[RADIOCARBON, VOL. 11, NO. 2, 1969, P. 394-395]

ILLINOIS STATE GEOLOGICAL SURVEY RADIOCARBON DATES I

STEPHEN M. KIM and R. R. RUCH

Illinois State Geological Survey
Urbana, Illinois 61801

The radiocarbon dating laboratory of the Illinois State Geological Survey has been established to satisfy a growing need for radiocarbon dates for an active Pleistocene research program. Because of the age and type of material dated, the benzene liquid scintillation counting method is employed in this laboratory. The detailed chemical procedure for converting carbon to benzene has been published by Noakes, Kim, and Stipp (1965) and Noakes, Kim, and Akers (1967); however, the procedures for benzene synthesis and sample counting are briefly explained below to clarify this laboratory's procedure.

An organic sample, such as peat, organic silt, or wood, is burned and the CO_2 evolved is absorbed in NH_4OH. $SrCl_2$ solution is added to precipitate the carbonate, and the solution plus precipitate is boiled and cooled before filtration of $SrCO_3$. The $SrCO_3$ is acidified with dilute H_3PO_4 to liberate CO_2 in a closed system, and the CO_2 is converted to C_2H_2, as reported by Barker (1953). In this method, 2.4 gm of dry packed lithium, obtainable from the Lithium Corporation of America, is used for each liter of CO_2 that is converted to C_2H_2. Trimerization of the C_2H_2 to form C_6H_6 is accomplished using a vanadium-alumina catalyst.

To the C_6H_6 synthesized from the sample carbon, 2 cc of toluene containing 100 mg Butyl-PBD, 2-(4-tert-Butylphenyl)-5-(4-Biphenylyl)-1,3,4-Oxadiazole, are added, and this mixture is made to a total volume of 10 cc with spectrograde C_6H_6. A modified Packard Instrument Co. liquid scintillation spectrometer (Model 3375) is used for measurement of C^{14} activity.

Ages are calculated from a C^{14} half-life of 5568 years, and the standard deviation (1σ) is based only on counting errors; however, if calculated error is less than 200 years, 200 years is chosen as one standard deviation (1σ).

I. INTERLABORATORY CHECK SAMPLES

ISGS-3. Shark Bay, Australia — **38,600 ± 200 / 36,650 B.C.**

Sample from valve (*Spondylus sp.*) dated and reported previously as ORINS-42, 38,100 ± 600 B.P. (Radiocarbon, 1967, v. 9, p. 313).

ISGS-4. Shark Bay, Australia — **30,700 ± 400 / 28,750 B.C.**

Sample from valve (*Spondylus sp.*) dated and reported previously 28,850 ± 400 B.P. (Radiocarbon, 1967, v. 9, p. 313).

ISGS-7. Appleton, Wisconsin **11,500 ± 300 9550 B.C.**

Sample from log previously dated and reported as follows:

Sample no.	Age	Date list
FSU-3	11,245 ± 450	Florida State I (Radiocarbon, 1966, v. 8, p. 46-53)
ANU-5	11,700 ± 260	ANU I (Radiocarbon, 1967, v. 9, p. 15-27)
Tx-541	11,620 ± 80	Davis, pers. commun.

II. GEOLOGIC SAMPLES

ISGS-6. McAllister School P-6519 **27,500 ± 500 25,550 B.C.**

Peat sample from Whiteside County, Illinois, 2 mi SW of Round Grove, Illinois, and 3 mi SE of Morrison, Illinois (41° 46′ 11″ N Lat, 89° 55′ 15″ W Long). This sample is from 8 ft below present surface. Coll. 1968 by J. C. Frye, H. B. Willman, and J. B. Kempton; subm. by J. P. Kempton, Illinois State Geol. Survey. *Comment* (J.P.K.): this date eliminates Woodfordian age for till below which was previously mapped as "Shelbyville," and thus restricts Green lobe (Woodfordian) to a position somewhere to S and E of this locality.

ISGS-8. Union School, P-6440 **>27,850**

Organic silt sample from Ogle County, Illinois, 4 mi WNW of Woosung, Illinois, and 5 mi SSW of Polo, Illinois (41° 54′ 50″ N Lat, 89° 36′ 00″ W Long). Sample is from 13.5 ft below present surface. Coll. 1968 by J. C. Frye, H. B. Willman, and J. P. Kempton; subm. by J. P. Kempton. *Comment* (J.P.K.): date eliminates Woodfordian age for till below which was previously mapped as "Shelbyville." This date is in line with ISGS-6 in indicating older age for till below, probably Illinoian as indicated by work currently in progress.

REFERENCES

Date lists:

ANU I — Polach, Stipp, Golson, and Lovering, 1967
FSU I — Stipp, Knauer, and Goodell, 1966
ORINS I — Noakes, Kim, and Akers, 1967

Barker, H., 1953, Radiocarbon dating; large scale preparation of acetylene from organic material: Nature, v. 172, p. 631-632.

Noakes, J. E., Kim, S. M., and Akers, L. K., 1967, Recent improvements in benzene chemistry for radiocarbon dating: Geochim. et Cosmochim. Acta, v. 31, p. 1094-1096.

———— 1967, Oak Ridge Institute of Nuclear Studies radiocarbon dates I: Radiocarbon, v. 9, p. 309-315.

Noakes, J. E., Kim, S. M., and Stipp, J. J., 1965, Chemical and counting advances in liquid scintillation radiocarbon dating: Sixth Internatl. Conf. Radiocarbon and Tritium Dating Proc., Conf-650652, p. 68-98.