

OAK RIDGE ASSOCIATED UNIVERSITIES RADIOCARBON DATES II

JOHN E. NOAKES, S. M. KIM, and F. FISCHER*

Special Training Division, Oak Ridge Associated Universities,
Oak Ridge, Tennessee

The Radiocarbon Dating Laboratories of the Oak Ridge Associated Universities (ORAU) has previously published radiocarbon dates under the Oak Ridge Institute of Nuclear Studies (ORINS) name. ORINS has recently changed its name to ORAU and its laboratories and programs have accordingly assumed this new name. The ORINS prefix, which previously designated the published radiocarbon dates of this laboratory, will be continued to minimize confusion in the literature.

The radiocarbon dating program carried out at this laboratory is primarily concerned with assisting the ORAU Special Training Program in its teaching and research activities. Radiocarbon dates which appear in this paper represent samples submitted from research groups associated with the 41 universities which make up ORAU and by other college and university personnel who do not have access to radiocarbon dating facilities.

Carbon samples are chemically synthesized to liquid benzene and their C^{14} activity determined by liquid scintillation spectroscopy. Samples are first converted to lithium carbide and then to acetylene gas as described by Barker (1953). The acetylene is catalytically trimerized to benzene by a method described by Noakes *et al.* (1965). Chemical yields for the synthesized benzene routinely approach 90% with no evidence of chemical impurities or carbon isotope fractionation occurring in the chemistry.

A Packard Tricarb Model 314 D.C. liquid scintillation spectrometer, which has been modified for low level counting, is used to count the benzene samples. Counting efficiency is 50% when operating at a voltage of 800 with discriminator setting of 100-800-1000. Background count rate is 1.7 c/m with a 5 cc benzene sample. Shielding consists of 4 in. of lead with coincidence and anticoincidence systems.

The modern reference standard is 0.95% activity of NBS oxalic acid standard which is 6.82 c/m/g carbon. Ages are calculated on a C^{14} half-life of 5570 yr as suggested by Godwin (1962). The statistics quoted are compiled as one standard deviation (1σ) of the uncertainty involved in counting background, standard, and sample.

ACKNOWLEDGMENTS

Dr. Brian Logan, Geol. Dept., Univ. of W. Australia, contributed many samples and helped in the evaluation. Dr. James Harding of Oceanonics, Inc. and William Bryant, Oceanog. Dept., Texas A & M Univ., submitted many marine samples and assisted in their evaluation. Mr. Darwin Chapman, a research assistant at the ORAU Special Training Division, assisted in sample preparation and counting.

* ORAU Research Participant, Graduate Student, UCLA at San Diego, California.

Financial support was received from the Division of Biology and Medicine and the Division of Nuclear Education and Training through the ORAU contract with the Atomic Energy Commission, No. AT(40-1)-GEN-33.

SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

A. Campeche Bank, Yucatan

Series of cores were taken from Campeche Bank, Yucatan, for study of physical, chemical, and geochemical properties of carbonate sediments in the area. Cores were coll. on various cruises of Texas A & M research vessel, "R. V. Alaminos," during 1965 and 1966.

CaCO₃ material from middle and lower sections of core (21E-65-A4) from Campeche Bank (20°-20' N Lat, 92° 17½' W Long); water depth 90 fms. Coll. 1965 by William Bryant, Dept. of Geol. Oceanog., Texas A & M Univ.; subm. 1965. *Comment:* medium-grained dark-gray calcarenite with lithic fragments in 300 cm section graded to light-gray calcilutite with dark-gray calcarenite with blebs of dark clay at 1000 cm section.

Lab No.	Core Interval (cm)	C ¹⁴ Date
ORINS-65	610-620	8,936 ± 90 6,986 B.C.
ORINS-66	670-680	9,180 ± 90 7,230 B.C.
ORINS-68	780-790	9,323 ± 100 7,373 B.C.
ORINS-69	920-930	10,267 ± 105 8,317 B.C.
ORINS-72	950-960	11,078 ± 130 9,128 B.C.
ORINS-70	960-970	12,585 ± 100 10,635 B.C.
ORINS-73	1000-1010	14,750 ± 130 12,800 B.C.
ORINS-63. Campeche Bank, Sample 8E-65-A4		15,000 ± 154 13,050 B.C.

Whitish-gray fine-grained calcilutite from upper middle section (interval 380 to 390 cm) of core from Campeche Bank (21°-59' N Lat, 92°-19' W Long); water depth 70 fms. Coll. 1965 by William Bryant; subm. 1965. *Comment:* CaCO₃ content less than 80% with pellets and dark-gray lithic fragments.

ORINS-71. Campeche Bank, Sample 10E-65-A4 >41,000

Medium- to coarse-grained gray calcarenite from bottom (1210 to 1220 cm) of core from Campeche Bank (20° 59' N Lat, 96° 26' W Long); water depth 73 fms. Coll. 1965 by William Bryant; subm. 1965. *Comment*: CaCO₃ content less than 80% with admixture of brown silt and clay. C¹⁴ date chronology of this core from 100 to 1150 cm intervals, publ. by Noakes (1967).

B. Shark Bay, Western Australia

Shark Bay is lagoonal sea lying between (26° 45' S Lat, 24° 30' S Long) on W coast of Australia. Since 1964, a marine research group from the Dept. of Geol., Univ. of W. Australia, has been conducting research programs on carbonate sedimentation and diagenesis of carbonate sediments in Shark Bay. The following C¹⁴ dates are mainly on shell material obtained from emergent Quaternary sediments in the area.

**ORINS-62. Shark Bay, B265133 424 ± 86
A.D. 1,526**

Oöid sand from Sta. B265133, Hamelin Pool W. Australia (26° 08' S Lat, 113° 57' E Long). Oöids are quartz nucleated and found in 4 to 5 ft depth of Anchorage Bank. Coll. 1965; subm. by Brian W. Logan.

**ORINS-80. Shark Bay, L 157001 27,861 ± 630
25,911 B.C.**

Coral (*Lobophyllia corymbosa*) (Forskal) from emergent coral reef, Tetradon Loop, Dirk Hartog I., Shark Bay, W. Australia, (25° 27' S Lat, 113° 07' E Long). Reef top is ca. 10 ft above present mean sea-level. Coll. 1957; subm. by Brian W. Logan.

ORINS-79. Shark Bay, L 157002 >30,000

Coral (*Galaxea fascicularis*) (Linne) from same location and emergent coral reef as L 157001. Coll. 1957; subm. by Brian W. Logan.

**ORINS-61. Shark Bay, G 266001 30,532 ± 1078
28,582 B.C.**

Marine pelecypods (*Hemicardium hemicardium*, *Circe sugillata*, *Chama* sp., *Fargum unedo*, *Circe plicatina*, *Pitarina citrine*) from sub-surface intertidal zone, Gladstone embayment, Shark Bay, W. Australia (25° 59' S Lat, 114° 15' E Long). Sample from 2 cores, over 6-in. interval ca. 4 ft below mean high water level. Coll. 1966; subm. by G. R. Graves.

**ORINS-78. Shark Bay, 6266002 36,888 ± 2750
34,938 B.C.**

Valves of pelecypods (*Ostrea* sp. and *Chama* sp.) from base of tertiary anticline (old shoreline) on W margin of Lake Mc. Leod, W. Australia (23° 32' S Lat, 113° 52' E Long). Sample locality is ca. 15 to 20 ft above mean sea level. Coll. 1966; subm. by G. R. Davis.

II. ARCHAEOLOGIC SAMPLES

ORINS-75. Kum River, Korea **5,596 ± 600**
3,646 B.C.

Organic silt from Kum R. prehistoric excavation site 36° 27' N Lat, 127° 9' E Long), Korea. Sample obtained 600 cm below present vegetation level. Coll. 1966; subm. by P. K. Sohn, Yonsei Univ., Seoul, Korea. *Comment:* sample treated with dil. alkali and acid and dry-combusted.

ORINS-83. Grassy Cove Cave, Tennessee **3,404 ± 68**
1,454 B.C.

Fecal pellets containing visible grass and other undigested vegetation from karst cavernous formation (36° 30' N Lat, 85° 30' W Long), Crossville, Tennessee. Sample from attic formation of Grassy Cove Cave in dry uncovered condition. Coll. 1967; subm. by Fred Fischer, ORAU Research Participant, Oak Ridge, Tennessee. *Comment:* sample treated with dil. alkali and acid and dry-combusted.

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