[RADIOCARBON, VOL. 16, NO. 1, 1974, P. 118-130]

NANCY NATURAL RADIOCARBON MEASUREMENTS III

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This list includes results of measurements made from 1969 to 1972 in the Natural Radiocarbon Laboratory of the Centre de Recherches Radiogéologiques de Nancy (CRR).

From samples Ny-128 to Ny-169, measurements were performed with a gas proportional counter. This method, counting technique, and equipment are described in Nancy I (R, 1968, v 10, p 119-120). From samples Ny-170 and on the laboratory used liquid scintillation counting following the method of Scharpenseel and Pietig (1968). Chemical synthesis of benzene from the original carbon sample is made in the CRR. Samples are converted to CO_2 by combustion or acidification and evolved CO_2 is collected in ammonium hydroxide. Strontium carbonate is precipitated from carbonate solution upon addition of strontium chloride and can be stored. Carbon dioxide is generated by acidification of the carbonate and reduced to carbide by reaction with molten Li metal at 650°C. Acetylene is produced by reacting the carbide with fossil water and converted to benzene by a catalytic process using chromium activated silica-aluminium catalyst.

All measurements of ^{14}C activity of synthesized benzene were made on a Tri-Carb Packard M-3003 liquid scintillation spectrometer in the Centre de Pédologie Biologique. Background of the counting vial is 9.84 ± 0.01 cpm and the figure of merit ca 470. The counting solution consists of 4ml benzene (3.25g carbon), plus 1ml scintillation PPO (0.5%) and POPOP (0.02%) in solution with toluene.

Samples are counted for 24 hr. Radiocarbon ages are calculated using ^{14}C half-life of 5568 years, 95% activity of NBS oxalic acid is used as the modern standard. The counting errors are expressed at 1σ confidence level.

ACKNOWLEDGMENTS

The authors thank Jose Miguel Latasa, a DEA student in 1970, Centre de Pédologie Biologique, whose scientific help enabled adaptation of the chemical process to our own need, particularly in soil dating studies.

SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

Sainte Hélène series, Vosges

Carex and *Sphagnum* peat developed on coarse sands in the Sainte Hélène forest near Rambervillers, Vosges (48° 18′ 34″ N, 6° 40′ 15″ E). Coll and subm 1969 by B Guillet.

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Ny-250. Sainte Hélène, 40cm **2190 ± 90** **240 BC**

Humified peat with pollens of *Alnus, Quercus, Fagus,* without *Abies.*

Ny-251. Sainte Hélène, 65cm **2360 ± 60** **410 BC**

Sphagnum peat, decline of *Tilia* and *Abies* pollens.

Ny-252. Sainte Hélène, 90cm **2750 ± 70** **800 BC**

Carpinus arises continuously and dates beginning of Sub-Atlantic period. Sharp occurrence of *Abies* pollens, > 5% of AP.

Ny-253. Sainte Hélène, 110cm **3780 ± 80** **1830 BC**

Pollen spectrum with *Alnus, Quercus, Fagus. Abies* reaches only 1% of AP.

General Comment: pollen was analyzed to determine W limit of *Abies* during Sub-Boreal and Sub-Atlantic periods in the Vosges (Guillet *et al,* 1972). The decline of *Abies,* present in the Sub-Boreal period and beginning of Sub-Atlantic is assumed due to anthropic practices more than to climatic changes. Correlations between the fall of *Abies* and the development of synanthropic weeds become obvious from 410 BC.

Beaumont sur Vesle series, Marne

Two peat layers separated by loamy alluvium 70cm thick in the Vesle Valley at Beaumont sur Vesle (49° 10′ 31″ N, 1° 51′ 12″ E). These alluvions are supposedly relatively recent. Coll and subm 1972 by R Durand, Sta agron de Châlons-sur-Marne.

Ny-318. Beaumont sur Vesle, 30cm **940 ± 50** **AD 1010**

Upper layer overlying alluvial loam.

Ny-319. Beaumont sur Vesle, 100cm **8580 ± 100** **6630 BC**

Comment: date of lower layer seems to indicate that alluvial process began by an important erosional phase of the peat, because there is a large gap between age of lower peat and age of alluvium in which Gallo-Roman pottery was discovered.

Ny-312. Fontainebleau, Seine et Marne **1200 ± 60** **AD 750**

Charcoal of *Quercus, Corylus, Carpinus* at 50cm depth, beneath surface of sandy soil in Fontainebleau-Tillaie forest (48° 25′ 24″ N, 2° 39′ 29″ E). Coll and subm 1972 by A M Robin, Univ Paris VI. *Comment*: charcoal of tree species except *Fagus* indicates recent (post-medieval) immigration of this tree, already established by pollen analysis of iron-humus podsol in the same forest (Guillet and Robin, 1972).

Razès series, Haute Vienne

Wood buried under sandy alluvium overlying bedrock at bottom of small valley in Razès, Haute Vienne (46° 02′ N, 0° 59′ E). Coll and subm 1969 by R Magne, CEA Nancy.

1480 ± 150
Ny-129. Razès, 125cm **AD 470**

1470 ± 100
Ny-130. Razès, 120cm **AD 480**

General Comment: ages date beginning of an alluvial period after an erosional local phase. Alluvium was expected to be from glacial period.

2390 ± 70
Ny-180. Saint Priest-Taurion, Haute Vienne **440 BC**

Charcoal from buried fireplace beneath clayey and sandy alluvium, 150cm depth (45° 53′ N, 0° 56′ E). Coll and subm 1971 by R Magne, CEA Nancy. *Comment*: date indicates the beginning of an important alluvial phase.

1960 ± 50
Ny-181. Compreignac, Haute Vienne **10 BC**

Slightly charred wood at bottom of organic loamy soil in valley of Vincou streamlet in dist of Compreignac (45° 59′ 30″ N, 1° 03′ 30″ E). Coll and subm by R Magne, CEA Nancy. *Comment*: organic hydromorphous soil is 2000 yr old.

7970 ± 230
Ny-142. Gumenil, Vosges **6020 BC**

Peat with birch bark at 50cm present surface at Gumenil, Vosges (48° 07′ N, 6° 29′ E). Coll and subm 1971 by D Magron, CRR Nancy. *Comment*: date agrees with Boreal period.

Lake Jura series, France

Charcoal in lacustral lime muds in various Jura lakes. Coll and subm 1969 by P Petrequin, Antiquités Préhist Franche-Comté, Besançon.

5850 ± 180
Ny-143. Chalain **3900 BC**

Ilot des Roseaux, Level 4 (46° 41′ N, 3° 29′ E).

5790 ± 220
Ny-144. Chalain **3840 BC**

Ilot des Roseaux, Level 1 (46° 41′ N, 3° 29′ E).

4960 ± 140
Ny-145. Clairvaux **3010 BC**

Sta lacustre N°3 (46° 35′ N, 3° 25′ E).

General Comment: dates agree with expected age according to Neolithic artifacts found with charcoals.

Ny-137. Diou, Allier **>32,000**

Partly charred wood from disturbed clay paleosol with predominant kaolinite under 15m Pliocene sand (sables de Chagny) at Diou, Allier (46° 32′ N, 1° 25′ E). Coll 1968 by J de la Comble, Conservateur Mus Hist Nat d'Autun; subm 1970 by H G Carrat, CEA Nancy. *Comment*: expected age.

Auvergne Puys series, Massif Central

Charcoal, small boughs, from domitic projection. Coll and subm 1969 by J Babkine, Univ Nancy.

Ny-166. Puy de Tunisset CB3 **8000 ± 200**
6050 BC

(45° 51′ 25″ N, 2° 57′ 52″ E)

Ny-167. Puy de Laschamp CB2 **7580 ± 360**
5630 BC

(45° 44′ 16″ N, 2° 57′ 18″ E)

Ny-168. Puy de Lantegy CB1 **8560 ± 100**
6610 BC

(45° 49′ 05″ N, 2° 56′ 38″ E)

General Comment: expected dates of these 3 samples, ca 8000 BP, agree with last volcanic eruptions of "Chaîne des Puys" in Massif Central.

Bamyan series, Afghanistan

Two travertine and 2 calcareous crusts from Quaternary soil horizons in Bamyan Bassin, Central Afghanistan (34° 00′ N, 66° 00′ E). Coll and subm 1972 by J Lang, Lab Géol Univ Paris.

Ny-190. Travertin 320 $\mathbf{32{,}890^{+1500}_{-1200}}$
30,940 BC

Ny-191. Travertin 344 $\mathbf{24{,}300^{+550}_{-500}}$
22,350 BC

Ny-153. Calcareous crust 418 **>40,000**

Ny-154. Calcareous crust 407 **>40,000**

General Comment: isotopic $^{13}C/^{12}C$ corrections have not been made.

Herbillon series, Algeria

Charcoal and shells probably neotyrrhenian from coastal sand, dist Herbillon, Baie W, E Constantinois (Algeria) (37° 06′ N, 7° 20′ E). Coll and subm 1970 by J Hilly, Univ Nancy.

Ny-170. Shells **$27,870^{+800}_{-700}$**
25,920 BC

(*Pectonculus, Patella,* rolled up *Conus*) at bottom of offshore bar.

Ny-172. Charcoal **$30,330^{+1870}_{-1520}$**
28,380 BC

General Comment: in sandy deposit, with shells and charcoal, moustero-aterian tools, were found.

II. ARCHAEOLOGIC SAMPLES

Ny-285. Saint Mihiel, Meuse **4170 ± 70**
2220 BC

Charcoal from a Neolithic fireplace near a winning and flint-chipping zone at Saint Mihiel, Meuse, France. Coll and subm 1971 by Ch Guillaume, Antiq Prehist, Nancy. *Comment*: date agrees well with environmental artifacts of late Neolithic age in Lorraine.

Ny-284. Etival, Vosges **2010 ± 50**
60 BC

Charcoal of *Abies* from fences of a pre-Roman oppidium near Saint Dié, Vosges, at Pierre d'Appel site (48° 22′ 35″ N, 6° 52′ 01″ E). Coll and subm 1971 by A Deyber, Fac Lettres, Nancy. *Comment*: expected age from 125 to 50 BC (La Tène D/2) according to archaeologic material and silver coins found in the pre-Roman dwellings (Deyber, 1972).

Chaudeney sur Moselle, Meurthe et Moselle series

Wood from 3 buried boats under 400 to 500cm coarse gravels of the Moselle alluvions at Chaudeney (48° 40′ 16″ N, 5° 53′ 52″ E) near Toul. Coll 1960 and subm 1972 by A Lieger, Toul.

Ny-313. Wood from monoxylous boat, 400cm **1850 ± 60**
AD 100

Boat in *Quercus* wood, 650cm long.

Ny-314. Wood from monoxylous boat, 500cm **1750 ± 70**
AD 200

Ny-313 and -314 are separated from each other by 10m.

Ny-315. Wood from boat **840 ± 50**
AD 1110

Comment: boat of Ny-315, not made from a single timber-tree appears more recent and seems to belong to Medieval times. Ny-313 and -314 agree with expected age of Gallo-Roman civilization; most finds date back to that age (Lieger and Marguet, 1973).

1420 ± 90
Ny-163. Mazeroy plateau, Meuse, France **AD 540**

Charcoal found during excavations of a supposed Gallo-Roman temple. Mazeroy plateau, dist Saint Amand sur Ornain, 9km from Ligny en Barrois, Meuse (48° 38′ N, 3° 04′ E) was part of ancient Nasium. Coll 1970 by J Colette Rodange, Luxembourg; subm 1970 by G Durand, IUT Nancy. *Comment*: too recent.

12,490 ± 270
Ny-128. Fantas cave, Pyrénées, France **10,540 BC**

Thigh bone of bison from Fantas cave in Plantaurel range in Pyrénées, France (43° 00′ N, 0° 46′ E). Coll and subm 1969 by P Blazy, INP Nancy. *Comment*: expected age of Magdalenian culture according to environmental stratigraphy.

2530 ± 130
Ny-169. Memphis, Egypt **580 BC**

Sarcophagus head of cedar tree from Memphis was dated to check its authenticity. Bronze eyes are set in wood and the lips are painted red (29° 50′ N, 31° 12′ E). Coll and subm 1971 by Dr Brouant, Nancy. *Comment*: date of wood indicates late archaic age.

3320 ± 130
Ny-158. (V 2929) Acari Valley, Peru **1370 BC**

Charcoal from Site 16b, VI-55, Layer 100 in Acari Valley in S Peru (15° 28′ S, 74° 37′ W). Coll and subm 1970 by F Engel and B Ojeda, Miss archéol française au Peru.

5490 ± 140
Ny-159. (V 2871) Colorado Pampa, Peru **3540 BC**

Charcoal from barrow mound of large site of Colorado Pampa, S Peru, Site 17c, VIII.500, Layer 100 (16° 27′ 28″ S, 72° 57′ 58″ W). Coll and subm 1970 by F Engel. *Comment*: artifact typology indicates presence of camps of Meso-Indian hunters.

1220 ± 100
Ny-160. (V 2880) Chala, Peru **AD 730**

Indian corn from storage pit in large fortified town of Quebrada-Honda in coastal S Peru, Site 16c, x. 125, Layer 200 (15° 53′ S, 74° 18′ W). Coll and subm 1970 by F Engel. *Comment*: expected age.

III. SOIL SAMPLES

Soil samples were freed of roots and organic cell debris following an original method. Non-humified organic debris are released by soft blowing of small quantities of soil vibrating on an inclined plane. Results are very good for samples of spodic horizons of podsols, not so good for upper horizons. All soil samples were coll, pretreated, and subm 1970 and 1971 by B Guillet. The present list includes measurements made with spodic horizons of various podsols previously pollen-analyzed.

Pollen analysis of the podsols establish 2 main groups of podsols following their own phytoecologic history. Iron-humus podsols (humods) are linked to historical heather landscapes while for iron-podsols (orthods), the forest has remained unchanged in the past. Mean residence time of carbon in the spodic horizons of the podsol profiles was tested and results compared with data of pollen analysis (Guillet, 1972).

A. Iron-humus podsols (humods)

Lowland podsols, alt 135m, in the forest of Fontainebleau (48° 25′ 27″ N, 2° 39′ 36″ E), 70km S of Paris. Podsol profile was developed on stampien sand and is presently covered with a pine forest.

2100 ± 50
Ny-292. Fontainebleau, 3.3% C, Bh, 45 to 50cm 150 BC

Comment: the only Bh horizon, dark colored, was analyzed. This podsol is an old podsol formed during the Atlantic period but the Bh horizon developed since the beginning of Sub-Boreal period, ca 4500 yr BP under anthropic heather landscape. Pines were grown on the heather landscape in the last century.

Lowland podsols in the Sainte Hélène forest, alt 320m, near Rambervillers, Vosges, (48° 19′ 26″ N, 6° 44′ 14″ E) developed on coarse sands of early Pleistocene alluvions. Present forest is mainly composed of *Fagus* and *Quercus*.

1050 ± 50
Ny-254. Saint Gorgon, 5.4% C, Bh, 63 to 70cm AD 900

1410 ± 50
Ny-255. Saint Gorgon, 1.1% C, B_{2ir}, 70 to 80cm AD 540

Comment: very thick and rich in humus, the Bh horizon was developed under an open landscape with dominant *Calluna*. Beginning of heathland arose after anthropic degradation of a *Quercus-Tilia* forest, ca 2000 to 2200 yr ago (see also Ny-250, -251).

Highland podsols on triassic sandstones in the W Vosges mts, near Saint Dié, Vosges. Present forest is a *Pinetum* (*Pinus silvestris*) with *Calluna vulgaris* and *vaccinium myrtillus*. Pollen analysis of these podsols clearly shows *Pinus silvestris* was emplanted on heathlands in the last century. Profiles of iron-humus podsols are strongly developed with well-differentiated Bh horizons.

Belmont I podsol, alt 610m (48° 13′ 20″ N, 6° 47′ 31″ E).

430 ± 60
Ny-286. Belmont I, 6.5% C, Bh, 45 to 50cm AD 1520

850 ± 50
Ny-287. Belmont I, 3.7% C, Bhir, 50 to 60cm AD 1100

Comment: heather landscape appeared after destruction by man of climatic *Abieto-fagetum*, ca 5 or 6 centuries ago.

Belmont I bis podsol, alt 610m (same location as Belmont I).

Ny-300. Belmont I bis, 5.5% C, Bh, 63 to 67cm — **470 ± 50**, **AD 1480**

Ny-301. Belmont I bis, 5% C, Bhir, 70 to 80cm — **820 ± 50**, **AD 1130**

Ny-302. Belmont I bis, 2.8% C, Bs, 80 to 100cm — **990 ± 50**, **AD 960**

Comment: profile 5m from Belmont I. Same phytoecologic history as Belmont I, pollen-analyzed and study was made to compare and test results of measurements of 2 adjacent profiles.

Belmont II podsol, alt 650m (48° 12′ 28″ N, 6° 46′ 27″ E).

Ny-288. Belmont II, 6.2% C, Bh, 70 to 78cm — **600 ± 50**, **AD 1350**

Ny-289. Belmont II, 1.2% C, Bs, 80 to 95cm — **830 ± 50**, **AD 1120**

Comment: *Callunetum* (with *Betula*) appeared ca 8 to 10 centuries ago.

Ormont podsol, alt 640m (48° 18′ 33″ N, 6° 59′ 13″ E).

Ny-261. Ormont, 4.1% C, Bh, 60 to 65cm — **720 ± 70**, **AD 1230**

Ny-262. Ormont, 2.9% C, Bhir, 65 to 70cm — **800 ± 60**, **AD 1150**

Ny-263. Ormont, 2.6% C, Bs, 70 to 80cm — **1260 ± 70**, **AD 690**

Comment: by human degradation of climatic forest, a heather landscape appeared ca 15 centuries ago.

Taintrux podsol, alt 530m (48° 16′ 27″ N, 6° 52′ 44″ E).

Ny-256. Taintrux, 4% C, Bh, 51 to 56cm — **1270 ± 50**, **AD 680**

Ny-257. Traintrux, 1.9% C, Bs, 56 to 65cm — **1520 ± 60**, **AD 430**

Biffontaine podsol, alt 520m (48° 12′ 46″ N, 6° 48′ 32″ E).

Ny-258. Biffontaine, 2.2% C, Bh, 70 to 75cm — **1300 ± 60**, **AD 650**

Ny-259. Biffontaine, 1.5% C, Bs, 75 to 85cm — **2230 ± 60**, **280 BC**

Ny-260. Biffontaine, 0.7% C, BsC, 85 to 100cm — **1860 ± 60**, **AD 90**

Comment: for Taintrux and Biffontaine stas, degradation of climatic forest and appearance of the *Calluna* landscape are oldest confirmed by pollen analysis. These events were probably linked to the 1st important human occupation of Vosges ca 2 to 3 centuries BC.

B. Iron-podsols (orthods)

Lowland podsol, alt 138m, in the Fontainebleau forest (48° 25′ 31″ N, 2° 39′ 50″ E) on eolian sandy parent material blown up from next stampian sand surface.

Ny-290. Fontainebleau-Tillaie, 0.5% C, Bh, 60 to 65cm — **180 ± 50** — **AD 1770**

Ny-291. Fontainebleau-Tillaie, 0.3% C, Bs, 70 to 75cm — **210 ± 50** — **AD 1740**

Comment: podsol developed under deciduous forest first of *Quercus* and later of *Fagus* for at least 5000 yr. Low mean residence time of humus-C in Bh horizon contrasts with that of iron-humus podsol of Fontainebleau (Ny-292) developed under heather vegetation though at the same time (Guillet and Robin, 1972).

Lowland podsol, alt 295m, on rhetian sand of Lorraine Plateau, 30km NE of Nancy, in Bezange forest (48° 44′ 52″ N, 6° 31′ 36″ E).

Ny-316. Bezange, 1.2% C, Bh, 30 to 35cm — **610 ± 50** — **AD 1340**

Ny-317. Bezange, 0.6% C, Bs, 40 to 50cm — **140 ± 50** — **AD 1810**

Comment: exceptional inversion of mean residence time *vs* depth may be explained, bearing in mind that the Ae horizon of the present profile has been lately differentiated. Eluviation of old organic matter bleached down from the upper horizon and its insolubilization in the Bh horizon may be the cause of inverse gradient of radiocarbon ages.

Highland podsol, on triassic sand in the W Vosges mts. Present forest is a climax *Abietum,* not destroyed by man. Since at least the beginning of the Sub-Boreal period, these podsols have been in a steady state equilibrium with forest vegetation of *Abies* and *Fagus.*

Raon-Pierre d'Appel podsol, alt 410m (48° 22′ 38″ N, 6° 51′ 55″ E).

Ny-276. Raon-Pierre d'Appel, 1.8% C, Bh, 56 to 58cm — **600 ± 50** — **AD 1350**

Ny-277. Raon-Pierre d'Appel, 1.7% C, Bs_1, 63 to 70cm — **800 ± 50** — **AD 1150**

Ny-278. Raon-Pierre d'Appel, 1.4% C, Bs_2, 70 to 80 cm — **970 ± 50** — **AD 980**

Ny-279. Raon-Pierre d'Appel, 0.8% C, BsC, 85 to 90cm — **980 ± 50** — **AD 970**

Raon-Venival podsol, alt 460m (48° 24′ 16″ N, 6° 53′ 19″ E).

Ny-293. Raon-Venival, 1.8% C, Bh, 40 to 43cm — **440 ± 50** — **AD 1510**

Ny-294. Raon-Venival, 1.1% C, Bs_1, 45 to 55cm — **420 ± 50** — **AD 1530**

Ny-295. Raon-Venival, 0.8% C, Bs_2, 60 to 73cm — **830 ± 50** — **AD 1130**

Corcieux-Croisette podsol, alt 600m (48° 13′ 14″ N, 6° 50′ 29″ E).

Ny-280. Corcieux-Croisette, 0.9% C, Bh, 65 to 67cm — **510 ± 50** — **AD 1440**

Ny-281. Corcieux-Croisette, 1.1% C, Bs_1, 70 to 75cm — **480 ± 50** — **AD 1470**

Ny-282. Corcieux-Croisette, 1.4% C, Bs_2, 75 to 85cm — **710 ± 50** — **AD 1240**

Ny-283. Corcieux-Croisette, 0.6% C, BsC, 90 to 100cm — **1260 ± 50** — **AD 690**

Corcieux-Vanemont podsol, alt 590m (48° 13′ 26″ N, 6° 50′ 56″ E).

Ny-296. Corcieux-Vanemont, 0.6% C, Bh, 60 to 63cm — **450 ± 50** — **AD 1600**

Ny-297. Corcieux-Vanemont, 1.2% C, Bs_1, 63 to 70cm — **540 ± 50** — **AD 1410**

Ny-298. Corcieux-Vanemont, 0.8% C, Bs_2, 80 to 90cm — **860 ± 50** — **AD 1090**

Ny-299. Corcieux-Vanemont, 1.0% C, BsC, 110 to 120cm — **1040 ± 50** — **AD 910**

Comment: low humus-C content in the spodic horizons of these 4 iron podsols is the main difference between iron-humus podsols partly formed under heather landscape and iron podsols developed under climatic forest. In comparison with the antiquity of podsolization, at least Sub-Boreal, mean residence time of humus-C in Bh horizons of iron podsols indicates a rapid turn-over cycle of ca 0.2%/yr, and suggests good biologic activity.

Highland podsol on hercynian granitic arenaceous sand, high central mts in Vosges. Forest (*Abieto-Fagetum*) was not destroyed in the past. Podsols were entirely developed under forest cover. Climatic conditions (mean annual rainfall 1800mm, mean annual temperature 7°C) prevent total decomposition of forest litter and reduce breakdown rate of organic matter, so that profiles are then rich in humus-C (Duchaufour, 1972).

Klingenthal podsol, alt 750m (48° 26′ 07″ N, 7° 20′ 47″ E).

Ny-272. Klingenthal, 2.6% C, Ae/Bh_1, 38 to 41cm — **470 ± 60** / **AD 1480**

Non-compact horizon, thin layer of Ae horizon.

Ny-273. Klingenthal, 5.0% C, Bh_{2ir}, 41 to 46cm — **870 ± 50** / **AD 1080**

Alios horizon.

Ny-274. Klingenthal, 1.1% C, Bs, 50 to 60cm — **1190 ± 60** / **AD 760**

Ny-275. Klingenthal, 0.6% C, BsC, 75 to 80cm — **1230 ± 50** / **AD 720**

Barembach podsol, alt 570m (48° 27′ 49″ N, 7° 15′ 45″ E); see also Ny-77; R, 1969, v 11, p 465.

Ny-267. Barembach, 1.6% C, Ae/Bh_1, 37 to 40cm — **610 ± 50** / **AD 1340**

Non-compact horizon, thin lower layer of A_2 horizon.

Ny-268. Barembach, 3.1%, Bh_{2ir}, 40 to 47cm — **1020 ± 50** / **AD 930**

Alios horizon, upper layer.

Ny-269. Barembach, 2.5% C, Bh_{2ir}, 52 to 63cm — **1140 ± 50** / **AD 810**

Alios horizon, lower layer.

Ny-270. Barembach, 1.5% C, Bs, 65 to 75cm — **1200 ± 50** / **AD 750**

Ny-271. Barembach, 0.7% C, BsC, 75 to 85cm — **1310 ± 50** / **AD 640**

Vieilles Charrieres podsol, alt 880m (48° 08′ 52″ N, 7° 02′ 58″ E).

Ny-303. Vieilles Charrieres, 4.6% C, Bh_1, 24 to 34cm — **930 ± 50** / **AD 1020**

Ny-304. Vieilles Charrieres, 3.4% C, Bh_{2ir}, 34 to 45cm — **1580 ± 50** / **AD 370**

Compact horizon.

Ny-305. Vieilles Charrieres, 2.3% C, Bs, 50 to 60cm — **1860 ± 50** / **AD 90**

Ny-306. Vieilles Charrieres, 0.5% C, BsC, 60 to 70cm — **2080 ± 50** / **130 BC**

Belbriette podsol, alt 930m (48° 04′ 55″ N, 6° 59′ 21″ E).

870 ± 50
Ny-307. Belbriette, 4.3% C, Bh, 37 to 42cm **AD 1080**

1390 ± 50
Ny-308. Belbriette, 6% C, B_{2ir}, 45 to 55cm **AD 660**

1520 ± 50
Ny-309. Belbriette, 3.4% C, Bs_1, 60 to 70cm **AD 430**

1670 ± 50
Ny-310. Belbriette, 1.6%, Bs_2, 75 to 85cm **AD 280**

1950 ± 50
Ny-311. Belbriette, 1.2% C, BsC, 90 to 100cm **0**

Gérardmer-de Liaucourt podsol, alt 920m (48° 03′ 05″ N, 6° 52′ 52″ E).

1120 ± 50
Ny-264. Gérardmer, 5.1% C, Bh, 43 to 53cm **AD 830**

1780 ± 50
Ny-265. Gérardmer, 3.2% C, Bs, 60 to 70 cm **AD 170**

2220 ± 60
Ny-266. Gérardmer, 1.1% C, BsC, 85 to 95cm **270 BC**

Comment: in these old podsols in steady-state equilibrium with climatic forest vegetation, mean residence time of humus-C decreases with depth. Mean residence time of Carbon in Bh horizons, suggests slower organic matter turn-over than in iron-podsols developed on triassic sandy parent material. Alt of these stations and more severe climate of high mts may decrease breakdown and rejuvenate speed of organic matter in spodic horizons.

General Comment on podsols: dates on Bh of iron-humus podsols developed under heather *(Calluna vulgaris)* correlate ages of appearance of heather landscape and radiocarbon ages. Radiocarbon ages are ca ½ the *Callunetum* ages, which may be interpreted as a lack of organic matter breakdown due to nature and structure of *Calluna's* polymers precipitated in Bh horizons. These organic polymers which are not very labile (Handley, 1961), have a very slow turn-over time and tend to accumulate in Bh horizons. Dates on Bh of iron-podsols developed under forest climax are of ages young in comparison with the podsolization process time. This may be a reflection of the more or less rapid turn-over rate of polymers descending from forest litter and precipitated in Bh horizons. Organic polymers apparently seem more labile than those of *Calluna*.

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