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ATOMIC ENERGY RESEARCH INSTITUTE OF KOREA RADIOCARBON MEASUREMENTS I

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This radiocarbon dating laboratory was established to complement the research activities in the field of archaeology and geology in Korea. The benzene liquid scintillation counting method (Noakes, Kim, and Stipp, 1965; Noakes, Kim, and Akers, 1967) is employed in this laboratory because of its compatibility with other dating methods and future possibility in application of this procedure to the biomedical research field. The chemical process for converting carbon from a sample to benzene used by this laboratory is briefly outlined below.

The sample is first converted to CO_2 by combustion or acid digestion in a closed system. The CO_2 is converted to lithium carbide (Barker, 1953). Acetylene is then obtained by hydrolysis of lithium carbide. Trimerization of acetylene to benzene is carried out with a vanadium-alumina catalyst. In cases of some organic samples such as peat, silt, or wood, CO_2 is purified by the carbonate formation by absorption of CO_2 in concentrated ammonium hydroxide and addition of calcium chloride solution. All chemicals used are CO_2-free.

To the synthesized benzene, spectrograde benzene is added to make total volume of counting vial. The resulting counting solution contains 0.3% PPO and 0.02% POPOP. The liquid scintillation counter used is from the Beckman Instrument Co., Model LS-100. The background count rate of 4 cc counting vial is about 7.5 cpm, and counting efficiency is about 50%.

Ages are calculated from a C^{14} half-life of 5568 years and the modern reference standard is 95% activity of NBS oxalic acid standard. The error (1σ) quoted is calculated from the uncertainty involved in counting background, NBS oxalic acid standard, and sample.

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SAMPLE DESCRIPTIONS

I. INTERLABORATORY CHECK SAMPLES

AERIK-1. Two Creeks, U.S.A. **11,510 ± 150 9650 B.C.**

Wood, Two Creeks, Forest bed, Wisconsin, dated and reported previously as ISGS-7, 11,500 ± 300 (Radiocarbon, 1969, v. 11, p. 395); Tx-

541, 11,620 ± 80 (E. M. Davis, pers. commun.); FSU-3, 11,245 ± 450 (Radiocarbon, 1966, v. 8, p. 46-53); ANU-5, 11,700 ± 260 (Radiocarbon, 1967, v. 9, p. 15-27).

AERIK-2. Danvers Section Z-1 **24,000 ± 870 22,050 B.C.**

Wood, Danvers Sec. Z-1, dated previously as ISGS-12, 23,900 ± 200 (S. M. Kim, pers. commun.); Tx-693, 23,880 ± 490 (E. M. Davis, pers. commun.).

II. ARCHAEOLOGIC SAMPLES

AERIK-3. Tongnae site **3469 ± 78 1519 B.C.**

Charcoal fragments from depth 40 to 50 cm below surface in the bottom of hearth built 3 m in diam. at Tongnae site, Tongnae-ku, Pusan, Korea (35° 10′ N Lat, 129° 07′ E Long). Earthenware, animal bone implements, and other animal bones were found in the vicinity of a shell mound of the Early Iron age. Coll. 1968 and subm. by B. S. Han, Natl. Mus. of Korea.

AERIK-4. Yangsan site **2169 ± 122 219 B.C.**

Charcoal fragments, probably representing cooking fires from Yangsan site, Yangsan-myon, Yangsan-kun, Kyongsang-nam-do, Korea (35° 20′ N Lat, 129° 02′ E Long). Sample from depth 70 to 80 cm in a dwelling area on the hill at ca. +50 m. Near the dwelling area, a shell mound contained earthenware fragments, animal bone implements, oyster, clam, bones of fish, deer, and bear. Coll. 1967 and subm. by B. S. Han.

AERIK-5. Sokchang-ni site, Locality 1 **30,690 ± 3000 28,740 B.C.**

Almost indiscernible charcoal contents were collected from a large amount of soil of an undisturbed layer of the Sokchang-ni site, Loc. 1, Changki-myon, Kongju-kun, Chungchong-nam-do, Korea (36° 21′ N Lat, 127° 10′ E Long). Sample from depth 3.5 to 3.7 m in a roughly circular depression ca. 50 cm in diam. where dark soil color was observed. No stone implements were in this layer, but quartz palaeolithic tools were collected above and below. Excavation took place in 1967 and 1969 by P. K. Sohn. Subm. by P. K. Sohn, Yonsei Univ., Seoul, Korea. *Comment* (P.K.S.): date seems younger than expected since layer below is Mousterian tradition, and the uppermost layer bears Aurignacian character. A reasonable explanation is that the samples might have been contaminated before excavation, since the area is flooded almost annually.

AERIK-6. Sohak-ni site **3417 ± 60 1467 B.C.**

Charcoal fragments, probably representing cooking fires on flood disturbed slope of Kum R. bank, Sohak-ni site, Kyeryong-myon, Kongju-kun, Chungchong-nam-do, Korea (36° 30′ N Lat, 127° 05′ E Long). Sample

from bottom of circularly arranged boulders which might have been hearth. Boulders are below water level all year round. Crude pebble scrapers and chopping tools coll. 1967 and subm. by P. K. Sohn. *Comment* (P.K.S.): date seems extraordinarily young. Most reasonable explanation may be found in contamination by modern carbon in view of the Sokchang-ni site (AERIK-5).

3573 ± 48

AERIK-7. Tokmyong-ni site **1623 B.C.**

Slightly carbonized wood with polished stone tools 1 m below surface of Tokmyong-ni site, Hai-myon, Kosong-kun, Kyongsang-nam-do, Korea (34° 55′ N Lat, 128° 20′ E Long). Coll. 1967 and subm. by P. K. Sohn.

REFERENCES

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

Kim, S. M. and Ruch, R. R., 1969, Illinois State Geological Survey radiocarbon dates I: Radiocarbon, v. 11, p. 394-395.

Noakes, J. E., Kim, S. M., and Akers, L. K., 1967, Oak Ridge Institute of Nuclear Studies radiocarbon dates I: Radiocarbon, v. 9, p. 309-315.

———— 1967, Recent improvements in benzene chemistry for radiocarbon dating: Geochim. et Cosmochim. Acta, v. 31, p. 1094-1096.

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., Pullman, Washington, June 7-11, 1965, Conf-650652, p. 68-98.

Polach, H. A., Stipp, J. J., Golson, J., and Lovering, J. F., 1967, ANU radiocarbon date list I. Radiocarbon, v. 9, p. 15-27.

Stipp, J. J., Knauer, G. A., and Goodell, H. G. 1966, Florida State University radiocarbon dates I: Radiocarbon, v. 8, p. 46-53.