

TEXAS A & M UNIVERSITY RADIOCARBON DATES I

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The Radiocarbon Dating Laboratory of Texas A & M University was initiated as a research facility in the Oceanography and Meteorology Department. The facilities are available to graduate study programs and to other research groups associated with the University.

Research was begun in June 1960, towards development of a carbon dating method utilizing liquid scintillation counting. Benzene was chosen as the counting solvent because of its high energy transmitting properties and the high carbon content of benzene which could be totally derived from the sample to be dated. A catalytic method of synthesis of C_6H_6 at low temperature, as first reported by Shapiro and Weiss (1957), was further developed and modified by Noakes and others (1963) to a procedure suitable for carbon dating. A combined effort of this laboratory and the University of Texas Radiocarbon Dating Laboratory has resulted in a routine procedure for carbon dating, as reported earlier (Texas I).

In the dates reported here the sample preparation and the method of conversion of carbon samples to the counting solvent, benzene, was the same as reported in the earlier papers cited. The problem, reported then, of variation in background count rate between counting vials was eliminated by prior determination of the background for each vial used. With the exception of samples TAM 1 and TAM 2, all dates reported here were calculated according to this procedure.

The modern standard used was wood obtained from a tree felled in Central Texas between 1850 and 1854. The count rate for this standard was 6.42 counts/min/g with a counting efficiency of 50%, as determined by use of a Packard Tri-Card Automatic Liquid Scintillation Spectrometer, Series 314E, operating at a voltage of 850 with a 10 to 50-division window operating in coincidence. The statistics quoted here indicate only the uncertainty involved in counting random events. Ages are calculated on a C^{14} half-life of 5568 yr, using 1950 as the reference yr.

The check samples TAM 1 and TAM 2 listed in the date list are the same as samples TX-1 and TX-2 reported earlier by the University of Texas (Texas I), since both laboratories were initially developed through a co-operative effort.

Marine water samples from the Gulf of Mexico have been dated relative to our modern wood standard. Sea water dates will be published as δC^{14} values relative to a NBS oxalic acid C^{14} standard when mass spectrometric δC^{13} values are available for these calculations, as suggested by Broecker and Olson (1959).

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laboratory was being renovated. The technicians of his laboratory, F. Howard Hughes and William B. Wollet, helped in certain phases of the sample preparation of the dates recorded here.

Dr. Brian Logan of the Geological Section of the Department of Oceanography and Meteorology of Texas A & M University contributed many samples and helped in the evaluation of dates.

Dr. Ruble Langston of the Department of Plant Physiology and Pathology at Texas A & M University generously made available his liquid scintillation counter for counting and rechecking the samples.

SAMPLE DESCRIPTIONS

I. CHECK SAMPLES (GEOLOGIC)

TAM-1 (= Tx-1). Grand Forks, North Dakota **10,820 ± 190**
8870 B.C.

Wood from sand overlying till of the last ice advance in North Dakota; from 15 mi W of Grand Forks in NW $\frac{1}{4}$ sec. 31, T 152 N, R 52 W (47° 56' N Lat, 97° 22' W Long), Grand Forks County, North Dakota. Coll. 1958 by R. W. Lemke, U. S. Geol. Survey, Denver, Colorado, and H. E. Wright, Jr., Univ. of Minnesota, Minneapolis; subm. to Univ. of Texas Lab. in 1961 as a check sample by Meyer Rubin, U. S. Geol. Survey, Washington, D. C. *Comment:* measurement was previously reported as Tx-1 (Texas I). Sample has also been dated by U. S. Geol. Survey as W-723, 10,960 ± 300 (USGS V).

TAM-2 (= Tx-2). Sheep Creek, Alaska **5925 ± 275**
3975 B.C.

Wood from stump in W wall of placer cut, Sheep Creek, near Fairbanks, in SE $\frac{1}{4}$ sec. 17, T 1 N, R 2 W (64° 55' N Lat, 148° 00' W Long), Fairbanks D-2 Quadrangle, Alaska. From ca. 5 ft below surface of a gravel fan interbedded in silt, representing perhaps the last third of the Quaternary Period. The gravel overlies the Wisconsin-age Goldstream Muck Formation, or is part of the upper part of it, and is perennially frozen. Coll. 1956 by T. L. Péwé, U. S. Geol. Survey, College, Alaska; subm. 1961 to Univ. of Texas Lab. as a check sample by Meyer Rubin. *Comment:* measurement was previously reported as Tx-2 (Texas I). Sample has also been dated by U. S. Geol. Survey as W-859, 5940 ± 250 (USGS V).

TAM-3. Hutchins Creek, Illinois **4815 ± 250**
2865 B.C.

Wood specimen from Hutchins Creek Terrace, in NW $\frac{1}{4}$, SW $\frac{1}{4}$, sec. 25, T 11 S, R 3 W (37° 32' N Lat, 89° 23' W Long), Union County, Illinois. Log with well-preserved leaves, found in silt 24 ft below terrace surface. Coll. 1957 by S. E. Harris, Jr., Southern Illinois Univ., Carbondale. *Comment:* sample has been dated by U. S. Geol. Survey as W-823, 4840 ± 300 (USGS V).

II. GEOLOGIC SAMPLES

A. Campeche Bank, Yucatan

These dates were determined in an attempt to establish a chronology of sedimentary events in the late Pleistocene and early Holocene transgression of Campeche Bank, Yucatan. Samples are from cores and surface grabs taken on

various cruises of the Texas A & M research vessel R. V. *Hidalgo* during 1960 and 1961. The material dated includes calcareous shells and tests, oolites and calcareous pellets from various carbonate lithofacies in the area.

TAM-4. Cayo Arenas, Campeche Bank **1500 ± 500**
A.D. 450

Coral fragment forming nucleus of a large algal nodule at Station 70, Cayo Arenas reef, Campeche Bank (22° 08' 27" N Lat, 91° 22' 27" W Long), depth 47 m. *Comments*: predicted age was about 7000 B.P., synchronous with a lower sea level during the Holocene. The C¹⁴ date may be anomalous, due to the introduction of large amounts of secondary carbonate (aragonite).

TAM-5. Campeche Bank, Station 715, Sample 1 **17,710 ± 500**
15,760 B.C.

Shells from 43 to 71 cm interval below top of core from Station 715, Campeche Bank. Station occupied on cruise 61-H-2 (21° 30' N Lat, 32° 25' W Long), depth 180 m. Sample was taken from a stratum of white clayey pellet calcarenite in the lower section of the core and from immediately below a burrowed zone in the core which marks the upper surface of this stratum. Material dated consisted of planktonic tests and shells, calcareous pellets, and benthic tests. *Comment*: the white clayey pellet calcarenite is wide-spread on the NW margin of Campeche Bank, occurring in cores from depths below 110 m. It is believed to be of Wisconsin age.

TAM-6. Campeche Bank, Station 715, Sample 2 **10,220 ± 300**
8270 B.C.

Shells from 11 to 26 cm below top of core from Station 715, Campeche Bank. Station occupied on cruise 61-H-3 (21° 30' N Lat, 32° 25' W Long), depth 180 m. Samples was taken from a stratum of planktonic lutite in the upper section of the core and overlying the white clayey pellet calcarenite (Sample 1, Station 715). *Comment*: date closely approaches the postulated age (early Holocene).

TAM-7. Campeche Bank, Station 342 **13,320 ± 200**
11,370 B.C.

Superficial oolites and calcareous pellets from a surface grab sample at Station 342, Campeche Bank. Station was occupied on cruise 61-H-10 (21° 04' N Lat, 92° 28' W Long), depth 99 m. The grab was taken on the top of a mound-like feature on the shelf margin. *Comment*: the oolites were believed to be synchronous with the terrace at 90 to 100 m on Campeche Bank; their expected age was late Wisconsin.

TAM-8. Campeche Bank, Station 1224 **Modern**

Pelecypods from Station 1224, Campeche Bank. Station occupied on cruise 61-H-14 (20° 30' N Lat, 90° 46' W Long), depth 9 m. Shells were from a skeletal calcarenite veneer that overlies sea floor. *Comment*: expected age: modern.

TAM-9. Campeche Bank, Station 1234, Sample 1 **5200 ± 170**
3250 B.C.

Coarse fragments of pelecypod shells from surface grab at Station 1234, Campeche Bank, occupied on cruise 61-H-14 (20° 22' N Lat, 91° 40' W Long),

depth 35 m. Similar to the modern fauna from Station 1224. *Comment*: expected age: 6000 to 8000 B.P.

TAM-10. Campeche Bank, Station 1234, Sample 2 **3570 ± 200**
1620 B.C.

Fine shell fragments from surface grab at Station 1234, Campeche Bank, occupied on cruise 61-H-14 (20° 22' N Lat, 91° 40' W Long), depth 34 m. Fine silt-size carbonate grains washed out of the matrix of Sample 1/1234. Postulated age 1000 to 3000 yr. *Comment*: as expected, date was younger than the coarse fraction of the sediment from TAM-9 (above) suggesting that the bimodality of this lithology is due to mixing of two genetically and chronologically unrelated components.

TAM-11. Campeche Bank, Station 1231 **3925 ± 150**
1975 B.C.

Fine silt-sized skeletal grains from a skeletal calcarenite lithology from a surface grab Station 1231, Campeche Bank, occupied on cruise 61-H-14 (20° 22' N Lat, 91° 17' W Long), depth 22 m. *Comment*: expected age: 1000 to 3000 B.P.

TAM-12. Campeche Bank, Station 1236 **3470 ± 1000**
1520 B.C.

Thin-shelled pelecypod fauna from sandy carbonate mud surface grab, Station 1236, Campeche Bank. Station occupied on cruise 61-H-14 (20° 22' N Lat, 91° 56' W Long), depth 42 m. *Comment*: C¹⁴ date was obtained to test the postulated modern age of this fauna.

TAM-13. Campeche Bank, Station 141 **3150 ± 380**
1200 B.C.

Fine skeletal grains from fine-grained skeletal calcarenite from a surface grab, Station 141, Campeche Bank. Station occupied on cruise 60-H-2 (21° 40' N Lat, 91° 48' W Long), depth 45 m. *Comment*: expected age: 1000 to 3000 B.P.

TAM-33. Campeche Bank, Station 1301, Sample 1 **10,930 ± 170**
8980 B.C.

Hard calcareous pellets from a surface grab, Station 1301, Campeche Bank. Station occupied on cruise 62-H-2 (22° 20' 48" N Lat, 91° 28' 42" W Long), depth 115 m. *Comment*: sample was dated to ascertain the age of an extensive blanket of pelletal and oolitic sediments which overlie the northern margin of the Campeche Bank between the 80 and 160 m isobaths.

B. Antarctica

During the 1959-1960 and 1961-1962 Antarctic field seasons, several samples of mummified seal remains were collected from the Victoria Land sector of Antarctica by members of two separate field parties from the University of Kansas, Lawrence, Kansas. Dates are of interest in relation to present and future geological and geochemical studies.

TAM-14. Victoria Land, Sample McMRS-1 **1385 ± 200**
A.D. 565

Flesh of a freshly-killed Weddell Seal (*Leptonychates weddellii*) taken from the ice near NAF, McMurdo Sound, Victoria Land, Antarctica (77° 51'

S Lat, S Lat, 166° 37' E Long). Coll. Nov. 1961; stored in CCl₄. Subm. Dec. 1961 by E. E. Angino, Dept. of Geology, Univ. of Kansas. *Comment*: CCl₄ was eliminated from sample by vacuum drying. Sample used as modern reference standard to calculate date of mummified seal (MTN-1) relative to modern seal.

TAM-15. Victoria Land, Sample MTN-1 **1855 ± 160**
A.D. 95

Bones, skin and flesh from mummified crab-eater seal (*Lobodon carcinophagus*) from surface of dry moraine at alt 793 ± 25 m on the SW flank of Mount Nussbaum, Taylor Dry Valley, Victoria Land, Antarctica (77° 41' 30" S Lat, 162° 40' E Long). Coll. and stored in CCl₄ Dec. 1959, by E. E. Angino and E. J. Zeller, Dept. of Geology, University of Kansas; subm. Oct. 1961 by E. E. Angino. *Comment*: sample was dried in a vacuum oven to eliminate CCl₄. Calculated date relative to modern seal (sample TAM-14) was 500 yr. Olson and Broecker (Lamont VII) dated fur from carcass of a mummified seal (L-462E) obtained from Bonney Lake at the upper end of Taylor Dry Valley (77° 42' S Lat, 162° 25' E Long) in McMurdo Sound Area. Through use of a contemporary Antarctic seal (L-570, Lamont VIII) as a reference standard, an age of 300 yr was calculated. Relative to an oxalic acid C¹⁴ standard, their modern seal gave an age of 1300 yr.

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