[RADIOCARBON, VOL. 18, NO. 3, 1976, P. 355-361]

TBILISI RADIOCARBON DATES III

A A BURCHULADZE, L D GEDEVANISHVILI,
and G I TOGONIDZE

Radiocarbon Laboratory, Tbilisi State University, Tbilisi, USSR

The Radiocarbon Laboratory under the Chair of Nuclear physics of Tbilisi State University is engaged in studies of radiocarbon variation in the atmosphere and mineral waters and determination of the absolute age of archaeologic, geologic, botanical, and other samples. This list reports dates of archaeologic and geologic specimens only. Gas counting and liquid scintillation methods are used for dating.

Initially CO_2 activity was determined by proportional counting. Results of the first measurement were published earlier (Burchuladze, 1968). At present, the absolute age of most samples is determined in laboratory by the liquid scintillation method. For this, a 3-channel scintillation spectrometer SL-30 of "Intertechnique" was used, and benzene C_6H_6 served as scintillation solvent. Benzene is synthesized according to the modified method of Barker (1969). The pretreated sample is burnt out instantaneously in the calorimetric "bomb" under high pressure of oxygen, and the obtained CO_2 needs no further purification. Acetylene is obtained from CO_2 through lithium carbide by means of dissociation with artesian water (from Tbilisi) and then is transformed into benzene (C_6H_6) with the help of alumosilicate catalyst, activated by vanadium pentoxide with a high yield of benzene ($\sim$ 90%). Usually 5ml of benzene synthesized from the sample in the vessel with minimum content of potassium is dissolved in 5ml of "dead" benzene with the content of 4 g/l PPO and .1 g/l POPOP. For one of the ^{14}C channels an SL-30 spectrometer is used for measurements in which the interval with high quality and effectiveness of 64.9% is selected.

Volume of scintillation solvent of benzene is 10ml, the count of "dead carbon" (background) is 11.3 cpm, the count of modern carbon 76.6 cpm (the reference sample of the modern carbon was prepared in the laboratory of the Inst Geol Acad Sci USSR). Modern carbon is controlled by NBS oxalic acid (USA).

Measuring time of sample activity was 30 to 50 hours. Obtained data are registered by digital printers each 100 min. After 5 to 6 samples are measured, the activity of modern and dead carbon is checked. Statistical accuracy of measurements for various samples is 2σ to 3σ. Calculations are based on the ^{14}C half-life, 5568 $\pm$ 30 years, with values relative to 1950. Below are given the dating results made by gas and scintillation methods, and the characteristics of those samples as well.

I. ARCHAEOLOGIC SAMPLES

TB-7. Mestia, Georgian SSR **900 ± 110 AD 1050**

Wooden beams and boards. Wall of Svani tower, ancient tower of Koldans, Muzhali village, Mestia region. Archaeol date: Middle age.

Subm by G Chitaya, Inst History, Archaeol & Ethnog, Georgian Acad Sci.

660 ± 40

TB-84. Mestia, Georgian SSR **AD 1290**

Cereals, Kvanchiantkari village, Mestia region. Subm by I Tumajanov and L Gogichaishvili, Inst Botanics, Acad Sci, GSSR.

5590 ± 260

TB-10. Novgorod region, RSFSR **3640 BC**

Wood (birch) remains of bark. Lake peat, 2.3m deep, Novgorod region. Dated to compare with results from radiocarbon lab of Geol Chem: Mo-346 (5860 ± 210). Subm by A Devirtz, Inst Geochem & Analytical Chem, Vernadsky Acad Sci USSR.

TB-11. Tsulukidze, Georgian SSR **<250**

Wood with bull bones incorporated into it. Mus Regional Studies, City of Tsulukidze. Subm by P Pirpilashvili, State Mus Georgia.

1925 ± 175

TB-24. Uplistsikhe, Georgian SSR **AD 25**

Semi-carbonized tree. Field no. AI, Uplistsikhe village, Gori region. Archaeol date: Late Bronze age. Subm by D Khakhutaishvili, Inst History, Archaeol & Ethnog, Acad Sci GSSR.

1130 ± 125

TB-25. Uplistsikhe, Georgian SSR **AD 820**

Semi-carbonized tree. Field no. A2. From same location (TB-24). Subm by D Khakhutaishvili.

3370 ± 60

TB-26. "Sabid-Akhcha", Georgian SSR **1420 BC**

Wood from wooden 4-wheeled chariot, 1m deep. Barrow no. 5, "Sabid-Akhcha" Tsalka Plateau. Archaeol date: Trialeti culture. Subm by O Japaridze, Tbilisi State Univ.

6300 ± 120

TB-27. "Imiris Gora", Georgian SSR **4350 BC**

Wood remains of carbonized wooden structure of building span, "Imiris-Gora", Shulaveri village, Marneuli region. Archaeol date: Chalcolithic epoch. Subm by O Japaridze and A Javakhishvili, State Mus Georgia.

4220 ± 90

TB-29. "Khizanaant-Gora", Georgian SSR **2270 BC**

Cereals, "Khizanaant-Gora", Urbnisi village, Kareli region. Archaeol date: Early Bronze age. Subm by Y Kikvidze, State Mus Georgia.

3330 ± 60

TB-30. Tetri-Tskaro, Georgian SSR **1380 BC**

Wood, remains of tomb, 10m deep, Bedeni upland, Tetri-Tskaro.

Archaeol date: Bronze age. Subm by A Apakidze and G Gobejishvili, Inst History, Archaeol & Ethnog, Acad Sci GSSR.

TB-31. Metekhi, Georgian SSR **3235 ± 60** / **1285 BC**

Wood, 5m deep, Burial no. 6, Metekhi village, Kaspi region. Archaeol date: Middle Bronze age. Subm by Z Shatberashvili, Inst History, Archaeol & Ethnog, Acad Sci GSSR.

TB-32. Mtskheta, Georgian SSR **1670 ± 50** / **AD 280**

Coal, 5m deep, City gates, Mtskheta. Archaeol date: Early Middle ages. Subm by A Kalandadze, Inst History, Archaeol & Ethnog, Acad Sci GSSR.

TB-34. "Treligora", Georgian SSR **2565 ± 60** / **615 BC**

Coal, 1.2 to 1.5 m deep, Burial no. 9, "Treligora", Digomi, Tbilisi. Archaeol date: Iron age. Subm by R Abramishvili, Inst History, Archaeol & Ethnog, Acad Sci GSSR.

TB-37. "Treligora", Georgian SSR **2730 ± 130** / **780 BC**

Coal, 4m deep. From same location as TB-34, from stone burial, no. 16. Archaeol date: Iron age. Subm by R Abramishvili.

TB-35. "Darbazi", Georgian SSR **245 ± 40** / **AD 1705**

Wood from peasant's house "Darbazi", Chachkari village, Aspindza region. Archaeol date: Middle ages. Subm by G Chtaya, Inst History, Archaeol & Ethnog, Acad Sci GSSR.

TB-36. "Samnateo", Georgian SSR **740 ± 50** / **AD 1210**

Wooden piece of beam, "Samnateo", Sanctuary Kotia, Tsitelauri village, Pshavi, Dusheti region. Archaeol date: Middle ages. Subm by G Chitaya, Inst History, Archaeol & Ethnog, Acad Sci GSSR.

TB-38. The mummy, Egypt **4330 ± 160** / **2380 BC**

Bandages of Egyptian mummy, Tarkhan II, Cairo, Egypt. Sample was subm by Univ Birmingham lab for control dating; it was previously dated by other labs: Arizona: A-569 (4295 ± 90), Univ California: UCLA-739 (4265 ± 80), British Mus: BM-203 (4150 ± 110), Univ Birmingham: Birm-20 (4224 ± 97), Natl Physical Lab: NPL (4310 ± 90).

TB-40. Akhaltsikhe, Georgian SSR **990 ± 90** / **AD 960**

Remains of cloth from mummified corpse from one of bricked-up caves, Janisi village, Akhaltsikhe region. Subm by P Pirpilashvili, Research Inst Traumatology & Orthopedics, Ministry Public Health, Georgian SSR.

TB-41. Tsutskhvati, Georgian SSR **>38,000**

Bones (cave-bear) from Bison cave, Tsutskhvati village, Tkibuli region. Cave remains are of upper Pleistocene. Subm by L Maruashvili, Inst Geog, Acad Sci GSSR.

2520 ± 45

TB-49. "Choga", Georgian SSR **570 BC**

Coal, .35 to .5m deep, "Choga II", First Choga village, Chkhorotski region. Subm by D Khakhutaishvili.

1930 ± 50

TB-52. "Simagre", Georgian SSR **AD 20**

Wood from ruins of ancient building, Hill "Simagre", Sakorkio village, Khobi region. Archaeol date: Roman epoch. Subm by G Mikeladze, T Baramidze, Inst History, Archaeol & Ethnog, Acad Sci, GSSR.

980 ± 40

TB-58. "Simagre", Georgian SSR **AD 970**

Wood, 4m deep, from same location as TB-52. From deposits of 1st terrace over flood land, bank of Rioni R. Subm by T Mikeladze, D Tabidze, Inst History, Archaeol & Ethnog, Acad Sci, GSSR.

Kulevi series

2010 ± 45

TB-60. Kulevi, Georgian SSR **60 BC**

Wood, 1.3m deep, ancient Kolkhi settlement, 4th cultural layer. Right bank of Khobi R, Kulevi village, Khobi region. Subm by D Khakhutaishvili.

2260 ± 45

TB-61. Kulevi, Georgian SSR **310 BC**

Wood, 1.5m deep, from same location as TB-60. Subm by D Khakhutaishvili.

2150 ± 45

TB-62. Kulevi, Georgian SSR **200 BC**

Wood, 1.6m deep, from same location as TB-60, 61. Subm by D Khakhutaishvili.

605 ± 40

TB-68. Tsutskhvati, Georgian SSR **AD 1345**

Wood, from Tsutskhvati cave, Tsutskhvati village, Tkibuli region. Subm by L Maruashvili.

6655 ± 55

TB-72. "Guard Hill", Georgian SSR **4705 BC**

Coal, 4.4m deep, "Guard Hill", Shulaveri-I Hill, settlement of Shaumyani, Marneuli region. End of Neolithic beginning of early Eneolithic. Subm by A Javakhishvili, State Mus Georgia.

3025 ± 50

TB-73. "Tetri-Mgvime", Georgian SSR **1075 BC**

Coal, 10m deep relative to present earth surface in cave, "Tetri-Mgvime", Legvtadzeebi Hill, Khomuri village, Tskkaltubo region. Archaeol date: Bronze age. Subm by K Kalandadze, Inst History, Archaeol & Ethnog, Acad Sci, GSSR.

1885 ± 40

TB-74. "Tsikhi-Gora", Georgian SSR **AD 65**

Cereals, 1.5m deep. "Tsikhi-Gora", Kavtiskhevi village, Kaspi region. Subm by G Tskitishvili, Inst History, Archaeol & Ethnog, Acad Sci GSSR.

1995 ± 40

TB-75. "Tsikhi-Gora", Georgian SSR **45 BC**

Wood, 3.5m deep, "Tsikhi-Gora", from same location as TB-74. Subm by G Tskitishvili.

3235 ± 50

TB-80. "Dikha-Gubura", Georgian SSR **1285 BC**

Wood, 5m deep, "Dikha-Gubura II", left bank of Inguri R, Anaklia village, Zugdidi region. Subm by D Muskhelishvili, Inst History, Archaeol & Ethnog, Acad Sci, GSSR.

Namcheduri series

3115 ± 50

TB-81. "Namcheduri", Georgian SSR **1165 BC**

Wood, 4.4m deep, 7th layer, "Namcheduri", right bank of Ochkhamuri R, city of Kobuleti, Ajarian ASSR. Subm by D Khakhutaishvili.

2770 ± 45

TB-50. "Namcheduri", Georgian SSR **820 BC**

Wood, 3m deep, "Namcheduri", 5th cultural layer, ancient Kolkhi settlement, right bank Ochkhamuri R, Kobuleti region, Ajarian ASSR. Subm by D Khakhutaishvili.

2795 ± 50

TB-63. "Namcheduri", Georgian SSR **845 BC**

Wood, 3m deep, from same location as TB-50, 4th cultural layer. Subm by D Khakhutaishvili.

4405 ± 50

TB-82. "Ispani", Georgian SSR **2455 BC**

Wood, 2.8 to 3m deep in peaty layer, "Ispani", left bank of Shavcheli R, Kobuleti region, Ajarian ASSR. Subm by D Khakhutaishvili.

II. GEOLOGIC SAMPLES

3450 ± 270

TB-33. Tokhliauri, Georgian SSR **1500 BC**

Lake deposits with organic particles, 4.25m deep, 2nd terrace of Iozi R, Sagarejo region. Subm by I Tumajanov and L Gogichaishvili.

Kolkhidka series

4460 ± 150

TB-42. Kolkhidka, Georgian SSR **2510 BC**

Peat, 1.8m deep in terrace surface, from deposits of New Black Sea terrace, mouth of Kolkhidka R, Gagra, Abkhazian ASSR. Subm by C Janelidze, Inst Geog, Acad Sci, GSSR.

4280 ± 60

TB-43. Kolkhidka, Georgian SSR **2330 BC**

Submerged peat, 4 to 5m below water surface, from same location as TB-42, from surface of submerged peat horizon. Subm by C Janelidze.

7060 ± 100

TB-47. Kolkhidka, Georgian SSR **5110 BC**

Submerged peat, 4 to 5m deep, from same location as TB-43. Sample was taken from sea bottom, from lower layers of submerged peaty horizon. Subm by C Janelidze.

Kazbegi series

6580 ± 70

TB-46. Kazbegi, Georgian SSR **4630 BC**

Peat, 4m deep in diluvial terrace surface, from same location as TB-44, 45. Subm by C Janelidze.

5950 ± 90

TB-44. Kazbegi, Georgian SSR **4000 BC**

Wood, 3.2m deep below terrace surface, from deposits of 1st terrace over flood plain of Terek R, Goristsikhe village, Kazbegi region. Subm by C Janelidze, Inst Geog, Acad Sci, GSSR.

3470 ± 50

TB-45. Kazbegi, Georgian SSR **1520 BC**

Peat, 2m deep, from same location as TB-44, from diluvial deposits from surface of peaty horizon. Subm by C Janelidze.

Sakorkio series

6660 ± 100

TB-55. Sakorkio, Georgian SSR **4710 BC**

Peat, 19m deep, from Holocene deposits on left bank of Rioni R, Sakorkio village, Khobi region. Subm by C Janelidze.

3150 ± 90

TB-56. Sakorkio, Georgian SSR **1200 BC**

Peat, 6m deep, from same location as TB-55. Subm by C Janelidze.

31,300 ± 320

TB-57. Sakorkio, Georgian SSR **29,350 BC**

Peat, 64m deep, from same location as TB-55, -56. Subm by C Janelidze.

31,290 ± 510

TB-65. Samikao, Georgian SSR **29,340 BC**

Peat, 67m deep, from upper Pleistocene deposits, left bank of Tsivi R, Samikao village, Abasha region. Subm by C Janelidze.

35,300 ± 690

TB-66. Ureki, Georgian SSR **33,350 BC**

Wood, 4m deep in terrace surface, from sea deposits of late caragate terrace of Black Sea, Ureki village, Makharadze region. Subm by C Janelidze.

4050 ± 50

TB-67. Anaklia, Georgian SSR **2100 BC**

Peat, 3.5m deep, from Anaklian peaty deposits, left bank of Tikori R, Anaklia village, Zugdidi region. Subm by C Janelidze.

5600 ± 50

TB-69. Khorga, Georgian SSR **3650 BC**

Peat, 6m deep, from lower layer of peaty horizon, mouth of Khobi R, Khorga village, Khobi region. Subm by C Janelidze.

4170 ± 50

TB-70. Khorga, Georgian SSR **2220 BC**

Peat, 3.5m deep, from upper layer of peaty horizon, from same location as TB-69. Subm by C Janelidze.

910 ± 40

TB-71. Kariata, Georgian SSR **AD 1040**

Wood, 8m deep, Kariata village, Khobi region, mouth of Khobi R. Subm by C Janelidze.

870 ± 40

TB-76. Chakva, Georgian SSR **AD 1080**

Wood, 1.2m deep in terrace surface, Chakva village, Kobuleti region, Ajarian SSR. Subm by C Janelidze.

4865 ± 60

TB-78. Akhalkalaki, Georgian SSR **2915 BC**

Peat, 3.75m deep, Kartsakhi swamp, Kartsakhi village, Akhalkalaki region. Subm by C Janelidze.

2085 ± 50

TB-79. Akhalkalaki, Georgian SSR **135 BC**

Peat, 2.25m deep, from same location as TB-78. Subm by C Janelidze.

References

Barker, Harold, Burleigh, Richard, and Meeks, Nigel, 1969, British Museum natural radiocarbon measurements VI: Radiocarbon, v 11, p 278-294.

———— 1969, New method for the combustion of samples for radiocarbon dating: Nature, v 221, no. 5175, p 49-50.

Burchuladze, A A, 1968, Tbilisi radiocarbon dates I: Radiocarbon, v 10, p 466-467.

Burchuladze, A A *et al*, 1969, Tbilisi radiocarbon dates II: Radiocarbon, v 11, p 499-501.

———— 1970, New system for the combustion of samples for radiocarbon dating: The works of the Symposium "Astrophysical phenomena Radiocarbon", Tbilisi, p 51-55 (in Russian).

———— 1974, On some method of synthesis of the scintillation solvent from natural patterns containing carbon: The works of the Symposium "Astrophysical phenomena Radiocarbon", Tbilisi, p 317-323 (in Russian).