau Archaic occupation, mixed component. Coll 1974 and subm by J G Gallagher, Archaeol Research Program, Southern Methodist Univ, Dallas, Texas.

Tx-2050. Hopewell School 389-9 **50 ± 60**

Hearth, Block C, Sq 389, Feature A.

Tx-2051. Hopewell School 360-73 **190 ± 60**

From within skeleton soil, Block C, Sq 360, Feature A.

Tx-2052. Hopewell School 360-72 **200 ± 60**

Same provenience as Tx-2051, above.

Tx-2064. Hopewell School 2208-1 **560 ± 110**

From bone and shell midden, Block BB, Sq 2208, Level 1.

General Comment (PGG): dates too recent for Edwards Plateau Archaic. For detailed discussion see Gallagher and Bearden, 1976, p 81-82.

Northlake series, Texas

Charcoal from Northlake site (X41DL8), 0.3km S of Ledbetter Rd on Leslie dairy farm, SE of Coppell, Dallas Co, Texas (32° 56′ N, 97° 57′ W). Assoc with Carrollton and Elam focus materials of Archaic stage, and pottery; possibly disturbed. Coll 1972, 1974 and subm by T R Hays, Inst Appl Sci, N Texas State Univ, Denton, Texas.

Tx-2066. Northlake 4 **1000 ± 100**

Level 3, A&B; ceramic level.

Tx-2123. Northlake 2 **Modern**

Level 6; lowest level, aceramic.

Tx-2308. Northlake 3 **1130 ± 170**

Level 6; aceramic.

General Comment (TRH): Tx-2066 and -2308 place levels in correct chronologic position and indicate site has not been disturbed. Dates also indicate when pottery first appeared in area, and provide estimate of length of occupation. No explanation apparent for Tx-2123, anomalous modern date.

Tx-2124. Palmetto Bend 41JK91/C4, Texas **2400 ± 90**

Charcoal from hearth, Feature 2, bottom of natural level 7, 3x3m unit, Site 41JK91, 2nd terrace W bank Navidad R, 11.2km SE of Edna, Jackson Co, Texas, in Palmetto Bend Reservoir basin (28° 53′ 18″ N, 96° 34′ 58″ W). Assoc with Abasolo point and other Archaic material. Coll 1974 by Jackson and McGuff and subm by D S Dibble, Texas Archaeol Survey, Univ Texas, Austin. *Comment* (W B Fawcett & P R McGuff): date agrees with dates for Archaic stage (pre-AD 1000) in other parts of Texas coast (see comment, R, 1970, v 12, p 265).

Tx-2482. Hop Hill, Texas **230 ± 70**

Charcoal from postulated fire hearth in Hop Hill site (41GL21), ca 26.5km E of Fredericksburg, 300m S of Pedernales R, central Texas (30° 14′ N, 98° 36′ W). From Zone #2, 1000E/101N, Strata 2-1, 14cm depth, believed to be Twin Sisters substage, central Texas Archaic. Coll 1976 and subm by J D Gunn, Center for Archaeol Research, Univ Texas, San Antonio. *Comment* (JDG): date indicates sample is intrusive root, charred in recent burning of vegetation.

Tx-2539. San Gabriel 41WM53, Texas **1620 ± 70**

Charcoal from Site 41WM53, on N fork of San Gabriel R, ca 7km NW of Georgetown, central Texas (30° 39′ N, 97° 43′ W); Area E, Test Sq D, Level 5, assoc with Bulverde points. Coll 1976 and subm by T R Hays, Inst Appl Sci, North Texas State Univ, Denton, Texas. *Comment* (TRH): date agrees fairly well with geol interpretation but is later than expected in terms of projectile point chronology for central Texas.

Tx-2675. Loeve site WM-CS-1, Texas **8500 ± 130**

Charcoal from hearth exposed in stream bank ca 4m below present surface in Loeve site (41WM133), 6.3km downstream from Hwy 95 on left bank of San Gabriel R, central Texas (30° 39′ 35″ N, 97° 24′ 30″ W). Early Archaic component. Coll 1977 and subm by E P Baxter, Anthropol Research Labs, Texas A&M Univ, College Station, Texas. *Comment* (EPB): date is appropriate for central Texas Archaic. Previous dates from site (Tx-802, 7000 ± 160, and Tx-805, 6900 ± 110; R, 1970, v 12, p 633) were from hearth believed to be stratigraphically higher; dates support this relationship. This is earliest date from San Gabriel R basin.

Chayah site series, Texas

Carbonized nuts and wood from Chayah site (41NA44), single-component late prehistoric Caddoan site ca 22.5km W of Nacogdoches, E Texas, on FM 225 (31° 36′ N, 94° 52′ W). From Area M, assoc with Patton Engraved pottery, a type often found elsewhere in this area with European trade goods. Coll 1976 and subm by J E Corbin, Dept Sociol, Stephen F Austin State Univ, Nacogdoches, Texas.

Tx-2639. Chayah 215 **1110 ± 70**

N62-W197, SU #9, 30 to 40cm.

Tx-2640. Chayah 425 **420 ± 80**

N62-W195, SU #5, 30 to 40cm.

Tx-2799. Chayah 420 **630 ± 50**

N60-W195, SU #1, 40 to 50 cm.

Tx-2800. Chayah 210 **670 ± 140**

Another part of same sample as Tx-2639, above.

General Comment (JEC): except for Tx-2640, dates do not pertain to occupation of site, which on total archaeol evidence dates from 350 ± 100BP. Samples represent all carbonized plant material coll on fine screen from excavation units indicated. Evidently this method of collecting samples from a sandy, gopher-disturbed site cannot be expected to produce valid results. Tx-2639 and Tx-2800, different parts of same sample, emphasize this problem.

Hinds Cave series, Texas

Charcoal from Hinds Cave (41VV456; Shafer and Bryant, 1977), W side of Still Canyon, 3.2km above confluence with Pecos R, Val Verde Co,

SW Texas (29° 53′ 30″ N, 101° 26′ 12″ W). All samples from early Archaic context. Coll 1975 and subm by H J Shafer, Archaeol Research Lab, Texas A&M Univ, College Station, Texas.

Tx-2314. Hinds Cave 1 **8280 ± 80**

Unit D-2, Level 7, 100 to 101cm depth, white ash lens. *Comment* (HJS): dates hitherto undated sandal forms and other perishable material contained in lens; is earliest date thus far for this cave occupation.

Tx-2315. Hinds Cave 2 **7220 ± 60**

Trench B-E, Level 4, 60 to 80cm depth, coprolite lens. *Comment* (HJS): provides date for latrine area which yielded "Early Barbed" dart point.

Tx-2316. Hinds Cave 3 **6750 ± 100**

Unit C, Level 10, possible remains of rock-lined pit. *Comment* (HJS): dates one of series of deep cultural lenses in Area C of cave. "Early Barbed" dart points in assoc deposits.

Tx-2466. Baker Cave C, Texas **9020 ± 150**

Charcoal from hearth in Zone 1 (Golondrina point horizon) in Baker Cave (41VV213; Word and Douglas, 1970), midway between Comstock and Juno, SW Texas, on dry tributary of Devils R (29° 59′ N, 101° 06′ W). Coll 1976 and subm by T R Hester, Center for Archaeol Research, Univ Texas, San Antonio. *Comment* (TRH): date agrees with Tx-128, 8910 ± 140, and Tx-129, 9030 ± 230, from same stratum in site (R, 1965, v 7, p 305, where stratum is called "Zone 8;" it is "Zone I" in Word and Douglas, 1970). Faunal and floral assoc indicate somewhat more mesic climate, with xeric conditions beginning ca 7500 BP (Hester, 1978).

Other States

Shallow Lake Site series, Arkansas

Fragments of burned log supports from floor of Structure 1 beneath Mound C, Shallow Lake site (3UN52), early Caddoan site 0.8km W of Shallow Lake, Lapoile Creek drainage, Arkansas (33° 08′ N, 92° 10′ W). Coll 1975 (except as noted) and subm by P Stacy, Arkansas Archaeol Survey, Univ Arkansas at Monticello.

Tx-2623. Shallow Lake 75-379-20 **660 ± 80**

Center of Sq 10.

Tx-2624. Shallow Lake 75-379-25 **470 ± 130**

Sq 6M.

Tx-2625. Shallow Lake 75-379-28 **720 ± 60**

Sq 7.

Tx-2626. Shallow Lake 75-379-30 **650 ± 60**

SE quad of Sq 5.

Tx-2627. Shallow Lake 72-531-60 **1890 ± 390**

Test pit 10, top of midden. Coll 1972 by J Lischka.

General Comment (PS): Tx-2623, -2626 support archaeo-magnetic date of AD 1302 ± 23 from central hearth of Structure 1 (Stacy, written commun); they are slightly later than ceramic estimate of AD 1100-1200. Tx-2624 slightly later, but not significantly so. Tx-2627 is anomalous; presumably relevant to midden beneath structure, not to structure.

Tx-2190. Perry Ranch Bison, Oklahoma **7030 ± 190**

Apatite fraction of *Bison antiquus* bone from Perry Ranch site (34JK81), on Turkey Creek, tributary of Salt Fork of Red R, SW Oklahoma (34° 40′ N, 99° 40′ W). Assoc with Plainview point. Coll 1974 and subm by R S Saunders, Oklahoma Archaeol Survey, Univ Oklahoma, Norman. *Comment* (RSS): date indicates later portion of Plainview time range as now understood.

Tx-2408. Waurika 1, Oklahoma **630 ± 100**

Charcoal from Waurika site (34St26), N bank of Beaver Creek, Stephens Co, S central Oklahoma (34° 19′ N, 98° 07′ W). Sample eroding from creek bank, 2m below surface, assoc with lithic debitage. Coll 1976 by S Hall and subm by T R Hays, Inst Appl Sci, N Texas State Univ, Denton, Texas. *Comment* (TRH): dates alluvial deposit and may be related to cultural material. Other sites in area have been subjected to severe erosional activity and are not in primary context.

Tx-2816. Mahaffey, Oklahoma **1920 ± 70**

Charcoal from Feature 3, trash pit, 50cm depth, in Mahaffey site (Ch-1), McCurtain focus (late Caddoan) site on peninsula on E side Hugo Lake, Choctaw Co, Oklahoma (34° 02′ 50″ N, 95° 23′ 45″ W). Coll 1977 and subm by G Perino, Mus of the Red River, Idabel, Oklahoma. *Comment* (GP): date >1000yr too old for McCurtain focus, reason for discrepancy unknown; assocs with McCurtain pottery were good.

Tx-2285. X29ED13, 0-0-19, New Mexico **5810 ± 290**

Charcoal from buried hearth in alluvium, exposed in arroyo cut 65 to 75 cm below surface, site X29ED13, 9km S of McMillan Dam, E side of Pecos R, 6.6km SE of Seven Rivers, Eddy Co, New Mexico (32° 32′ 50″ N, 104° 22′ 30″ W). Coll 1975 and subm by J G Gallagher, Archaeol Research Prog, Southern Methodist Univ, Dallas, Texas. *Comment* (JGG): date refers to diffuse occupation represented only by lithic debris and hearth.

Tx-2717. M-362/V1-6c, New Mexico **1250 ± 330**

Charcoal from earth in 2 early Mogollon vessels containing shell jewelry, site M-362/V1-6c, New Mexico, ca 96km NNE of El Paso, Texas (32° 30′ 36″ N, 105° 45′ 30″ W). Coll 1975 and subm by W Wooldridge, Texas Archaeol Survey, Univ Texas, Austin. *Comment* (WW): date con-

sistent with typologic features of vessels, although pre-AD 1000 was expected.

Placitas Arroyo series, Mexico

Charcoal from 3 early Mogollon sedentary sites, in Placitas Arroyo subwatershed, 5km SW of Hatch, New Mexico (32° 40′ N, 107° 09′ W). Subm to establish date for shift to sedentism in this region. Coll 1976 and subm by E P Morenon, Inst Appl Sci, North Texas State Univ, Denton, Texas.

Tx-2613. Placitas Arroyo 2, 272 **1690 ± 70**

Site 2, burned post in Pithouse 1; Mogollon 1.

Tx-2614. Placitas Arroyo 2, 297 **1260 ± 70**

Site 2, from hearth in magnetometer-defined anomaly; assoc with Mesilla phase artifaces but in unsealed context near surface.

Tx-2615. Placitas Arroyo 2, 448 **1440 ± 70**

Site 2, burned post in subfloor pit, Pithouse 1; Mogollon 1.

Tx-2616. Placitas Arroyo 2, 453 **1540 ± 70**

Site 2, burned post in Pithouse 1; Mogollon 1.

Tx-2618. Placitas Arroyo 5, 124 **2030 ± 80**

Site 5, possible hearth within a paleosol, assoc with Hueco to Mesilla phase artifacts but in unsealed context near surface.

Tx-2619. Placitas Arroyo 8, 262 **1750 ± 60**

Site 8, burned roof post from Pithouse 2; Mogollon 1.

Tx-2620. Placitas Arroyo 8, 333/528 **900 ± 70**

Site 8, carbonized wood from subfloor pit in Pithouse 2; Mogollon 1. *Comment* (EPM): context apparently well-sealed, but sample may be intrusive tree root since wood was carbonized rather than burned. Trees are rare on these sites today, being mainly confined to arroyo bottoms.

Tx-2621. Placitas Arroyo 8, 473 **1580 ± 70**

Site 8, burned roof fall from Pithouse 4; Mogollon 1.

Tx-2622. Placitas Arroyo 8, 556 **1720 ± 70**

Site 8, post from Pithouse 4; Mogollon 1.

General Comment (EPM): by 2000 BP (Tx-2618), horticulturists were using Placitas Arroyo at open-air sites. Later, tight cluster of dates for pithouses from Sites 2 & 8 shows sedentary Mogollon 1 village in use ca 1700 to 1500 BP. This is unusually early for Jornada branch of Mogollon, but agrees with recent evidence from Mogollon Rim to W. At Site 2, Mesilla phase follows Mogollon 1; Tx-2614 date agrees with traditional age estimate of Mesilla phase.

Tx-2128. Lehner site A, Arizona **10,160 ± 140**

Charcoal from upper portion of Unit F_2, Lehner site (Ariz:EE:12:1), W side of San Pedro R, Cochise Co, Arizona (31° 25′ 23″ N, 110° 06′ 48″ W). Coll 1974 by N Ajeman and subm by C V Haynes, Dept Anthropol, Univ Arizona, Tucson. *Comment* (CVH): sample slightly above Clovis surface; dates post-Clovis occupation of site.

Tx-2541. Last Supper Cave, Nevada **8960 ± 190**

Charcoal from Last Supper Cave (26Hu102), N side of canyon overlooking Hell Creek, 2.5km from confluence with Virgin Creek, Nevada (41° 44′ N, 119° 10′ W). From "shell stratum" below Mazama ash, assoc with Parman series and Cougar Mt projectile points. Coll 1974 and subm by J O Davis, Nevada Archaeol Survey, Univ Nevada, Reno. *Comment* (JOD): date is significantly older than WSU-1706, 8260 ± 90 (J O Davis, written commun), on another part of same sample. Generally agrees with dates on pelecypod shells from same stratum: LSU-120, 8790 ± 350 (T Layton, written commun) and WSU-1431, 8630 ± 195 (R, 1976, v 18, p 145). All these dates are significantly younger than 10 dates on Lake Mohave points from Smith Creek Cave, which are ca 9300 to 11,700 BP (R, 1977, v 19, p 318-319). Apparently Lake Mohave, Parman, and Cougar Mt points span at least 2000yr, from ca 10,500 to 8500 BP.

Tx-2714. Kachina Cave, Nevada **1350 ± 70**

Charcoal from pine nut cache in juniper-bark-lined pit, Kachina Cave (26WP69), N side Smith Creek Canyon, ca 29km N of US Hwy 50 crossing of Nevada-Utah border (39° 21′ N, 114° 06′ W). Feature 2, Unit C-10, 30cm BD. Coll 1971 and subm by D R Tuohy, Dept Anthropol, Nevada State Mus, Carson City. *Comment* (DRT): dates earliest use of pine nuts by inhabitants of Smith Creek caves; adds to chronology of Baker phase. Previous Kachina Cave dates are in R, 1977, v 19, p 319.

Wortham Shelter series, Wyoming

Wood from 2 arrowshaft fragments, surface of woodrat midden, Sq D1, Wortham Shelter (48BH730) E side Bighorn Canyon, N end of Little Mt Plateau, Wyoming, 0.6km S of Montana state line (44° 59′ 30″ N, 100° 14′ 00″ W). Assoc with Avonlea style arrowpoints. Coll 1975 and subm by J W Greer, Dept Anthropol, Univ Missouri, Columbia.

Tx-2715. Wortham, Lot 9, 1 **1230 ± 90**

Tx-2716. Wortham, Lot 9, 2 **1230 ± 70**

General Comment (JWG): dates agree with previous estimates of Avonlea phase materials in Montana and Canada.

Mexico, Belize

Monte Albán series, Mexico

Charcoal from Monte Albán (B86-91), immediately SW of Oaxaca City, Mexico (17° 02′ N, 96° 47′ W). Subm to define chronology of Monte

Albán ceramic sequence. Coll 1972-73 by M C Winter and subm by D M Varner, Dept Anthropol, California State Univ at Fresno.

Tx-1814. Monte Albán MA72/2 **1350 ± 80**

Feature 20; assoc with late Period I ceramics. *Comment* (MCW): see Tx-1816, below.

Tx-1815. Monte Albán MA72/3 **1210 ± 100**

Feature 19, assoc with Period IIIB ceramics. *Comment* (MCW): date indicates contemporaneity with Period IV at site of Lambityeco in Valley of Oaxaca. Relation between Periods IIIB and IV remains to be clarified in terms of ceramics as well as chronology. Tx-1814-1816 probably date latest occupation at residential area excavated at Monte Albán in 1972 and 1973.

Tx-1816. Monte Albán MA72/4 **1230 ± 80**

Feature 20, 96.8 to 96.9cm depth; assoc with early Period III ceramics. *Comment* (MCW): this date and Tx-1814, above, suggest that midden deposit, Feature 20, was laid down in Period IIIB (Tx-1815) and that dated charcoal does not correspond in time with late Period I and early Period II sherds that occurred in deposit.

Tx-1918. Monte Albán MA72/45.5 **1560 ± 100**

Feature 45, 93.45cm depth, NE bottom; assoc with Period I/II ceramics. *Comment* (MCW): date is several centuries too late for late Period I context; no evident reason.

Tx-1919. Monte Albán MA73B/69.9 **2470 ± 50**

Feature 69, 92.68 to 92.58cm depth, Level IA; assoc with early Period I ceramics. *Comment* (MCW): see Tx-1921, below.

Tx-1920. Monte Albán MA73/73.7 **1790 ± 70**

Center of Feature 73, 91.26cm depth; assoc with Period II ceramics. *Comment* (MCW): date consistent with Period II context.

Tx-1921. Monte Albán MA73B/77.9 **2530 ± 50**

Feature 77, 93.0 to 42.0cm depth, Quads NW, SW; assoc with Period I ceramics. *Comment* (MCW): this date and Tx-1919, above, appear to date initial occupation of residential area excavated at Monte Albán in 1972 and 1973.

Tx-2402. Blue Creek #1, Belize **1420 ± 60**

Charcoal from Blue Creek site, on 92m rise W of village of Blue Creek, N Belize (17° 50′ N, 88° 55′ W). From Burial #1 in trench through Mound B-1; late Classic. Coll 1976 and subm by M B Nievens, Univ de las Americas, Puebla, Puebla, Mexico. *Comment* (MBN): date slightly earlier than pottery assocs suggest, but not impossible. Date is one of few clues for placing site in chronologic sequence.

Tx-2403. El Pozito #1, Belize **1860 ± 60**

Charcoal from El Pozito site, SW of Orange Walk, midway between villages of Guinea Grass and August Pine Ridge, N Belize (18° 00′ N, 88° 40′ W). From chamber fill of Mound B-VIII, alt 98.58m; assoc with late Chicanel ceramics. Coll 1976 and subm by M B Nievens. *Comment* (MBN): date confirms estimate by ceramics and dates construction of earliest architecture at site.

Venezuela, Ecuador

Campoma series, Venezuela

Charcoal assoc with pottery from Campoma site (Wagner, 1972a,b), near E shore Lake Campoma, 8km NE of Cariaco, Dist Ribero, Estado Sucre, E Venezuela (10° 30′ N, 63° 35′ W). Coll 1971 and subm by E Wagner, Dept Antropol, IVIC, Caracas, Venezuela. Each sample was broken into 3 parts which were prepared and counted separately. Individual dates are given; final date is average. Figures after title denote trench no. and level.

Tx-1433. Campoma EW1, C-3, 0.0-0.25m **700 ± 50**

700 ± 70; 650 ± 110; 760 ± 80.

Tx-1434. Campoma EW3: D-3, 0.50-0.75m **720 ± 40**

700 ± 70; 800 ± 70; 670 ± 70.

Tx-1435. Campoma EW4: D-1, 0.25-0.50m **750 ± 40**

740 ± 70; 770 ± 80; 750 ± 80.

General Comment (EW): dates fit well into expected protohistoric Period IV (AD 1000 to 1500) occupation of regional chronology. Previously, chronology was based entirely on stylistic comparisons.

El Jobal series, Venezuela

Charcoal from El Jobal site (Wagner, 1973a;b), ca 5km SE of Aqua Viva, Dist Valera, Estado Trujillo, W Venezuela (9° 30′ N, 70° 37′ W). Coll 1972 and subm by E Wagner. Figures after title denote trench no. and level.

Tx-1576. El Jobal EW1-1: B-2, 0.25-0.50m **1530 ± 50**

Tx-1577. El Jobal EW3-1: B-2, 0.75-1.00m **1680 ± 70**

Tx-1578. El Jobal EW4-1: B-2, 1.00-1.25m **1670 ± 70**

Tx-1579. El Jobal EW6.1: B-1, 0.25-0.50m **1520 ± 50**

General Comment (EW): dates are consistent. Closely related pottery belonging to Betijoque style (Cruxent & Rouse, 1958, p 148) from nearly Los Tiestos site not adequately dated yet, due to lack of organic material. Present dates place El Jobal and Betijoque in Period III (AD 300 to 1000) of regional chronology, which fits well into W Venezuelan chronology.

Lagunillas U-52 series, Venezuela

Samples from Lagunillas U-52 site (Wagner, 1974; 1976), ca 2km E of Lagunillas, Estado Zulia, ca 200m from Shell Oil Wells 1951 and 2093 (10° 10′ N, 71° 20′ W). Formerly part of Lake Maracaibo but not under water since dam built in 1939. Coll 1974 and subm by E Wagner.

Tx-1945. Lagunillas 6 **1170 ± 60**

Rotted wood pole fragment from Trench A, in vertical position, depth of upper part of pole ca 1m.

Tx-1946. Lagunillas 7 **1280 ± 60**

Peat (turba), Test Trench 2, ca 1.5m depth. Could date draining of lake.

Tx-1947. Lagunillas 8 **1310 ± 50**

Rotted wood pole fragment from Test Trench 1, in vertical position, ca 2m depth.

Tx-1948. Lagunillas 9 **2430 ± 60**

Charcoal fragments in earth from Trench A, 0.30 to 1.10m depth.

Tx-1949. Lagunillas 10 **2390 ± 60**

Charcoal from Trench A, 0.30 to 1.10m depth.

Tx-1950. Lagunillas 11 **2160 ± 80**

Charcoal from Trench 1, 1.30 to 1.50m depth.

Tx-1951. Lagunillas 12 **2330 ± 70**

Charcoal from Trench B, 0.10 to 0.25m depth.

General Comment on Tx-1945—Tx-1951 (EW): Tx-1948-1951 were assoc with pottery of newly established Lagunillas phase (Wagner & Tarble de Ruíz, 1975). Dates are consistent and agree with expected ages, and with related material from Venezuela and Colombia. Tx-1945-47 are more recent and may date draining of lake.

Tx-2272. Lagunillas 13 **300 ± 70**

Wood fragments 100m S of Trenches A & B, from upper portion of pole protruding ca 1m above ground.

Tx-2273. Lagunillas 14 **400 ± 50**

Same as Tx-2272, above; 0.5m above ground.

General Comment on Tx-2272, -23 (EW): dates fit well into expected early historic period (after AD 1500), and confirm information provided by historic sources. Assoc pottery very different from Lagunillas phase pottery.

Bachaquero series, Venezuela

Samples from Trench E, Bachaquero site E, between towns of Bachaquero and Lagunillas near "La curva del Indio", Pueblo Viejo,

on Rd GG-82, near Oil Well 1737, Estado Zulia, Venezuela (10° 00′ N, 71° 10′ W). Assoc with Dabajuroid ceramics; subm to confirm relative dating of Dabajuro IV and V of regional chronology. Coll 1974 and subm by E Wagner.

Tx-2270. Bachaquero 1, bone apatite **550 ± 70**

Mammal bones, 0.15 to 0.25m depth.

Tx-2271. Bachaquero 2, snail shells **420 ± 50**

Depth 0.25 to 0.50m.

General Comment (EW): dates confirm relative date for Dabajuro as belonging to Periods IV and V of regional chronology, AD 1000 to after AD 1500.

El Diluvio series, Venezuela

Charcoal from sites near Hacienda El Diluvio, Dist Perija, Estado Zulia, Venezuela (10° 37′ N, 72° 23′ W). Assoc with pottery and stone tools related to Rancho Pueblo of Dabajuroid tradition. Subm to confirm regional chronology. Coll 1976 and subm by E Wagner.

Tx-2409. El Diluvio 1, DIL-1 **7410 ± 440**

Trench 1, level 0.25 to 0.50m, El Diluvio Site 1, E bank of R Palmar, 350m from main building of hacienda.

Tx-2410. El Diluvio 2, DIL-2 **1240 ± 170**

Trench 8B, level 0 to 0.25m, El Diluvio Site 2, in sugar cane field next to main bldg of hacienda.

Tx-2411. El Diluvio 2, DIL-3 **9850 ± 250**

Same location as Tx-2410, level 0.25 to 0.50m.

Tx-2412. El Diluvio, DIL-4 **3490 ± 240**

Same location as Tx-2410; Trench 9B, level 0.25 to 0.50m.

Tx-2413. El Diluvio 2, DIL-5 **8800 ± 100**

Same location as Tx-2410; Trench 10B, level 0.20m.

General Comment (EW): Tx-2409, -2411, -2413 seem too old and probably consisted of a mixture of charcoal (from recently cut trees) and coal (from Tertiary coal deposits common in Perija region). Dates for Tx-2410 and -2412 are reasonable. Additional dates are needed to refine and confirm regional chronology.

Alangasi Mastodon Locality series, Ecuador

Samples of wood from Alangasi Mastodon Locality, near Alangasi, Ecuador (0° 17′ S, 78° 24′ W). Samples are from trees buried in Late Cangagua, volcanic ash deposit of widespread occurrence around Mt Ilalo. Tx-1126-1130 from Site 1, 5m or more deep in side of quebrada; Tx-1131 from Site 2, ca 60m downstream from Site 1, 8 to 10m deep.

Coll 1970 and subm by R E Bell, Dept Anthropol, Univ Oklahoma, Norman.

Tx-1126. Alangasi Site 1, A **>38,000**

Tx-1127. Alangasi Site 1, B **>40,000**

Tx-1128. Alangasi Site 1, C **36,750 ± 2540**

Tx-1129. Alangasi Site 1, D **>40,000**

Tx-1130. Alangasi Site 1, E **39,560 ± 7200**

Tx-1131. Alangasi Site 2 **39,100 ± 6820**

General Comment (REB): dates are older than expected, but can be used to date Alangasi cangagua deposit. Whether they date mastodon remains is uncertain; either mastodon was not contained within cangagua and represents later time period, or was in cangagua and exposure by erosion aroused interest and attention of later prehistoric peoples.

Shobschi Cave series, Ecuador

Charcoal from preceramic horizon, Shobschi Cave, near Sigsig, Prov Azuay, Ecuador (3° 03′ S, 78° 48′ W). Coll 1968 by G Reinosa Hermida and subm by R E Bell.

Tx-1132. Shobschi A **8480 ± 200**

From 10cm below surface.

Tx-1133. Shobschi B **10,010 ± 430**

From 20cm below surface.

General Comment (REB): dates indicate that Shobschi represents important preceramic site; since depth of deposit exceeds that for oldest charcoal sample, greater antiquity can be expected for lower levels.

Santa Lucia series, Ecuador

Charcoal scraped from pottery vessels of Panzaleo ware from graves in Santa Lucia site (ED-16), near Tumbaco, Ecuador (0° 14′ S, 78° 23′ W). Coll 1970 and subm by R E Bell.

Tx-1134. Santa Lucia, Burial #1 **2060 ± 110**

Tx-1135. Santa Lucia, Burial #2 **2170 ± 100**

General Comment (REB): these are 1st radiocarbon dates for Panzaleo ceramics of highland area, which are common and widespread around Quito. Dates provide starting point for reliable chronologic sequence of ceramics in this region.

Tx-1136. Rubia Cocha #2, Ecuador **170 ± 70**

Charcoal from buried fireplace exposed in side of ditch, 10 to 35cm below surface, in Rubia Cocha #2 site (ED-4), near Tumbaco, Ecuador (0° 14′ S, 78° 23′ W). Field evidence not certain whether fireplace was

assoc with Panzaleo ceramics, with preceramic occupation, or represented recent charcoal preparation subsequently covered by collovium. Coll 1970 and subm by R E Bell. *Comment* (REB): date is clearly recent and apparently derived from charcoal industry of past few decades; does not contribute to dating of Panzaleo ceramics.

Peru

Gramalote series

Samples of epiphyte *Tillandsia* from stratigraphic cut in Gramalote site (H6168B; Pozorski, 1976, Ch IV), Initial Period site 150m from Pacific shore in Moche Valley, N coast of Peru (8° 06′ 04″ S, 79° 06′ 54″ W). Natural levels numbered from top to bottom. Coll 1973, 1974 and subm by T Pozorski, Dept Anthropol, Univ Texas, Austin.

Tx-1929A. Gramalote 128, charcoal **3070 ± 90**

Tx-1929B. Gramalote 128, wood **3250 ± 120**
From Natural Level 3.

Tx-1930A. Gramalote 129, charcoal **3050 ± 110**

Tx-1930B. Gramalote 129, wood **3540 ± 80**
From Natural Level 2.

Tx-1931A. Gramalote 130, charcoal **3530 ± 130**

Tx-1931B. Gramalote 130, wood **3280 ± 60**
From Natural Level 1.

General Comment (TP): although not in stratigraphic order, dates coincide well with early occupation of Caballo Muerto complex (Tx-1938, below), supporting relative-chronologic evidence of artifacts and subsistence remains.

Padre Aban series

Samples of *Tillandsia,* except as noted, from Padre Aban site (H64326410), preceramic site 200m from Pacific shore, Moche Valley, Peru (8° 04′ 27″ S, 79° 06′ 25″ W). Natural levels numbered from top to bottom. Coll 1973, 1974 and subm by T Pozorski.

Tx-1933. Padre Aban 64 **3850 ± 210**
From Natural Level 5.

Tx-1934. Padre Aban 63 **3930 ± 120**
From Natural Level 7.

Tx-1935. Padre Aban 64 **3670 ± 260**
Grama grass, from Natural Level 5.

Tx-1936. Padre Aban 66 **5420 ± 140**
From Natural Level 3.

General Comment (TP): Tx-1933 and -1934 are consistent with evidence that site is preceramic and without textiles, antedating Caballo Muerto, below, and Gramalote, above. Tx-1935 may be too young; Tx-1936 is much too old.

Caballo Muerto series

Samples of charred cane *(Gynerium sagittatum),* except as noted, from sites in Caballo Muerto complex (Pozorski, 1976), 18km to 20km inland from Trujillo, Moche Valley, Peru (8° 05′ S, 78° 56′ W). Chavin-Cupisnique horizon. Coll 1973, 1974 and subm by T Pozorski.

Tx-1937. Herederos Chica 197 **3040 ± 60**

Cut 2, 550 to 575cm depth, in small cobble and adobe mound, Huaca Herederos Chica site (K498586), ca 20km from Pacific coast.

Tx-1938. Herederos Chica 145 **3450 ± 70**

Same as Tx-1937, Cut 1, 400 to 420cm depth.

General Comment on Tx-1937, -1938 (TP): dates apply to Phase I of complex. Tx-1938 supports archaeol evidence, whereas Tx-1937 is inconsistent (too young) with archaeol data.

Tx-1939. Guavalito 41 **2390 ± 70**

From Huaca Guavalito (K482582), Cut 1, just above sealed floor of 2nd construction phase, in corridor W of colonnade. Phase 3 of complex. *Comment* (TP): agrees well with archaeol evidence for sequence.

Tx-1972. Huaca de los Reyes 105 **3310 ± 80**

First construction phase of Huaca de los Reyes (K4462), 18km inland from coast; Phase 2 of complex. Probable roofing material found on floor of 1st construction phase, Mound F, Cut 47.

Tx-1973. Huaca de los Reyes 106 **3140 ± 60**

Same provenience as Tx-1972.

Tx-1974. Huaca de los Reyes 289 **3680 ± 80**

Same provenience as Tx-1972, -1973; pieces of cane post burned *in situ* within bench floor.

Tx-2180. Huaca de los Reyes 438 **2800 ± 60**

Pieces of cane post in floor N of S bench, on top of Mound F, 1st construction phase, Cut 47.

General Comment on Tx-1972-1974, -2180 (TP): all dates apply to Phase 2 of Caballo Muerto complex. Tx-1972, -1973 are consistent with relative dating by archaeol evidence; Tx-1974 seems early; Tx-2180 is inconsistently late.

Tx-2181. Huaca de los Reyes 173 **1560 ± 120**

Junco grass (*Cyperus* sp) near floor along S face of 3rd N pillar, Cut 15, Mound B. *Comment* (TP): late date, relative to others of series, led to

re-examination of field records. Context is found to be dubious; date presumably not applicable to Phase 2 of complex.

Huancayo Alto series

Charcoal from various residential, administrative and industrial zones within Huancayo Alto site (PV-46-2), at Km 56 in Chillon Valley, central coast of Peru (11° 42′ S, 76° 50′ W). Late Intermediate period through Late Horizon. Coll 1974 and subm by T D Dillehay, Dept Anthropol, Univ Texas, Austin.

Tx-2002. Huancayo Alto 1 **320 ± 60**
Room 1, Unit 3, level 40cm, directly below Floor 2.

Tx-2003. Huancayo Alto 2 **1650 ± 170**
Stone-lined Terrace #2, Test pit 1, Level 1.

Tx-2004. Huancayo Alto 3 **2880 ± 80**
Storage Unit 1, Level 2.

Tx-2005. Huancayo Alto 4 **1740 ± 70**
Storage Unit 2, Level 2.

Tx-2006. Huancayo Alto 5 **580 ± 100**
Drying Terrace #1, Level 4.

Tx-2007. Huancayo Alto 6 **1250 ± 180**
Drying Terrace #2, Test pit 2, Level 3.

Tx-2008. Huancayo Alto 7 **1220 ± 60**
Drying Terrace #3, Test pit 1, Level 2.

Tx-2009. Huancayo Alto 8 **620 ± 60**
Room 3, level 65cm, fill at base of Floor 4.

General Comment on Tx-2002-2009 (TDD): dates confirm initial and secondary construction phases (ca 1000 to 500 BC and AD 200 to 500) and subsequent periods of occupation (AD 500 to 1650) indicated by assoc architecture and ceramics: Chavín-like, Maranga, Chancay Black-on-White, Inca. Tx-2004-2008 are from large drying terrace and storage facility area; this is earliest known complex of this kind peripheral to a central Andean urban site.

Tx-2070. Huancayo Alto 11 $\delta^{14}C = +29.4 \pm 2.4‰$
Platform, Level 2, Test Pit 1.

Tx-2071. Huancayo Alto 12 $\delta^{14}C = +19.7 \pm 2.9‰$
Room 3, Level 3.

Tx-2072. Huancayo Alto 13 **Modern**
Room 3, level 115cm.

General Comment on Tx-2070-2072 (TDD): dates show disturbance resulting from use of prehistoric floors by shepherds, though there was no field evidence of disturbance.

Tx-2376. Huancayo Alto 14 **610 ± 70**
Drying Terrace #1, Level 3.

Tx-2377. Huancayo Alto 15 **560 ± 50**
Terrace 1, Level 2.

Tx-2397. Huancayo Alto 16 **1840 ± 50**
Storage Unit 3, Level 1.

General Comment on Tx-2376, -2377, -2397 (TDD): dates confirm other dates in this list for drying and storage zones within site. Tx-2377 is from residential stone-lined terrace zone peripheral to main site area; these terraces are assoc with some highland ceramics, which suggests coastal-highland co-residence at site.

Quives series

Charcoal samples from Quives site (PV-46-3), at junction of Chillon and Arahuay Rs in upper Chillon Valley, central coast of Peru (11° 38′ S, 76° 46′ W). Assoc with pre-Incaic and early Colonial materials. Coll 1974 and subm by T D Dillehay.

Tx-2068. Quives 3 **2710 ± 70**
Test Pit 1, Rm 1, Level 2; pre-Incaic.

Tx-2069. Quives 4 **Modern**

General Comment (TDD): dates confirm ceramic evidence for occupation from ca 500BC to AD 1650. Tx-2069 suggests occupation continued into post-Colonial times.

Monterrico Grande Oeste 1 series

Charcoal from tomb and living floor within residential zone of Monterrico Grande Oeste 1 site, at Km 8 E of Lima on N bank of Rimac R, central coast of Peru (12° 10′ S, 76° 85′ W). Middle Horizon through Late Horizon. Coll 1974 by A S Millones and subm by T D Dillehay.

Tx-2369. Monterrico Grande Oeste 1/1 **Modern**
Area D, Sec 4, Quad 89, Level 2. *Comment* (ASM): date shows disturbance resulting from partial destruction by modern residents.

Tx-2370. Monterrico Grande Oeste 1/2 **780 ± 60**
Area 3, Sec 2, Floor A, Level 2, 1m depth, Quad 416, Burial 9. *Comment* (ASM): date confirms period of occupation (ca AD 500-1000) indicated by assoc architecture and ceramics of Huancho culture.

Mummy Bundle series

Specimens from prehistoric mummy bundles, central and S coast of Peru. Subm by J M Vreeland, Dept Anthropol, Univ Texas, Austin.

Tx-2448. Paracas Necropolis 226; X-5 **1860 ± 60**

Cotton cloth fragments from Mummy Bundle #226, Grand Necropolis of Cerro Colorado, Dpto Pisco, 250km S of Lima, Peru (13° 55′ S, 76° 15′ W). Paracas phase, Nazca culture. Bundle coll 1927 by T Mejía Xesspe; dissected and sample coll 1976 by Vreeland. Sample taken from bottom internal part of bundle isolated from environment, although moisture, mold, or insects could have affected it. *Comment* (JMV): according to current evidence, date is appropriate; falls at end of Paracas phase.

Tx-2449. Rinconada 60; X-2 **700 ± 50**

Oxidized cotton cloth fragments and organic remains from Mummy Bundle #60, from Rinconada Alta, La Molina, Rimac Valley, ca 5km E of Lima, Peru (12° 10′ S, 76° 55′ W). From internal portion of bundle, adjacent to body. Huancho phase cultural assoc. Bundle coll 1972 by A Sandoval M; dissected and sample coll 1975 by Vreeland. *Comment* (JMV): no other dates available for comparison; agrees with stratigraphic assignment to middle of Central Coast Huancho phase (ca AD 900-1532).

Tx-2450. Huaca de la Universidad **710 ± 60**

Cotton fiber from mummy bundle recovered in salvage operation during destruction of Huaca de la Universidad pyramid in downtown Lima, Peru (12° 10′ S, 76° 55′ W). One of largest prehistoric mummy bundles reported, containing largest known prehistoric single-web textile. Cultural assoc probably Epigonal. Bundle coll ca 1970 by T Mejía Xesspe; opened and sample coll 1974 by Vreeland. *Comment* (JMV): 1st date for material from this pyramid. Stylistic features support date, at end of Central Coast Epigonal.

La Galgada series

Charcoal and maguey wood from La Galgada site, Pallasca Prov, Peru, 1km S of La Galgada, E bank of Chuquicara R (8° 12′ S, 78° 10′ W). Dated to check archaeol evidence for preceramic date of very advanced architecture. Coll 1976 by Grieder and Bueno and subm by T Grieder, Dept Art, Unit Texas, Austin.

Tx-2463. La Galgada, 1 **3740 ± 90**

Wood charcoal from midden, base of massive wall, N Gallery, Mound B.

Tx-2464. La Galgada, 2 **3440 ± 80**

Maguey wood from shaft wall leading to tomb built into temple after all floors had been constructed, S Gallery, Mound B; Phase 5 of construction.

General Comment (TG): dates confirm preceramic period suggested by textiles, and indicate time lapse between end of temple bldg period (Tx-2463) and construction of shaft tombs (Tx-2464).

Italy, Egypt, Sudan

Pizzica Series II, Italy

Charred wood samples from Pizzica site, 3km NW of Metaponto Scalo, Pizzica Pontanelle area, S Italy (40° 23′ N, 16° 35′ E). Previous dates from site in R, 1977, v 19, p 323. Coll 1976 and subm by J C Carter, Dept Classics, Univ Texas, Austin.

Tx-2468. Pizzica PZ.76.293SS **2520 ± 90**

From beam in upper level of deposit of gray pottery, NS trench, Area Beta, Level 2.

Tx-2538. Pizzica PZ.76.140SS **2410 ± 120**

From below fallen roof tiles, probably from roof beams of tile factory. Sq A′12, W of Wall Beta W, N of rectangular structure, Level 2.

General Comment (JCC): ceramic evidence suggests 200 BC at earliest; thus dates are inconsistent with archaeol evidence. Since samples were from large beams, probably inner rings of old trees were being dated.

Tx-2340. El Khatara, Egypt **4970 ± 70**

Charcoal from El Khatara site (75/3A), Badarian midden, N bank of wadi 1km N of Danfiq, Egypt (25° 58′ N, 32° 40′ E). From Sq 2, Level 4, 75 to 100cm depth; subm to help date beginning of Egyptian Predynastic. Coll 1975 and subm by T R Hays, Inst Appl Sci, North Texas State Univ, Denton, Texas. *Comment* (TRH): date agrees with other dates from site (4780 ± 70 to 5030 ± 100: SMU-303, -351, -353, -355, -360; Hayes, written commun). All these dates are younger than most of Libby's Predynastic dates (4720 ± 310 to 6391 ± 180: C-457, -550, -551, -810-814; Libby, 1955, p 77-79).

Tx-2465. "Southtown," Egypt **4920 ± 90**

Charcoal from Petrie's "Southtown," N side of Wadi Ibeidalla, W of Nag Arab Turk, Egypt (25° 58′ N, 32° 40′ E), 15cm below surface in Gerzean culture midden. Coll 1976 and subm by T R Hays. *Comment* (TRH): date agrees with Libby's Gerzean dates (Libby, 1955, p 77-79).

Tx-1155. Dibeira West, Sudan **6540 ± 110**

Ostrich egg shell from deflated surface of Dibiera-Jer formation, partially *in situ,* Dibeira West site (DiW-5), Wadi Halfa, N Sudan (22° 05′ N, 31° 21′ E). Assoc with distinctive pottery with complex punctate and rocker-stamp decoration found at early Neolithic sites in Sudan, Ethiopia, Libya, Chad. Coll 1964 by A E Marks and subm by J L Shiner, Dept Anthropol, Southern Methodist Univ, Dallas, Texas. *Comment* (JLS): date indicates early Sudanese Neolithic; this widespread ceramic style appears to date from 4500 to 3500 BC. Sudanese Neolithic appears to be at least as early as Egyptian Neolithic.

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