

TALLINN RADIOCARBON DATES V

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The following list comprises age measurements carried out during 1976 and 1977. The activity of ^{14}C was computed by one- and two-channel scintillation devices (Punning *et al*, 1976; 1977). Ages are calculated using a half-life of 5568 ± 30 years for ^{14}C with NBC oxalic acid as a reference standard. All dates are reported in years before 1950. $^{12}\text{C}/^{13}\text{C}$ measurements were not performed and results are not corrected for ^{13}C fractionation.

I. GEOLOGIC SAMPLES

Estonian SSR

Tln-200. Marikoja **6820 \pm 70**

Carex/Phragmites peat from under beach barrier, NE of Kahala Lake, Harju Dist. In depression before glint near shore deposits of Littorina Sea overlying 0.5m complex organic deposits represented by *Carex/Phragmites* and wood peat. In transition zone wood remains. Pollen analyses by H Kesel refer accumulation of lacustrine deposits to Pollen Zone AT1. Coll 1971 and subm by H Kessel, Inst Geol, Acad Sci Estonian SSR (now Inst Geol).

Tln-201. Marikoja **7240 \pm 90**

Wood peat from same complex as Tln-200. Coll 1975 and subm by H Kessel.

Tln-202. Uuri **9230 \pm 80**

Wood (birch) remains underlying gravel of Ancylus Lake on foot of glint at Uuri, NE of Kahala Lake, Harju Dist. Lacustrine deposits overlay gravel and till. Coll 1975 and subm by H Kessel.

Tln-231. Tepanimägi **7660 \pm 110**

Well-decomposed peat from funnel on N slope of Tepanimägi hill, Otepää elev, Valga Dist. Lake and bog deposits, 2.5m thick are embedded in deluvial deposits. From depth 2.45 to 2.50m. Coll 1973 and subm by R Karukäpp, Inst Geol.

Latvian SSR

Tln-239. Ozolnieki **9840 \pm 160**

Wood remains from profile near settlement Ozolnieki, Jelgava Dist. Sample from sands overlying varved clays of Baltic Glacial Lake. Coll 1976 and subm by U Veinbergs, All-Union Research Inst Marine Geol.

Arkhangelsk and Murmansk Districts

Tln-192. Sija **31,380 \pm 350**

Shells from exposure on right bank of Severnaya Dvina R, 300m upstream from port Sija, Arkhangelsk Dist. Sample from fine sand over-

lain by 2 tills at alt 4m from river level. Coll 1975 by R Rajamäe. *Comment*: outer 40% removed by acid leaching.

Tln-230. Sija **40,250 ± 650**

Shells from exposure ca 100m downstream from profile at Severnaya Dvina R where Tln-192 was taken. Sample from clayey aleurites at alt 2.6 to 3.6m from river level. Coll 1975 by R Rajamäe. *Comment*: outer 40% removed by acid leaching.

Tln-210. Verhne-Tulomsky **9030 ± 90**

Shells (*Hiatella arctica*) from deposits of sea terrace on left bank of outflow canal of Verhne-Tulomsky Hudropower Sta, Murmansk Dist. Sample from depth 0.10 to 0.15m. Coll 1975 and subm by B Koshetchkin, Geol Inst, Kola Branch Acad Sci USSR. *Comment*: outer 40% removed by acid leaching.

Tln-211. Paive **6180 ± 60**

Shells (*Cyprina islandica*) from profile of Middle Holocene sea terrace in valley of Paive R, Rõbatchji Peninsula, Murmansk Dist. Horizon, 0.5m of fine and medium sands rich in shells lies at depth 0.6m. Coll 1975 and subm by B Koshetchkin, Geol Inst. *Comment*: outer 25% removed by acid leaching.

Tln-212. Eina **6270 ± 70**

Shells (*Hiatella arctica*) from exposure on sea terrace on right bank of Eina R, Rõbatchji Peninsula, Murmansk Dist. Clays containing shells overlain by pebble and sandy loams. Sample coll and subm by B Koshetchkin, Inst Geol. *Comment*: outer 40% removed by acid leaching.

Pasva series

Exposures lie on right bank of Vaga R (tributary of Severnaya Dvina R, Arkhangelsk Dist) near village Pasva, ca 4km upstream from profile of Koleshki (Tln-49, -52, -71, Devyatova Punning, 1976). In profile 2 complexes of organic deposits are overlain by sandy-clayey deposits. Thermoluminescent dates on quartz showed accumulation of sediments in Pasva profile continued steadily from Mikulian up to Late Valdai period (Hütt *et al*, 1978). On basis of pollen evidence Devyatova correlates accumulation of organic deposits with Mikulian interglacial and Upper-Valdai interstadial (Devyatova *et al*, 1978). Samples coll 1975 by R Rajamäe.

Tln-215. Pasva **34,600 ± 1100**

Upper layer of well-decomposed wood peat, 0.7m thick. Sample from depth 11.85 to 12.05m.

Tln-216. Pasva **36,500 ± 750**

Central part of same layer where Tln-215 was taken. Sample from depth 12.05 to 12.25m.

- Tln-217. Pasva** **34,600 ± 750**
 Lowermost part of same layer where Tln-215 was taken. Sample from depth 12.25 to 12.45m.
- Tln-226. Pasva** **≅49,700**
 Compacted wood peat from depth 12.95 to 13.05m.
- Tln-221. Verhnaya Telza** **46,830 ± 1100**
 Shells from exposure on right bank of Verhnaya Telza R (tributary of Onega R, Arkhangelsk Dist). Gravel-pebble sand abundant in shells underlies reddish brown till and medium sands at depth 8.5 to 10.0m. Coll 1975 by J M Punning and R Rajamäe. *Comment:* outer 40% removed by acid leaching.
- Tln-222. Raibola** **40,000 ± 800**
 Well-decomposed peat from profile on right bank of Vaga R (tributary of Severnaya Dvina R, Arkhangelsk Dist). Peat in aleurites overlain by 3 tills. Previous date from same complex ≅49,000: Tln-77. Tln-222 apparently too young. Sample coll 1975 by R Rajamäe.
- Tln-223. Lovozerskaya tundra** **≅42,000**
 Wood remains from borehole in foreland depression N of Lovozerskaya tundra, Murmansk Dist. Lake and bog deposits, 2m thick rest between cobble, gravel and sand deposits and are divided by interlayer of cobble and pebble loam into 2 complexes. Sample from depth 15.4 to 15.9m. Coll 1976 and subm by V Evzerov, Geol Inst.
- Tln-224. Lovozerskaya tundra** **21,630 ± 650**
 Wood remains from lowermost organogenous complex of same borehole as Tln-223. Sample from depth 16.6 to 16.8m.
- Tln-225. Lovozerskaya tundra** **≅45,000**
 Wood remains from same complex as Tln-224. Sample from depth 16.8 to 17.2m. According to Tln-223-225, age of lake and bog deposits in profile: ≅42,000 yr. Tln-224 apparently too young.
- Tln-227. Pervomaiskji** **39,000 ± 800**
 Peat from profile on left bank of Severnaya Dvina R, ca 10km upstream from settlement of Pervomaiskji, Arkhangelsk Dist. Peat layer in aleurites buried under medium sands and gray aleurite. Sample coll 1975 by J M Punning and R Rajamäe.
- Tln-229. Krasnaya Gorka** **36,930 ± 700**
 Shells from profile on right bank of Severnaya Dvina R near village Krasnaya Gorka, Arkhangelsk Dist. Shells of subfossil mollusks are embedded in medium sands on aleuritic till and are covered by clayey aleurites with interlayers of fine and medium sands. Sample from depth 1.6 to 1.8m. Coll 1975 by R Rajamäe. *Comment:* outer 40% removed by acid leaching.

Tln-240. Vajenga **3960 ± 70**

Wood remains from alluvial deposits on left bank of Vajenga R (tributary of Severnaya Dvina R) ca 1km upstream from settlement Ust-Vajenga. Coll 1975 and subm by E Devyatova, Geol Inst, Karelian Branch Acad Sci USSR.

Tln-248. Lodeinoe **6040 ± 110**

Shells (*Hiattella arctica*) from 22m sea terrace on E edge of settlement Lodenoye, Murmansk Dist. Sample from depth 2.3 to 4.7m. Coll 1976 and subm by B Koshetchkin, Geol Inst. *Comment*: outer 40% removed by acid leaching.

*West Spitsbergen***Tln-194. Billefjord** **34,120 ± 600**

Shells from profile on E coast of Billefjord near Cape Ekholm. Pleistocene deposits represented by complex of marine deposits lying between 2 tills and fluvioglacial deposits overlying carbonaceous sandstones. Uppermost till underlies marine deposits and terrace drifts. Terrace alt 30m. Coll 1975 and subm by L Troitski, Inst Geog. *Comment*: outer 40% removed by acid leaching.

Tln-219. Billefjord **8760 ± 90**

Shells from sands at depth 0.5m in deposits of 30m terrace on E coast of Billefjord near Cape Ekholm (see Tln-194). Coll 1975 and subm by L Troitski. *Comment*: outer 40% removed by acid leaching.

Tln-199. Billefjord **7370 ± 80**

Shells from surface of 20m terrace on E coast of Billefjord near Cape Ekholm. Coll 1975 and subm by L Troitski. *Comment*: outer 40% removed by acid leaching.

Tln-195. Brögger **42,490 ± 550**

Shells from base of 30m-terrace on N coast of Brögger Peninsula. Bedrock overlain by cobble loam, sand, till, red clay, sand with shells and cobble-and-pebble beach deposits. Coll 1975 and subm by L Troitski. *Comment*: outer 40% removed by acid leaching.

Tln-252. Brögger **33,200 ± 550**

Shells from same complex as Tln-195. Based on Tln-195, -252, the following conclusions can be drawn: 1) because of contamination of samples, Tln-195 reflects min age of complex, 2) occurrence of younger shells in deposits is not excluded, 3) data obtained reflect interval of warming. Coll 1975 by J M Punning and L Troitski. *Comment*: outer 40% removed by acid leaching.

Tln-196. Gravsjoem **1760 ± 50**

Animal bones near lagoon Gravsjoem, Nordenskjöld Land. Sample from upper layer. Col and subm by V Korjakin, Inst Geog.

- Tln-208. Homender** **230 ± 60**
Animal bones from cultural layer near mouth of Homender R, Nordenskjöld Land. Sample from uppermost layer. Coll and subm by V Korjakin.
- Tln-232. Agardalen** **10,570 ± 360**
Peat layer from sands from crest of push moraine of Elfenbeinbreen glacier, Sabine Land. Sample from upper part of layer. Coll 1975 and subm by I. Troitski.
- Tln-233. Agardalen** **9620 ± 120**
Central part of peat layer (see Tln-232).
- Tln-234. Agardalen** **9460 ± 110**
Lowermost part of peat layer (see Tln-232). Data obtained refer to reverse bedding of complex.
- Tln-244. Kalypsobyen** **16,720 ± 230**
Shells from surface of 16m-terrace near Kalypsobyen, Bay of Bellsund. Coll 1976 by J M Punning. *Comment:* outer 40% removed by acid leaching.
- Tln-250. Kalypsobyen** **17,070 ± 150**
Repeat analyses of shells from profile of Kalypsobyen (see Tln-244). *Comment:* outer 40% removed by acid leaching.
- Tln-258. Kalypsobyen** **10,380 ± 120**
Shells from surface of 30m-terrace near Kalypsobyen, Bay of Bellsund. Judging by dates, age of 16m-terrace is too old (see Tln-244, -250), which supposedly resulted from mixing of material used for dating with older material outwashed from base of terrace (see Tln-250). Sample coll 1976 and subm by J M Punning. *Comment:* outer 40% removed by acid leaching.
- Tln-245. Nathorst** **1380 ± 70**
Driftwood from marine deposits in distal part of E end of Nathorst moraine, Van Keulenfjord. Coll 1976 by J M Punning.
- Tln-246. Kap Lyell** **440 ± 70**
Driftwood from terrace deposits at alt 0.6m from sea level, 0.5km W of cape Kap Lyell (Bellsund). Coll 1976 by J M Punning.
- Tln-247. Renarodden** **230 ± 60**
Driftwood from surface of 60m-terrace near cape Renarodden (Bellsund). Judging by age driftwood is not of primary deposit. Coll 1976 by J M Punning.
- Tln-251. Renarodden** **31,910 ± 600**
Shells from intermorainic complex of sea deposits forming bases of 30m-terrace, cape Renarodden, Bellsund. Sample coll 1976 by J M Pun-

ning. From same complex previous date $30,750 \pm 800$: Tln-175 (Punning *et al.*, 1976), which confirms good correlation with last date. *Comment*: outer 40% removed by acid leaching.

Tln-249. Blomstrand **9185 \pm 120**

Shells from surface of 10m terrace (N coast of Kongsfjord). Coll 1976 and subm by L Troitski.

East Siberia

Tln-228. Tchaun-1 **35,300 \pm 900**

Biotritite from borehole on beach of estuary of Tchaun, 2km S of town Peven on coast of East-Siberian Sea. Ancient lagoon deposits lie between deluvial deposits at depth 3.2 to 4.8m. Coll 1975 and subm by F Kovalenko, All-Union Research Inst Marine Geol.

Tln-236. Tchaun-2 **14,180 \pm 350**

Well-decomposed peat from borehole in S part of estuary of Tchaun, East-Siberian Sea. Complex of lake deposits overlain by aleurite and fine sand. Sample from depth 1 to 1.2m. Coll 1975 and subm by F Kovalenko.

Tln-235. Aion-4 **7530 \pm 250**

Peat from terrace of erosion coast of Aion I, estuary of Tchaun, East-Siberian Sea. Sample from lower part of peat from drained thermokarst funnel. Coll 1975 and subm by F Kovalenko.

Tln-238. Aion-3 **23,600 \pm 800**

Plant remains from terrace on E abrasional coast of Aion I, estuary of Tchaun, East-Siberian Sea. Sample from under 13m complex of loess-like rocks alternating with horizontal layers of sandy and aleuritic deposits. Coll 1975 and subm by F Kovalenko.

Tln-242. Tchaun **13,460 \pm 280**

Peat from subaqueous coastal slope in E Part of tributary Tchaun, East Siberian Sea. Clayey aleurites with peat layers at 4.5 to 5.4m, overlain by clayey aleurites. Sample coll 1975 and subm by M Rosenblats, All-Union Research Inst Marine Geol.

Central Asia

Tln-198. Suphan **180 \pm 60**

Peat from central part of Suphan bog (Phergana Dist, Uzbek SSR). Sample from depth 0.2m. Coll 1974 and subm by L Serebryanny, Inst Geog.

Tln-203. Kerkidon-3 **5680 \pm 80**

Plant remains from alluvial bog deposits on slope of 2nd terrace of Kuvasay R, 1km NW of village Kerkidon, Aravan Dist, Oshs region, Kirghiz SSR. Sample from depth 0.4 to 0.5m. Coll 1975 by G Pshenin and L Serebryanny, Inst Geog.

- Tln-204. Kerkidon-4** **7430 ± 60**
 Plant remains from alluvial bog deposits on slope of 2nd terrace of Kuvasay R (see Tln-203).
- Tln-205. Kashkalan-1** **2470 ± 80**
 Peat sapropel from slope of canal 1km S of village Kashkalan Alabuhinsk Dist, Oshs region, Kirghiz SSR. In profile peat sapropels at depth 1.60 to 1.65m and 2.60 to 2.70m. Sample from upper layer. Coll 1975 and subm by L Serebryanny.
- Tln-206. Kashkalan-2** **2700 ± 120**
 Peat from lowermost horizon from same profile as Tln-205.
- Tln-241. Kulandy** **745 ± 80**
 Shells from surface of spit of ancient lagoon of Aral Sea 4km W of village of Kulandy (Aral Dist, Kōzol-Ordinsk region, Kazakh SSR. Sample coll 1976 and subm by I Veinbergs, All-Union Research Inst Marine Geol. *Comment*: outer 20% removed by acid leaching.
- Tln-243. Kulandy** **730 ± 80**
 Shells from surface of spit of ancient lagoon of Aral Sea 5km S of settlement Kulandy. Sample coll 1976 and subm by I Veinbergs. *Comment*: outer 20% removed by acid leaching.

II. ARCHAEOLOGIC SAMPLES

Estonian SSR

- Tln-207. Pajumõisa** **1468 ± 80**
 Remains of decomposed wood from ancient grave on I Saaremaa. Estimated age: 5th to 6th centuries AD. Sample from depth 0.6 to 0.7m. Coll 1975 and subm by T Hamla, Inst Hist.
- Tln-209. Narva-Jõesuu** **280 ± 50**
 Remains of ancient ship from under old coast dunes near settlement Narva-Jõesuu (estuary of Narva R). Sample coll 1976 by V Lõugas, Inst Hist.
- Tln-213. Kuressaare** **960 ± 60**
 Wood from wall of guard tower of castle Kuressaare, I Saaremaa. Sample coll 1975 and subm by K Aluvee, State Blda Comm Council Ministers Estonian SSR, Restoration Office.
- Tln-214. Kuressaare** **690 ± 60**
 Wood from defense wall of castle Kuressaare, I Saaremaa. Sample coll 1975 and subm by K Aluvee.
- Tln-218. Kuressaare** **630 ± 50**
 Wood from earlier building stage of Kuressaare castle, I Saaremaa. Coll 1974 and subm by K Aluvee.

Tln-237. Kaali**2890 ± 90**

Wood from lacustrine deposits in main crater of Kaali, I Saaremaa. Coll 1976 and subm by V Lõugas, Inst Hist.

REFERENCES

- Devyatova, E and Punning, J M, 1976, Upper-Pleistocene profile Koleshki (Arkhangelsk Dist) and its stratigraphic importance: Acad Sci Estonian SSR pub, v 25, no. 2, p 152-160 (in Russian).
- Devyatova, E, Raukas, A, Rajamäe, R, and Hütt, G, 1978, Upper-Pleistocene profile Pasva (Vaga R, Arkhangelsk Dist) and its stratigraphic importance: Comm Quaternary Geol Bull (in press, in Russian).
- Hütt, G, Punning, J M, Smirnov, A, and Rajamäe, R, 1978, Reliability of TL dating method in geology: 3rd methodological symposium in geochronol (in press, in Russian).
- Punning, J M, Kakum, T, and Rajamäe, R, 1976, Tallinn radiocarbon dates III: Radiocarbon, v 18, p 110-115.
- Punning, J M, Rajamäe, R, Ehrenpreis, M, and Sarv L, 1977, Tallinn radiocarbon dates IV: Radiocarbon, v 19, p 111-117.