GIF NATURAL RADIOCARBON MEASUREMENTS VII

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C\textsuperscript{14} dates reported below were obtained mainly at the end of 1968 and during 1969 on archaeologic and geologic samples. Techniques of measurement used are unchanged. Since 1968, 4 complete routine sets have been running, each equipped with a 1 L CO\textsubscript{2} proportional counter. One is made of stainless steel with a background of 2.70 cpm at pressure 1 atm and the others are of OFHC copper with a background of either 1.10 or 1.30 cpm for a corresponding pressure of, respectively, 1 or 2 atm. For age calculation, 95\% activity of NBS oxalic acid is used as the modern standard and the value of 5570 ± 30 years is used for the half-life of C\textsuperscript{14}. Dates are expressed in years B.P. (before A.D. 1950).

ACKNOWLEDGMENTS

Thanks are due Inès Mirre and Madeleine Kolbach for routine sample preparation and to Michel Jaudon for his assistance with electronic equipment.

I. ARCHAEOLOGIC SAMPLES

A. France

1. W France

La Hoguette, Fontenay-le-Marmion series, Calvados

Charcoal from Neolithic cairn at La Hoguette, Fontenay-le-Marmion (49° 05’ 50” N Lat, 0° 22’ 10” W Long), Calvados. Coll. and subm. 1968, 1969 by R. Caillaud and E. Lagnel, Caen.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Description</th>
<th>Date</th>
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<tbody>
<tr>
<td>Gif-1347.</td>
<td>La Hoguette, La/41</td>
<td>3750 ± 120</td>
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<tr>
<td></td>
<td>Exterior limit of Crematorium.</td>
<td>1800 B.C.</td>
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<tr>
<td>Gif-1346.</td>
<td>La Hoguette, J/42</td>
<td>4300 ± 120</td>
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<tr>
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<td>Interior of Crematorium.</td>
<td>2350 B.C.</td>
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<td>Gif-1514.</td>
<td>La Hoguette, La/43</td>
<td>4720 ± 130</td>
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<td>Carbonized log in low structure of Crematorium.</td>
<td>2770 B.C.</td>
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<tr>
<td>Gif-1513.</td>
<td>La Hoguette, La/42</td>
<td>4800 ± 130</td>
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<td>Carbonized log in low structure of Crematorium.</td>
<td>2850 B.C.</td>
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<td>Gif-1348.</td>
<td>La Hoguette, I/32</td>
<td>4820 ± 130</td>
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<td></td>
<td>Hearth, outside monument.</td>
<td>2870 B.C.</td>
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<tr>
<td>Gif-1345.</td>
<td>La Hoguette, P/45</td>
<td>5000 ± 130</td>
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<td></td>
<td>Hearth under sepulchral Chamber V.</td>
<td>3050 B.C.</td>
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</tbody>
</table>
General Comment (E.L.): coherent results except for crematorium, used once only, according to the archaeologists.

Gif-1248. Vrasville, Manche  A.D. 1090
Charcoal, from remains of stone-construction, under feudal moat of the 12th century, at Vrasville (49° 42' N Lat, 1° 22' W Long), Manche. Coll. and subm. 1968 by M. de Boïard, Centre de Recherches Archéol. Médiévales, Caen. Comment: dates 1st occupation of site.

Gif-1315. Penvern, Saint-Servais, Finistère  A.D. 930
Charcoal from pit, 1 m deep, near Penvern, Saint-Servais (48° 32' N Lat, 4° 12' W Long), Finistère. Coll. and subm. 1968 by P. R. Giot, Fac. Sci., Rennes. Comment: indicates existence of Middle Age habitation area.

Gif-1463. Fouesnant, Finistère  A.D. 700

Gif-1187. Pors-Rolland, Perros-Guirec, Côtes du Nord  A.D. 650

Gif-1466. Kervignac, Plussulien, Côtes du Nord  A.D. 450
Charcoal from filling of a souterrain at Kervignac, Plussulien (48° 22' N Lat, 3° 05' W Long), Côtes du Nord. Coll. by C. T. Le Roux. Comment: indicates late re-use.

Gif-1304. Keradennc, Saint-Frégant, Côtes du Nord  A.D. 190
Charcoal and ashes from praefurnium of a Gallo-Roman villa, Keradennc, Saint-Frégant (48° 34' N Lat, 4° 22' W Long), Côtes du Nord. Coll. and subm. 1968 by R. Sanquer, Fac. Lettres, Brest. Comment: fits well with archaeological clues: terra sigillata made by a well-known potter, Paternus, from Lezoux (A.D. 150 to 193); a sestercus of Emperor Commodus coined in A.D. 184; late 2nd century style of painting in fresco on walls of room heated by praefurnium (Sanquer and Galliou, 1970).

Gif-1186. Bel-Air, Treby, Côtes du Nord  A.D. 120
Charcoal from Iron age souterrain, Bel-Air, Treby (48° 20' N Lat, 2° 35' W Long), Côtes du Nord (Gouletquer, 1969). Coll. and subm.
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Gif-1190. Castellou-Péroni, Saint-Jean-Trolimon, Finistère
Charcoal from Iron age souterrain, Castellou-Péroni, Saint-Jean-Trolimon (47° 03' N Lat, 4° 07' W Long), Finistère. Coll. and subm. 1968 by P. L. Gouletquer. Comment: slightly too young, but contamination is probable; site was not sealed.

Gif-1303. Kersulvez, Pluzunet, Côtes du Nord

Gif-1188. Le Gouffre, Plougrescant, Côtes du Nord

Gif-1189. Le Frêche, Plémy, Côtes du Nord

Gif-1464. Ergué-Gabéric, Saint-André, Finistère
Charcoal from grave in Middle Bronze age barrow, Ergué-Gabéric, Saint-André (48° 01' N Lat, 3° 59' W Long), Finistère. Coll. and subm. 1969 by C. T. Le Roux. Comment: contaminated by a younger occupation of site.

Gif-1149. Kernonen, Plouvorn, Finistère, D

Goarem Goasven series, Berrien, Finistère
Charcoal in soil of Bronze age barrow without funeral room, an uncommon type of barrow, at Goarem Goasven, Berrien (48° 24' N Lat, 3° 47' W Long), Finistère. Coll. and subm. by J. Briard.

Gif-1313. Goarem Goasven I
W part.
Gif-1314. Goarem Goasven II

N part.

*General Comment:* Gif-1313 supposedly belongs to level anterior to barrow erection.

Gif-1462. Portsall-Kerdélié, Ploudalmezeau, Finistère

Carbonized brushwood in fossil sand hill over an ancient shore, ca. +2 related m.s.l. (mean sea level), and covered with 6 m silty grit, Portsall-Kerdélié, Ploudalmezeau (48° 34' N Lat, 4° 41' W Long), Finistère. Coll. and subm. 1969 by P. R. Giot. *Comment:* this date applies to dunes, but without relation to ancient shore.

Gif-1312. Trozoul, Trébeurden, Côtes du Nord

Charcoal from hearth, +6 m related to m.s.l., on shingle bar fossil shore, covered with solifluction material, 3 m thick, at Trozoul, Trébeurden (48° 46' N Lat, 3° 35' W Long), Côtes du Nord. Coll. and subm. 1968 by P. R. Giot. *Comment:* probably 1st Wurm interstadial or rather Riss-Würm interglacial (Giot, 1969).

Gif-1467. La Chenaie, Abbaretz, Loire Atlantique

Piece of wood, at 2.10 m under alluvium of La Chenaie R., Abbaretz (47° 33' N Lat, 1° 32' W Long), Loire Atlantique. Coll. and subm. 1969 by J. Guigues, B.R.G.M., Rennes. *Comment:* traces of works of tin placer in upper levels; 2 gold coins struck at Vannes and Nantes ca. A.D. 550-560 were found at some distance from site (Giot, 1970).

Gif-1112. Butte-aux-Pierres, Saint-Joachim, Loire Atlantique

Charcoal, 40 cm deep, from Neolithic level with Chasseen pottery types, La Butte-aux-Pierres, Saint-Joachim (47° 23' N Lat, 2° 10' W Long), Loire Atlantique. Coll. and subm. 1967 by G. Bellancourt, Nantes. *Comment:* disagrees with archaeologic clues; site is Neolithic.

ORS series, Oléron Is., Charente Maritime

Charcoal and burnt bones from “Peu Richardien” Neolithic site, on foreshore, ORS (45° 21' N Lat, 8° 31' W Long), Oléron Is., Charente Maritime. Coll. and subm. 1968 by C. Gabet, Rochefort-sur-Mer, Charente Maritime.

Gif-1329. ORS III, E 5-2

*General Comment:* younger than continental sites of La Garenne and Les Matignons with very similar ceramics dated 4790, 4560 and 4570
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**Gif-1128. Grotte des Terriers, Lussac-les-Châteaux, Vienne**  
10,450 ± 250  
8500 B.C.


**Gif-1007. La Bachellerie, Compreignac, Haute Vienne, Co F I**  
1040 ± 100  
A.D. 910

Charcoal from filling of souterrain at La Bachellerie, Compreignac (46° 00' N Lat, 1° 17' E Long), Haute Vienne. Coll. and subm. 1967 by P. Saumande, Limoges, Haute Vienne. Comment: agrees with age of numerous sherds from souterrain.

**Gif-1008. La Courrière, Saint Sulpice Laurière, Haute Vienne, Ba F I**  
750 ± 100  
A.D. 1200

Charcoal from filling of souterrain at La Courrière, Saint Sulpice Laurière (46° 03' N Lat, 1° 28' E Long), Haute Vienne. Coll. and subm. 1967 by P. Saumande. Comment: agrees with numerous sherds assoc.

2. S France

**Gif-1275. Grotte des Châtaigniers, Vingrau, Pyrénées Orientales**  
3430 ± 120  
1480 b.c.

Burnt grain from Early Bronze age level, in sepulchral grotte des Châtaigniers, Casenove-Vingrau (42° 51' N Lat, 2° 47' E Long) (Guilaine and Abelani, 1965). Coll. and subm. 1968 by J. Guilaine, C.N.R.S., Carcassonne. Comment: a 1st date of this level obtained with charcoal: 3120 b.p. (Gif-760: R., 1971, v. 13, p. 219) was considered too young and charcoal was supposedly late intrusion into level related to industry. This 2nd date fits much better with Early Bronze industry.

**Gif-1088. Cuxac, Aude**  
1920 ± 110  
A.D. 30


**Gif-1359. Grotte du Hasard, Tharaux, Gard**  
2950 ± 130  
1000 B.C.

Charcoal from Middle Bronze age Level 2, Rm. I.G., Grotte du Hasard, Tharaux (44° 14' N Lat, 4° 19' E Long), Gard. Coll. and subm. 1969 by J. L. Roudil, Montpellier, Hérault. Comment: slightly too young for assoc. industry.
Gif-1161. “Les Courondes”, Ouveillan, Aude 1800 B.C.

Gif-1093. Grotte de Resplandy, Hérault 2100 B.C.

Gif-1360. Grotte des Pins, Blandas, Gard 2400 B.C.
Charcoal in ashes, from Late Neolithic site, Grotte des Pins, Blandas (43° 54’ N Lat, 3° 33’ E Long), Gard. Coll. and subm. 1969 by J. L. Roudil. Comment: fits well with Late Neolithic industry of “Ferrière culture.”

Gif-1274. Grotte de Gaougnas, Cabrespine, Aude 2660 B.C.
Charcoal from Late Neolithic level of Grotte de Gaougnas, Cabrespine (43° 21’ N Lat, 2° 27’ E Long), Aude. Coll. and subm. 1968 by J. Guilaine. Comment: agrees well with industry and ceramics.

Gif-1273. Grotte de Gazel, Sallèles, Aude 4000 B.C.
Charcoal from level without ceramics just under Early Neolithic levels of Grotte de Gazel, Sallèles (43° 19’ N Lat, 2° 25’ E Long), Aude. Coll. and subm. 1968 by J. Guilaine. Comment: agrees with stratigraphy.

Grotte de Camprafaud series, Ferrière-Poussarou, Hérault
Grotte de Camprafaud is one of numerous cavities in Devonian dolomite, all occupied by prehistoric men, in N W Hérault. Grotte de Camprafaud, Ferrière-Poussarou (43° 26’ N Lat, 2° 54’ E Long) showed a continuous stratigraphy, from Late Bronze to Early Neolithic age. Charcoal coll. and subm. 1967-1969 by G. Rodriguez.

Gif-1091. Camprafaud, Level 3 1130 B.C.
Comment: disagrees with Early Bronze age industry assoc.

Gif-1092. Camprafaud, Level 6 1970 B.C.

Gif-1156. Camprafaud, Level 9 2350 B.C.
Comment: presence of 2 copper slags.
<table>
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<tr>
<th>Code</th>
<th>Site</th>
<th>Level</th>
<th>Date Range</th>
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<tr>
<td>Gif-1157.</td>
<td>Camprafaud, Level 10</td>
<td>4350 ± 140</td>
<td>2400 B.C.</td>
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<td>Gif-1484.</td>
<td>Camprafaud, Level 12</td>
<td>5100 ± 130</td>
<td>3150 B.C.</td>
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<td>Middle Neolithic period.</td>
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<td>Gif-1485.</td>
<td>Camprafaud, Level 13</td>
<td>5450 ± 130</td>
<td>3500 B.C.</td>
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<td>First level of Middle Neolithic period.</td>
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<td>Gif-1486.</td>
<td>Camprafaud, Level 14</td>
<td>5300 ± 130</td>
<td>3350 B.C.</td>
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<td>Early Languedocian Neolithic.</td>
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<td>Gif-1487.</td>
<td>Camprafaud, Level 15</td>
<td>5900 ± 140</td>
<td>3950 B.C.</td>
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<td>Early Languedocian Neolithic.</td>
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<td>Gif-1488.</td>
<td>Camprafaud, Level 16</td>
<td>5900 ± 140</td>
<td>3950 B.C.</td>
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<td>Middle level of Early Languedocian Neolithic.</td>
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<td>Gif-1489.</td>
<td>Camprafaud, Level 17</td>
<td>5800 ± 140</td>
<td>3850 B.C.</td>
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<td></td>
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<td>Similar to Gif-1488.</td>
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<td>Gif-1490.</td>
<td>Camprafaud, Level 18</td>
<td>6300 ± 140</td>
<td>4350 B.C.</td>
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<td>Similar to Gif-1489.</td>
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<tr>
<td>Gif-1491.</td>
<td>Camprafaud, Level 19</td>
<td>2500 ± 105</td>
<td>550 B.C.</td>
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<td>Grotte des Sarrazins series, Seyssinet-Pariset, Isère</td>
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<td>Grotte des Sarrazins (45° 23’ N Lat, 5° 40’ E Long), Seyssinet-Pariset, near Grenoble, Isère, is a large rock shelter, with 3 m habitation soils, uninterrupted from Gallo-Roman to Chalcolithic ages. Charcoal coll. and subm. 1968 by A. Bocquet, Grenoble.</td>
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<td>Gif-1201.</td>
<td>Grotte des Sarrazins, SAR 4</td>
<td>2980 ± 105</td>
<td>1030 B.C.</td>
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<td></td>
<td>Assoc. with Hallstatt C ceramics.</td>
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<td>Gif-1202.</td>
<td>Grotte des Sarrazins, SAR 7</td>
<td>4350 B.C.</td>
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<td>Assoc. with Late Bronze age II ceramics.</td>
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Gif-1203.  Grotte des Sarrazins, SAR 19  
3320 ± 110  
1370 B.C.  
Assoc. with Late Bronze age I to Early Middle Bronze age ceramics.

Gif-1204.  Grotte des Sarrazins, SAR 28  
3900 ± 120  
1950 B.C.  
Assoc. with Early Chalcolithic age ceramics.

General Comment: in spite of remote situation of site from protohistoric currents, it appears that all material fits well with archeologic context of E France (Bocquet and Papet, 1966). Coherent with results obtained by Lyon Radiocarbon Lab. for same site (R., 1971, v. 13, p. 55-56).

Baudinard series, Var  
Charcoal from Grotte de l’Eglise supérieure, with 7 Neolithic levels, all belonging to Chassean, Baudinard (43° 45’ N Lat, 6° 15’ E Long), Var. Coll. and subm. 1968-1970 by J. Courtin, C.N.R.S., Marseille.

Gif-1332.  Grotte de l’Eglise supérieure, Level 5  
4200 ± 130  
2250 B.C.  
Late Chascean with Chalcolithic rudiments.

Gif-1331.  Grotte de l’Eglise supérieure, Level 3  
4500 ± 130  
2550 B.C.  
Late Chascean with Chalcolithic rudiments.

Gif-1621.  Grotte C  
4800 ± 140  
2850 B.C.  
Middle Chascean.

Gif-1333.  Grotte de l’Eglise supérieure, Level 8A  
5500 ± 140  
3550 B.C.  
Early Chascean.

Gif-1334.  Grotte de l’Eglise supérieure, Level 8B  
5760 ± 140  
3810 B.C.  
Base level with Early Chascean.


Gif-1111.  “Abri du Capitaine”, Sainte-Croix-de-Verdon, Basses-Alpes  
6050 ± 150  
4100 B.C.  
3. S W France

**Gif-1224. Faycelles, Lot**

- **A.D. 1210**
- Human jaw from site of ancient lazar house, at bottom of cave in hillside, Faycelles (44° 34' N Lat, 1° 59' E Long), Lot. Coll. and subm. 1968 by G. Delbos, Caussade, Lot. *Comment*: locates previously known but unlocated ancient lazar house.

**Gif-1328. Grotte de la Fée, Thémines, Lot**

- **780 B.C.**

**Les Barbilloux series, Dordogne**


**Gif-1086. Les Barbilloux, B A R 1**

- **Modern**
- **3680 ± 130**

**Gif-1087. Les Barbilloux, B A R 5**

- **1730 B.C.**
- *Comment*: corresponds to Early Bronze age, as expected.

**Grotte du Noyer series, Esclauzels, Lot**


**Gif-1160. Grotte du Noyer, II**

- **1090 B.C.**
- Bottom of Level 2, of so-called civilization of “Champs d’Urnes”.

**Gif-1631. Grotte du Noyer, A D 8**

- **1200 B.C.**
- Hearth in Level 2; archaeologic clue of a new typical civilization of Middle Bronze age in region.

**Gif-1159. Grotte du Noyer, I**

- **1300 B.C.**
- Charcoal and grain in unbroken vase, Level 3, of Middle Bronze age.

**Gif-1632. Grotte du Noyer, A E 7-8**

- **2870 B.C.**
- Level 4 of Early Bronze age. *Comment*: slightly too old for a level containing copper: possibly contaminated from lower levels by gnawing.
Gif-1634. **Grotte du Noyer, A E 7**
Hearth 7. *Comment*: probable intrusion from upper level into Late Chassean level.

Gif-1633. **Grotte du Noyer, A E 8**
Level 5, Chassean Neolithic age.

Gif-1635. **Grotte du Noyer, A T C I**
Level 5, well separated from Middle Bronze age by sterile level; assoc. with incinerated human bones.  
*General Comment*: coherent with site stratigraphy according to archaeologic clues.

**Grotte des Eglises series, Ussat, Ariège**
Charcoal from Late Magdalenean site of Grotte des Eglises, Ussat (42° 49’ N Lat, 1° 37’ E Long), Ariège. Coll. and subm. 1967-1969 by P. Renault, C.N.R.S., Moulis, Ariège.

Gif-1158. **Grotte des Eglises, I**
*Comment*: disagreement with assoc. flints.

Gif-1434. **Grotte des Eglises, 2**
*Comment*: inert carbon added for measurement. Correct date, agrees with archaeologic data.

Gif-1354. **Carbon, Varilhes, Ariège, F.C.I.**

4. **Central France**

Gif-1225. **Le Razat, Laqueuille, Puy-de-Dôme**  A.D. 1550
Charcoal from hearth, from site of several hundred huts dug from altered basalt flow, alt.: 1100 m, on Mt. Le Razat, Laqueuille (45° 38’ 00” N Lat, 2° 44’ 40” E Long), Puy-de-Dôme. Coll. and subm. 1968 by S. Paul, Fac. Sci., Orsay.

**Montbani series, Mont-Notre-Dame, Aisne**
Montbani site, Mont-Notre-Dame (49° 16’ 30” N Lat, 1° 14’ 40” E Long), Aisne, is workshop or encampment with well-defined stratigraphy. Coll. and subm. 1967-1968 by R. Parent, La Fère-en-Tardenois, Aisne.
Gif-355. Montbani, 2
Hazel nut shells, 0.90 m deep, overlying Tardenoisian level.

Gif-1106. Montbani, 3
Charcoal from small hearths, 30 to 40 cm under Iron-age level. Comment: supposedly from Tardenoisian level; either contaminated by upper charcoal or belongs to same level as Gif-355.

Gif-356. Montbani, 1
Charcoal from hearth, 1.20 m deep, lying on basal crushed stone. Comment: dates Tardenoisian.

Coincy series, Aisne
La Sablonnière de Coincy (49° 10’ N Lat, 1° 57’ E Long) is Tardenoisian workshop, rich in artifacts of predominantly triangular forms. Coll. and subm. by R. Parent.

Gif-1107. Coincy I
Charcoal under Neolithic and Iron-age levels, 45 cm thick. Comment: supposed Tardenoisian level. Either contaminated by upper charcoal or belongs to lower Neolithic level.

Gif-1266. Coincy 2
Charcoal from hearth at bottom of Tardenoisian level, protected by clayey level, without charcoal in upper level. General Comment: same date for deepest level at Montbani and Coincy, which are very close together and typologically similar. Pollen analysis disagrees, probably due to pollen infiltration in sandy material, in both places. Best results are obtained, in both cases, for hearths protected by clayey levels.

Gif-1090. Clair Bois, Bressey, Côte d’Or
Charcoal from incineration in barrow at Clair Bois farm, Bressey (47° 18’ N Lat, 5° 11’ E Long), Côte d’Or. Coll. and subm. 1967 by R. Ratel, Fac. Sci., Dijon. Comment: disagrees with Late Hallstatt sepulchres.

Gif-1109. Chaume-Les-Baigneux, Côte d’Or
Charcoal from incineration in barrow at Chaume-Les-Baigneux (47° 38’ N Lat, 4° 34’ E Long), Côte d’Or. Coll. and subm. 1967 by R. Ratel. Comment: sepulchres from Late Bronze-Early Hallstatt period; agrees well.
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1740 ± 100

Gif-1108. Chantrans, Doubs
A.D. 210

Human bones, 0.20 to 0.40 m deep, Chantrans (47° 18' N Lat, 2° 48' E Long), Doubs. Coll. and subm. 1967 by A. Gauthier, Besançon. Comment: related to some Gallo-Roman vestiges around Chantrans.

1880 ± 100

Gif-1253. Niderbronn-des-Bains, Bas-Rhin
A.D. 70

Charcoal, 70 cm depth, at foot of rock decorated with concentric circles, Niderbronn-des-Bains, Wintersberg Cliff (48° 58' 30" N Lat, 7° 36' 30" E Long), Bas-Rhin. Coll. and subm. 1968 by C. Lenoble, Strasbourg, Bas-Rhin. Comment: brings no interesting information on engravings.

B. North Africa

Gif-890. Djorf Torba, Saoura, D J, T 4, Algeria
Modern

Charcoal from lower level of Rooms-barrow 28, Djorf Torba, Saoura (31° 30' N Lat, 2° 30' W Long). Coll. and subm. 1967 by G. Camps. Comment: expected age 1700 B.P.

540 ± 100

Gif-1120. El Mermouta, Ouled Djellal, Algeria
A.D. 1410

Charred bone in 30 cm ashy level of Upper Capsian, El Mermouta (34° 35' N Lat, 5° 21' E Long), Ouled Djellal. Coll. and subm. 1967 by G. Camps. Comment: either a recent bone was introduced into this superficial layer or date obtained from total carbon bone is wrong.

Guettara Wadi series, Bredea, Oran, Algeria

Charcoal from burial cave of Guettara Wadi, Bredea (35° 36' N Lat, 1° 10' W Long), Oran. Site of Neolithic facies of Oran dist. with sepulchres of Mecha el Arbi type. Coll. and subm. 1967 by G. Camps.

550 ± 95

Gif-881. Guettara, O E G I
A.D. 1400

25 to 45 cm depth. Comment: Neolithic ceramics assoc.; probably polluted by burrowing animals.

10,190 ± 230

Gif-882. Guettara, O E G 2
8240 B.C.

90 to 100 cm depth. Comment: pre-Neolithic industry, without ceramics, corresponds to Late Iberomaurusian period.

5850 ± 150

Gif-883. Station du Meandre, Brezina, Algeria
3900 B.C.

Charcoal in archaeologic layer at foot of rupestral paintings, Sta. du Meandre (33° 06' N Lat, 1° 15' E Long), Brezina. Coll. and subm. by G. Camps. Comment: confirms attribution of these paintings to Neolithic of Capsian tradition.
Gif-884. Safiet Bou Rhenan, Medea, Algeria

Charcoal in typical Neolithic site with ceramics in ashy sand, Safiet Bou Rhenan (34° 23' N Lat, 3° 27' E Long), Medea. Comment: oldest date known for Neolithic with ceramics. Confirms opinion that Neolithic appeared earlier in Saharian region than in N of Atlas.

Medjez II series, El-Eulma, Algeria

Medjez II, near El-Eulma town (36° 08' N Lat, 5° 40' E Long), Algeria, is a snail-shell heap, (“escargotière”) of Upper Capsian, with 3.65 m archaeologic layer. Stratigraphy established through evolution of lithic industry: upper part is characterized by presence of geometric microliths and numerous slotted tools; in lower part, size and number of large tools increase with depth. Coll. and subm. 1967 by G. Camps.

Gif-885. Medjez, M J Z, II, 3

Hearth, depth 0.90 m. Comment: diluted with inert carbon.

Gif-886. Medjez, M J Z II, 4

Depth 0.73 to 1.00 m.

Gif-887. Medjez, M J Z II, 5

Depth 1.00 to 1.30 m.

Gif-888. Medjez, M J Z II, 6

Depth 1.30 to 1.80 m.

Gif-889. Medjez, M J Z II, 7

Depth 2.30 to 3.20 m. Comment: diluted with inert carbon.


Aïn Naga series, Algeria

Charcoal from Aïn Naga (34° 21' N Lat, 3° 29' E Long), Messad, Titteri Dept. Coll. and subm. 1968 by G. Camps.

Gif-1221. Aïn Naga, A N G 3

Lower part of Neolithic level. Comment: diluted with inert carbon.

Gif-1220. Aïn Naga, A N G 2

Upper Capsian level.

General Comment: both dates are somewhat too old.
Gif-879. Koudiat Kifen Lahda, Constantine, Algeria  
8540 ± 200  
6590 B.C.

Gif-880. El Hadjar, Oasis, Algeria  
7300 ± 170  
5350 B.C.
Charcoal, 1 m deep in sand, El Hadjar, Oasis (31° 27’ N Lat, 4° 45’ E Long). Coll. and subm. by G. Camps. *Comment:* assoc. with epi-paleolithic industry with lamella different from Iberomaurusian and Capsian industries.

Gif-1222. Amekni, Oasis, A M K 4, Algeria  
6800 ± 220  
4850 B.C.
Charcoal from open-air site of Amekni, 60 to 90 cm depth, 40 km N.W. Tamanrasset, Oasis (22° 55’ N Lat, 5° 15’ E Long). Coll. and subm. by G. Camps. *Comment:* complex site which also includes Neolithic of Sudanese tradition, dated 8050 B.P. by UW-87 (unpub.) and MC-212 (R., 1969, v. 11, p. 127).

Gif-1195. Hassi-Mouillah, Ouargla, Oasis, Algeria  
7650 ± 170  
5700 B.C.
Charcoal from level F I, including Neolithic of Capsian tradition with stamped ceramics (Marmier and Trecolle, 1968), Hassi-Mouillah (32° 08’ N Lat, 5° 07’ E Long), Oasis dist. Coll. and subm. 1968, by G. Trecolle, Ouargla. *Comment:* lower level dated 8600 B.P., MG-150 (R., 1969, v. 11, p. 126). All these dates are classified and commented upon in Camps *et al.* (1968).

Gif-1316. Enneri Dirennao, N.E. Bardaï, Tibesti  
1570 ± 100  
A.D. 380
Charcoal in rock shelter, Enneri Direennao, N.E. Bardaï (21° 21’ N Lat, 16° 56’ E Long), Tibesti. Coll. and subm. 1968 by K. Kaiser. *Comment:* Neolithic age was expected.

Zouar series, Tibesti, Tchad

Gif-1126. Zouar 9  
Modern  
30 cm depth.

Gif-1318. Zouar 12 f  
A.D. 1200  
120 to 125 cm depth.
*General Comment:* rock shelters may have been inhabited very recently; sand accumulation by wind is very rapid.
G. Delibrias, M. T. Guillier, and J. Labeyrie

Zouar series, N Chad


Gif-1181. Zouar, 1
Charcoal from pre-Islamic sepulchre with incineration.

Gif-1182. Zouar, 2
Charcoal from ashy level, 20 to 30 cm deep, in Neolithic site. Comment: assoc. obsidian industry is typical for Zouar region.

Gif-1183. Zouar, 3
Human bones, 1.40 m deep, in one of many sepulchres of Sahara. Comment: usually attributed to beginning of Christian era.

General Comment: diversity of ages for these vestiges from small area in Sahara. Fills in hiatus between Neolithic and protohistoric ages for that region.

Chad series, République Centre-Afrique


Gif-740. Mdaga IV, 3.20 m depth
(12° 12' 45" N Lat, 15° 3’ 30" E Long)

Gif-741. Mdaga IV, 4.20 m depth
(12° 12' 45" N Lat, 15° 3’ 30" E Long)

Gif-742. Mdaga IV, 4.90 m depth
(12° 12' 45" N Lat, 15° 3’ 30" E Long)

Gif-1171. Mdaga XII, A, 3.80 m depth
(12° 12' 45" N Lat, 15° 3’ 30" E Long)

Gif-1172. Mdaga XII, B, 3.80 m depth
(12° 12' 45" N Lat, 15° 3’ 30" E Long)

Gif-1367. Mdaga VIII, 0.90 m depth
(12° 12' 45" N Lat, 15° 3’ 30" E Long) Comment: coherent with results obtained by Dakar C¹⁴ Lab. for same site (Lebeuf, 1969).
Gif-1365. Gawi I, A 19, 1.20 to 1.50 m depth in sepulchre A.D. 1800
(12° 10' 30" N Lat, 15° 09' 15" E Long)

Gif-1364. Gawi I, A 18, 2.00 m depth A.D. 1090
(12° 10' 30" N Lat, 15° 09' 15" E Long)

Gif-1369. Amkoundjo II, 1.70 m depth 2100 ± 100
(12° 21' 15" N Lat, 15° 02' 20" E Long)

Gif-1371. Amkoundjo II, 2.60 m depth 2300 ± 100
(12° 21' 15" N Lat, 15° 02' 20" E Long)

Gif-1370. Amkoundjo I, 1.80 m depth 350 B.C.
(12° 21' 15" N Lat, 15° 02' 20" E Long)

General Comment: oldest date for a tchadien site, i.e., 425 B.C. (Gif-742, Mdaga) corresponds to oldest date, 450 B.C., for Sao site of Daimo, Nigeria. Despite some resemblance between industries there is no real basis for comparison of archaeologic discoveries in these regions (J.P.L.).

Gif-1282. Lemdena, Akjoujt, Mauritania Modern

“Grotte aux Chauves-Souris” series, Akjoujt, Mauritania
Grotte aux Chauves-Souris is not a cave but a series of excavations in N flank of Guelb Mogreïn (19° 45' N Lat, 14° 25' W Long), remains of important copper mine, with indications of ore treatment on the spot. Filling is made of alternated levels of rubble stones, broken copper ore, charcoal, slag, and ashes. Charcoal coll. and subm. 1968-1970 by N. Lambert.

Gif-1284. Grotte aux Chauves-Souris, 1, A I-2
0.60 m depth. 2350 ± 110

Gif-1285. Grotte aux Chauves-Souris, 1, A I-1
1.90 m depth. 2400 ± 110

Gif-1286. Grotte aux Chauves-Souris, 3 B S II-9
1.60 to 1.85 m depth 2360 ± 110

Gif-1287. Grotte aux Chauves-Souris, 3, A S I-9
1.60 to 1.85 m depth. 2430 ± 110
<table>
<thead>
<tr>
<th>Gif-1822. Grotte aux Chauves-Souris, 1, 111</th>
<th>2460 ± 100</th>
</tr>
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<tbody>
<tr>
<td>7 m depth.</td>
<td>510 B.C.</td>
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<tr>
<th>Gif-1823. Grotte aux Chauves-Souris, 1, 112</th>
<th>2700 ± 100</th>
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<tbody>
<tr>
<td>8 m depth.</td>
<td>750 B.C.</td>
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<tr>
<th>Gif-1824. Grotte aux Chauves-Souris, 1, 115</th>
<th>2500 ± 100</th>
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</thead>
<tbody>
<tr>
<td>8 m depth.</td>
<td>550 B.C.</td>
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<tr>
<th>Gif-1825. Grotte aux Chauves-Souris, 1, 116</th>
<th>2460 ± 100</th>
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<tbody>
<tr>
<td>10 m depth.</td>
<td>510 B.C.</td>
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General Comment: dates agree well, except for Gif-1823. Important quantity of wood used for ore treatment suggests vegetation now non-existent in this desert region.

**Niani series, Guinea**


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<tr>
<th>Gif-1291. Niani, 5</th>
<th>1400 ± 100</th>
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<tbody>
<tr>
<td>A.D. 550</td>
<td></td>
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<tr>
<th>Gif-1915. Niani, 8</th>
<th>1020 ± 90</th>
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<tr>
<td>A.D. 1650</td>
<td></td>
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<tr>
<th>Gif-1916. Niani, 10</th>
<th>1200 ± 100</th>
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<tr>
<td>A.D. 930</td>
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<tr>
<th>Gif-1292. Niani, 13</th>
<th>3000 ± 110</th>
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<tbody>
<tr>
<td>A.D. 750</td>
<td>1050 B.C.</td>
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</table>

General Comment: doubt remains whether site was capital of Medieval Empire of Mali; dates are either older or younger than those for this hypothesis (Filipowiak, 1968).

**Gif-1361. Saqqarah, Egypt**

Wood from sarcophagus in royal tomb of III dynasty, Saqqarah (29° 51' N Lat, 31° 14' E Long), Egypt. Coll. and subm. 1969 by J. P. Lauer, Paris. Comment: according to authors, IIIrd dynasty, at beginning of Ancient Empire, is estimated at either 28th century B.C. or 27th century B.C.; ca. 1500 yr difference is unexplained but, interestingly, wood is badly conserved.

**C. Latin America**

**Temple of Sechin series, Casma, Peru**

Samples from mummy from Temple of Sechin (9° 30' S Lat, 78° 18' W Long), Casma, Peru. Subm. 1968 by J. V. Macchiavello, Patronato Arqueol., Casma, Peru.
Gif-1081. Temple of Sechin 1  
Cloth.  
A.D. 1530  
$420 \pm 90$

Gif-1082. Temple of Sechin 2  
Charcoal.  
A.D. 1190  
$760 \pm 90$

Gif-1083. Temple of Sechin 3  
Straw.  
A.D. 1290  
$660 \pm 90$

General Comment: temple is younger than Chavin culture.

Los Naranjos series, Honduras

Los Naranjas (16° 00' N Lat, 88° 33' W Long) is an important archaeological site of N W Honduras, 100 km N E ceremonial Mayan center of Capan. Comparison of ceramics of this site with Mayan area has enabled a determination of 4 cultural phases: Jaral, Eden, Yojoa, Rio Blanco. Charcoal coll. by C. F. Baudez and subm. 1967-1969 by P. Becquelin, C.N.R.S., Mus. de l’Homme, Paris.

Gif-1472. Los Naranjos, 811  
A.D. 420

Hearth of habitation site, 1.70 m depth. Yojoa phase.  
$1500 \pm 100$

Gif-1474. Los Naranjos, 819  
A.D. 450

Habitation soil, 2.20 to 2.40 m depth. Yojoa phase.  
$1260 \pm 90$

Gif-1326. Los Naranjos, 480  
A.D. 690

Soil of ceremonial place. Yojoa phase.  
$1700 \pm 100$

Gif-1324. Los Naranjos, 152  
A.D. 100

Habitation soil, 2nd part of Eden phase.  
$1850 \pm 100$

Gif-1473. Los Naranjos, 812  
A.D. 250

Habitation soil, 2.20 to 2.30 m depth; 2nd part of Eden phase.  
$2700 \pm 110$

Gif-1325. Los Naranjos, 325  
A.D. 100

Natural burning level under 1st occupation level of site corresponding to Jaral phase.  
$3680 \pm 100$

General Comment: corresponds to estimated chronology.
Gif-1205. **Ranchillos, San Juan, Argentina, 78** A.D. 1290


Gif-1206. **Costa de Reyes, Tinogasta, Catamarca, Argentina**

Wood from habitation level, from Excavation 1, Costa de Reyes (27° 04’ S Lat, 68° 01’ W Long), Tinogasta, Prov. Catamarca, Argentina. Coll. 1964 and subm. 1968 by A. R. Gonzalez. *Comment:* 1st known culture with ceramics in Valla de Abancan, N W Argentina (Bennett et al., 1948).

Gif-1265. **San Vicente de Tagua-Tagua, 4, Chile**


**Ponsomby series, Chile**


Gif-1050. **Ponsomby P B Y 53, A inferior** 1750 B.C.

Shell from deposit, at foot of clay cliff. *Comment:* industry similar to historic wandering fishermen.

Gif-1049. **Ponsomby P B Y 53, B**

Charcoal under Hearth B, from archaeologic level on terrace +4 m, in loess deposit. *Comment:* industry similar to that of inland pampas; may come from upper terrace which is very eroded.

Gif-1052. **Ponsomby P B Y 53, D, 53** 3570 B.C.

Wood from tree trunks in sand.

Gif-1048. **Ponsomby P B Y 3, D, 100** 4420 B.C.

Charcoal under lacustrine silt, lying on sand with tree trunks. *Comment:* assoc. fauna essentially terrestrial. Lithic industry related to those of interior inland pampas. First traces of human occupation by hunters.
Gif-1051. Ponsomby P B Y 3, 52


Marassi series, S Chile

Charcoal from rock shelter constituted by big erratic block, at Marassi (53° 30' S Lat, 69° 30' W Long), S coast of Bahia Inutil, Strait of Magellan, Tierra del Fuego. Coll. and subm. 1965 by A. Emperaire.

Gif-1033. Marassi I, 4542


Gif-1034. Marassi I, 4541

Charcoal debris dispersed in base level.

General Comment: 1st site found under rock shelter in Tierra del Fuego, dates probably most ancient appearance of man.

Bahia Municioñ 3 series, S Chile

Charcoal from different levels of Municioñ 3 site, on continental coast of strait of Magellan (52° 30' S Lat, 70° 30' W Long), in consolidated sand hill 5 m thick. Thirteen archaeologic levels were distinguished, separated by sterile levels. Site is very important because it is the only one in this strongly eroded region. Coll. and subm. 1967 by A. Emperaire.

Gif-1035. Bahia Municioñ 3, 4242

Hearth from Level 2.

Gif-1036. Bahia Municioñ 3, 4241

Level 3.

Gif-1037. Bahia Municioñ 3, 4245

Level 4.

Gif-1038. Bahia Municioñ 3, 4255

Level 5.

Gif-1039. Bahia Municioñ 3, 4273

Level 6.

Gif-1042. Bahia Municioñ 3, 4299

Level 9.
Gif-1043. Bahia Munición 3, 4326  
Base Level II.

Gif-1040. Bahia Munición 3, 4268  
Level 7.

Gif-1041. Bahia Munición 3, 4269  
Level 8.

*General Comment:* Levels 7 and 8 probably correspond to recent settlement at foot of sand hill. Base level dates period of forest, i.e., thermal optimum.

*D. Other Countries*

Gif-1349. Venice, Italy  
A.D. 450
Wood from stake, 3 m long, from silt of Venice Lagoon, Torcello I. (45° 26' N Lat, 12° 20' E Long), Italy. Subm. 1969 by V. Romanovsky, Centre de Recherches et d'Etudes Océanog., Paris.

Gif-1272. Magapit Bridge, Cagayan Valley, Philippines  
A.D. 1400

Phnom Laang series, Kampot Prov., Cambodia  

Gif-873. Phnom Laang, Cave 57  
A.D. 1450
River shells from upper archaeologic level in Cave 57. *Comment:* assoc. with bony tools and human bones. Cave still presently occupied by men, a fact which may explain recent inclusion of dated shells into prehistoric level.

Gif-1167. Phnom Laang, Cave 62 bis  
2420 B.C.
Bone tool remains in brown silty ground of Cave 62 bis. *Comment:* bone collagen dated.
**Gif-1447. Chamear Andong, Cambodia**


**Gif-1448. Chup, Cambodia**

Straw debris in potsherds from Neolithic site, at Chup (12° 00' N Lat, 105° 37' E Long), Kompong Cham Prov., Cambodia. Coll. and subm. 1969 by J. P. Carbonnel. *Comment:* same as for Gif-1447.

**Gif-1057. Samrong Sen, Cambodia**

River shells (*Corbicula* and *Paludina*), 1.50 m deep in large kitchen midden (350 m long, 200 m wide, 5 m thick), on Samrong village (12° 21' N Lat, 104° 50' E Long), Kompong Chhnang Prov., Cambodia. Exploited till recently for lime production. Coll. and subm. 1967 by J. P. Carbonnel. *Comment:* abundant potsherd remains assoc.; according to Mansuy (1923) presence of bronze; hence, expected age was ca. 300 B.C. (Carbonnel and Delibrias, 1968). Beginning of occupation of this site is much older because kitchen midden base level is 3.5 m deeper.

**Gif-872. Phnom Kbal Romeas, 515, Cambodia**

Marine shells from kitchen midden in front of rock shelter, Phnom Kbal Romeas, 10 km E Kampot (10° 36' 08" N Lat, 104° 15' E Long), Cambodia. Coll. and subm. 1967 by J. P. Carbonnel. *Comment:* atypical potsherds assoc.

### II. GEOLOGIC SAMPLES

#### A. France

**Channel Islands series**

Shelly sand from hydraulic dunes on sandy banks, submerged off the Channel Is., in Normano-Breton Gulf. Dredged and subm. 1968 by P. Hommeril, Fac. Sci., Rouen. Depths are related to lowest tide sea level (Hommeril, 1971).

**Gif-1152. Shôle Bank, D 509**

-17 m, (49° 35' 30" N Lat, 2° 13' 50" W Long).

**Gif-1666. Shôle Bank, D 523**

-19 m, (49° 33' 20" N Lat, 2° 13' 10" W Long).

**Gif-1663. Ecrevière Dune, D 169**

-1 m, (49° 17' N Lat, 1° 54' W Long).
302  G. Delibrias, M. T. Guillier, and J. Labeyrie

Gif-1664.  W Serk Bank, D 296

—43 m, (49° 25’ 15” N Lat, 2° 24’ 45” W Long).

Gif-1665.  Great-Bank, D 299

—8 m, (49° 26’ N Lat, 2° 30’ 50” W Long).

General Comment: elucidates history of submarine banks and of sedimentation in Normano-Breton Gulf.

Gif-1293.  Boulogne-sur-Mer, 1, Pas-de-Calais

Wood from tree trunk in littoral peat bog, 2.40 m above m.s.l. on beach, Boulogne-sur-Mer (50° 37’ N Lat, 0° 45’ W Long), Pas-de-Calais. Coll. and subm. 1968 by H. Mariette, Samer, Pas-de-Calais. Comment: agrees well with Bronze age of site found in peat bog.

Gif-1294.  Camiers, 2, Pas-de-Calais

Charcoal in peaty sand, 3 m above m.s.l., on beach, 50 m from foot of cliff, Camiers (50° 53’ N Lat, 0° 45’ W Long), Pas-de-Calais. Coll. and subm. 1968 by H. Mariette. Comment: site of 2nd Iron age found at this horizon yielded abundant material for salt exploitation.

Gif-1295.  Camiers, 3, Pas-de-Calais

Wood in gray clay under peaty sand, 1.50 m above m.s.l.; on beach, 150 m from foot of cliff, Camiers (50° 33’ N Lat, 0° 45’ W Long), Pas-de-Calais. Coll. and subm. 1968 by H. Mariette. Comment: agrees with Iron age industry found in this horizon. As Gif-1293 and 1294, indicates variations of sea level.

Cléon series, Seine Maritime

From base of alluvial terrace of Seine, near Cléon, alt. +5 m, (49° 18’ N Lat, 1° 01’ E Long), Seine Maritime. Coll. and subm. 1968 by P. Hommeril.

Gif-1153.  Cléon, Mn 1

Calcareaous nodules in gray sand, 9.00 to 10.50 m depth.

Gif-1154.  Cléon, Mn 2

Calcareaous nodules in fine gray sand, 2.60 to 2.80 m depth.

Gif-1155.  Cléon, Mn 3

Gasteropod shells from same sand as Gif-1154.

Gif-1169.  Colleville-sur-Mer, Calvados

Coquebourg, series, Les Veys, Manche

Borings, alt. +3 m, on littoral, at Coquebourg, Les Veys (49° 20' N Lat, 1° 08' W Long), Manche. Coll. and subm. 1968 by C. Larsonnér. Depths are related to m.s.l.

Gif-1216. Coquebourg, F 9
Peaty mud, +1 m. 3050 ± 110 1100 B.C.

Gif-1217. Coquebourg, F 28
Fine shelly sand, −4 m. Comment: in absence of organic matter, total carbon, probably partly detrital, was used for measurements. 13,000 ± 300 11,050 B.C.

Gif-1218. Coquebourg, F 35
Mud with organic matter, −5.5 m. 7550 ± 170 5600 B.C.

Gif-1219. Coquebourg, F 52
Muddy sand, −11 m. Comment: very low organic content; compensated with inert carbon. 16,000 ± 16,000

General Comment: Gif-1218 corresponds to Flandrian Transgression in Les Veys Bay, whereas Gif-1219 represents ancient sediments in situ.

Gif-1184. Continental shelf, Atlantic, D 16
A.D. 220
G. Glycymeris shells, on edge of continental shelf, −137 m (45° 54' N Lat, 0° 03' 35'' W Long), Atlantic. Coll. by dredging and subm. 1968 by M. Glémarec, Fac. Sci., Brest. Comment: it is interesting that such young shells may be dredged, so deep and so far from coast. 1730 ± 100

Gif-1259. Baie d’Audierne, Finistère
15,000 ± 400 13,050 B.C.
Shell debris extracted from ca. 3 m shelly sandstone of littoral facies, 34 m depth on continental shelf, 5 km off Baie d’Audierne (47° 58' N Lat, 4° 32' W Long), Finistère. Shells mixed with terrigenous gravel and pebbles; cement is of coarse sand (Saint-Requier and Guilcher, 1969). Coll. by divers and subm. 1969 by A. Guilcher, Fac. Lettres., Brest. Comment: if shore formation, as supposed, age is old for sea level at 34 m.

Gif-1214. Pont-de-Paille, Loire Atlantique
5250 ± 150 3300 B.C.
Oyster from shelly horizon, 4.50 to 4.70 m depth, Pont-de-Paille (47° 18' N Lat, 2° 11' W Long), Loire Atlantique, overflow region of Grande Brière. Coll. and subm. 1968 by F. Ottmann, Fac. Sci., Nantes. Comment: corresponds to marine transgression which destroyed forest of La Grande Brière.
Gif-1271. Trizay, Charente Maritime 2060 ± 100 110 B.C.

Peat, from base of peaty horizon over blue-gray clay, 1.70 m above mean sea level, on left bank of Arnoult R., tributary of Charente R., at Trizay (45° 13' N Lat, 3° 15' W Long). Coll. and subm. 1968 by C. Gabet, Rochefort. Comment: absence of alluvium between clay and peat suggests that peat accumulation began just after Flandrian Transgression.

Gif-866. Ile d'Or, Amboise, Indre et Loire 5000 ± 140 3050 B.C.


2. Central France

Chaine-des-Puys series, Massif Central

Samples from beneath lava or tephra from recent episodes of volcanism of Chaine-des-Puys, in Massif Central (Brousse et al., 1969). Unless otherwise specified, dates were obtained on organic matter in soil, humic acids being eliminated. Coll. and subm. by R. Brousse, Fac. Sci., Orsay.

Gif-1408. Pranal Flow ≥35,000

Wood from beneath Pranal Flow, from Chalusset Volcano, bank of Sioule R. (45° 52' N Lat, 2° 50' E Long).

Gif-1410. Source des Roches, Chamalières 12,800 ± 250 10,850 B.C.

Organic matter from lacustrine sediments with diatoms covered with basaltic tephra probably from “Petit-Puy-de-Dôme” near Source des Roches, at Chamalières (45° 47' N Lat, 3° 03' E Long).

Gif-1409. Royat 11,000 ± 150 9050 B.C.

Paleosol on Royat Flow, covered with 5 cm basaltic cinder and ash, near “Grotte du Chien,” at Royat (45° 45' N Lat, 3° 03' E Long).

Gif-1581. Clermont-Ferrand, Boring 3 10,700 ± 270 8750 B.C.

Peaty mud from beneath 1.50 m black ash and 0.50 m diatom mud with gastropods, beneath Clermont-Ferrand (45° 47' N Lat, 3° 05' E Long), Puy-de-Dôme. Coll. by boring and subm. by H. Pelletier.

Gif-1502. Puy de Lantegy 1 10,000 ± 250 8050 B.C.

Upper paleosol, 10 cm thick, at top of basaltic black cinder at 1.30
m depth, on N flank Puy de Lantegy (45° 49' N Lat, 2° 56' E Long), successively covered with 60 cm domitic ash rubbish, and present soil.

**Gif-1501. Puy de Lantegy, 2**
Charcoal in domitic ash layer overlying ancient soil Gif-1502, on N flank of Puy de Lantegy.

**Gif-1492. Puy de Lantegy, 3**
Charcoal in acid tephra on N flank Puy de Lantegy, but not in the same place as Gif-1502 and 1501. Coll. by D. Baudry and subm. 1969 by H. Tazieff.

**Gif-1498. Cheire de Mercoeur, V**
Carbonized wood in domitic tephra on lava flow from Puy Mey, at Cheire de Mercoeur, S Puy-de-Dôme (45° 43' N Lat, 2° 58' E Long).

**Gif-1497. Cheire de Mercoeur, IV**
Paleosol overlying domitic ash dated 8400 B.P.: Gif-1498, at Cheire de Mercoeur, S Puy-de-Dôme.

**Gif-1499. Puy-de-Laschamp**
Carbonized wood, 1.40 m deep in domitic ash, on top of Puy de Laschamp (45° 44' N Lat, 2° 57' E Long).

**Gif-1553. Saint-Saturnin I, organic remains**
Organic remains of ancient soil, 30 cm below lava flow of Saint-Saturnin (45° 39' N Lat, 3° 05' E Long).

**Gif-1552. Saint-Saturnin 1, humic acid**
Humic acid from fossil soil, 30 cm below lava flow of Saint-Saturnin.

**Gif-1625. Saint-Saturnin 2, organic remains**
Organic remains from ancient soil, upper level 0 to 15 cm, beneath lava flow of Saint-Saturnin, same place as Gif-1553.

**Gif-1626. Saint-Saturnin 2, humic acid**
Humic acid from ancient soil, 0 to 15 cm beneath lava flow of Saint-Saturnin. *Comment:* organic remains have a similar age at top and base of paleosol but humic acids are contaminated by humic acids from upper recent soil, which percolate through fissures in basaltic flow.

**Gif-1500. Puy de Barme**
Carbonized wood in domitic ash, 70 cm deep overlying red cinder of Puy de Barme (45° 44' N Lat, 2° 55' E Long).
Gif-1164. Puy de Montchal, 1
Fine charcoal in soil beneath 80 cm basaltic cinder, probably from Puy de Montchal, N lake of Pavin (45° 29' N Lat, 2° 53' E Long) (Brousse et al., 1969).

Gif-1191. Puy de Montchal, 2
Similar to Gif-1164. Comment: confirms absence of pollution from upper charcoal horizon.

Gif-1375. Puy de la Toupe
Ancient soil, 60 cm deep, under basaltic ash from Puy de la Vache and Puy de Lassolas and covering Puy de la Toupe (45° 41' N Lat, 2° 56' E Long).

Gif-1278. N Puy du Montcineyre
Paleosol beneath 40 cm basaltic ash, 4 km N of Puy du Montcineyre (45° 27' N Lat, 2° 54' E Long) (Brousse and Horgues, 1969).

Gif-1496. N E Puy du Montcineyre
Ancient soil overlying volcanic ash, covered with phonolitic ejecta, 2 km S SE from Puy du Montcineyre.

Gif-1529. Clermont-Ferrand, Boring CRDP 7
Charcoal in black mud with gastropods, 5.50 m deep, beneath 3 m volcanic pumice Clermont-Ferrand (45° 47' N Lat, 3° 05' E Long), Puy-de-Dôme. Coll. by boring and subm. by H. Pelletier, Fac. Sci., Clermont-Ferrand. Comment: elsewhere, upper part of pumice relates to archeological horizon of La Tène age. Age is consistent.

General Comment: proves existence of very recent volcanism in N Massif Central; one phase is contemporaneous with volcanism in Eifel dated 10,680 to 11,150 B.P. (Firbas, 1953).

Lake Pavin series, Massif Central
Lacustrine sediments from crater Lake Pavin, in Chaine des Puys, Massif Central (45° 30' N Lat, 2° 53' E Long). Two methods of sampling were used according to consistency of sediments:

a) sample 70 cm deep coll. with conventional coring equipment
b) sample 30 cm deep from muddy, soft, surface coll. by diver with hand-operated glass tube.

Neither pumice nor ash was found in sediments. Coll. by R. Chesselet and subm. 1968 by R. Brousse.
<table>
<thead>
<tr>
<th>Sample</th>
<th>Location</th>
<th>Depth</th>
<th>Radiocarbon Date</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gif-1305.</td>
<td>Pavin P 2, surface</td>
<td>surface</td>
<td>1250 ± 100 A.D. 700</td>
<td>Probably surface sediment. Comment: water content of sediment was ca. 300% in glass tube.</td>
</tr>
<tr>
<td>Gif-1306.</td>
<td>Pavin P 12, 27 to 30 cm depth</td>
<td>4150 ± 120 2200 B.C.</td>
<td>At bottom of glass tube.</td>
<td></td>
</tr>
<tr>
<td>Gif-1261.</td>
<td>Pavin, 30 to 40 cm depth</td>
<td>6050 ± 145 4100 B.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gif-1262.</td>
<td>Pavin, 50 to 60 cm depth</td>
<td>4900 ± 130 2950 B.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gif-1263.</td>
<td>Pavin, 70 to 80 cm depth</td>
<td>5770 ± 140 3820 B.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gif-1135.</td>
<td>Pavin, 90 to 100 cm depth</td>
<td>4150 ± 170 2200 B.C.</td>
<td>General Comment: age inversions indicate important disturbance in lake sediment, confirmed by presence of fission products from modern fallout, along 30 first cm.</td>
<td></td>
</tr>
</tbody>
</table>

**Pont de la Clamouze series, Puy-de-Dôme**

Peat from peat bog of Pont de la Clamouze, at 1185 m alt. (45° 29' N Lat, 2° 51' E Long) in Puy-de-Dôme. Coll. and subm. 1968 by G. Delibrias and R. Brousse.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Location</th>
<th>Depth</th>
<th>Radiocarbon Date</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gif-1163.</td>
<td>Pont de la Clamouze, 0.60 m depth</td>
<td>3700 ± 130 1750 B.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gif-1162.</td>
<td>Pont de la Clamouze, 1.50 m depth</td>
<td>4100 ± 130 2150 B.C.</td>
<td>General Comment: pollen analysis indicates Fagus maximum ca. 4100 B.P.</td>
<td></td>
</tr>
</tbody>
</table>

3. **S France**

**Les Estables I series, Vallespir, Bassin de la Parcigoule, Pyrénées Orientales**


<table>
<thead>
<tr>
<th>Sample</th>
<th>Location</th>
<th>Depth</th>
<th>Radiocarbon Date</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gif-1197.</td>
<td>Estables I, Palyn 7, 0 to 5 cm</td>
<td>1350 ± 100 A.D. 600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gif-1198.</td>
<td>Estables II, Palyn 8, 11 to 16 cm</td>
<td>600 ± 90 A.D. 1350</td>
<td>Comment: evident inversion of 2 upper levels.</td>
<td></td>
</tr>
</tbody>
</table>
Gif-1199. Estables I, Palyn 9, 50 to 55 cm  5120 ± 130
Gif-1199. Estables I, Palyn 9, 50 to 55 cm  3170 b.C.

Atlantic-Sub-Boreal transition. Comment: marks extension of beech at Sub-Boreal period.

Gif-1200. Estables I, Palyn 10, 72 to 79 cm  8260 ± 220
Gif-1200. Estables I, Palyn 10, 72 to 79 cm  6310 b.C.

Boreal period characterized by abundant pollen of Pinus and scarcity of Abies.

General Comment: mountain vegetation of Tech river basin, as in Têt river basin (Gif-870: 8300 ± 190, R., 1971, v. 13, p. 236) is different from that of Aude valley where, at same period, Abies pollen is abundant (Gif-792: 9250 ± 210, R., 1971, v. 13, p. 236, Van Campo and Jalut, 1969). This indicates one of most important differences between types of paleosylvatic succession of Aude river basin, in N slope and Têt and Tech valleys which are of SW-NE orientation and where Mediterranean climate appears as determining agent of this development (Jalut, 1971).

Les Estables II series, Vallespir, Bassin de la Parcigoule, Pyrénées Orientales


Gif-1389. Les Estables II, 0 to 5 cm  8C14 = +20%
Gif-1389. Les Estables II, 0 to 5 cm  Modern

Gif-1390. Les Estables II, 45 to 55 cm  1100 ± 90
Gif-1390. Les Estables II, 45 to 55 cm  A.D. 850

Gif-1391. Les Estables II, 145 to 155 cm  1200 ± 90
Gif-1391. Les Estables II, 145 to 155 cm  A.D. 750

Comment: consistent with presence of cereal pollen in the 3 levels.

Gif-865. La Channe R., Hautes Alpes  8500 ± 200
Gif-865. La Channe R., Hautes Alpes  6550 b.C.


Gif-1080. Turrone I, Chauranne Valley, Hautes Alpes  7960 ± 185
Gif-1080. Turrone I, Chauranne Valley, Hautes Alpes  6010 b.C.

Tree trunk still rooted in Jurassic marl and buried by mud flow, 8 m deep, in terrace of Turrone torrent, tributary of Buëch R., St-Pierre-d’Argençon (44° 31’ 45” N Lat, 5° 41’ 54” E Long), Hautes Alpes. Coll. and subm. 1967 by M. Archambault. Comment: same as for Gif-865.
Gif-1138. Le Villard, La Beaume, Hautes Alpes

Fossilized trunks in sink hole bottom, in colluvium at top of black Jurassic marl, on folding above Villard hamlet, La Beaume (44° 33’ 32” N Lat, 5° 40’ 34” E Long), Hautes Alpes. Coll. and subm. 1968 by M. Archambault.

Gif-1139. Melve, Hautes Alpes

Tree trunk rooted in 40 cm silt level, covered by stratified silty and marly debris, 6 m deep in bank of La Sausse Ravine, affluent of the Durance, N.W. Melve (44° 21’ 40” N Lat, 5° 59’ 34” E Long), Hautes Alpes. Coll. and subm. 1968 by M. Archambault. Comment: same as for Gif-865.

Corsica series


Gif-1207. Urbino, Corsica

Cardium from Urbino pond, alt. 0.50 to 1 m (42° 03’ N Lat, 9° 27’ 40” E Long) on E coast Urbino Peninsula, Corsica.

Gif-1208. Vadina, Corsica

Cardium from Vadina, alt. ca. +20 m (42° 03’ N Lat, 9° 26’ 30” E Long), Corsica Lagoon facies.

Gif-1209. Figari Gulf, Corsica

Oysters from far end of Figari Gulf, alt. +3 m (41° 27’ N Lat, 9° 01’ E Long), Corsica. Level of lagoon facies.

Gif-1210. Arbitro Cove, Corsica

Shells from Arbitro Cove, alt. 1.5 to 2 m (41° 27’ N Lat, 9° 01’ E Long), Corsica. Assoc. with important sand dunes and organogenic calcareous sandstone. Marine facies.

Gif-1211. Saint-Florent Gulf, Corsica

Shells from Saint-Florent Gulf, alt. 1.5 to 2 m (42° 42’ N Lat, 9° 19’ 30” E Long), Corsica. Assoc. with important dune formations and organogenic calcareous sandstone. Marine facies.

Gif-1212. S Ajaccio Gulf, Corsica

Shells from cove between Capo Muro and Capo Nero, S Ajaccio Gulf, alt. 2.5 m (41° 43’ N Lat, 8° 42’ E Long), Corsica. Marine facies. General Comment (F.O.): for a region of recent strong tectonic instability, alt. of coastal sites is not very significant. Yet, results do not fully disagree with faunal study.
Gif-1235. Nioum Wadi, Karem, Chad, D.698 A.D. 1570

Shells (Melania tuberculata) from upper part of silt layer, 60 cm thick, in terrace 4 m above bottom of Nioum Wadi (14° 05' N Lat, 14° 28' E Long) Kanem, Chad. Coll. and subm. 1969 by B. Dupont, ORSTOM, Fort-Lamy, Chad. Comment: dates one of last transgressions of Chad lake, or, more probably, residual pond fed by ground water.

Gif-1236. Kalia Wadi, Kanem, Chad, D.844 Modern

Charcoal and ash from iron working kiln dug into diatomite, Kalia Wadi (14° 18' N Lat, 14° 54' E Long), Kanem, Chad. Coll. and subm. 1969 by B. Dupont. Comment: unrelated to age of diatomite, which is much older.

Gif-1237. Matafo Fo, Bol, Chad, D.928 Modern

Shells (Bellamya unicolor) from shelly deposit, alt. 285 to 287 m, on dune, Matafo (13° 31' N Lat, 14° 41' E Long), Bol, Chad. Coll and subm. 1969 by B. Dupont. Comment: correct for shoreline of Chad lake at this alt.

Bimba, Mayo Mali series, Cameroun

Superposed paleosols, in Quaternary sediments forming terraced glacis of Mayo Mali which crosses Alantika Mts., near Bimba, W Cameroun (8° 34' N Lat, 12° 31' E Long). Coll. and subm. 1968 by J. Hervieu, Centre ORSTOM, Yaoundé. In Cameroun, accumulation of this ancient alluvium is related to an erosion cycle with drier climate than at present; soils were developed during short humid cycles which stopped sedimentation (Hervieu, 1970).

Gif-1319. Mayo Mali, W J 12

5 m deep in Sec. c of terrace. Comment: ancient CO₂ added for measurement.

Gif-1320. Mayo Mali, W J 11

8 m deep, Sec. c.

Gif-1321. Mayo Mali, W J 10

10 m deep, Sec. c.

Gif-1322. Mayo Mali, W J 9

12 m deep, Sec. c.

Gif-1323. Mayo Mali, W J 14 bis

From another sec., near Sec. c, in a similar stratigraphic position to Gif-1319 and Gif-1320.
General Comment: in N Cameroun, this ancient alluvium is correlated with Dourouanian period, one of the known main arid periods. This dry period could be a result, between 8° and 12° N, of a semi-arid climatic influence from Sahara region. Dourouanian sediments appear to have been deposited during a short time and more recently than thought.

Madagascar series

Gif-1335. Ambalavao, A M T 1474 A.D. 1290
2.10 to 2.50 m beneath present alluvium Ambalavao region, (21° 01’ S Lat, 46° 07’ E Long), S part of Highlands.

660 ± 90

Gif-1336. Tananarive plain, A T B 1200 A.D. 1170
1.50 to 2.00 m beneath colluvium of a red ferralitic soil, in terrace bordering on Tananarive Plain (18° 50’ S Lat, 47° 28’ E Long). Corresponds to top of Terrace II.

780 ± 90

Gif-1479. Tananarive plain, H T B 1300 22,050 B.C.
8 to 8.50 m in Terrace II, in Tananarive Plain (18° 50’ S Lat, 47° 30’ E Long).

24,000 ± 1000

Gif-1480. Tananarive plain, H T B 1400 >35,000
14 m in Terrace II, in Tananarive Plain (18° 50’ S Lat, 47° 30’ E Long).

Gif-1337. Ampitano, T T B 600 Modern
1.50 m deep, in alluvial Terrace I of Ampitano, S Antsirabe, in Highlands (20° 02’ S Lat, 47° 07’ E Long).

Gif-1338. Manjakandriana, T T B 800 >35,000
0.80 m deep in Terrace II, in Manjakandriana region (18° 53’ S Lat, 47° 47’ E Long).

General Comment: precise chronology of formation of 2nd and recent terraces. Considering shielding role of vegetation in equatorial climate, formation of terraces could be correlated to climate phase with strong erosion: this does not imply important climatic variations, but rather changes, in duration and in intensity of dry and wet seasons.

C. Arctic Regions

Spitsbergen series
Shells from uplifted terraces, W coast of Spitsbergen. Coll. by A. Moign and subm. 1968 by A. Guichler.

Gif-1256. Gipsbukta, S P I, 11 1280 B.C.
3230 ± 120

Mytilus on a rocky strandflat, alt. +4 m, N shore of Sassenfjord (78° 25’ N Lat, 16° 30’ E Long), Spitsbergen.
Gif-1442. Gipsbukta, S P I, 10
Whale bone, on emerged marine terrace, +26 m, Gipsbukta (78° 25' N Lat, 16° 30' E Long), Spitsbergen.

Gif-1443. Gipsbukta, S P I, 14
Shells from emerged marine terrace, +55 m, Gipsbukta (78° 25' N Lat, 16° 30' E Long), Spitsbergen.

Gif-1257. Dandmannsoyra
Mytilus level, alt. 10 m, 2 km from littoral, in Aula Valley, Dandmannsoyra (78° 15' N Lat, 13° 15' E Long), N W of Isfjord, Spitsbergen.

Gif-1258. Erdmannsflya
Mya level, alt. +19 m, on a strandflat, Erdmannsflya (78° 15' N Lat, 14° 20' E Long), N of Isfjord, Spitsbergen.


Fort Chimo series, Quebec
Peat bog, 84 m thick, at Fort Chimo (56° N Lat, 67° W Long), Quebec. Peat samples coll. and subm. 1970 by J. Malaurie.

Gif-1831. Fort Chimo 1, 0 to 12 cm depth
A.D. 1570

Gif-1830. Fort Chimo 3, 24 to 36 cm depth
A.D. 90

Gif-1829. Fort Chimo 5, 48 to 60 cm depth
950 B.C.

Gif-1828. Fort Chimo 7, 72 to 84 cm depth
4020 ± 120
2070 B.C.

General Comment: Betula pollen dominant till ca. 30 cm depth; in lower part of profile, pollen of picea abundant and Alnus present. Diagram suggests change S to N forest line in Quebec. Pollen analysis by Y. Vasari, Univ. Oulu, Finland.

Greenland series

Ita profile, Fjord Foulke
Peat bog, 52 cm thick, at Ita (78° 16' N Lat, 72° 34' W Long), Fjord Foulke region.
**General Comment:** main components of pollen diagram are *Salix arctica-glauc*a type, *Cassiope* type, gramineae and *Cerastium-stellacia* type. Between 500 and 750 A.D. pollen density and rate of formation of peat are maximum.

**Idglolorssuit profile, Robertson Fjord**

Peat bog, 82 cm thick, at Idglolorssuit (77° 50’ N Lat, 70° 18’ W Long), Robertson Fjord region.

**General Comment:** gramineae pollen predominant throughout profile. Maximum pollen density and rate of peat formation from A.D. 1200 to 1400.
**Thulé profile**
Peat bog, 66 cm thick, at Thulé (76° 35’ N Lat, 68° 57’ W Long).

<table>
<thead>
<tr>
<th>Sample</th>
<th>Depth (cm)</th>
<th>Age (A.D.) ± Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gif-1650</td>
<td>3, 5 to 8</td>
<td>310 ± 90</td>
</tr>
<tr>
<td>Gif-1651</td>
<td>8, 19 to 21</td>
<td>400 ± 90</td>
</tr>
<tr>
<td>Gif-1691</td>
<td>10, 24 to 27</td>
<td>640 ± 90</td>
</tr>
<tr>
<td>Gif-1652</td>
<td>12, 30 to 32</td>
<td>750 ± 90</td>
</tr>
<tr>
<td>Gif-1692</td>
<td>13, 32 to 35</td>
<td>900 ± 90</td>
</tr>
<tr>
<td>Gif-1693</td>
<td>15, 39 to 41</td>
<td>1120 ± 90</td>
</tr>
<tr>
<td>Gif-1754</td>
<td>18, 47 to 50</td>
<td>1170 ± 90</td>
</tr>
<tr>
<td>Gif-1755</td>
<td>22, 57 to 60</td>
<td>1330 ± 90</td>
</tr>
<tr>
<td>Gif-1549</td>
<td>24, 63 to 66</td>
<td>1350 ± 90</td>
</tr>
</tbody>
</table>

*General Comment:* upper part of profile dominated by gramineae pollen till ca. A.D. 1300. Cyperaceae dominates in lower part. Rapid rate of peat formation ca. A.D. 800 and from A.D. 1550 to 1650.

**Ivsugissok profile**
Peat bog, 55 cm depth, at Ivsugissok (76° 30’ N Lat, 68° W Long).

<table>
<thead>
<tr>
<th>Sample</th>
<th>Depth (cm)</th>
<th>Age (A.D.) ± Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gif-1648</td>
<td>1, 5 to 10</td>
<td>50 ± 50</td>
</tr>
<tr>
<td>Gif-1649</td>
<td>4, 20 to 25</td>
<td>150 ± 50</td>
</tr>
<tr>
<td>Gif-1749</td>
<td>6, 30 to 35</td>
<td>550 ± 90</td>
</tr>
<tr>
<td>Gif-1750</td>
<td>8, 40 to 45</td>
<td>950 ± 90</td>
</tr>
<tr>
<td>Gif-1550</td>
<td>10, 50 to 55</td>
<td>1060 ± 90</td>
</tr>
</tbody>
</table>

*General Comment:* pollen diagram shows constant dominance of gramineae.
**Savigssivik profile**

Peat bog, 82 cm depth, at Savigssivik (76° 02' N Lat, 64° 50' W Long).

<table>
<thead>
<tr>
<th>Sample</th>
<th>Depth</th>
<th>Radiocarbon Measurement</th>
<th>Age (A.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gif-1806</td>
<td>1 to 7 cm depth</td>
<td>1320 ± 90</td>
<td>630</td>
</tr>
<tr>
<td>Gif-1646</td>
<td>8 to 15 cm depth</td>
<td>1400 ± 90</td>
<td>550</td>
</tr>
<tr>
<td>Gif-1751</td>
<td>15 to 22 cm depth</td>
<td>1370 ± 90</td>
<td>580</td>
</tr>
<tr>
<td>Gif-1647</td>
<td>29 to 36 cm depth</td>
<td>1450 ± 90</td>
<td>500</td>
</tr>
<tr>
<td>Gif-1752</td>
<td>36 to 43 cm depth</td>
<td>1460 ± 90</td>
<td>490</td>
</tr>
<tr>
<td>Gif-1753</td>
<td>60 to 68 cm depth</td>
<td>1480 ± 90</td>
<td>470</td>
</tr>
<tr>
<td>Gif-1551</td>
<td>75 to 82 cm depth</td>
<td>1300 ± 100</td>
<td>650</td>
</tr>
</tbody>
</table>

*General Comment:* Peat bog formation stopped ca. A.D. 600. Rapid formation due to proximity of peat bog nidifying birds.

**D. Other Countries**

**Gif-1192. Signal de Bougy, Vaud, Switzerland**

Sapropelic lignite in clayey moraine, under Signal de Bougy (46° 29' N Lat, 6° 22' E Long), Vaud, Switzerland. Coll. by A. Jeannet and subm. 1968 by J. P. Vernet, Geneva.

**Gif-1193. Mine de Grandson, Vaud, Switzerland**

Sapropelic lignite in mine de Grandson (46° 29' N Lat, 6° 38' E Long), Vaud, Switzerland. Coll. and subm. 1968 by J. P. Vernet.

**Eastern Coastal Area series, Belgium**

Shells and peat coll. by coring to study lithostratigraphy of Quaternary sediments in E coastal area, Belgium. Subm. by C. Sys, Geol. Inst., Gent.

**Gif-1339. Meetkerke, 124 MB, m 8**

Shells in sand, 2.50 m depth, Meetkerke (51° 13’ 07’’ N Lat, 3° 08’ 48’’ E Long).

**Gif-1341. Meetkerke, 124 MB 14, m 17**

Shells (Hydrobia) in clayey Meetkerke formation 5.50 to 7.00 m depth, (51° 13’ 07’’ N Lat, 3° 08’ 48’’ E Long).
Gif-1342. Stalhille, 124 DB 1, m 31
Shells in shelly sand, 8 m depth, Stalhille (51° 13' 08" N Lat, 3° 04' 29" E Long).

21,000 ± 600
19,050 B.C.

Gif-1344. Zuienkerke, 124 DB 6, m 60
Shells in coarse sand, 23.5 m depth, Quienkerke (51° 16' 03" N Lat, 3° 09' 39" E Long).

≥40,000

Gif-1343. Wenduine, 48 DB 3, m 37
Shell debris in shelly sand, 14 m depth, Wenduine (51° 18' 30" N Lat, 3° 05' 52" E Long).

22,600 ± 600
20,650 B.C.

Gif-1340. Litherke, 48 DB 2, m 16
Peat, 3.5 m depth, Litherke (51° 17' 35" N Lat, 3° 07' 14" E Long).

General Comment: conclusions only for Gif-1340: Atlantic, Gif-1344: probably Eemien; Gif-1343: fits very well between both in good agreement with stratigraphy (de Breuck et al., 1969).

Gif-1239. Gli Astroni, Phlegrean Fields, Campania, Italy
Carbonized branch, 10 m under fine-grained tephra, E flank of Gli Astroni, one of most important volcanoes of Phlegrean Fields, N Solfatarcatum (40° 45' N Lat, 14° 27' E Long), Campania, (Delibrias et al., 1969). Coll. and subm. 1968 by G. Kieffer, Inst. Geog., Clermont-Ferrand.

Comment: confirms Late Neolithic age assigned to Astroni owing to industry found beneath tephra.

3950 ± 120
3000 B.C.

Gif-1605. Valle del Bove, Etna 69-I
Carbonized tree trunk from forest buried under 2 to 3 m ash, outer flank of Valle del Bove, 2 km S E Mt. Zoccolaro, 1650 m alt. (37° 42' 30" N Lat, 15° 06' 30" E Long), S E Etna. Coll. and subm. 1970 by G. Kieffer.

Comment: dates last episode of formation of caldera, 4 km wide on E flank of Etna (Kieffer, 1970).

5000 ± 130
3050 B.C.

Gif-1766. Etna, 70-3
Carbonized tree trunk from 2 to 4 m below surface of pumice and covered in places with deposit dated 5000 B.C. (Gif-1605), 2 km S E Mt. Zoccolaro, S E Etna (37° 45' N Lat, 15° 00' E Long). Coll. and subm. 1970 by G. Kieffer.

7100 ± 140
5150 B.C.

Gif-1942. Vesuvius 71-1
Carbonized wood, 2 m below top of pumice on W flank of Vesuvius, 560 m alt. (40° 49' 30" N Lat, 14° 26' 30" E Long), Italy. Coll. and subm. 1971 by G. Kieffer.

Comment: had been supposed to date eruption of Vesuvius before catastrophe of A.D. 79; in fact, dates this very event.

1850 ± 100
A.D. 100
Asturias series, Spain

Shells from Asturias coast, Spain, 0.50 to 1 m above high sea level. Coll. and subm. 1968 by G. Mary, Fac. Sci., Le Mans. 1920 ± 110

Gif-1267. La Fontias, Asturias A.D. 30

Patella carulea and vulgata, 2 m above high sea level, Las Fontias (43° 33’ 30” N Lat, 3° 19’ W Long), Asturias.

Gif-1268. Salias, Asturias A.D. 1800

Cardium edula from shelly deposit at high sea level, Salias (43° 31’ 30” N Lat, 3° 19’ 40” W Long), in Ria de Ribadeo, Bahia, Asturias.

Gif-1269. Salias de Granda, Asturias Modern

Gryphea angulata, from shelly deposit, at high tide sea level limit, covered with silt, Salias de Granda (43° 30’ 40” N Lat, 3° 21’ W Long), El Vintero, in Ria de Ribadeo, Asturias.

Gif-1270. Las Aceas, Asturias Modern

Patella, from high tide sea level, Las Aceas, (43° 31’ 20” N Lat, 3° 22’ W Long), Ria de Ribadeo, Asturias.

General Comment: Gif-1268-1270 are shells presently deposited by sea in Ria de Ribadeo.

Gif-123. Tekich, Barrada Valley, Syria 1630 B.C.


El Laklouk series, Lebanon

Samples from base of solifluction layer, NNE El Laklouk, ca. 43 km N E Beirut (35° 52’ N Lat, 34° 06’ E Long), Lebanon. Coll. and subm. 1967 by K. Kaiser.

Gif-1124. El Laklouk, 3 930 B.C.

Wood, 3 m depth.

Gif-1125. El Laklouk, 4 2640 B.C.

Charcoal, 2 to 3 m depth.

General Comment: corresponds to moist period, as for Gif-123.

Cabo Frio series, Brazil

Calcareous nodule, 5 cm diam., off Cabo Frio, 89 m depth, Rio de Janeiro (22° 53’ S Lat, 41° 04’ W Long), Brazil. Formed with concentric layers of Bryozoa and calcareous algae. Dredged and subm. by L. M. Braga, Inst. Pesquisas da Marinha, Rio de Janeiro.
Gif-1327. Cabo Frio, internal part

A.D. 900

Gif-1471. Cabo Frio, superficial part

Modern

General Comment: recent formation. Cabo Frio is in warm current of Brazil.

Aoba Island series, New Hebrides


Gif-1134. Aoba Island, 2468

A.D. 820

Charcoal from hearth, 1 m deep, with ceramic debris and arrow point.

Gif-1133. Aoba Island, 2463

A.D. 400

Brown soil, 3.00 to 3.20 m deep.

General Comment: indicates 4 periods of volcanic activity in 400 yr. Time required for soil formation after volcanic eruption is very short in moist tropical climate.

Tongoa Island series, New Hebrides

Organic samples from system of basaltic flows and ejecta in volcanic formations, Tongoa I. (16° 54' S Lat, 168° 33' E Long), New Hebrides. Coll. 1965 and subm. 1967 by P. Quantin, ORSTOM, Noumea, New Caledonia.

Gif-1131. Meriu, Tongoa I., 1550

Carbonized tree trunk, 10 m under present soil in pumice and obsidian tephra.

Gif-1132. Burika, Tongoa I., 1603

A.D. 280

Brown soil, 3.00 to 3.20 m deep.

pumice and ash, overlying ancient flow.

General Comment: dates 2 of last emissions of pumice from the volcano.

Gif-1493. Cave of Chua Hang, Hon Chông, S Viet Nam

2200 B.C.

Oyster shells in marine terrace, +2 m, Cave of Chua-Hang (10° 08' N Lat, 104° 38' E Long), S Viet Nam (Fontaine, 1970). Coll. and subm. by J. P. Carbonnel. Comment: dates recent sea level as in many places in Pacific.
Gif-1713. Cai-Lây, Mekong Delta, Viet Nam

4500 ± 110

Marine and tidal-marsh shells from ancient shore, 100 km from present littoral, at Cai-Lây (10° 24' 15" N Lat, 106° 07' 30" E Long), in Mekong Delta. Coll. and subm. by H. Fontaine, Service Geol., Saigon. Comment: dates recent sea transgression, as Gif-1493 (Fontaine, 1971).

Gif-1413. Dong Nai, Viet Nam

> 35,000

Carbonized wood in clay lentil, 5 m below surface of sandy alluvial terrace, Dong Nai Valley (10° 55' N Lat, 106° 51' 30" E Long), S Viet Nam. Coll. by H. Fontaine and subm. by J. P. Carbonnel. Comment: confirms alluvium is not recent.

Correction

Gif-721, v. 13, p. 228 should read: Gif-727.
Gif-1060, v. 13, p. 236 should read: Gif-1069.

References

Guilaine, G., Gonzalez, Giot, Firbas, Laming-Emperaire, Hommeril, Gouletquer, Van Thommeret, Sanquer, Saint-Requier, Ottmann, Marmier, Mansuy, H., Kieffer, G.,

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