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INSTITUT ROYAL DU PATRIMOINE ARTISTIQUE RADIOCARBON DATES IX

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This list contains the results of ^{14}C age determinations obtained at the laboratory in 1981-1982. Samples are analyzed in three new proportional counters which are described in R, 1980, v 22, p 442. Our installation differs from that of Heidelberg in that our filling gas is methane.

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I. GEOLOGIC SAMPLES

A. Belgium

IRPA-411. Zoniënbos **180 ± 80**

Wood (*Fagus*) from Zoniënbos in Brabant (50° 48′ 14″ N, 4° 48′ 17″ E) at 125cm below surface. Coll Dec 1980 and subm Jan 1981 by R Langohr, Univ Gent, Belgium. *Comment*: expected date 10,000-13,000 BP (Langohr, 1981).

IRPA-452. De Haan **2470 ± 50**

Shells from sand dunes at De Haan in W Vlaanderen (58° 18′ N, 3° 05′ E) at 130cm below surface. Coll Aug 1982 and subm Sept 1982 by F Verhaeghe, Univ Gent. *Comment*: result used to date sand dune formation in coastal plain; agrees with expected age.

Ipenrooi series

Material from peat bog sec at Ipenrooi, Antwerpen (51° 28′ 40″ N, 4° 45′ 04″ E). Coll and subm 1980 by L Beyens, Univ Antwerpen, Belgium. In 75cm core, pollen was taken every 2cm.

IRPA-391. Ipenrooi-ven 1 **7350 ± 120**

Peat from 75 to 74cm. Atlantic age expected.

IRPA-472. Ipenrooi-ven 2 **5200 ± 90**

Peat from 73 to 72cm. Atlantic age expected.

IRPA-392. Ipenrooi-ven 3 **3280 ± 80**

Peat from 60 to 56cm. Sub-boreal age expected.

IRPA-393. Ipenrooi-ven 4 **1160 ± 100**

Peat from 52 to 48cm. Sub-atlantic age expected.

IRPA-394. Ipenrooi-ven 5 **260 ± 80**

Peat from 42 to 37cm. Sub-atlantic age expected.

IRPA-404. Ipenrooi-ven B **3105 ± 90**

Peat from 56 to 48cm from profile similar to IRPA-392. Sub-boreal age expected.

General Comment: dates agree with pollen analysis (Beyens, 1982).

IRPA-403. Meerle **9020 ± 120**

Peat from bog sec at Meerle, Antwerpen (51° 28′ 50″ N, 4° 46′ 49″ E). Coll and subm 1980 by L Beyens. In core of 88cm, many pollen samples and one for ^{14}C dating were taken from 85 to 83cm. This profile is related to Ipenrooi series. *Comment* (LB): date is perhaps too young; expected date: 9660 BP (Beyens, 1982).

Bredene series

Peat from coastal plain at Bredene in W Vlaanderen (51° 14′ 20″ N, 2° 57′ 30″ E). Coll and subm 1981 by C Verbruggen, Univ Gent. Dating results and pollen analysis indicate beginning and end of peat growth.

IRPA-437. Sample 1 **5550 ± 100**

Base of peat layer.

IRPA-438. Sample 2 **1940 ± 90**

Top of peat layer.

IRPA-439. Adinkerke 193DB5M53 **7790 ± 130**

Clayey peat from marine deposits at Adinkerke in W Vlaanderen (51° 04′ 30″ N, 2° 35′ 15″ E). Coll and subm 1981 by C Verbruggen. *Comment*: dates agree well with beginning of Atlantic.

Dunes series

Peat from coastal plain in W Vlaanderen. Coll Oct 1980 by R De Ceunynck and M Van Strydonck and subm Oct 1980 by R De Ceunynck, Univ Gent. Results are used to study stratigraphy of sand dunes.

IRPA-405. De Panne AC 37 **3090 ± 80**

Base of peat layer (51° 04′ 02″ N, 2° 34′ 47″ E).

IRPA-436. Nieuwmunster 48HB10 bis **440 ± 70**

Peat from layer at 183cm below surface (51° 17′ 29″ N, 3° 03′ 45″ E).

IRPA-447. De Panne DW5A **Modern**

Wood from sand layer, 110 to 180cm below surface (51° 04′ N, 2° 34′ E).

IRPA-448. De Panne DW5B **Modern**

Soil with sand, 180 to 195cm below surface (51° 04′ N, 2° 34′ E).

IRPA-449. De Panne DW5C **1310 ± 70**

Peat from layer, 225 to 255cm below surface (51° 04′ N, 2° 34′ E).

Mark series

The following results complete previously pub list (R, 1981, v 23, p

345-346) of samples from alluvial plain of Mark R in W Vlaanderen, Hainaut and Brabant. Coll and subm 1981-1982 by W Huybrechts, Geol Inst, Free Univ Brussels.

IRPA-440. Lessines B 80/4/3(1) 5800 ± 90

Clayey peat from layer, 260 to 290cm below surface (50° 44′ N, 3° 53′ E).

IRPA-441. Lessines B 80/4/3(2) 8370 ± 120

Peat with vegetable residues, 405 to 440cm below surface (50° 44′ N, 3° 53′ E).

IRPA-442. Galmaarden B 80/8/27 1730 ± 80

Wood from sand layer, 180 to 200cm below surface (50° 45′ N, 3° 57′ E).

IRPA-443. Moerbeke B 80/2/12(2) 6710 ± 100

Peat with vegetable residues, 330 to 355cm below surface (50° 45′ N, 3° 55′ E).

IRPA-444. Moerbeke B 80/2/12(3) 8470 ± 120

Peat from layer, 390 to 430cm below surface (50° 45′ N, 3° 55′ E).

IRPA-445. Moerbeke B 80/2/12(1) 8000 ± 90

Clayey peat with pieces of wood, 355 to 390cm below surface (50° 45′ N, 3° 55′ E).

IRPA-473. Enghien B 81/6/19 1700 ± 70

Peat from layer, 110 to 125cm below surface (50° 41′ N, 4° 00′ 30″ E).

IRPA-481. Galmaarden B 80/6/37(1) 8700 ± 110

Peat from layer, 585 to 595cm below surface (50° 45′ N, 3° 37′ E).

IRPA-482. Galmaarden B 80/6/37(2) 6490 ± 100

Clay from layer, 606 to 614cm below surface (50° 45′ N, 3° 37′ E).

IRPA-484. Galmaarden B 82/6/16(2) 9090 ± 110

Peat with shell residues, 620 to 630cm below surface (50° 45′ N, 3° 37′ E).

IRPA-485. Marcq B 82/6/41 990 ± 80

Clayey peat from layer, 290 to 300cm below surface (50° 40′ N, 3° 59′ E).

General Comment (WH): dates confirm previous results and describe continuous peat growth in alluvial plain, beginning ca 9000 BP, ending ca 5500 BP. In parts of basin upstream, peat layer is much younger, ca 2000 to 1000 BP.

B. Africa

IRPA-501. Murama 160 ± 70

Charcoal at alt of Murama, Bujumbura (2° 33′ N, 2° E), from low

terrace of Ruzizi R at 300cm above lake Tanganika. Coll by L Ilunga, Free Univ Brussels, and subm Oct 1980 by C Baeteman. *Comment*: young date can be explained by hydrography of area.

Taourga series

Organic material and calcareous crust from Taourga, Algeria (36° 10′ 12″ N, 3° 05′ 17″ E). Coll and subm Feb 1981 by L Bock, Fac Agronom Gembloux, Belgium. *Comment*: dates are used in morphol and pedol study in which soils and calcareous crusts are assoc (Bock and Mathieu, 1982).

IRPA-429. 2.5 **5210 ± 260**

Organic material extracted from vertisol.

IRPA-430. 24.3 **3820 ± 210**

Organic material extracted from red soil, diluted, 27% sample.

IRPA-431. IV_1 **10,940 ± 140**

Calcareous crust from basin.

IRPA-432. C_3 **24,650 ± 620**

Calcareous crust from E border of upland.

IRPA-433. I_3 **34,080 ± 1940**

Calcareous crust from border of upland.

II. ARCHAEOLOGIC SAMPLES

A. Belgium

St-Lambert series

The following results complete previously pub list (R, 1981, v 23, p 349-350) from archaeol excavation at Place St-Lambert, Liège (50° 38′ 45″ N, 5° 34′ 30″ E). Coll Aug 1980 by M Van Strydonck and subm Aug 1980 by J Alénus-Lecerf, Nat Service Excavations, Belgium.

TABLE 1
St-Lambert radiocarbon dates

IRPA no.	Ref (Sample no.)	Material	Depth (cm)	^{14}C age	Expected age (AD)
-395	7	Wood	200	1010 ± 30	<1185
-396	7	Mortar	under wall Street level	2130 ± 50 $\delta^{13}C = -15.8‰$	<1185
-397bis	6	Mortar	300 to 400	1660 ± 40	>1185
-398	6	Mortar	under wall Street level	$\delta^{13}C = -12.8‰$ 2700 ± 50 $\delta^{13}C = -12.1‰$	>1185
-399	7	Mortar	200	1060 ± 50	<1185
-400	2	Mortar	under wall Street level	$\delta^{13}C = -17.0‰$ 1290 ± 50 $\delta^{13}C = -12.4‰$	>1185
-401	6	Wood (pile)	Under wall	800 ± 70	
-402	6	Wood (pile)	Under wall	550 ± 70	
-479		Charcoal		740 ± 70	
-480		Wood (pile)		490 ± 110	

General Comment: charcoal and wood yielded dates that agree well; mortar carbonate gave old ages probably caused by infiltration from several floods (Van Strydonck, Dupas, and Dauchot-Dehon, 1982).

Antwerpen series

Mortar from "Onze-Lieve-Vrouw" cathedral and from three houses in Antwerpen (51° 13′ 16″ N, 4° 23′ 60″ E). Coll 1981 by M Van Strydonck, A De Nayer, and R Tijs, Dienst Monumentenzorg Antwerpen, and subm 1981 by M Van Strydonck. Samples were taken from pillars of cathedral at 150 to 600cm above street level and from floors or walls of houses.

TABLE 2
Antwerpen radiocarbon dates

IRPA no.	Ref	Material	Depth (cm)	^{14}C age	Expected age (AD)
-412	3rd pillar S	Mortar	150 above street level	610 ± 30 $\delta^{13}C = -15.4‰$	1420-1435
-413	6th pillar S	Mortar	180 above street level	580 ± 30 $\delta^{13}C = -14.3‰$	1420-1435
-414	3rd pillar N	Mortar	250-300 above street level	410 ± 30 $\delta^{13}C = -13.8‰$	1420-1435
-415	5th pillar N	Mortar	600 above street level	760 ± 30 $\delta^{13}C = -16.0‰$	1420-1435
-418		Mortar	Foot of pillar	Modern $\delta^{13}C = -19.4‰$	1420-1435
-416	House Rodenborg	Mortar	15-20 under floor	Modern $\delta^{13}C = -9.3‰$	1550
-420	House on "Grooten Helm" ground	Mortar*	In wall	840 ± 90 $\delta^{13}C = -9.7‰$	1500
-421	"Jacob Jordaens" House	Mortar*	In wall	1120 ± 80 $\delta^{13}C = -11.9‰$	1640

General Comment: mortar samples were first examined to separate fractions containing chalk carbonate from those containing carbonate formed after mortar preparation (Van Strydonck, Dupas, and Dauchot-Dehon, 1982). Dates for pillar of cathedral agree with expected ages. Mortars with (*) are diluted, 80% sample.

Vrasene series

Mortar and charcoal from Vrasene in O Vlaanderen (51° 13′ N, 4° 12′ E). Coll and subm Aug 1980 by R Van Hove.

IRPA-422. Vr K80/II/5, 6/A **940 ± 90**

Charcoal from 115cm below street level.

IRPA-424. Sleuf 80/I **1090 ± 120**
$\delta^{13}C = -14.7‰$

Mortar from foot of pillar of Romanesque church. *Comment*: diluted, 48.5% sample.

IRPA-425. Sleuf 80/II **3935 ± 10**
$\delta^{13}C = -22.5‰$

Mortar from foot of pillar of Romanesque church.

IRPA-426. Vr K80/II/C_2 **820 ± 70**

Charcoal from top of leveling layer under oldest floor level.

General Comment (RVH): IRPA-422 and -426 corroborated archaeol and stratigraphic data. IRPA-425 is too old.

Gent series

Wood from Gent in O Vlaanderen (51° 06′ N, 3° 45′ E) at 100 to 200cm below street level. Coll and subm 1980 by V Van Doorne, Dienst Monumentenzorg Gent.

IRPA-409. Profile B-C **1260 ± 70**

IRPA-410. Profile A-D **330 ± 80**

General Comment: archaeol date: 12th-14th centuries AD.

Flobecq series

Samples from Flobecq, Hainaut (50° 44′ 50″ N, 3° 43′ 34″ E). Coll and subm by A Roolant, Fed archéol Wallonie. Samples are stratigraphically defined (Faider-Feytmans, 1980).

IRPA-427. Sample 1 **1910 ± 130**

Peat from layer in Roman well. *Comment*: diluted, 40.16% sample.

IRPA-428. Sample 2 **2000 ± 80**

Wood from Roman well.

IRPA-446. Waasmunster **1940 ± 60**

Wood from Roman well in Waasmunster, O Vlaanderen (51° 06′ 25″ N, 4° 05′ 12″ E). Coll and subm Aug 1981 by C Verbruggen. *Comment*: result agrees with archaeol date: 1st century AD.

Wortegem-Petegem series

Charcoal from "Oud Kasteel" site along Schelde R at Wortegem-Petegem, O Vlaanderen (50° 50′ 01″ N, 3° 33′ 19″ E). Coll and subm 1982 by D Callebaut, Nat Service Excavations (Callebaut, 1981).

IRPA-474. Pe 77/1 **990 ± 60**

Sample from furnace. Archaeol date: 9th-10th century AD.

IRPA-475. Pe 77/6 **1550 ± 80**

Sample from fireplace in wooden house. This oldest building dates from 8th century AD, following stratigraphic data.

IRPA-478. KZ B2 III **560 ± 60**

Charcoal from furnace in Abbey church at St-Gillis-Dendermonde, O Vlaanderen (51° 01′ 11″ N, 4° 06′ 42″ E). Coll 1981 by A Stroobants, Oudheidkundige Kring van het Land Dendermonde and subm 1982 by D Callebaut. *Comment*: archaeol date: AD 1228-1667.

IRPA-486. Webbekom **2260 ± 70**

Grain of wheat from Webbekom, Brabant (50° 58′ 05″ N, 5° 04′ 26″

E). Coll and subm 1980 by P Vermeersch, Univ Leuven. *Comment*: archaeol date: Iron age.

IRPA-495. WV 8219 **2270 ± 70**

Wood from calcined beam at Waudrez, Hainaut (50° 25′ 50″ N, 4° 09′ 08″ E). Coll and subm Sept 1982 by Ph Dekegel, Cercle archéol Waudrez. *Comment*: sample from Roman level; expected date: 1st-3rd century AD.

IRPA-500. A **1185 ± 50**

B **1190 ± 50**

Wood (*Alnus*) from plank in Veemarkt at Antwerpen (51° 13′ N, 4° 23′ E) 250cm under street level. Coll Jan 1982 by M Van Strydonck and T Oost, Oudheidkundige Mus Antwerpen; subm Jan 1982 by M Van Strydonck. *Comment*: expected date: 12th-13th century AD.

IRPA-453. **940 ± 50**

Wood from dugouts at Austruweel, Antwerpen (51° N, 4° E). Coll 1910-1911 by Rahir, Mus Royaux Art Hist (Rahir, 1911; 1913); subm Sept 1982 by M Van Strydonck. Sample divided in fine parts and dated separately. Results are shown in table 3 which gives per mil depletion with regard to standard (Stuiver and Polach, 1977).

TABLE 3
Wood samples from Austruweel

IRPA-453.	$D^{14}C$ ‰
1	−0.1026
2	−0.1153
3	−0.1014
4	−0.1184
5	−0.1133
Mean	−0.1102

General Comment (MVS): result shows that dugouts date from Middle ages and not from Iron age as expected (Ellmers, 1978; Van Strydonck, Dauchot-Dehon, and Heylen, in press). Dates are confirmed by Lv-826, -827: 1050 ± 65, 820 ± 45 (Dauchot-Dehon *et al*, 1982).

IRPA-378. Br 79/1/19 **1920 ± 70**

Peat from Roman site in Belgian coastal plain at Bredene (51° 14′ 24″ N, 2° 57′ 33″ E). Coll and subm 1981 by H Thoen, Univ Gent. This sample completes previously pub list (R, 1981, v 23, p 348-349).

B. Yugoslavia

Zadar series

Mortar from St-Donat church in Zadar, Croatia (44° 06′ 48″ N, 15° 14′ 04″ E). Subm Oct 1981 by D Srdoč, Inst "Rudjer Boškovic," Zagreb. The two samples were coll very carefully with precise description of loca-

tions. Mortar samples were first examined to separate fraction containing chalk carbonate from those containing carbonate formed after mortar preparation.

IRPA-498. Zadar 1 **1610 ± 70**
$\delta^{13}C = -12.1‰$

IRPA-499. Zadar 2 **510 ± 70**
$\delta^{13}C = -9.5‰$

General Comment (DS): lime used to make mortars in Middle ages was prepared in primitive kilns where decomposition of limestone was not complete due to low firing temperature. Also, sand used for mortars was pure limestone, *ie*, dead carbonate. This may explain why date for IRPA-498 is too old. More surprising is date for IRPA-499 that is too young, but we cannot exclude much younger mortar, since church was reconstructed, and destroyed, several times in history.

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