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NANCY NATURAL RADIOCARBON MEASUREMENTS VI

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The following list includes some measurements made during 1978 and 1979 in the radiocarbon laboratory of the Ecole Nationale Supérieure de Géologie Appliquée et de Prospection Minière (ENSG) de Nancy. Equipment, measurement and treatment of samples are as reported previously (R, 1979, v 21, p 453-464) where the sample is synthesized to benzene. Radiocarbon ages are calculated using the ^{14}C half-life of 5568 years and 95% activity of NBS oxalic acid is used as modern standard. Anthracite coal and Merck commercial benzene are used for the dead carbon run.

Counting errors are expressed at 1σ confidence level. AD/BC* dates are corrected using the half-life of 5730 years and according to the MASCA correction curve (Ralph, Michael, and Han, 1973). Description and comments are generally based on information supplied by submitters.

SAMPLE DESCRIPTIONS

I. ARCHAEOLOGIC AND HISTORIC SAMPLES

A. France

Château de la Hunaudaye, Plédéliac, Côtes-du-Nord

Castle destroyed in 1347 and rebuilt soon after. N part was modified about 1420 and two houses were built, the first in the 16th century and the second in the 17th century. Castle was set on fire by revolutionists in 1793 (Delumeau, 1969; 1971).

Ny-547. **570 ± 80**
AD 1370 *

Carbonized wood. Coll by J Y Gervais under flagstone of castle yard; subm 1978 by P Henry. *Comment:* ^{14}C date agrees with repairs about 1420.

Ny-548. **320 ± 80**
AD 1510 *

Carbonized wood. Same origin as Ny-547. *Comment:* ^{14}C date agrees with known date of building in 16th century.

Ny-669. Avioth, Meuse **710 ± 80**
AD 1250 *

Head of a wooden statue. Subm 1979 by R Sommesous, parson of Avioth, 55 Montmédy, France. May belong to old wooden statue. Possibly a more recent copy (Vigneron, 1972; 1979). *Comment*: ^{14}C date does not conflict with first hypothesis (*cf* Ny-336, R, 1978, v 20, p 63).

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Jabreille-les-Bordes series, Lieu-dit Le Chatelard (Haute-Vienne)

Samples date rampart of fence. Coll and subm by J M Desbordes, Dir Antiquités Hist Limousin, Limoges, France. Estimated age: Gallo-Roman period.

Ny-555. **1690 ± 80** **AD 270 ***

Charcoal. Foundations of W part of rampart.

Ny-556. **1820 ± 80** **AD 150 ***

Charcoal. Middle of W part of rampart.

Ny-557. **730 ± 120** **AD 1230 ***

Charcoal. Upper part of W part of rampart.

Ny-671. **2190 ± 270** **330 BC***

Charcoal. Core of the W part of rampart.

Ny-670. **2150 ± 180** **300 BC ***

Charcoal. Shoulder of fence, S part, median level.

Ny-672. **1920 ± 180** **AD 60 ***

Charcoal. Shoulder of fence, S part, lower level.

General Comment (JMD): ^{14}C dates agree with expected age (early Roman age for construction of hill-fort).

Solignac series, Haute-Vienne

Coll and subm 1979 by J M Desbordes.

Ny-634. **970 ± 80** **AD 1010 ***

Charcoal. Estimated age: 10th century.

Carbonized wood from sepultures close by the apse of a church dedicated in 1143.

Ny-674. Sepulture 0 **340 ± 110** **AD 1490 ***

Ny-695. Sepulture 1 **730 ± 100** **AD 1230 ***

Ny-696. Sepulture 2a **1030 ± 90** **AD 950 ***

Ny-693. Drilling **840 ± 110** **AD 1140 ***

General Comment: dates agree with expected age.

980 ± 80

Ny-635. Javerdat, Haute-Vienne **AD 1000 ***

Coll 1978 by G Lintz; subm by J M Desbordes. Charcoal. Estimated age: 11th or 12th century. *Comment* (JMD): dates agree with age of broken pottery.

1760 ± 80

Ny-552. Tarnac, Corrèze **AD 200 ***

Charcoal at foot of tumulus (No. 5). Coll 1978 by G Lintz; subm by J M Desbordes. Estimated age: Tène or Roman period. *Comment* (JMD): no material. ^{14}C gives one and only date.

1320 ± 90

Ny-646. La Vallade Saint Victor, Creuse **AD 650 ***

Charcoal coll 1978 by Valladas; subm by J M Desbordes. May date early ploughing.

B. Italy

Monte Amiata district series, Grossetto and Sienna

Oak from regular timbering of shallow seated mines. Discovered 1970 by O Strappa; coll and subm 1978 by F Saupé.

First sample

Ny-411.1 **5730 ± 100**

Ny-411.2 **5720 ± 110**

Second sample

Ny-411.3 **5720 ± 100**

Ny-411.4 **5710 ± 100**

Ny-411.5 **5770 ± 100**

Comment: Mean: 5730 BP. Much too old to be attributed to one of known civilizations in Italy.

Mofettes — Monte Amiata dist, Grossetto and Sienna Prov, Italy. Coll and subm 1978 by F Saupé.

Ny-526. **22,570 ± 1000**

Drill hole Sienna 2. Dismantled power-plant of Piancastagnaio, Sienna.

Ny-524. **>41,000**

Drill hole No. 10, 12th level, Solforate mine.

Ny-525. **>41,000**

Drill hole 100m N of former mine of Argus.

Ny-522. **30,580 ± 1000**

Drill hole ENEL "PN 4" (open tank).

General Comment: two emanations have a high pressure and show virtually no ^{14}C (Ny-524,-525). Two others have a pressure close to

atmospheric and small amounts of ^{14}C were introduced by atmospheric contamination (Ny-522,-526).

Living plants (trees, bushes, and reeds) growing near volcanic emanations. Coll and subm by F Saupé 1978.

Ny-483. **540 ± 80**

Alder (*Alnus* sp), S bank of Rondi naia Creek, front of blowing exhaust shaft of Pietrineri mine, Sienna.

Ny-484. **370 ± 80**

Cherry. A few m from S Giovanni shaft, Sienna.

Ny-519. **4350 ± 90**

Wild cherry (*Cerasus* sp). Same as above.

Ny-516. **1820 ± 100**

Reed (*Phragmites* sp), immediately below Renaioli drift, next to putizze di Renaioli, Abetoso Creek, Grossetto.

Ny-517. **2450 ± 80**

Broom (*Sarothamnus scoparius*), Putizze di S Giovanni, Sienna.

Ny-518. **4350 ± 80**

Broom (*Sarothamnus scoparius*), Putizze di Pietrineri sink-hole, Sienna.

Ny-535. **Modern**

Blank oak (*Quercus robur*), NW of Palazzo di Pietrineri, outside of presently active mofette. *Comment*: dating of plants grown in vicinity of volcanic emanations emitting CO_2 can yield pseudo-ages with too high results.

General Comment: study performed in order to check working hypothesis of volcanic contamination made to explain results of Ny-411.

II. SOIL SAMPLES

Podzols

Landes du Medoc series, France

The Landes du Medoc, near Bordeaux, are characterized by a covering of quartz sand and the presence of groundwater very close to the surface. Soils here are fairly hydromorphic podzols. Righi (1977) studied the evolution of a podzolic sequence on a very short soil catena, 12m long at Lagunan (45° 11′ 20″ N, 0° 57′ 24″ W). Altitudinal difference between foot and top of hill is ca 30cm. Best drained podzols at top of hill have cemented spodic horizon (B_{22h}). Most hydromorphic podzols at foot of the hill have loose B_{2h} horizon. B horizon samples, coll and subm by D Righi, Univ Poitiers, are further described according to vertical topographic sequence. Lateral distance between each sampled profile is ca 3m.

Ny-609. Lagunan 3 B_{21h} **1440 ± 80**
50 to 55cm, C %: 1.8 C/N = 19

Ny-610. Same location, cement B_{22h} **2810 ± 70**
60 to 65cm, C %: 1.5 C/N = 39

Ny-611. Same location B_3 **3390 ± 80**
75 to 80cm, C %: 0.9 C/N = 47

Ny-612. Lagunan 3-2, cemented B_{22h} **2380 ± 70**
60 to 65cm, C %: 1.0 C/N = 36

Ny-613. Lagunan 2, slightly cemented 3_{22h} **2000 ± 70**
55 to 60cm, C %: 1.1 C/N = 34

Ny-614. Same location B_3 **2440 ± 70**
65 to 70cm, C %: 0.7 C/N = 33

Ny-615. Lagunan 2-4 B_{2h} **1220 ± 70**
40 to 45cm, C %: 1.9 C/N = 22

Ny-616. Lagunan 4 B_{2h} **770 ± 80**
30 to 35cm, C %: 1.9 C/N = 22

Ny-617. Same location B_3 **770 ± 80**
40 to 45cm, C %: 0.9 C/N = 23

General Comment: most striking aspects of series are very good agreement between longest mean residence times of organic matter (Ny-610-614) and micromorphologic features of corresponding horizons. In these horizons the N poor organic matter is assoc with mainly alumina-polymers to form grain coatings which solder skeleton grains together. In the other horizons, better biologic activity is demonstrated by shorter mean residence times, lower C/N ratios of organic matter and, above all, a microstructural organization of silt and organic matter as pellets and aggregates (Righi and Guillet, 1977).

Bassin Parisien series, France

During the Pleistocene and Holocene the sands of the Tertiary (Auversian Beauchamp sands and Stampian Fontainebleau sands) were more or less recovered and mixed by silt. Even in the case of a moderate sitation rate (≅10%) the developed soils are podzols or podzolic soils in which an A_2 horizon is slightly differentiated. Samples coll near Villers Cotterets (49° 13′ 48″ N, 2° 59′ 40″ E) and Fontainebleau (48° 25′ 44″ N, 2° 39′ 10″ E) and subm 1976 by A M Robin, Univ Paris VI.

Ny-510. Villers Cotterets 11 B_h **50 ± 90**
30 to 40cm, C %: 0.6 C/N = 24

Ny-501. Fontainebleau 3 B_h **210 ± 50**
40 to 55cm, C %: 0.5 C/N = 24

Ny-511. Villers Cotterets 12 B_h **Modern**
33 to 45cm, C %: 0.3 C/N = 18

Ny-512. Villers Cotterets 13 B_{21h} **160 ± 90**
63 to 70cm, C %: 1 C/N = 19

Ny-514. Same profile B_s **Modern**
70 to 75cm, C %: 0.8 C/N = 26

Ny-508. Villers Cotterets 9 B_h **320 ± 100**
65 to 75cm, C %: 1.6 C/N = 29

Ny-509. Same profile B_s **460 ± 100**
75 to 85cm, C %: 0.8 C/N = 27

Ny-502. Villers Cotterets 1 B_{h1} **1890 ± 100**
30 to 37cm, C %: 4.7 C/N = 52

Ny-503. Same profile B_{2h} **1820 ± 100**
77 to 85cm, C %: 1.6

Ny-507. Villers Cotterets 3 B_{h2} **2930 ± 100**
120 to 130cm, C %: 0.9

Ny-504. Fontainebleau, buried II A **1750 ± 90**
40 to 55cm, C %: 2.7

Ny-505. Same profile II B_{21h} **1660 ± 90**
100 to 110cm, C %: 1.5

Ny-506. Same profile, II B_{22h} **2510 ± 100**

General Comment: series was classified according to two criteria. First seven dates correspond to podzols presently under deciduous forest (oak and beech) that received weak eolian silt contamination. With respect to low mean residence time of organic carbon, these forest podzols behave as biologically active soils with relatively low C/N ratio. The other profiles are in steady state equilibrium with a degraded vegetation (*Pinus silvestris, Calluna vulgaris*) and received no silt contamination. Although the last podzols are not necessarily older than the forest podzols, the large quantity of organic matter is biologically more stable since the mean residence times in B_h horizons are close to 2000 years. Note also the higher C/N ratio of the organic matter. According to Robin (1979) clay mineral composition must be considered in explaining the difference. In forest podzols, weathering ferromagnesian clay minerals must liberate iron which stimulates biologic activity and catalytic decay of organic matter. For the second group of podzols, the only clay minerals are kaolinite and feldspars, the weathering of which releases alumina. It is now well known (Guillet, 1979) that Al-hydroxypolymers assoc with organic matter in B_h skeleton grain coatings have a depressive effect on mineralization and decay of organic matter.

History of vegetation during Holocene in estuary of the Loire R and in "Grande Brière" Loire Atlantique, France (Visset, 1979). Samples coll and subm 1977-1979 by L Visset.

Trignac, Canal de Fougères series

Palynology shows invasion of site by *Alnus,* forming a real *alnetum* that declines towards the end of the Sub-Boreal and disappears at limit of Sub-Boreal-Sub-Atlantic.

Ny-494. **4180 ± 90**

Brown peat, *Alnetum,* depth, −154 to −160cm.

Ny-493. **3770 ± 90**

Brown peat, declining *alnetum,* depth, −125 to −131cm.

Ny-492. **3480 ± 90**

Black peat, disappearance of *alnetum,* depth, −119 to −125cm.

Tree series

At some time, increase of fresh-water level causes formation of a phragmites bog. *Quercetum* cannot survive in this anaerobic environment and gradually declines. The trees die progressively.

Ny-496. Trignac **4000 ± 80**

Ny-523. Trignac **4120 ± 90**

Ny-544. Rozé **4100 ± 90**

General Comment: trees of the same area but originating from different sites have been dated by other laboratories: (Sa-35: 4040 ± 300 BP; Sa-40: 3880 ± 300 BP; Sa-46: 4260 ± 300 BP; Gif-3536: 4230 ± 110 BP). Close correspondence of all results confirm validity of date.

Ny-495. **4260 ± 90**

Organic mud, depth, −180 to −185cm. *Comment:* agrees with results obtained from trees (Ny-496,-523,-544). Brown peat, Ny-494, does not show meaningful differences with Ny-495, indicating short peaty mud period.

Ny-491. **2110 ± 80**

Black peat from top of layer, depth, −45 to −49cm. *Comment*: interruption of peat formation by sediments of tidal mud, as a result of rising sea level and penetration in bog (cf Ny-6, R, 1968, v 10, p 122).

Pierre blanche series

Ny-476. **2280 ± 80**

Brown peat.

Ny-475.1. **2120 ± 80**

Black peat.

Ny-475.2. **2070 ± 80**

Black peat.

General Comment: estimated age: brown peat, 4000 BP, black peat, 3500 BP. Dates corresponding to Sub-Atlantic disagree with pollen record and geologic history of site.

Rozé series

Ny-545. **3340 ± 90**

Bark and wood of birch in peat in transitional brown peat — black peat during disappearance of *Betuletum*. *Comment*: date agrees with Ny-492.

Charcoal fragments at the base of black peat in a well characterized level of a fire.

Ny-546.1. **3570 ± 80**

Ny-546.2. **3490 ± 90**

Ny-546.3. **3390 ± 80**

Comment: date of 3400 can be retained in agreement with Ny-492 and Ny-545.

Ny-633. Ile d'Errand **2510 ± 80**

Oak wood fragment.

Ny-474. Quatre canaux **6830 ± 100**

Drilling −15.55m WGF. Oisters. *Comment*: date agrees with palynologic results and places this sediment (1m thick) around Middle of Atlantic period.

History of the vegetation of the Pleistocene in the valley of the Loire R.

Ny-543.1. Roc-en-Pail **19,400 ± 560**

Ox bone.

Ny-543.2. **19,510 ± 620**

Same sample. *Comment*: prehistoric site of Mousterian at Chalonnes sur Loire (assumed age: 35,000 yr).

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