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VIENNA RADIUM INSTITUTE RADIOCARBON DATES XIV

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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. No $^{13}C/^{12}C$ ratios were measured. Sample descriptions have been prepared in cooperation with submitters.

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SAMPLE DESCRIPTIONS

GEOLOGIC AND BOTANIC SAMPLES

Austria

Hainburg series, NÖ

Wood from borings in Quaternary ballast of Danube R between Hainburg (48° 08′ N, 16° 57′ E) and Fischamend-Markt (48° 07′ N, 16° 37′ E), Lower Austria. Coll by Georg Gangl, Österr Donau-Kraftwerke AG, Vienna.

General Comment (GG): dated for chronology of fluvial ballast deposition.

VRI-644. Boring 51 **<260**

Boring 51 (48° 08′ 22″ N, 16° 53′ 04″ E) from −9 to −9.5m.

VRI-645. Boring 64 **3620 ± 80**

Boring 64 (48° 08′ 35″ N, 16° 53′ 43″ E) from −10 to −11.5m.

VRI-646. Boring 315 **34,000 $^{+2200}_{-1950}$**

Boring 315 (48° 07′ 11″ N, 16° 41′ 27″ E) from −8.2 to −10.4m.

VRI-647. Boring 321 **4060 ± 90**

Boring 321 (48° 08′ 03″ N, 16° 37′ 06″ E) from −7.8 to −8.4m.

VRI-648. Boring 370 **4730 ± 100**

Boring 370 (48° 07′ 37″ N, 16° 37′ 25″ E) from −11.5m.

VRI-822. Boring 919 **31,000 ± 1500**

Boring 919 (48° 08′ 20″ N, 16° 52′ 20″ E) from −20m.

VRI-758. Pyhrnpaβ, OÖ **1450 ± 80**

Cyperaceae peat at −33 to −38cm of uppermost part of 6.5m long profile of bog Vorderes Filzmoos at Wurzeralm, Warscheneck (47° 38′ 57″

N, 14° 17′ 12″ E), 1360m asl, near Pyhrnpaβ, OÖ. Coll 1982 by Friedrich Kral and Michael Oberforster; subm by F Kral, Univ Bodenkultur, Vienna. *Comment* (FK): dates period immediately before clearing, when *Picea-Abies-Fagus* woods were not yet influenced by men.

Gasteiner Naβfeld series, Salzburg

Peat from bog (47° 03′ 20″ N, 13° 03′ 45″ E), SH 1690m, Gasteiner Naβfeld, Salzburg. Coll 1982 and subm by Friedrich Kral.

General Comments (FK): dates for pollen analysis; (HF): no pretreatment.

VRI-756. 65-75cm **880 ± 80**

Sandy wood peat with wood detritus at −65 to −75cm from layer, 12cm thick, below Cyperaceae peat, above coarse sand layer. *Comment* (FK): dates palynologically detected clearing at slopes for pasturing.

VRI-757. Base **2230 ± 80**

Sandy wood peat with wood detritus from base of bog at −100 to −110cm. *Comment* (FK): dates palynologically detected older and weaker local human influence on woods at slopes.

VRI-805. St Alban, Salzburg **390 ± 70**

Wood sample Q-1 from oak stem 2.8m long, 60cm thick, −3m below gravel at St Alban (47° 59′ N, 12° 59′ E) near Lamprechtshausen, 6km NNE Oberndorf bei Salzburg. Coll 1982 and subm by Gottfried Tichy, Univ Salzburg. *Comment* (GT & HF): date contradicts expected Middle Atlanticum.

VRI-806. Salzburg **370 ± 80**

Wood detritus, −1m below surface, sporadically dispersed in fossil soil below old landslide at periphery of city of Salzburg (47° 48′ N, 13° 05′ E). Coll 1983 and subm by Hans Angerer, Magistrat Salzburg. *Comments* (HA): date is max for landslide. (HF): sample prepared from 22kg soil material and cleaned from rootlets and seeds still capable of germinating. No pretreatment.

Salzburg series

Peat from different horizons at periphery of Salzburg (47° 48′ N, 13° 05′ E). Coll 1982 and subm by Hans Angerer.

General Comment (HA): individual peat horizons separated by overriding landslips give max age for these events.

VRI-807. ABF2 **2430 ± 90**

Peat at −2m.

VRI-808. ABF3 **7800 ± 110**

Peat at −2.5m.

VRI-570a. Ampass 1, Tirol **>37,000**

Earthy peat from peat band, 3cm thick, *in situ* in sand layer ca 2m thick followed by 20m gravel overlain by 1 to 2m ground moraine and

recent soil. Coll 1976 near Ampass (47° 15′ 39″ N, 11° 27′ 28″ E), Inn Valley, Tyrol, 680m asl, and subm by Gernot Patzelt, Geog Inst, Univ Innsbruck. Repeat of VRI-570 (R, 1980, v 22, p 111) with new material. *Comment* (GP & HF): date is max age for gravel deposit in Inn Valley before last glaciation. No NaOH pretreatment.

Mieming series, Tirol

Peat from deposition on lacustrine sediments near Mieming (47° 17′ 13″ N, 10° 58′ 06″ E). Coll 1982 by Burgi Wahlmüller, subm by Sigmar Bortenschlager, Bot Inst, Univ Innsbruck.

General Comment (BW): dates palynologically detected events.

VRI-699. Mieming 1 **4430 ± 90**

Peat, cleaned from roots, at −437 to −444cm. *Comment* (BW): beginning of peat growth and 1st appearance of grain pollen.

VRI-700. Mieming 2 **1190 ± 80**

Radicella brown moss peat at −306 to −313cm. *Comment* (BW): beginning of clay deposition.

VRI-701. Mieming 3 **880 ± 80**

Cyperaceae *Radicella* peat, cleaned from roots, at −240 to −244cm. *Comment* (BW): end of clay deposition.

Zillertal series, Tirol

Peat and wood from bog (47° 01′ 33″ N, 11° 48′ 19″ E), 1875m asl, Waxeckalm, Zillertal. Coll 1982 by H Hüttemann, subm by Sigmar Bortenschlager.

General Comment (HH): dates palynologically detected events.

VRI-702. 60-65 **760 ± 80**

Detritus *Radicella* peat with charcoal pieces at −60 to −65cm. *Comment* (HH): dates burning horizon connected with intense cultural phase.

VRI-703. 95-100 **3450 ± 90**

Brown moss *Carex* peat with detritus at −95 to −100cm. *Comment* (HH): dates *Alnus* climax.

VRI-704. 150-154 **3600 ± 210**

Alnus root wood at −150 to −154cm.

VRI-706. 170-175 **5520 ± 100**

Radicella peat at −170 to −175cm. *Comment* (HH): dates climatic oscillation.

Kühtai series, Tirol

Peat samples from different depths of bog near Dortmunder Hütte (47° 12′ 20″ N, 11° 00′ 38″ E), ca 1980m asl, Kühtai, Tirol. Coll 1982 by H Hüttemann, subm by Sigmar Bortenschlager.

General Comment (HH): dates for pollen diagram.

VRI-708. 55-60 **3910 ± 100**

Carex-Eriophorum-Sphagnum peat at –55 to –60cm. *Comment* (HH): dates decreasing intensive cultural phase.

VRI-709. 75-80 **4170 ± 100**

Carex-Eriophorum-Sphagnum peat at –75 to –80cm. *Comment* (HH): dates beginning cultural phase.

VRI-710. 110-115 **5290 ± 100**

Cyperaceae peat at –110 to –115cm. *Comment* (HH): dates 1st appearance of beech.

VRI-711. 145-150 **6080 ± 100**

Cyperaceae peat at –145 to –150cm. *Comment* (HH): dates 1st appearance of fir.

VRI-712. 180-185 **7600 ± 130**

Detritus *Radicella* peat at –180 to –185cm. *Comment* (HH): dates initial spread of spruce.

Kufstein series, Tirol

Detritus gyttja from profile of Egelsee Lake (47° 37′ 29″ N, 12° 10′ 20″ E) near Kufstein. Coll 1982 by Burgi Wahlmüller, subm by Sigmar Bortenschlager.

General Comment (BW): dates for pollen diagram.

VRI-714. 165-175 **1820 ± 80**

Sample at –165 to –175cm. *Comment* (BW): dates elm decrease.

VRI-715. 311-319 **3990 ± 90**

Sample at –311 to –319cm. *Comment* (BW): dates 1st human influence.

VRI-786. 361-371 **5290 ± 100**

Sample at –361 to –371cm. *Comment* (BW): dates spread of *Abies*.

VRI-787. 570-580 **10,280 ± 140**

Sample at –570 to –580cm. *Comment* (BW): dates spread of warm phase plants.

Defereggental series, Osttirol

Peat (possibly contaminated by younger roots) from Jagdhausalm bog (46° 58′ 30″ N, 12° 09′ 30″ E), 2035m asl, upper Defereggental, East Tyrol. Coll 1982 and subm by Friedrich Kral.

General Comment (FK): dates for pollen diagram. No pretreatment.

VRI-799. Jagdhausalm II/52-58 **2220 ± 70**

Cyperaceae peat with small amounts of wood peat from middle part of profile at –52 to –58cm. *Comment* (FK): dates forest development relatively undisturbed by men immediately before human influence.

VRI-800. Jagdhausalm II/82-88 **3280 ± 80**

Cyperaceae wood peat from lower part of profile at –82 to –88cm. *Comment* (FK): dates completely undisturbed forest development immediately before 1st human influence.

CSSR

Spišska Kotlina series

Peat at different depths of Spišska Kotlina bog (49° 03′ N, 20° 18′ E), SH 670m, Hozelec near Poprad. Coll 1982 by Heinz Hüttemann, subm by Sigmar Bortenschlager.

General Comment (HH): dates for pollen diagram (Jankovska, 1972).

VRI-794. 75 **7500 ± 120**

Peat with lake marl at –75cm. *Comment* (HH): dates *Picea* max.

VRI-795. 100 **9020 ± 120**

Peat at –100cm. *Comment* (HH): dates sample rich in pollen of *Larix* sp and *Picea abies*.

VRI-796. 146-148 **11,010 ± 160**

Peat from base at –146 to –148cm. *Comment* (HH): dates beginning of bog development.

Vysoke Tatry series

Samples from bog near Trojhranne pleso lake (49° 13′ 15″ N, 20° 13′ 50″ E), 1650m asl, Vysoke Tatry. Coll 1982/83 by Heinz Hüttemann, subm by Sigmar Bortenschlager.

General Comment (HF): completes Vysoke Tatry series (R, 1982, v 24, p 225; R, 1983, v 25, p 939-940).

VRI-713. 157 **1750 ± 160**

Wood (*Salix* sp) at –157cm.

VRI-821. 70-75 **1480 ± 80**

Sphagnum peat at –70 to –75cm. *Comments* (HH): dated for evaluation of growth rate of bog, (HF): no NaOH pretreatment.

Greece

Archagelos-Aridea series

Clayey dy from bog near Archagelos-Aridea (41° 01′ N, 22° 17′ E), 1080m asl. Coll 1975 and subm by Nikolaos Athanasiadis, Inst Forstbot, Aristotelion Univ, Thessaloniki, Greece.

General Comment (NA): provides chronology for palynologic research. Extracted humic acids were used for dating.

VRI-753. 0.82-0.87 **1720 ± 80**

Dy at –0.82 to –0.87m.

VRI-754. 1.37-1.42 **2530 ± 80**

Dy at –1.37 to –1.42m.

VRI-755. 1.90-1.95 **2840 ± 120**

Dy at −1.90 to −1.95m.

Italy

VRI-834. Kastelruth **680 ± 70**

Wood, fossil pine, excavated during road-building at ca −1m near Church of St Virgilius at Kastelruth (46° 34′ N, 11° 34′ E), Italy. Coll 1983 and subm by Ludwig Nössing, Prüfanstalt Baustoffe Geol Dienst, Kardaun, Alto Adige, Italy. *Comment* (LN): date is max for burial of sample.

Algeria

VRI-872. **(5.2 ± 0.4)% modern**

Calcareous quartz sand encrustation in Algerian part of Sahara. Coll on surface by Eckhard Klenkler, Ettenheim, BRD. *Comment* (HF): ^{14}C concentration in clearly marked light-colored outermost layer of encrustation provides date of last growth phase. Tentatively assumed recent concentration, 85% modern (Münnich & Vogel, 1959; Geyh & Schillat, 1966) yields model age, 22,500 ± 600. Recent concentration, 100% modern, yields max age, 23,800 ± 600.

Dominican Republic

VRI-819. Cotui **<250**

Copal near surface in soil, near Cotui (19° 04′ N, 70° 11′ W), San Brano. Coll 1982 by local inhabitants, subm by Dieter Schlee, Mus Naturkunde, Stuttgart, BRD. No chemical pretreatment of hard yellowish transparent resin. *Comment* (HF): date reveals that resin is recent.

Colombia

VRI-820. **<220**

Copal from unknown locality. Coll 1982 by local inhabitants, subm by Dieter Schlee. No chemical pretreatment of hard yellowish transparent resin. *Comment* (HF): date reveals that resin is recent.

Japan

VRI-830. Mitsunami **33,100 +2000 −1600**

Fossil resin coll near Mitsunami ca 45km E of Gifu (35° 37′ N, 136° 46′ E), Honshu I. Details of colln unknown; subm by Dieter Schlee. *Comment* (DS): certain characteristics of Mitsunami amber suggest that its age is somewhere intermediate between copal and amber.

ARCHAEOLOGIC AND HISTORIC SAMPLES

Austria

VRI-804. Loitzendorf, NÖ **2240 ± 80**

Charcoal of old iron smelting site at −50cm, Loitzendorf (48° 18′ N, 12° 19′ E) near Maria Laach, Lower Austria. Coll 1982 and subm by Brigitte Cech, Inst mittelalterliche Realienkunde, Österr Akad Wiss. *Comment* (BC): dates smelting site.

Spital am Pyhrn series, Steiermark

Bones of cave bear at different depths in sediment of Bone Cave on Ramesch Mt, Warscheneck group, Totes Gebirge, 2000m asl, near Spital am Pyhrn (47° 40′ N, 14° 20′ E), Styria. Coll 1980/1982 and subm by G Rabeder and K Mais, Inst Paleontol, Univ Vienna.

General Comment (GR & HF): stone tools found in cave sediment. Collagen was extracted by method of Longin (1970). Dates verify uranium series dating on bones from strata of VRI-776 and -792: 36,100 $^{+3000}_{-2800}$, 38,900 $^{+2300}_{-2200}$, and 42,500 $^{+5300}_{-4900}$, obtained by P Hille and E Wild (pers commun).

VRI-776. 90-100 **34,900 $^{+1800}_{-1500}$**

Sample RK 80/II/D7/3/14/51-70 at −90 to −100cm.

VRI-792. 110-120 **37,200 $^{+1900}_{-1600}$**

Sample RK82/I-T15/2 at −110 to −120cm.

VRI-793. 150-160 **>40,700**

Sample RK 82/I-T16/7 at −150 to −160cm.

Kindberg series, Stiermark

Wood remains from Georgibergkirche (47° 30′ 07″ N, 15° 25′ 34″ E), Kindberg, Styria. Subm by Herbert Stolla.

General Comments (HS): provides chronology for history of church. (HF): only HCl pretreatment.

VRI-797. I/1982 **210 ± 70**

Wood of broken cross (?) in hole in top of stone altar. Coll 1982 by Thea Gladysz.

VRI-798. II/1976 **290 ± 130**

Decayed wood remains in octagonal post hole excavated in middle of nave. Coll 1976 by H Stolla. *Comment* (HS): hole was closed when Gothic style was changed to Baroque.

Spain

Hierro series, Canary Is.

Shells from different shell heaps, Hierro I. Coll 1982 and subm by H Novak, Inst Canarium, Hallein, Austria.

General Comment (HN): Canarian Neolithic. Dates periods of settlement.

VRI-790. Restinga **790 ± 70**

Shells at −0.35m; Malpais above Restinga.

VRI-791. El Julan **1820 ± 80**

Shells at −1.15m; Tagoror, El Julan.

VRI-789. La Palma, Canary Is. **1850 ± 100**

Charcoal, Belcamo III, –2.8m below bottom of Belcamo cave, La Palma I. Coll 1982 and subm by H Novak. *Comment* (HN): Canarian Neolithic. Dates settlement.

Peru

VRI-811. Zaña **3120 ± 80**

Burned plant remains in combustion shaft below pyramid at Cerro de Purulen (6° 45′ S, 79° 45′ W), Valley of Zaña, Lambayeque. Coll 1978, subm by Ferdinand Anders, Inst Völkerkunde, Univ Vienna. *Comment* (FA): construction and sample belong to Formative period.

Chao series

Plant remains and wood at Salinas de Chao (8° 35′ S, 78° 43′ W), Valley of Chao, Trujillo. Subm by Ferdinand Anders.

General Comment (FA): stone buildings and samples belong to Formative period.

VRI-812. Chao 1 **3600 ± 90**

Burned plant remains from bottom of stone structures, Cut 6, Unit C.

VRI-813. Chao 2 **3200 ± 90**

Wood within platform fill, Cut 21, Unit C.

Chavin series

Human bones in Tello pyramid, interior galleries, Chavin (9° 35′ S, 77° 15′ W). Coll 1982 by Kaufmann-Doig, subm by Ferdinand Anders.

General Comment (FA): burials may be contemporaneous.

VRI-814. Chavin 4 **2060 ± 90**

Skull bones.

VRI-815. Chavin 5 **2290 ± 90**

Skeleton.

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