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VIENNA RADIUM INSTITUTE RADIOCARBON DATES VI

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Measurements have continued with the same proportional counter system, pretreatment procedure, methane preparation and measurement, and calculation, 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 C^{13}/C^{12} 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, AND FORESTRY

A. Austria

VRI-322. Wallern, Burgenland **>36,000**

Wood, fragile fragments of oak; depth 7m, embedded in sand below gravel in subsoil water. Seewinkel between Wallern (47° 36′ N, 16° 56′ E) and Pamhagen, Burgenland. Coll 1971 by Fa Frank, well digger, in Frauenkirchen; subm by H Franz, Hochschule f Bodenkultur, Vienna.

Glacier Pasterze series, Kärnten

Pressed sandy humus from fossil autochthonous soil below 1 to 2m ground moraine. Forefield of glacier Pasterze within lateral moraine from 1856, erosion groove of E Seebach rivulet (47° 03′ 48″ N, 12° 45′ 22″ E), Glockner-Group, Hohe Tauern, Carinthia. Site thawed ca 20 yr ago (Patzelt, 1969). Coll 1971 and subm by G Patzelt, Inst Meteorolog Geophys, Univ Innsbruck.

General Comment (GP): samples date passage of advancing glacier over fossil soil. VRI-317 verifies glacier advance proved repeatedly in other areas (Patzelt, 1973). According to stratigraphy dates were expected. No contamination by recent rootlets. Only acid pretreatment was given.

VRI-316. Pasterze 1 **1310 ± 80**
640 BC

Alt 2210m.

VRI-317. Pasterze 2 **1700 ± 100**
AD 250

Alt 2220m.

31,600 ± 1400

VRI-393. Freibach, Kärnten **29,650 BC**

Deformed wood remnants in banded sand-clay sediment of former lake probably dammed by mud-flow cone. Site 7 to 10m below surface under moraine of former Freibach glacier and gravel. Left border of R Freibach (46° 29′ 18″ N, 14° 26′ 47″ E) S of bridge Pt 812 (Ö K 1:25000, Part 212/1 Zell Pfarre), Carinthia. Coll 1972 and subm by D van Husen, Inst Geol, TH Vienna.

5690 ± 100

VRI-396. Groβenzersdorf, N Ö **3740 BC**

Stem of Elm 10 in terrace gravel of R Danube dredged at —5m in underground water in gravel pit 2 km ENE Grossenzersdorf (48° 15′ N, 16° 35′ E), Lower Austria. Coll 1973, subm by J Fink, Geog Inst, Univ Vienna.

13,900 ± 200

VRI-391. Schwarzach, Salzburg **11,950 BC**

Wood at base of banded clay several m thick overlying coarse gravel, underlying sand. Artificial opening of R Salzach terrace, Schwarzach (47° 20′ N, 13° 10′ E), Pongau, Salzburg. Coll 1973 and subm by H Slupetzky, Geog Inst, Univ Salzburg. *Comment* (HS): 1st date of inner alpine terrace of R Salzach and of ice free period in this region.

Koralpe series, Steiermark

Peat from bogs of Mt Koralpe, Styria. Coll 1973 and subm by F Kral, Hochschule Bodenkultur, Vienna.

General Comment (FK): establishes chronology of pollen diagram and forest history.

5720 ± 140

VRI-387. Koralpe 1 **3770 BC**

Sphagnum peat, bog See-Eben near shelter Stoffhütte (46° 53′ 55″ N, 15° 01′ 25″ E), depth 300 to 310cm.

7000 ± 120

VRI-388. Koralpe 2 **5050 BC**

Wood peat, bog Filzmoos near Freiländer Alm (46° 54′ 50″ N, 15° 04′ 10″ E), depth 305 to 315cm.

11,930 ± 250

VRI-392. Bad Aussee, Steiermark **9980 BC**

Gyttja, base of bog between moraine ramparts. Schmiedgut (47° 37′ 15″ N, 13° 45′ 50″ E), Bad Aussee, Styria. Coll 1972 and subm by D van Husen. *Comment* (DvH): dates climatic deterioration recognized in pollen diagram.

Venter Tal series, Tirol

Cyperaceae peat from different depths of bog 130cm deep near Delorette-Weg (46° 49′ 51″ N, 10° 49′ 36″ E), Venter Valley, Ötztaler Alpes, Tyrol, alt 2735m. Coll 1971 by S Bortenschlager and G Patzelt;

subm by S Bortenschlager, Inst Bot Systematik Geobot, Univ Innsbruck. *General Comment* (SB): highest bog of E Alps palynologically analyzed. Observed age inversion probably caused by cryoturbation.

VRI-318. Delorette-Weg 127 to 130cm **6790 ± 140** **4840 BC**

Sample from base of bog; depth 127 to 130cm. *Comment* (SB): should date beginning of peat growth.

VRI-319. Delorette-Weg 117 to 119cm **7830 ± 130** **5880 BC**

Depth 117 to 119cm. *Comment* (SB): sample represents horizon characterized by alternation of peat layers.

VRI-349. Alpbachtal, Tirol **4990 ± 100** **3040 BC**

Wood from Filzmoos bog, depth 50cm. Alpbachtal, Lueger Graben, path S of Filzalpe, alt 1640 m (47° 20′ N, 12° 01′ E), Tyrol. Coll 1971 and subm by G Mutschlechner, Innsbruck.

VRI-359. Baumkirchen, Tirol **27,200 ± 900** **25,250 BC**

Wood with roots (*Alnus viridis*) in undisturbed site in alt 675m from banded clay of pit Baumkirchen (47° 18′ 25″ N, 11° 34′ 19″ E), Tyrol. Coll 1972 and subm by F Fliri, Geog Inst, Univ Innsbruck. *Comment* (FF): expected age (Fliri *et al*, 1970, 1971, 1972; Felber, 1971).

Untergurgl series, Tirol

Clay gyttja coll by boring from different depths of bog Piller Mösl (46° 54′ 04″ N, 11° 02′ 41″ E), alt 1780m, Untergurgl, Ötztal, Tyrol. Coll by G Patzelt and S Bortenschlager; subm by G Patzelt. Gyttja was extracted with NaOH, precipitated by HCl, and dated.

VRI-365. Piller Mösl, 497 to 500cm **9950 ± 290** **8000 BC**

Depth 497 to 500cm. *Comment* (GP): dates beginning of organic sedimentation and 1st recolonization by vegetation. Minimum age of ice retreat in this area.

VRI-366. Piller Mösl 485, 5 to 492cm **9520 ± 220** **7570 BC**

Depth 485, 5 to 492cm. *Comment* (GP): dates palynologically recognized postglacial climatic deterioration.

Imst series, Tirol

Wood frequently found in present working level of brickyard clay pit Imst (47° 13′ 51″ N, 10° 45′ 04″ E), alt ca 730m, Tyrol. Presumably secondary deposition; originally at least below 4m clay. Coll 1972 and subm by G Patzelt.

9890 ± 150

VRI-369. Imst 1 **7940 BC**

Branch (*Pinus* sp). *Comment* (GP): dates embedding of forest parts into clay. Age is minimum for ice retreat, clay deposition, and postglacial vegetation development in Imst basin.

9710 ± 140

VRI-370. Imst 2 **7760 BC**

Stem (*Pinus silvestris*). *Comment* (GP): determines contemporaneity of tree embedment.

Matrei series, Osttirol

Peat cutting Priel near Matrei (46° 58′ 30″ N, 12° 33′ E), alt 950m, E Tyrol. Coll 1971 by J Kalhs, subm by F Kral.

General Comment (FK): clarifies period of clearance in Valley of R Isel shown in pollen diagram.

800 ± 80

VRI-336. Matrei 1 **AD 1150**

Pine cones and wood remnants (alder?) from depth 55 to 58cm.

1030 ± 80

VRI-337. Matrei 2 **AD 920**

Dark brown sandy wood peat, possibly contaminated with younger rootlets from depth 58 to 66cm.

Rostocker Hütte series, Osttirol

Sand with fossil humus around shelter Rostocker Hütte (47° 03′ 20″ N, 12° 18′ 06″ E), alt 2210m, Maurertal, Venediger Group, E Tyrol, (Patzelt, 1973). Coll 1971 and subm by G Patzelt. Humic acids were extracted, precipitated, and dated.

2030 ± 80

VRI-367. Rostocker Hütte M-1 **80 BC**

Humus overridden by advancing glacier Simonykees and incorporated into moraine M of this advance. *Comment* (GP): age is maximum for overriding of fossil soil and older limit for glacier advance see VRI-368.

620 ± 80

VRI-368. Rostocker Hütte M-2 **AD 1330**

Humus of soil grown on moraine M of Simonykees before burial by subsequent glacier advances. *Comment* (GP): age is minimum for underlying moraine, and gives younger limit for deposition of moraine M see VRI-367.

3210 ± 90

VRI-397. Vienna **1260 BC**

Stem wood, oak, embedded in gravel horizon 10m thick; near recent R Danube, left bank, km 1922,500, inn "Roter Hiasl" (48° 10′ N, 16° 30′ E), Vienna 22. Position in profile unknown. Excavated by dredging 1973,

subm by J Fink. *Comment* (JF): a rounded off Roman brick was found in same stratigraphic location 500m upstream at base of this gravel horizon. Thus accumulation of gravel in broad area is quite irregular.

B. Italy, Saudi Arabia, Switzerland, and Spain

VRI-340. Wolfsgruben, Italy **12,310 ± 170** **10,360 BC**

5cm gyttja on coarse-grained glacial clay overlain by brown moss cyperaceous peat. Base of former lake in quartz-porphyritic depression located in relict pine woodland on Mt Signater Kopf/Ritten, alt 1260m (46° 31′ 00″ N, 11° 25′ 02′ E) near Wolfsgruben, prov Bozen/Bolzano (Alto Adige), Italy. Coll 1972 by R Schmidt; subm by S Bortenschlager. *Comment* (HF, RS): overlying 10cm peat had to be added for getting enough organic material. No NaOH pretreatment. Dates beginning of organic sedimentation and late glacial stadial.

VRI-341. Montiggl, Italy **12,850 ± 180** **10,900 BC**

Lowermost 15cm clayey gyttja, 20cm thick, overlying clay and underlying brown moss cyperaceous peat, 5m thick. Base of former lake in shallow quartz-porphyritic depression near Montiggl (46° 25′ 22″ N, 11° 17′ 03″ E), alt 495m, prov Bozen/Bolzano (Alto Adige), Italy. Coll 1972 by R Schmidt, subm by S Bortenschlager. *Comment* (RS): dates forest succession in this area.

Langtaufers series, Italy

Wood from bogs near Langtaufers, N Italy. Coll and subm by G Mutschlechner.

VRI-350. Langtaufers 1 **4120 ± 90** **2170 BC**

Bog "Moosiges Loch"; from −50cm. N hamlet Pazzin, alt 2380m (46° 51′ N, 14° 17′ E). Coll 1971.

VRI-351. Langtaufers 2 **6840 ± 110** **4890 BC**

Nameless bog; from −1m. Below Kappler See, alt 2520m (46° 51′ N, 14° 16′ E). Coll 1971.

VRI-353. Langtaufers 3 **2440 ± 80** **490 BC**

Small nameless hanging bog, N above Melag, alt 2070m (46° 50′ N, 14° 15′ E). Coll 1972.

VRI-352. Graun, Italy **4750 ± 100** **2800 BC**

Wood from bog, depth 50cm. Ochsenberg, SE Hut, alt 2300m (46° 49′ N, 14° 20′ E), NE Graun, Italy. Coll 1972 and subm by G Mutschlechner.

1090 ± 80

VRI-383. Persian Gulf, Saudi Arabia **AD 860**

Shell fossils in horizontal layer 1.3m above msl dividing 2 sand dunes of different age. Persian Gulf, W coast (26° 30′ N, 50° 03′ E), Saudi Arabia. Coll 1973 and subm by J Zötl, Inst Min Techn Geol, TH Graz. *Comment* (JZ): dates old shore line.

10,930 ± 160

VRI-321. Winterthur, Switzerland **8980 BC**

Wood (*Pinus silvestris* L) from Trunk 203 of buried *Pinus* forest, —7m in sand, silt, and clay of cut off "Urstromtal", near Winterthur (47° 31′ 15″ N, 8° 42′ E), Switzerland. Coll 1971 by F Kaiser; subm by S Bortenschlager. *Comment* (SB): dates forest burial.

Tenerife series, Canary Islands, Spain

Conifer wood under volcanic material. Tenerife, Canary Islands, Spain. Coll by T Bravo, subm by B Schwaighofer, Inst Bodenforschung, Hochschule Bodenkultur, Vienna.

VRI-323. Tenerife 1 **>36,000**

Wood in sediments similar to fanglomerate below layer 800m thick of alternating basalt and phonolite (Bravo, 1962). Coll 1961. La Guancha, Galeria El Laurel (28° 21′ N, 12° 57′ E). *Comment* (BS): gives younger limit for embedding sediment.

VRI-324. Tenerife 2 **>36,000**

Wood in clastic material similar Lahar below basaltic layer 400m thick of Series III (Bravo, 1962). Coll 1964, Valle de la Orotava (28° 20′ N, 15° 52′ E). *Comment* (BS): gives younger limit for embedding material.

II. ARCHAEOLOGIC SAMPLES

A. Austria

VRI-300. Nussdorf, O Ö **Modern**

Wooden piling, cross section ca 10 × 10cm², from bottom of lake Attersee, Latzl-bay, Nussdorf am Attersee (47° 53′ N, 13° 31′ E), Upper Austria. Coll 1971 by M Reiter, subm by J Reitinger, O Ö Landesmus, Linz. *Comment* (HF): date disagrees with supposition of Neolithic lake dwelling.

Mooswinkl series, Mondsee, O Ö

Soaked remnants of wooden pilings (*Picea abies*) near shore lifted from bottom of lake Mondsee, —3m, Gde Innerschwand, Mooswinkl (47° 48′ 50″ N, 13° 23′ 40″ E), O Ö. Coll 1972 and subm by J Offenberger, Bundesdenkmalamt, Wien.

General Comment (JO): dates prove Neolithic lake dwellings (R, 1973, v 15, p 433).

VRI-331. Mooswinkl 3 **4350 ± 90**
2400 BC

VRI-332. Mooswinkl 4 **4260 ± 90**
2310 BC

VRI-333. Mooswinkl 5 **4430 ± 110**
2480 BC

Hallein series, Salzburg

Wood fragments of fire sticks, props and tools in different parts of prehistoric salt mine Dürrnberg near Hallein (Schauberger, 1968) (47° 39′ 30″ N, 13° 05′ E), Salzburg. Subm 1970 by O Schauberger, Bad Ischl, O Ö.

VRI-268. Central group, 3/1 **1890 ± 90**
AD 60

Fire sticks in "laistigem Heidengebirge" (deads of rock salt in form of plastic saliferous clay), S part of Central group, Georgenberg-horizon, Querschlag III, 80m from Wechsel, Site 3. Coll 1959 by O Schauberger.

VRI-269. Central group, 12a **2000 ± 80**
50 BC

Fire sticks and charcoal in "kernigem Heidengebirge" (deads of rock salt; salt fragments cemented to breccia by saliferous clay), W of Central group, Obersteinberg-horizon, Ferro-Schachtricht, Site 12a. Coll 1958 by O Schauberger.

VRI-288. Central group, 3/2 **2300 ± 90**
350 BC

Tool in "laistigem Heidengebirge", S of Central group, Georgenberg-horizon, Site 3. Coll 1970 by A Aschauer.

VRI-289. Central group, 13a **2420 ± 90**
470 BC

Prop, W of Central group, Werk O/9, Site 13a. Coll 1970 by A Aschauer.

VRI-290. Central group, 5 **2670 ± 80**
720 BC

Tool in "Heidengebirge", Central group, Georgenberg-horizon, Werk Platz, Site 5. Coll 1971 by A Aschauer.

VRI-291. S group, 1 **2090 ± 80**
140 BC

Fragment of prop in "kernigem Heidengebirge", S group, Kelb-horizon, Werk Schrempf, Site 1. Coll 1950 by O Schauberger.

VRI-292. S group, 3a **2390 ± 80**
440 BC

Fragment of prop in "kernigem Heidengebirge", S group, Georgenberg-horizon, Werk Brandner, Site 3a. Coll 1967 by O Schauberger.

2470 ± 90

VRI-293. S group, 3b **520 BC**

Fragment of prop in "kernigem Heidengebirge", S group, Georgenberg-horizon, Werk Mitterauer, Site 3b. Coll 1970 by A Aschauer.

B. Greece, Turkey

3670 ± 90

VRI-395. Aegina, Greece **1720 BC**

Charcoal from fortification of ancient Aegina, Aegina I. (37° 45′ N, 23° 25′ E), near Athens, Greece. Coll 1972 and subm by H Walter, Inst Klass Archäol, Univ Salzburg. *Comment* (HW): sample from habitation level of early Bronze age in 3rd millennium BC. Dates destruction of fortification. De Vries corrected date, 2100 BC, fits archaeologically determined age (Weinberg, 1967).

2390 ± 80

VRI-329. Ephesos, Turkey **440 BC**

Burnt remnants of wood 3m below loamy horizon excavated with pottery and bones in area between altar and temple of Diana (Bammer, 1972; Vetters, 1973) in Ephesos (37° 57′ N, 27° 20′ 10″ E), Turkey. Coll 1971 and subm by A Bammer, Österr Archäol Inst, Univ Vienna.

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