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TARTU RADIOCARBON DATES II

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The following list includes samples dated between 1956 and 1961. Wood dating from A.D. 1850 ± 10 yr is used as a contemporary reference standard. Background sample is synthesized from anthracite. All radiocarbon dates were calculated with the half-life of C^{14} being equal to 5568 ± 30 yr. All dates are calculated from the year 1950.

Sample synthesis and measurement methods are described in Tartu Radiocarbon Dates I (Liiva, *et al.*, 1966) except for TA-99, 100, and 101. For their dating, benzene was synthesized in a larger amount and a scintillator solution composed of PPO 4 g/l + POPOP 0.1 g/l + naphthalene 100 g/l in benzene was used. When 40 ml of this solution was used, rate of the background was 6.32 ± 0.04 counts/min, the count of the contemporary reference standard being 183.53 ± counts/min ± 0.30 counts/min. The maximum determinable age is equal to 52,500 yr (= 48 hours counting 4 5 criterion) (Punning, *et al.*, 1966).

I. ARCHAEOLOGIC SAMPLES

TA-81. Asva — **2520 ± 60 / 570 B.C.**

Charcoal from lower horizon of cultural layer of fortified settlement Asva, Is. Saaremaa, Kingissepp District, Estonian SSR near present village Asva at depth of 35 to 45 cm below surface near S wall. Presumably late Bronze age (corresponding to the 5th period in Mentelius system), 8th to 6th c. B.C. Coll. 1965 and subm. by V. Lõugas (Inst. of Hist., Acad. of Sci. of Estonian SSR).

TA-82. Valgjärv — **1370 ± 60 / A.D. 580**

Wood from ancient dwellings on Valgjärv ("White Lake"), Valga District, Estonian SSR, 3 km S of settlement Koorküla. According to archaeol. data (Selirand, 1960), samples are remains of peculiar, fortified settlement in middle of lake. According to popular belief, monument is linked to legend of origin of lake whose waters inundated farms. (Eisen, 1958). Presumable age of sample, 2nd half of 1st millennium A.D. Coll. 1958 and subm. by J. Selirand (Inst. of Hist.).

TA-84. Torva — **1370 ± 75 / A.D. 580**

Charcoal from lower horizon of cultural layer found in NW part of outer defense works in Tõrva township, Valga District, Estonian SSR, 1½ km S of Tõrva. Sample coll. at depth of 90 to 110 cm. Layer immediately underlies grass cover and extends 60 to 130 cm below ground surface. Presumable age of sample, 6th to 7th c. A.D. Coll. 1965 and

subm. by H. Moora jun. (Viljandi Interdistrict Mus. of Regional Studies).

TA-104. Paatsa **670 ± 60** **A.D. 1280**

Charred wood from dwelling remains of Paatsa township village soviet Võhma, near the center of Paatsa, Kingissepp District, Estonian SSR. Sample coll. in NW part of township at depth of 30 to 40 cm below ground surface and is attributed to the latest period of township. According to A. Kustin, township existed in 12th to 13th c. A.D., maybe as late as 14th century. Coll. 1963 and subm. by A. Kustin (Inst. of Hist.).

TA-108. Rauasaatme mäed **600 ± 60** **A.D. 1350**

Charcoal from dump of metal slag 3 km E of township Paatsa (cf. TA-104) in Kingissepp District, Estonian SSR. Dumps are remains of single melting of iron ore with charcoal. Bog-iron ore probably served as raw material (Aalose, Kustin, 1966). Ceramics discovered near slag dump similar in form to late ceramics from Paatsa township. Presumable age of sample, 2nd half of 13th or 14th c. Coll. 1962 by A. Kustin and A. Aaloe; subm. by A. Kustin.

TA-105. Usvyata **4570 ± 70** **2620 B.C.**

Wood from Neolithic settlement Usvyata IV on S outskirts of settlement Usvyata, Nevel' District, Pskov Region, RSFSR. Sample coll. from lower horizon of cultural layer (B) at 125 cm below surface, is fragment of pile settlement dwelling. Pollen analyses by E. A. Spiridonov refer Layer B to Atlantic period. Presumable archaeol. age, end of 3rd or beginning of 2nd millennium B.C., maybe older. Coll. 1964 and subm. by A. M. Miklyayev (State Hermitage of SSSR).

II. GEOLOGIC SAMPLES

TA-74. Pühajärv **3300 ± 60** **1350 B.C.**

Plant remains near Lake Pühajärv, Valga District, Estonian SSR, at depth of 1.30 to 2.20 cm below surface. Coll. 1964 and subm. by K. Kajak (Geological Board attached to Council of Ministers of Estonian SSR, later referred to as Geol. Board).

TA-75. Altküla **8460 ± 180** **6510 B.C.**

Silvan, dark brown peat from Haapsalu District, Estonian SSR. Underlying varved clays, protective layer-clayey aleurite with plant remains, sample was at depth of 125 to 135 cm. Presumable age, Q_{IV} Ancylus. Coll. 1964 and subm. by H. Stumbur (Geol. Board).

TA-77. Voidu **9100 ± 90** **7150 B.C.**

Buried wood peat from Kilingi-Nõmme District, Estonian SSR at depth of 520 to 527 cm. Layer of peat rests on moraine, overlain by

clayey sapropelite, followed by littoral deposits of Lake Ancylus. Coll. 1965; subm. by Prof. K. Orviku; pollen-dated by H. Kessel (1963a).

8995 ± 125

TA-78. Tapu **7045 B.C.**

Buried wood peat from Pärnu District (N of settlement Pärnu-Jaagupi), Estonian SSR, at depth of 194 to 199 cm. Sequence described in TA-77. Coll. by H. Kessel and E. Ilves. Pollen analysis by H. Kessel (1963b).

7000 ± 80

TA-79. Erdi **5050 B.C.**

Silvan low-lying peat from peat-bog Erdi, Viljandi District, Estonian SSR, from layer at depth of 775 to 800 cm. Pollen analysis by E. Liivrand attributes sample to Pollen Zone VIII (V. Post-Nilsson system). Coll. 1965 by H. Liivrand; subm. by K. Kajak.

8225 ± 80

TA-80. Kolga-Jaani **6275 B.C.**

Peat at depth of 100 cm, 3 km NE of Kolga-Jaani, Viljandi District, Estonian SRR. Coll. 1965 and subm. by K. Kajak.

Endla series

Samples coll. from high moor Teosaare, incorporated in bog system Endla (1.5 km NE of settlement Kärde, Jõgeva District, Estonian SSR).

Table 1. Stratigraphy of Endla Bog System

Depth (cm)	Sediment type	Degree of decomposition (humification %)
to 105	sphagnum peat	15
105 to 120	wood and reed peat	20
120 to 220	wood peat	35 to 50
220 to 250	wood and reed peat	25 to 30
250 to 390	reed peat	20 to 30
390 to 407	wood and reed peat	70 to 80
407 to 415	moraine	
415 +	limestone	

Coll. 1965 by E. Ilves. Pollen analyses (according to V. Post-Nilsson system) were carried out by A. Sarv.

1145 ± 65

TA-85. Endla **A.D. 805**

Sphagnum peat at depth of 55 to 60 cm. The boundary-line of Pollen Zones Ib/Ia.

1260 ± 65

TA-86. Endla **A.D. 690**

Sphagnum peat at depth of 90 to 95 cm. Upper maximum of spruce.

1670 ± 110
TA-87. Endla **A.D. 280**

Sphagnum peat passing over into wood and reed peat at depth of 100 to 105 cm. Border of Pollen Zones II/Ib.

2855±70
TA-88. Endla **905 B.C.**

Wood peat at depth of 155 to 160 cm. Boundary of Pollen Zones III/II.

3125 ± 70
TA-89. Endla **1175 B.C.**

Wood peat at depth of 175 to 180 cm. Lower maximum of spruce.

3465 ± 70
TA-90. Endla **1515 B.C.**

Wood peat at depth of 190 to 195 cm. Boundary of Pollen Zones IV/III.

3935 ± 70
TA-91. Endla **1985 B.C.**

Wood peat at depth of 205 to 210 cm. Maximum of oak Pollen.

4265 ± 70
TA-92. Endla **2315 B.C.**

Wood and reed peat at depth of 220 to 225 cm. Boundary of Pollen Zones V/IV.

4735 ± 70
TA-93. Endla **2785 B.C.**

Wood and reed peat collected from 230 to 235 cm. Maximum of lime Pollen.

5245 ± 70
TA-94. Endla **3295 B.C.**

Wood and reed peat at depth of 245 to 250 cm. Possibly border of Pollen Zones VI/V.

6480 ± 70
TA-95. Endla **4530 B.C.**

Reed peat at depth of 305 to 310 cm. Boundary of Pollen Zones VII/VI.

7865 ± 75
TA-96. Endla **5915 B.C.**

Wood and reed peat at depth of 370 to 375 cm. Boundary of Pollen Zones—VIII/VII.

8015 ± 80
TA-97. Endla **6065 B.C.**

Wood and reed peat at depth of 375 to 380 cm. Maximum of pine Pollen.

8495 ± 85
TA-98. Endla **6545 B.C.**

Wood and reed peat at depth of 394 to 400 cm. Pollen Zone VIII.

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6180 ± 90
TA-109. Endla **4230 B.C.**
Reed peat at depth of 275 to 280 cm. Maximum of elm Pollen.

Karuküla series

Intermorainic deposits of Karuküla are situated in SW of Estonian SSR, 7 km S of town Kilingi-Nõmme. Samples taken from wall of prospecting shaft. Structure of section: humic horizon of soil; rubbly sandy loam (moraine); organogenous layer, 140 cm thick (arboreal peat with wood remains, equisetic peat, clayey sapropelite); aleurite. Pollen analyzed by R. Pirrus showed changes in climate from severe to warm and back to severe (Orviku and Pirrus, 1965). Coll. 1965 and subm. by K. Kajak (Punning, *et al.,* 1966).

33,450 ± 800
TA-99. Karuküla **31,500 B.C.**
Wood remains at depth of 150 to 170 cm.

48,100 ± 1700
TA-100. Karuküla **46,150 B.C.**
Peat at depth of 150 to 170 cm.

48,100 ± 1650
TA-101. Karuküla **46,150 B.C.**
Peat at depth of 195 to 215 cm.

TA-106. Karuküla **≥ 45,000**
Clayey sapropelite at depth of 235 to 255 cm.

1915 ± 70
TA-102. Kivilope **A.D. 35**
Peat from boggy plain of Lake Võrtsjärv 7 km E of Mustla, Viljandi District, Estonian SSR. Sample lay on lake silt at depth of 170 to 210 cm. Pollen analysis by E. Liivrand. Sample is referred to Pollen Zone II (V. Post-Nilsson system). Coll. 1965 and subm. by K. Kajak.

9240 ± 85
TA-122. Lemmeoja **7290 B.C.**
Gravelly sapropelite from bottom of gravel pit 20 m from right bank of stream Lemmeoja, Pärnu District, Estonian SSR. Coll. at depth of 38 to 44 cm,, sapropelite underlies bank deposits of Lake Ancylus. Pollen analyzed by N. Kessel. Coll. 1966 by J. M. Punning; subm. by K. Kajak.

9100 ± 85
TA-123. Lemmeoja **7150 B.C.**
Wood from bottom of gravel pit 20 m from right bank of stream Lemmeoja, Pärnu District, Estonian SRR (see: TA-122). Coll. at depth of 45 to 49 cm.

11,930 ± 110
TA-124. Ula **9,980 B.C.**
Wood remains from valley of river Ula near village Zervinus SW of city Vilnius, Vilnius District, Lithuanian SSR. Wood remains and peat

lie in middle of thick complex of sand. Sample coll. from layer of black-gray humified clay containing shells of mollusks. Coll. 1966 by J. M. Punning, L. Serebryanny, and R. Pirrus; subm. by K. Kajak. *Comment:* Lab. of V. I. Vernadsky Institute of Geochemistry and Analytical Chemistry (MO-302) dated sample at 16,260 ± 640.

TA-125. Ula **12,160 ± 120**
10,210 B.C.

Mossy peat from valley of river Ula near Zervinus, taken from same layer as TA-124.

TA-126. Kolga **7505 ± 165**
5555 B.C.

Clayey sapropelite with remains of bulrushes on right bank of river Kolga, Pärnu District, Estonian SSR. Sapropelic layer, 18 cm thick, underlies 10-cm-thick dunes of Littorina Sea. Sample depth 0 to 3 cm (with reference to dune). Coll. 1966 by J. M. Punning; subm. by K. Kajak.

TA-127. Virunurme **5880 ± 60**
3930 B.C.

Peat from peat bog Virunurme, Kohtla-Järve District, Estonian SRR at depth of 630 to 680 cm. Coll. 1966 by J. Paap; subm. by K. Erisalu (Geol. Board).

TA-128. Sarkanais mals **10,390 ± 105**
8,440 B.C.

Wood remains of brick quarry "Sarkanais mals" on right bank of river Melune, Jelgava District, Latvian SSR at depth of 220 to 240 cm. Wood remains overlain by soil and sand, and underlain by varved clays and moraine. Pollen analyzed by V. Stelle. Sample assigned to Pollen Zone X (V. Post-Nilsson system), (V. J. Stelle, 1963). Coll. 1965 and subm. by V. Stelle (Inst. of Geol., Latvian SSR).

TA-129A. Progress **11,950 ± 110**
10,000 B.C.

Plant remains from a brick quarry "Progress" on right bank of river Lielupe, Jelgava District, Latvian SSR. Sample lay in sand plain, at depth of 300 cm, overlying varved clay (V. Stelle, 1963). Coll. 1965 and subm. by V. Stelle.

TA-129B. Progress **11,875 ± 110**
9,925 B.C.

Control dating of the sample TA-129.

TA-131. Bolotnitsa **1330 ± 65**
A.D. 620

Wood and plant remains from an outcrop on river Bolotnitsa 1.2 km from village Bolotnitsa, Leningrad Region, RSFSR. Borderline horizon of peat bog. Sample taken at depth of 50 cm. Coll. 1966 and subm. by L. Serebryanny (Inst. of Geogr., Acad. Sci., USSR).

11,090 ± 135

TA-132. Vitka **9,140 B.C.**

Submorainic peat near village Vitka, 5 km SE of town Vastseliina, Võru District, Estonian SSR at depth of 3.7 to 4.0 m. Coll. 1964 and subm. by K. Kajak.

9765 ± 130

TA-133. Oara **7815 B.C.**

Peat sapropelite near river Oara, Pärnu District, Estonian SSR at depth of 154 to 163 cm. Sapropelic layer, 28 cm thick, underlies aleurite and overlies varved clays. Pollen analyzed by H. Kessel, sample assigned to Pollen Zone IX (V. Post-Nilsson system). Coll. 1966 by J. M. Punning; subm. by K. Kajak.

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