TBILISI RADIOCARBON DATES II

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The peculiarities of the geologic structure of the Caucasus, of Georgia in particular, and the existence of numerous rich archaeologic monuments on the territory of the Georgian SSR have made it necessary for the Scientific Laboratory to date both geologic and archaeologic samples.

Radiocarbon Laboratory at Tbilisi State University began dating in 1964. This is the only University laboratory; other radiocarbon laboratories operate under the Academy of Sciences of the USSR.

Taking into consideration the advantages of a radiocarbon gas method, including the fact that only relatively small quantities of samples are needed, we have chosen the method of gas proportional counting.

Carbon dioxide (CO_2) serves as working gas and is synthesized from the sample studied.

The construction of the measuring installation has some advantages compared to others well-known in literature. While measuring, the substitution of the working gas is carried out without disconnecting separate parts of the installation.

The whole operation cycle, beginning from burning and cleaning the working gas up to the end of the measuring, is carried out in succession, without removing the sample, which practically excludes the possibility of its being contaminated by carbon of modern origin. It practically eliminates changing parameters of the measuring system, while passing from the standards to dating the samples.

The installation consists of 3 main parts: a) a system to obtain chemically pure CO_2, b) a proportional counter with the corresponding shield, and c) a system of feeding and recording.

After some preliminary treatment the investigated sample is burnt in a stream of O_2. The CO_2 obtained passes through several stages of purification. The contents of chlorine, oxygen, and other electronegative gases should not exceed 10^{-5} per cent. The degree of purification is controlled continuously.

The purified CO_2, under the pressure of several atmospheres, fills the proportional counter of a special construction, which is placed in a thick-walled lead chamber. A special protection system minimizes the background caused by cosmic rays and radioactive contamination.

Anthracite and marble were used as the standards for ancient carbon (background), while an elm from the Western Georgian woods (cut 1910) and an eastern beech (cut 1932) were used as the standards of modern carbon.

The counter is filled to 2 to 3 atm pressure. The background count rate varies slightly with the pressure and is 11.6 cpm at 2 atm. The net

modern activity is 23.2 cpm at 2 atm. Dates are given in terms of the Libby half-life of 5568 yr.

During the 48-hr counting the apparatus can date samples of 36,000 yr maximum age.

GEOLOGIC SAMPLES

20,590 ± 680
TB-17.   Tokhliauri, E Georgia   **18,640 B.C.**

Fossil tree with much pitch, 7 to 8 m deep. Sample from 3rd terrace of Iori R., near Sagaredzho, Georgian SSR. Estimated age: 18,000 to 28,000 B.C. Subm. 1965 by I. Tumadzhanov and L. Gogichaishvili.

14,160 ± 500
TB-18.   Tokhliauri, E Georgia   **12,210 B.C.**

Lake deposits with organic particles, 14 m deep. Sample from 2nd terrace of Iori R., same location as TB-17. Estimated age: 18,000 to 28,000 B.C. Subm. 1965 by I. Tumadzhanov and L. Gogichaishvili.

2230 ± 150
TB-19.   Lake Gomni, S Georgia   **280 B.C.**

Lake peat, 2 m deep, at +1800 m. Sample from Borzhomi region (41° 50′ N Lat, 43° 20′ E Long), Georgian SSR. Estimated age: 0 to 8000 B.C. Subm. 1966 by I. Tumadzhanov and N. Margalitadze.

5120 ± 200
TB-20.   Lake Gomni, S Georgia   **3170 B.C.**

Lake peat, from same location as TB-19, 4 m deep. Estimated age: 3000 to 13,000 B.C. Subm. 1966 by I. Tumadzhanov and N. Margalitadze.

12,050 ± 360
TB-21.   Uzhgorod   **10,100 B.C.**

Coaly loam with detritus, 6 m deep, near Uzhgorod, Ukrainian SSR. Estimated age: 8000 to 13,000 B.C. Subm. by Lvov Inst. of Geophysics.

6160 ± 210
TB-22.   Lake Tzero, S Georgia   **4210 B.C.**

Moor peat, 11 m deep, from same location as TB-19 and TB-20. Estimated age: 3000 to 13,000 B.C. Subm. by I. Tumadzhanov and N. Margalitadze.

2370 ± 150
TB-23.   Lake Tzero, S Georgia   **420 B.C.**

Peat, 5 m deep, from same location as TB-19, TB-20, and TB-22. Estimated age: 3000 to 13,000 B.C. Subm. by I. Tumadzhanov and N. Margalitadze.

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