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# LOUVAIN NATURAL RADIOCARBON MEASUREMENTS XII

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The following list comprises selected measurements made in the Louvain $^{14}C$ Dating Laboratory with the 0.6 L $CH_4$ proportional counter. Details of procedure are given in previous lists. Dates are reported in terms of the Libby half-life, 5570 ± 30 years and quoted with $1\sigma$ experimental error.

Descriptions, comments, and references to publications are based on information supplied by the submitters.

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## SAMPLE DESCRIPTIONS

### I. GEOLOGIC SAMPLES

**Sainte Gertrude series**

Fibrous peat from Tenneville (50° 05′ 05″ N Lat, 5° 27′ 17″ E Long), Prov. Luxembourg, Belgium, alt. 540 m. Coll. 1967 by D. Trullemans and W. Mullenders; subm. by W. Mullenders, Lab. Palynol., Univ. Louvain. Pollen analyzed by D. Trullemans. *Comment*: NaOH-leach omitted.

**Lv-555. Sainte Gertrude** **790 ± 110** **A.D. 1160**

From 53 to 60 cm depth in peat bog. At this level pollen curve shows 3rd beech maximum F III (Trullemans, 1971). Date agrees with other $C^{14}$ dates of same feature in High Belgium (Gilot *et al.*, 1969).

**Lv-556. Sainte Gertrude** **1240 ± 65** **A.D. 710**

From 83 to 87 cm in peat bog. Dated level represents 2nd beech maximum F II. Dates agrees with palynologic results.

**Lv-523. Hour la Petite** **2740 ± 80** **790 B.C.**

Wood from Hour la Petite (50° 10′ N Lat, 5° 01′ E Long), Prov. Namur, Belgium, alt. 120 m. From trunk overlain by upper layers of dejection cone next to Lesse R. Overlying sediments dated to final Würm. Coll. 1970 by M. J. Michel; subm. by P. Macar, Univ. Liege. $C^{14}$ date proves a land slip because of undermining by the river.

**Lv-517. Lac Long Inférieur, France** **7410 ± 120** **5460 B.C.**

Humic matter from lacustrine sediments from Lac Long Inférieur (44° 33′ 28″ N Lat, 7° 27′ 26″ E Long), Dept. Alpes Maritimes, France,

alt. 2093 m. From 161 to 169 cm depth in gray clay containing organic remains. Coll. 1969 by J. L. de Beaulieu; subm. by A. Pons, Lab. Hist. Botany Palynol., Univ. Provence, Marseille. Pollen analysis, by J. L. de Beaulieu, shows evolution of vegetation in Maritime Alps since Younger Dryas. $C^{14}$ date proves that increase of *Abies,* followed by *Larix* increase, begins as early as Atlantic period.

**Méditerranée series**

Carbonate fraction from deep-sea core in E Mediterranean Sea. Coll. 1967 by "Jean Charcot" oceanog. ship. *Comment*: no $C^{12}/C^{13}$ correction.

**Lv-504. Méditerranée 39.MO.67** **8420 ± 130 / 6470 B.C.**

Core 39.MO.67 (36° 11′ N Lat, 22° 47′ E Long) in Ionian Sea, W of Cythere, depth 1340 m. From 23 to 30 cm, black sapropelic mud horizon, overlain by 17 cm brownish mud. Subm. by H. Chamley, Lab. Marine Geol., Univ. Provence, Marseille. Dated horizon corresponds to water stagnation period in E Mediterranean Sea estimated as end of Boreal to beginning of Atlantic period (Chamley, 1971). $C^{14}$ date as expected.

**Lv-505. Méditerranée 44.MO.67** **>36,210**

Core 44.MO.67 (35° 46′ N Lat, 23° 28′ E Long) in N Crete Basin, E of Cythere, depth 910 m. From 117 to 125 cm, gray-green sapropelic horizon. Subm. by H. Chamley. Paleoclimatic study on clay horizons leads to attribute this level to Würm II-Würm III interstadial (Chamley, 1971). $C^{14}$ date as expected.

**Lv-506. Méditerranée 25.MO.67** **9370 ± 140 / 7420 B.C.**

Core 25.MO.67 (35° 51′ N Lat, 25° 50′ E Long) in N Crete Sea between Iraklion and Santorin, depth 790 m. From 28 to 32 cm, black sapropelic horizon overlain by 25 cm muddy horizon with scattered volcanic sand. Subm. by H. Chamley. Correlated to end of Boreal to beginning of Atlantic period. Date as expected.

**Lv-508. Méditerranée 3.MO.67** **8590 ± 160 / 6640 B.C.**

Core 3.MO.67 (34° 26′ N Lat, 24° 50′ E Long) in S Crete Sea, depth 1950 m. From 30 to 35 cm, black sapropelic horizon overlain by 26 cm brownish muddy layer. Subm. by H. Chamley. $C^{14}$ date confirms Boreal/Atlantic age.

**Lv-509. Méditerranée 17.MO.67** **12,690 ± 280 / 10,740 B.C.**

Core 17.MO.67 (36° 15′ N Lat, 27° 20′ E Long), NW of Rhodes I., depth 630 m. From 93 to 98 cm, black sapropelic mud with light-colored spots. Subm. by L. Pastouret, Centre Océanolog. de Bretagne, France. From foraminifera and pteropod stratigraphy, this level is dated 5000 to 7000 B.C. (Pastouret, 1970). Discrepancy is yet unexplained.

**11,290 ± 120**

**Lv-507. Méditerranée 11.MO.67** **9340 B.C.**

Core 11.MO.67 (35° 33′ N Lat, 27° 44′ E Long), S of Crete I., depth 1260 m from 43 to 51 cm, black sapropelic mud with light-colored spots. Subm. by L. Pastouret. Due to same reasons as Lv-509, date seems too old.

**Furka series, Switzerland**

Samples from Col de la Furka, Alpetli near Realp (46° 36′ 03″ N Lat, 8° 27′ 40″ E Long), Canton Uri, Switzerland. Coll. 1970 and subm. by H. Zoller and W. Mullenders.

**3620 ± 85**

**Lv-484. Furka** **1670 B.C.**

Rootlet peat from 92.5 to 97.5 cm in peat bog, alt. 2285 m, at base of layer overlying gravel-sandy sediments. Date shows that truly post-glacial moraines of the Tiefengletscher, revealed as far as thalweg of Urseren valley, are earlier than Sub-Atlantic cold phases of Göschener. Also shows that during these cold phases, the Tiefengletscher hardly surpass its positions of 17th and 19th centuries. *Comment*: NaOH-leach omitted.

**1010 ± 60**

**Lv-561. Furka II** **A.D. 940**

NaOH soluble humic matter from alpine humic podzol, alt. 2310 m; sample from 11 cm depth in peaty humus horizon, 3.5 cm thick, overlying 0.5 to 1 cm sesqui-oxide layer on sand and gravel. Profile overlies a Tiefengletscher moraine ca. 30 m from the 17th century moraine. Date proves that underlying moraine is older than A.D. 940 and thus would correspond to glacial advance of Göschener II dated 6th to 7th centuries.

**Alpe Chierra series, Switzerland**

Samples from Alpe Chierra near Faido (46° 30′ 28″ N Lat, 8° 45′ 15″ E Long), Leventina, Canton Tessin, Switzerland, alt. 2015 m. Coll. 1970 and subm. by H. Zoller.

**5550 ± 90**

**Lv-527. Alpe Chierra T2** **3600 B.C.**

Gyttja partly mixed with highly decomposed brown peat, from 115 to 122 cm depth. In pollen curve, *Picea abies* rises from <1% to nearly dominance. Date consistent with previous determinations and suggests relatively late *Picea* competed with *Pinus cembra* and *Pinus mugo* near altitudinal forest limit in S Swiss Alps. *Comment*: NaOH-leach omitted.

**7690 ± 110**

**Lv-528. Alpe Chierra T3** **5740 B.C.**

Brown peat from 155 to 160 cm. Level characterized by maximum of *Abies alba* pollen with presence of *Abies stomates*. Not much later,

at 150 cm depth, begins a 2-fold NAP phase with a short *Betula phase*. Date shows wide altitudinal distribution of *Abies* during Boreal period and confirms temporary depression during Atlantic ca. 5500 to 4000 B.C. (Misox cold phases). *Comment*: NaOH-leach omitted.

**8000 ± 160**

**Lv-529. Alpe Chierra T4** **6050 B.C.**

Clayey and sandy gyttja overlying glacial clay, from 182 to 190 cm. After a pioneer phase rich in NAP, comes a *Pinus* dominance with large percentages of *Corylus*. Date shows, as in Val Priora, relatively late reforestation close to glaciers of "Schlussvereisung."

II. ARCHAEOLOGIC SAMPLES

**10,380 ± 170**

**Lv-535. Remouchamps** **8430 B.C.**

Bones from Remouchamps cave (50° 29′ N Lat, 5° 43′ E Long), Prov. Liege, Belgium, alt. 140 m. From 40 cm depth, Trench D, Layer 4, Side 5. Bones were between horizon estimated final Würm and stalagmitic floor attributed to milder climate. Coll. 1970 and subm. by M. Dewez, Univ. Liege. Assoc. lithic industry is Ahrensburg culture, probably a little more recent than Layer C in Geldrod I dated 9010 B.C. ± 85 (de Vries *et al.*, 1958). Bone study indicates cold period, with reindeer dominance. All results agree.

**Kemmelberg series**

Charcoal from Kemmelberg at Loker (50° 46′ 37″ N Lat, 2° 48′ 40″ E Long), Prov. W Flanders, Belgium, alt. 144 m. From charcoal layer 0.5 to 2 cm thick covered by levelling silty sand, 0 to 25 cm thick, red (burned) at base. Cultural horizon overlies this layer. Coll. 1970 by A. Van Doorselaer; subm. by P. Vermeersch, Univ. Louvain.

**5000 ± 120**

**Lv-524. Kemmelberg M2** **3050 B.C.**

Sample K70.10.M2 from charcoal layer, 62 cm below present ground surface.

**5020 ± 95**

**Lv-525. Kemmelberg M3** **3070 B.C.**

Sample K70.10.M3 from same layer, 65 cm depth.

*General Comment*: archaeol. industry of Kemmelberg is attributed to Middle Neolithic, presently without precision. Both $C^{14}$ dates are consistent with assumptions.

**3970 ± 100**

**Lv-503. Arquennes** **2020 B.C.**

Charcoal from Bois de la Garenne at Arquennes (50° 34′ N Lat, 4° 17′ E Long), Prov. Hainaut, Belgium. From Layers IV and V, 40 to 70 cm below ground surface, sand layers containing charcoal, flint, and ceramics. Coll. 1969 and subm. by Y. Graff, Romana Soc., Braine l'Alleud,

Belgium. Culture is not yet steadily determined: Michelsberg or S.O.M. (Graff and Decoster, 1971). Ceramic paste with ground flint is of same composition as that from Chaumont-Gistoux dated 2090 B.C. ± 90 (Lv-301, R., 1969, v. 11, p. 109). Date as expected.

**Lv-481. Opgrimbie** **1940 ± 70** **A.D. 10**

Charred wood from Opgrimbie (50° 57′ N Lat, 5° 40′ E Long), Prov. Limburg, Belgium. From hearth at 60 cm depth in upper part of $B_3$-C horizon of humoferric podzol, 11 m from center of Mesolithic site of which artifacts are found in $A_2$ and $B_2$ horizons. Coll. 1969 and subm. by P. Vermeersch. Although assoc. between hearth and industry is unsteady, strat. evidence suggests $C^{14}$ date is too young (Vermeersch *et al.*, 1972).

**Lv-541. Saint Servais** **2400 ± 110** **450 B.C.**

Charcoal from Saint Servais (50° 28′ N Lat, 4° 51′ E Long), Prov. Namur, Belgium. Charcoal layer, at 1 m depth, embedded in rampart of protohist. refuge. Coll. 1970 by M. Cahen; subm. by J. Mertens, Univ. Louvain. Sample dates one of numerous Gallic oppida in Belgium, where archaeol. material is missing. Result as expected.

**Lv-497. Rosmeer 69.RO.14** **2430 ± 85** **480 B.C.**

Charcoal from Rosmeer (50° 51′ N Lat, 5° 35′ E Long), Prov. Limburg, Belgium, alt. 110 m. From 1 m depth in Pre-Roman detritus pit. Coll. 1969 by G. de Boe; subm. by J. Mertens. Archaeol. date is questionable: Neolithic or Iron age. $C^{14}$ date agrees with Iron age.

**Lv-519. Oudenburg 70.Ou.27** **2040 ± 60** **90 B.C.**

Charcoal from Oudenburg (51° 11′ N Lat, 3° 00′ E Long), Prov. W Flanders, Belgium, alt. 3 m. From Trench I, Level 5. Coll. 1970 and subm. by J. Mertens. Sample from burned layer, archaeol. dated to 3rd or 4th century.

**Lv-431. Lacuisine 67.La.9** **370 ± 80** **A.D. 1580**

Wood from feudal castle at Lacuisine (55° 22′ N Lat, 5° 25′ E Long), Prov. Luxembourg, Belgium. From beam incorporated in a protection tower. Sample 67.La.9 from 1 m depth, Trench 67 II/A. Coll. 1967 and subm. by J. Mertens. Castle was destroyed A.D. 1521. After correction according to dendrochronologic correlation curve by Suess $C^{14}$ date is compatible with hist. data.

**Tongeren series**

Charcoal from Tongeren (56° 42′ N Lat, 5° 43′ E Long), Prov. Limburg, Belgium, alt. 105 m. Coll. 1967 and subm. by J. Mertens. Samples from same level with Roman archaeol. material, but strat. horizons seemed altered. Both dates confirm this last interpretation.

780 ± 85
**Lv-428. Tongeren 67.To.1** **A.D. 1170**

880 ± 65
**Lv-429. Tongeren 67.To.23** **A.D. 1070**

910 ± 75
**Lv-536. Corroy le Château** **A.D. 1040**

Oak from Corroy le Château (50° 32′ N Lat, 4° 39′ E Long), Prov. Namur, Belgium, alt. 163 m. From principal rafter of primeval timberwork of NW wing of castle. Coll. 1970 by T. Cortenbos; subm. by L. F. Génicot, Univ. Louvain. Sample was fixed in building archaeol. attributed to 2nd half of 13th century (Cortenbos, 1971).

**Grimbergen series**

Charcoal from a feudal mound at Grimbergen (50° 55′ 45″ N Lat, 4° 24′ 30″ E Long), Prov. Brabant, Belgium, alt 28 m. Coll. 1967 and subm. by R. Borremans, Mus. Royaux d'Art et d'Hist., Brussels. Dated horizon corresponds to earliest occupation on top of mound. According to hist. data, castle was destroyed A.D. 1159.

830 ± 70
**Lv-533. Grimbergen 1** **A.D. 1120**
From Sq. M10, Pit 1.

770 ± 65
**Lv-534. Grimbergen 2** **A.D. 1180**
Pale from Sq. KL12, Layer 2.

1120 ± 65
**Lv-532. Huizingen** **A.D. 830**

Wood from Huizingen (50° 44′ N Lat, 4° 36′ E Long), Prov. Brabant, Belgium, alt. 33 m. From hollowed oak trunk containing human skeleton at 2.30 m depth, ca. 4 m from S wall of destroyed St. John Baptist church. Coll. 1967 and subm. by R. Borremans. $C^{14}$ date agrees with assumed date of church foundation. It is 1st burial of that type found in Belgium.

790 ± 60
**Lv-522. Vohémar, Madagascar** **A.D. 1160**

Human bones from Vohémar (13° 20′ S Lat, 50° 00′ E Long), Madagascar. From 2 m depth, in cemetery of ancient Mohammedan settlement in NE sea coast of Madagascar. Coll. 1941 by M. Gaudebout and E. Vernier; subm. by J. Millot, Mus. de l'Homme, Paris. Site was occupied by Mohammedan colony during Middle ages, probably since 11th till 14th century (Vernier and Millot, 1971). Date agrees with archaeol. context and elucidates Indian Ocean history before European colonization.

References

Chamley, H., 1971, Recherches sur la sédimentation argileuse en Méditerranée: Thesis, Sci. Fac., Marseille, 401 p.

Cortenbos, T., 1971, Corroy le Château, Organisation d'une forteresse du XIIIe siècle: Mém., Univ. Louvain, 122 p.

de Vries, Hessel, Barendsen, G. W., and Waterbolk, H. T., 1958, Groningen radiocarbon dates II: Science, v. 127, p. 129-137.

Gilot, E., 1969, Louvain natural radiocarbon measurements VII: Radiocarbon, v. 11, p. 106-111.

Gilot, E. *et al.*, 1969, Evolution de la végétation et datations $^{14}C$ en Belgique: Centre Belge d'Histoire Rurale, pub. 15, 29 p.

Graff, Y. and Decoster, J., 1971, Le site néolithique du Bois de la Garenne à Arquennes: Romana Contact, v. 2.

Pastouret, L., 1970, Etude sédimentologique et paléoclimatique des carottes prélevées en Méditerranée orientale: Téthys, v. 2, no. 1, p. 227-266.

Trullemans, D., 1971, Etude palynologique de la tourbière de Sainte Gertrude en Ardenne belge: Mém., Univ. Louvain, 90 p.

Vermeersch, P., Paulissen, E., and Munaut, A. V., 1972, Fouilles d'un site mésolithique à Opgrimbie (Limbourg belge): Soc. royale belge anthropol. prehist. Bull., v. 83.

Vernier, E. and Millot, J., 1971, Archéologie malgache (Comptoirs musulmans): Paris, Mus. de l'Homme.