

VIENNA RADIUM INSTITUTE RADIOCARBON DATES V

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Measurements have continued with the same proportional counter system, pretreatment procedure, methane preparation and measurement, and calculation using a half-life of 5568 ± 30 years, as described previously (R, 1970, v 12, p 298-318). Uncertainties quoted are single standard deviations originating from standard, sample, background counting rates and half-life. No $^{13}\text{C}/^{12}\text{C}$ ratios were measured.

The following list presents most samples of our work in the last year. Sample descriptions have been prepared in cooperation with submitters.

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SAMPLE DESCRIPTIONS

I. GEOLOGY, GEOGRAPHY, SOIL SCIENCE

A. Austria

VRI-344. Dachstein, O Ö **3400 ± 170**
1450 BC

Black organic material finely distributed in cave sediment of Dachstein-Mammuthöhle ($37^{\circ} 32' 10''$ N, $13^{\circ} 42' 39''$ E), Mt Dachstein, Upper Austria. Coll 1972 and subm by R Seemann, Mineralog Petrog Inst, Univ Vienna. *Comment* (RS): dates formation of microscopically observed pyrites in sediment (Seemann, 1970; VRI-255, -257: R, 1973, v 15, p 426).

VRI-286. Grabensee, O Ö **4240 ± 100**
2290 BC

Fen peat with wood overlying limno-telmatic contact, taken with Dachnowski probe from depth 175 to 170cm at center of large mire at N end of lake Grabensee, mostly on lake marl, 150m from shore ($47^{\circ} 59' 55''$ N, $13^{\circ} 06' 26''$ E), Lot 1633/1, K G Mundenham, Gde Palting, Upper Austria. Coll 1971 and subm by R Krisai, Bot Inst, Univ Salzburg. *Comment* (RK): dates onset of peat growth on lake marl and waning of this part of lake.

VRI-285. Trumer Moor, Salzburg **2730 ± 80**
780 BC

Carex fen peat overlying limno-telmatic contact, taken with Dachnowski probe from depth 145 to 140cm at center of small birch forest, Lot 2121/2, K G Mattsee, Trumer Moor at end of lake Obertrumer See ($47^{\circ} 56' 40''$ N, $13^{\circ} 04' 41''$ E), Salzburg. Coll 1971 and subm by R

Krisai. *Comment* (RK): dates onset of peat growth on lake marl and waning of this part of lake.

8590 ± 130

VRI-287. Zellhofer Moor, Salzburg

6640 BC

Detritus gyttja with *Carex* radicals overlying clay-gyttja, taken with Dachnowski probe at depth 565 to 570cm from bog Zellhofer Moor near Mattsee (47° 59' 16" N, 13° 05' 14" E), Salzburg. Bore hole at center of dessicating raised bog on Lot 233, K G Mattsee. Coll 1971 and subm by R Krisai. *Comment* (RK): dates beginnings of elm increase in pollen diagram and bog growth.

Schlatenkees III series, Venediger Group, Osttirol

Peat from varying depths in ca 100cm deep peat bog at outer slope of lateral moraine of glacier Schlatenkees, Venediger Group (Patzelt, 1967), near lake Salzbodensee, E Tyrol (47° 06' 56" N, 12° 26' 47" E), alt 2130m. Coll 1970 and subm by G Patzelt, Geog Inst, Univ Innsbruck. *General Comment*: submitter hoped to date palynologically determined climate fluctuations. Age inversion in series verified by VRI-282 and -283 submitted afterwards is yet unexplained.

560 ± 70

VRI-246. 20.5 to 21.5cm

AD 1390

Peat from depth 20.5 to 21.5cm underlying several disturbed raw humus horizons. *Comment* (GP): dates end of peat growth and beginning of several disturbances in soil development. According to pollen diagram, beginning of disturbances corresponds with climatic deterioration and period of glacial maximum of late Middle ages.

1680 ± 90

VRI-283. 29 to 31cm

AD 270

Peat from depth 29 to 31cm. *Comment* (GP): should limit distinct climatic deterioration together with VRI-246. Sudden increase in herbaceous pollen, especially in pioneer plants.

1760 ± 90

VRI-247. 38 to 41cm

AD 190

Peat from depth 38 to 41cm, from heavily decomposed peat band rich in mineral substances. *Comment* (GP): should date peat growth disturbance corresponding with climatic deterioration as revealed by pollen diagram.

1530 ± 80

VRI-282. 51 to 52.5cm

AD 420

Peat from depth 51 to 52.5cm. *Comment* (GP): proves age inversion detected by VRI-245 and -247. Sample should date beginning of climatic deterioration corresponding with increase of pioneer plants in pollen diagram.

VRI-245. 75 to 78cm **1400 ± 80**
AD 550

Peat from depth 75 to 78cm. *Comment* (GP): should date beginning of moss peat development and end of climatic deterioration in early Middle ages.

VRI-302. 96cm **4790 ± 100**
2840 BC

Peat from base of bog. *Comment* (GP): dates beginning of peat growth, gives minimum age of underlying moraine and maximum age for disturbance in peat growth stratigraphically marked by sand band at depth 95cm.

VRI-303. Obersulzbachkees II, Venediger Group **3110 ± 130**
1160 BC
Osttirol

Branch (*Pinus cembra*) from base of peat bog 160cm deep within end moraine of glacier Obersulzbachkees (Patzelt, 1967). Site adjacent to Obersulzbach-hut (47° 08' 36" N, 12° 16' 54" E), Venediger Group, E Tyrol. Coll 1970 and subm by G Patzelt. *Comment* (GP): date is minimum for underlying moraine.

Schönwies-Hütte series, Obergurgl, Tirol

Cyperaceous peat from different depths of bog near shelter Schönwies-Hütte (46° 50' 40" N, 11° 00' 50" E), Obergurgl, Tyrol. Coll 1971 and subm by S Bortenschlager, Inst Bot Systematik Geobot, Univ Innsbruck.

VRI-296. 180 to 190cm **8840 ± 140**
6890 BC

Comment (SB): dates beginning of herbaceous pollen increase in pollen profile corresponding with climatic fluctuation.

VRI-297. 120 to 123cm **7880 ± 170**
5930 BC

Comment (SB): dates end of NBP maximum and end of climatic deterioration.

VRI-298. 82 to 85cm **5720 ± 100**
3770 BC

Comment (SB): dates climatic and glacial fluctuation clearly recognizable in pollen profile.

VRI-299. 32 to 35cm **3630 ± 90**
1680 BC

Comment (SB): dates end of climatic deterioration.

Münster series, Tirol

Wood from base of Mt Pletzsch landslide between Münster and Kramsach, Tyrol. Subm 1971 by H Heuberger, Geog Inst, Univ Innsbruck. Wood determined by H Hilscher, Innsbruck.

General Comment (HH): samples date Pletzsch landslide assumed to be late glacial by Schreiber (1950) but postglacial by submitter.

VRI-304. Pletzach Landslide 1 **3630 ± 90**
1680 BC

Juniperus sp embedded in silt at base of Mt Pletzach landslide excavated by workers at well sinking in limestone quarry and limekiln Huber-Einberger, Hagau (47° 26' 13" N, 11° 52' 00" E). *Comment* (HH): maximum age for landslide.

VRI-305. Pletzach Landslide 2 **3690 ± 90**
1740 BC

Probably *Abies* embedded in unlaminated silt of R Inn, dammed up by landslide at hwy bldg site Hagau (27° 25' 52" N, 11° 52' 18" E) near Brixlegg bridge. Coll 1971 by H Heuberger. *Comment* (HH): maximum age for landslide.

VRI-306. Pletzach Landslide 3 **1740 ± 80**
AD 210

Root of tree, in soil beneath bank of sand and gravel, under Pletzach landslide. Same site as VRI-305. Coll 1971 by H Heuberger. *Comment* (HH): sample proves irrelevant for landslide.

VRI-339. Baumkirchen, Tirol **27,400 ± 900**
25,450 BC

Branch deformed by pressure, Find 24 (Fliri *et al.*, 1970; 1971), in undisturbed banded silts, alt 671m, clay pit Baumkirchen (47° 18' 25" N, 11° 34' 19" E), Inn Valley, Tyrol. Coll 1972 and subm by F Fliri, Geog Inst, Univ Innsbruck. *Comment* (FF): dates Inn Valley sediments.

VRI-354. Scharnitz, Tirol **1110 ± 110**
AD 840

Wood fragment (*Pinus*) from deeper part, Shaft 1, depth 1.7m, of slope near "Silberner Hansl" below "Haspelzeche", E of Scharnitz (47° 24' N, 11° 16' E), S side of Mt Reps, Karwendel Mts, Tyrol. Coll 1972 by M Forelli, subm by L Kostelka, Bleiberger, Bergwerks Union, Carinthia. *Comment* (LK): proves this part of slope is older than Middle ages mining slag heap in upper part. Zinc from slope is not derived from mining.

B. Italy, Saudi Arabia

VRI-272. Laas/Lasa, Italy **4350 ± 100**
2400 BC

Charcoal from colluvial humus horizon with burnt remains on detritus of alluvial cone from depth 3m at foot of slope of Laaser Leiten (46° 37' 30" N, 10° 41' 25" E), Vinschgau, Südtirol, Italy. A Neolithic arrowhead was found in this horizon. Coll 1970 by A Otto; subm by F Fliri.

VRI-384. Wadi Ha, Saudi Arabia **8400 ± 140**
6450 BC

Snail shells in calcareous sands from interfingering of lake sediments with river terraces, Wadi Ha (24° 20' N, 46° 52' E), Saudi Arabia.

Coll 1973 and subm by J Zötl, Inst Min Tech Geol, T H Graz. *Comment* (JZ): dates accumulation terraces in Wadi Hanifah.

II. ARCHAEOLOGIC SAMPLES

VRI-281. Gummern, Kärnten **250 ± 90**
AD 1700

Charcoal, 30cm below surface of oval, ca 7 x 9m, flat mound embedded in gently rising slope W of Villach, near Gummern in Drau Valley (46° 36' N, 13° 42' E), Carinthia. Front side of mound 1.5m high. Coll 1971 by S Steinwender; subm by R Pittioni, Inst Ur Frühgeschichte, Univ Vienna. *Comment* (SS): contradicts assumption that mound and Roman attack on Cimbri (W of Villach, according to Appianus) 113 BC are contemporaneous.

Scharfling series, O Ö

Remains of wooden pilings lifted from bottom of lake Mondsee near shore at depth -3m, Sta Scharfling (47° 49' N, 13° 25' E), Gde St Lorenz, O Ö. Coll 1971 and subm by H Offenberger, Bundesdenkmalamt, Wien. Determination of wood by J Kisser, Wien.

General Comment: samples prove to be remains of Neolithic lake dwellings.

VRI-311. Scharfling I **4940 ± 120**
2990 BC
Picea abies.

VRI-312. Scharfling II **4870 ± 100**
2920 BC
Acer pseudoplatanus.

VRI-313. Scharfling III **4660 ± 90**
2710 BC
Fagus sylvatica.

VRI-314. Scharfling IV **4780 ± 90**
2830 BC
Picea abies.

VRI-345. Hallstatt, O Ö **2810 ± 90**
860 BC

Wood (*Fagus sylvatica*) fragment of tool shaft (so-called knee-shaft) from Grüner Werk, N group of prehistoric salt mine Salzberg Hallstatt (47° 34' N, 48° 57' 26" E), Upper Austria. Coll 1960 and subm 1972 by F E Barth, Naturhist Mus, Wien. *Comment* (HF): date agrees with VRI-258 and -267.

Hallstatt series 1, O Ö

Wood fragments of fire sticks and tools from different groups of prehistoric salt mine Salzberg, Hallstatt (Schauberger, 1960) (47° 34' N, 48° 57' 26" E), Upper Austria. Subm by O Schauburger, Bad Ischl.

- VRI-258. E group, 8a** **2810 ± 90**
860 BC
Tool (?), E group, Kaiser Josef horizon, prospecting NO adit (Untersuchungsquerschlag) at 40m, Site 8a. Highest finding site. Coll 1957 by O Schaubberger.
- VRI-259. E group, 9a** **2340 ± 80**
390 BC
Fire sticks and twigs, E group, Kaiser Josef horizon, Werk Stüger, Site 9a. Coll 1954 by O Schaubberger.
- VRI-260. E group, 26** **2170 ± 80**
220 BC
Prop, E group, Kaiserin Christina horizon, cast on day at left side-wall of main adit, Site 26. Coll 1960 by O Schaubberger. *Comment* (OS): proves prehistoric origin was originally uncertain.
- VRI-261. E group, 13/1** **2140 ± 80**
190 BC
Prop, larch, E group, Kaiserin Christina horizon, Werk Katharina von Edlersberg, SE sidewall, Site 13. Coll 1970 by B Unterberger.
- VRI-262. E group, 13/2** **2380 ± 100**
430 BC
Fire sticks, E group, Kaiserin Christina horizon, Werk Katharina von Edlersberg, SE sidewall, Site 13. Coll 1970 by B Unterberger.
- VRI-263. E group, 18** **2320 ± 100**
370 BC
Fire sticks, E group, Kaiserin Christina horizon, Josef Ritschner Ankehrschurfkopf, Site 18. Coll 1970 by B Unterberger.
- VRI-264. E group, 17/1** **2400 ± 80**
450 BC
Fragment of prop in "Kernigem Heidengebirge", E group, Kaiserin Christina horizon, Layer Aufdeckungsschlag, 100m from main adit, Site 17. Coll 1970 by B Unterberger.
- VRI-265. E group, 17/2** **2480 ± 80**
530 BC
Fire sticks, E group, Kaiserin Christina horizon, Layer Aufdeckungsschlag, 100m from main adit, Site 17. Coll 1970 by B Unterberger.
- VRI-266. E group, 21** **2290 ± 100**
340 BC
Fire sticks and twig, E group, Kaiserin Maria Theresia horizon, Pohl Schöpfungbau Offen, Site 21. Deepest find. Coll 1970 by B Unterberger.
- VRI-267. N group, 7** **2920 ± 100**
970 BC
Fire sticks, N group, Kaiser Josef horizon, Werk Flechner, Landsteiner Kehr, Site 7. Site farthest from surface. Coll 1959 by O Schaubberger.

Hallstatt series 2, O Ö

Wooden tools from Peter et Paul Werk, no longer accessible W group of prehistoric salt mine Salzberg Hallstatt (47° 34' N, 48° 57' 26" E), Upper Austria. Coll 1892 (Barth, 1972; 1973), kept in Mus Nat Hist and subm 1973 by F E Barth, Naturhist Mus, Wien.

VRI-371. Inv no. 35729

Wooden shovel.

**1850 ± 80
AD 100****VRI-372. Inv no. 35730**

Wooden shovel.

**2050 ± 80
100 BC**

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