

**INSTITUT ROYAL DU PATRIMOINE ARTISTIQUE  
RADIOCARBON DATES X**

MICHÈLE DAUCHOT-DEHON, MARK VAN STRYDONCK,  
and JOS HEYLEN

Institut royal du Patrimoine artistique, Koninklijk Instituut voor het  
Kunstpatrimonium, Brussels, Belgium

This list contains the results of  $^{14}\text{C}$  determinations obtained at the  
laboratory in 1982-1983.

ACKNOWLEDGMENTS

The authors would like to thank the  $^{14}\text{C}$  laboratory in Lyon for the  
 $\delta^{13}\text{C}$  measurement. M Dupas is gratefully acknowledged for analysis of  
mortar samples.

GEOLOGIC SAMPLES

*Belgium*

**Doel-Beveren series**

Peat and wood from Doel-Beveren in O Vlaanderen (51° 18' N, 4°  
15' E). Coll Sept 1981 and subm Oct 1982 by C Verbruggen, Univ Gent,  
Belgium.

**IRPA-454. III 4900 ± 60**

Peat from base of thin clay layer at 350cm depth. *Comment* (CV):  
date is probably correct.

**IRPA-455. I 2050 ± 70**

Peat from top of peat layer at 200cm depth. *Comment* (CV): date  
agrees with extension of *Fagus* in pollen diagram, typical for that period.

**IRPA-456. I 3000 ± 70**

Wood from top of peat layer at 200cm depth. *Comment* (CV): date  
similar to IRPA-455 was expected.

**IRPA-457. II 5350 ± 70**

Peat from top of thin layer at 338cm depth. *Comment* (CV): date is  
too old compared to IRPA-454 at base of layer.

**IRPA-458. IV 5490 ± 80**

Peat from base of peat layer at 412cm depth. *Comment* (CV): date  
confirms onset of peat growth in lower Scheldt-basin.

**Assenede series**

Peat from Holocene sediment in de Schelde polders at Assenede in  
O Vlaanderen (51° 16' N, 3° 47' E). Coll and subm Sept 1982 by C  
Baeteman, Geol Service, Belgium.

**IRPA-487. B1 3130 ± 60**

Peat from 168 to 183cm.

<b>IRPA-488. (1) B87</b>	<b>3790 ± 60</b>
Peat from 155 to 180cm. Distillation product.	
<b>IRPA-488. (2) B87</b>	<b>3900 ± 60</b>
Peat from 155 to 180cm.	
<b>IRPA-489. B5</b>	<b>3090 ± 60</b>
Peat from 140 to 150cm.	
<b>IRPA-567. DB3</b>	<b>4560 ± 70</b>
Peat from 155 to 160cm.	
<b>IRPA-568. DB4</b>	<b>2230 ± 50</b>
Peat from 185 to 190cm.	

*General Comment* (CB): IRPA-567 is much older than other dates, most probably due to boring (DB3) in strong micro-relief of top of cover sand. IRPA-568 is much younger than expected most probably due to contamination by younger roots.

#### **Western coastal plain of Belgium series**

Peat and wood from several levels of core in W Vlaanderen. Dated to study evolution of so-called surface peat (Baeteman *et al*, 1979; Baeteman, ms). Coll and subm 1982 by C Baeteman.

<b>IRPA-524. Driegrachten 1-A</b>	<b>3610 ± 60</b>
Wood from 383 to 388cm at Noordschote (50° 57' 45" N, 2° 49' 22" E).	
<b>IRPA-529. Driegrachten 1-B</b>	<b>3540 ± 60</b>
Peat from 383 to 388cm at Noordschote (50° 57' 45" N, 2° 49' 22" E).	
<i>General Comment</i> (LD): samples date slight increase of marine influence corresponding with end of peat formation in some parts of coastal plain.	
<b>IRPA-530. Driegrachten 2</b>	<b>3790 ± 60</b>
Peat from 463 to 467cm at Noordschote (50° 57' 45" N, 2° 49' 22" E).	
<i>Comment</i> (LD): dates possible dry period indicated by diatom analysis.	
<b>IRPA-531. Driegrachten 3</b>	<b>5220 ± 70</b>
Peat from 611 to 617cm at Noordschote (50° 57' 45" N, 2° 49' 22" E).	
<b>IRPA-532. Pervijse Orthodoxe kerk 1</b>	<b>5130 ± 70</b>
Peat from 408 to 411cm at Lampernisse (51° 03' 20" N, 2° 47' 32" E).	
<b>IRPA-538. Jacobs 1</b>	<b>5360 ± 70</b>
Peat from 410 to 412cm at Oudekapelle (51° 01' 11" N, 2° 48' 10"E).	

*General Comment* (CB): samples date onset of freshwater predominance and early start of continuous peat growth in region. Dates are as expected. They coincide well and show that peat growth started slightly earlier in land areas than in surrounding areas.

**IRPA-537. Jacobs 2 1870 ± 60**

Peat from 217 to 220cm at Oudekapelle (51° 01' 11" N, 2° 48' 10" E).

*Comment* (CB): age indicates that end of peat growth in area is later than in surrounding areas. Date agrees with expected ages as other <sup>14</sup>C dates indicated that in this area peat could grow much longer than in surrounding coastal plain.

**IRPA-533. Pervijse Orthodoxe kerk 2 7230 ± 70**

Peat from 882 to 885cm at Lampernisse (51° 03' 20" N, 2° 47' 32" E).

**IRPA-534. Pervijse Orthodoxe kerk 3 7110 ± 90**

Peat from 875 to 879cm at Lampernisse (51° 03' 20" N, 2° 47' 32" E).

**IRPA-541. Dijk 1 6680 ± 80**

Peat from 816 to 819cm at Oudekapelle (51° 01' 11" N, 2° 48' 10" E).

**IRPA-542. Dijk 2 6870 ± 80**

Peat from 833 to 836cm at Oudekapelle (51° 01' 11" N, 2° 48' 10" E).

*General Comment* (CB): top and base of basal peat showed that initial marine influence in area was already occurring at beginning of Atlantic period. Dates agree with expected ages in relation to depth.

**Oostkerke series**

Peat from Oostkerke, W Vlaanderen (51° 02' 40" N, 2° 47' 30" E). Coll and subm Sept 1982 by C Baeteman.

**IRPA-535. 12.24 to 12.27m 6750 ± 80**

**IRPA-536. 12.34 to 12.38m 7000 ± 80**

*General Comment* (CB): samples date top and base of deepest intercalated peat layer, as yet known, in coastal plain in first part of Atlantic period.

**Avekapelle series**

Peat from Avekapelle, W Vlaanderen (51° 03' 55" N, 2° 45' 55" E). Coll and subm Sept 1982 by C Baeteman.

**IRPA-539. 983 to 990cm 3890 ± 70**

**IRPA-540. 760 to 768cm 2680 ± 60**

*General Comment* (CB): both samples were coll from same tidal channel sequence at rather great depth (−5.7m and −3.5m). Ages show that peat is eroding from surface of upper regional peat layer and not from second regional peat layer occurring at greater depth (−2.5m).

**Wulpen series**

Peat from Wulpen in W Vlaanderen (51° 06' N, 2° 42' 45" E). Coll and subm March 1982 by C Baeteman. Results used to study stratigraphy in Western coastal plain.

**IRPA-527. Wulpen A-1 3490 ± 60**

Base of upper peat layer at 117cm below surface.

**IRPA-528. Wulpen A-2** **2970 ± 60**

Top of upper peat layer at 100cm below surface.

*General Comment* (CB): samples coll from top and base of upper part of "surface peat" in area divided by intercalated clay layer, corresponding with CIV-B transgression. Age of top coincides well with all other data indicating end of surface peat in W coastal plain. Age of base coincides with some dates of similar series in same area (Baeteman *et al*, 1979).

**IRPA-512. Raversyde** **2580 ± 60**

Peat from top layer at 349cm below surface in W Vlaanderen (51° 11' 45" N, 2° 52' 20" E). Coll and subm Jan 1983 by C Baeteman.

**Kallo series**

Peat and wood from Kallo, Antwerpen (51° 15' 45" N, 4° 14' 31" E). Coll and subm May 1982 by D Ferguson, Univ Antwerpen, Belgium.

**IRPA-547. Profile 1** **2530 ± 70**

Wood at 190cm below surface.

**IRPA-544. Profile 2-1** **2810 ± 60**

Top of peat layer at 130cm below surface.

**IRPA-545. Profile 2-2** **4240 ± 70**

Middle of peat layer at 227cm below surface.

**IRPA-546. Profile 2-3** **6790 ± 80**

Base of peat layer at 347cm below surface.

**Mark series**

These results complete pub list (R, 1981, v 23, p 345-346; R, 1983, v 25, p 868-869) of samples from alluvial plain of Mark R in W Vlaanderen and Brabant. Coll and subm 1983 by W Huybrechts, Geol Inst, Free Univ Brussels.

**IRPA-506. Galmaarden B80/6/36 Top** **2580 ± 60**

Clayey peat 229 to 234cm below surface (50° 45' N, 3° 57' E).

**IRPA-548. Galmaarden B80/6/36 Base** **3260 ± 60**

Clayey peat 280 to 290cm below surface (50° 45' N, 3° 57' E).

**IRPA-549. Galmaarden B82/6/16 Top** **4330 ± 70**

Clayey peat 362 to 367cm below surface (50° 45' N, 3° 57' E).

**IRPA-550. Galmaarden B81/6/16 Top** **5730 ± 80**

Clayey peat 320 to 326cm below surface (50° 45' N, 3° 57' E).

**IRPA-551. Galmaarden B81/6/16 Base** **5770 ± 80**

Clayey peat 341.5 to 350cm below surface (50° 45' N, 3° 57' E).

**IRPA-552. Herne B81/6/5 Middle** **8890 ± 100**

Wood 622 to 625cm below surface (50° 43' N, 4° 01' E).

**IRPA-554. Herne B81/6/5 Base** **10,060 ± 110**

Residues of wood 695 to 700cm below surface (50° 43' N, 4° 01' E).

**IRPA-556. Herne B81/6/9 Base** **2390 ± 60**

Wood 195 to 200cm below surface (50° 43' N, 4° 01' 15" E).

*Other countries*

**IRPA-543. Hulst** **3770 ± 70**

Wood (trunk) from upper peat layer in Schelde Channel at Hulst, Zeeuws Vlaanderen, Netherlands (51° 22' N, 4° 13' E). Coll and subm March 1983 by S Dievoet.

**Djelfa series**

Calcareous crusts and organic material from Djelfa, Algeria. Coll and subm Feb 1981 by H Tsaki, Univ Oran, Algeria.

**IRPA-451. DJI/E1DZ** **7970 ± 370**

Organic material from black soil horizon (34° 41' N, 3° 15' E) at 850cm in profile. Diluted: 26% sample. Expected age: 7000 to 10,000 BP.

**IRPA-459. C107/1DCDZ** **21,000 ± 350**

Calcareous crust from 20cm depth (34° 52' N, 3° 27' E). Expected age: >20,000 BP.

**IRPA-460. C88DCDZ** **10,570 ± 120**

Crusty calcareous tufa from 40cm depth (34° 50' N, 3° 27' E). Expected age: 10,000 to 15,000 BP.

**IRPA-461. C13bis 1DCDZ** **>47,000**

Calcareous crust from 10cm depth (34° 53' N, 3° 26' E). Expected age: >30,000 BP.

**IRPA-462. C13/2DCDZ** **26,000 ± 800**

Crusty calcareous tufa from 25cm depth (34° 53' N, 3° 27' E). Expected age: >30,000 BP.

**IRPA-463. C13/1DCDZ** **14,910 ± 180**

Calcareous crust from 10cm depth (34° 53' N, 3° 27' E). Expected age: >25,000 BP.

**IRPA-464. DCI/ODZ** **31,200 ± 1300**

Calcareous and friable crust from 80cm depth (34° 53' N, 3° 26' E). Expected age: >30,000 BP.

**IRPA-465. DCI/00DZ** **31,600 ± 1300**

Calcareous crust from 30cm depth (34° 53' N, 3° 26' E). Expected age: >30,000 BP.

**IRPA-466. DCI/000DZ** **22,200 ± 430**

Calcareous crust from 10cm depth (34° 53' N, 3° 26' E). Expected age: >30,000 BP.

- IRPA-467. C52DCDZ** **25,100 ± 600**  
Calcareous crust from 30cm depth (34° 51' N, 3° 27' E). Expected age: >20,000 BP.
- IRPA-468. DJII/2DZ** **34,400 ± 2100**  
Calcareous crust from 20cm depth (34° 50' N, 3° 20' E). Expected age: >40,000 BP.
- IRPA-469. DCI/3DZ** **11,730 ± 140**  
Calcareous and friable crust from 50cm depth (34° 51' N, 3° 27' E).
- IRPA-470. DJII/7DZ** **>48,000**  
Calcareous crust, very powdery, from 180cm depth (34° 40' N, 3° 20' E). Expected age: >40,000 BP.
- IRPA-471. DJII/4DZ** **36,800 ± 2800**  
Crusty calcareous tufa from 60cm depth (34° 40' N, 3° 20' E). Expected age: >40,000 BP.

*General Comment* (HT): all samples are of Würmian or Soltanien age in stratigraphy of North Africa, which indicate that crusts have been re-deposited. This can be explained by running water during last period of rain. Chronology of layers follows: crusts (IRPA-460 and -469) and crusts (IRPA-459) of Tensifto-Amirien glacia from middle Quaternary are younger than crust (IRPA-462) and crust (IRPA-466) of Soletto-Moulouyenne outliers from lower Quaternary. Results confirm geomorphologic layers.

ARCHAEOLOGIC SAMPLES

*Belgium*

- IRPA-526. Evergem** **3480 ± 60**  
Charcoal from Evergem, O Vlaanderen (51° 6' 36" N, 3° 42' 32" E). Coll and subm Dec 1982 by C Verbruggen. Archaeol date: Bronze age.

**Destelbergen series**

Charcoal from graves, Destelbergen, O Vlaanderen (51° 03' 16" N, 3° 46' 40" E). Coll and subm June 1982 by H Thoen, Univ Gent, Belgium.

- IRPA-476. Grave 84** **2430 ± 50**  
Sample from 64 to 94cm depth. Expected age: Bronze or Early Iron age.
- IRPA-477. Grave 87** **2410 ± 50**  
Sample from 67 to 77cm depth. Expected age: late Bronze or Early Iron age.

- IRPA-505. Webbekom** **2230 ± 70**  
Charcoal from Webbekom, Brabant (50° 57' 54" N, 5° 04' 26" E). Coll and subm March 1982 by L Van Impe, Natl Service Excavations, Belgium. *Comment*: no NaOH pretreatment. Archaeol date: 2650 to 2300 BP.

**Donk series**

Samples from Donk, Limburg (50° 56' N, 5° 07' 30" E). Coll and subm May 1983 by L Van Impe.

**IRPA-507. 82DO554 1010 ± 50**

Charcoal from 80 to 100cm depth. Expected date: 2400 to 2200 BP.

**IRPA-508. 81DO507 1220 ± 70**

Charcoal from 90 to 110cm depth. Diluted: 41% sample. Expected date: 3950 to 3450 BP.

**IRPA-509. 80DO429 1740 ± 80**

Charcoal from 70 to 80cm depth. Diluted: 57% sample. Expected date: 1700 to 1550 BP.

**IRPA-510. 81DO515 1440 ± 50**

Wood from well at 185 to 205cm below water-bearing bed. Expected date: 2650 to 1550 BP.

**IRPA-511. 81DO505 3110 ± 60**

Charcoal from 130 to 140cm depth. Expected date: 2650 to 2350 BP.

**IRPA-503. 81 Wellin B2 1420 ± 70**

Charcoal from Wellin, Luxembourg (50° 5' 2" N, 5° 6' 54" E), at 185cm below surface. Coll and subm Aug 1981 by A Matthys, Natl Service Excavations. Expected date: 1850 BP.

**Ucimont series**

Charcoal from Ucimont, Luxembourg (49° 49' 54" N, 5° 3' 21" E). Coll and subm 1982 by A Matthys. No archaeol data.

**IRPA-522. UC79/n°2 1390 ± 50**

**IRPA-523. UC79/n°1 Modern**

**IRPA-525. 77 Cu 10 Modern**

Charcoal from Cugnon, Luxembourg (49° 48' 9" N, 5° 12' 14" E), at 125cm below surface. Coll 1977 and subm 1982 by A Matthys.

**IRPA-606. Karbonkelhuis 610 ± 50**

Timber from Karbonkelhuis, Antwerpen (51° 13' 16" N, 4° 23' 60" E). Subm Jan 1984 by P de Henau, Inst Royal Patrimoine artistique. *Comment:* dated to establish original building 16th century or 19th century rebuilding. Calibrated date (Klein *et al*, 1982): AD 1270-1410. Since sample was taken from beam, annual rings are missing; accounting also for drying time of wood, date agrees with 16th century construction.

**Mortar series**

Dating of mortars has been studied in our lab since 1980. With collaboration of Centre de Datation et d'Analyses isotopiques, Univ Claude Bernard, Lyon, France, we have followed a method based on those of

Folk and Valastro (1976). Results come from activity measurement of "hypothetical fraction" where no "dead carbonate" has reacted. Isotopic fractionation correction was made (Van Strydonck, Dupas, & Dauchot-Dehon, in press).

**IRPA-296. St Lambert 1740 ± 60**

Mortar from St Lambert cathedral, Liège (50° 38' 45" N, 5° 34' 30" E). Coll and subm 1979 by H Danthine, Univ Liège. Sample was taken from underground remains of wall constructed between 7th and 13th century, at 1.8m below street level.

**IRPA-490. Antwerpen 530 ± 50**

Mortar from "Onze-Lieve-Vrouw" cathedral, Antwerpen (51° 13' 16" N, 4° 23' 60" E). Coll and subm 1982 by M Van Strydonck. Sample was taken from column of bricks embedded in sandstone at 6m above street level. Column is loc in nave of church, built between 530 and 515 BP.

**IRPA-496. Vrasene 1 1600 ± 60**

Very powdery mortar from "Heilige-Kruis" church, Vrasene, O Vlaanderen (51° 13' N, 4° 12' E). Coll and subm 1982 by M Van Strydonck. Sample was taken from Romanesque bench surrounding pillar built between 800 and 767 BP.

**IRPA-497. Vrasene 2 870 ± 50**

Mortar from same church. Coll and subm 1982 by M Van Strydonck. Sample was taken from chalk blending used during construction period (ca AD 1350) at street level.

*General Comment:* IRPA-490 and -497 agree with historic age. IRPA-296 is too old but contamination by running water containing carbonate is possible because of location of sample. For IRPA-496, method of "hypothetical fraction" does not work probably because sample is very powdery. If we assume that at first approximation, measured  $\delta^{13}\text{C}$  is proportional to abundance of "live" carbonate, we can calculate theoretical date which corroborated historic age, 980 ± 80 BP, (Van Strydonck, Dupas, & Dauchot-Dehon, in press).

REFERENCES

- Baeteman, C, ms, 1981, De Holocene ontwikkeling van de Weselijke kustvlakte (België): PhD dissert, Univ Brussels, 297 p.
- Baeteman, C, Verbruggen, C, with Dauchot-Dehon, M, Heylen, J, and Van Strydonck, M, 1979, New approach to the evolution of the so-called surface peat in the Western Coastal Plain of Belgium: Service Geol Belgium. Prof paper, v 11, no. 167, p 2-16.
- Dauchot-Dehon, M, Van Strydonck, M, and Heylen, J, 1981, Institut royal du Patrimoine artistique radiocarbon dates IX: Radiocarbon, v 23, p 345-346.
- Klein, J, Lerman, J C, Damon, P E, and Ralph, E K, 1982, Calibration of radiocarbon dates: tables based on the consensus data of the Workshop on Calibrating the Radiocarbon Time Scale: Radiocarbon, v 24, p 103-150.
- Folk, R L and Valastro, S, 1976, Successful technique for dating of lime mortar by carbon-14: Jour Field Archaeol, v 3, p 203-208.
- Van Strydonck, M, Dupas, M, and Dauchot-Dehon, M, in press, A further step in the radiocarbon dating of old mortars: Inst Royal Patrimoine artistique Bull, in press.