

HANNOVER RADIOCARBON MEASUREMENTS II

M. A. GEYH, H. SCHNEEKLOTH, and I. WENDT

Niedersächsisches Landesamt für Bodenforschung, Hannover

The results described herein are measurements performed in 1961. Sample preparation and conversion into acetylene have been described (Wendt, Schneekloth and Budde, 1962). In calculating errors we did not follow the procedure used in our Date List I, where only the standard deviations of counting rates were used. The errors attached to the dates listed below include systematic errors due to sample preparation and small changes in the counting characteristics of sample, background, and standard counting gas.

Some samples, especially gyttja and highly decomposed peat, did not contain sufficient cellulose residues. In these cases the humic-acid fractions were used, although they are not as reliable as dates based on the cellulose fraction. In the descriptions these sample are labeled "humic acid."

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SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

A. Germany

Hv-36. Colmar, Niedersachsen 4260 ± 190

Peat from depth of 510 to 515 cm in core boring in the village Colmar (53° 19' 30" N Lat, 8° 21' 13" E Long). Peat is overlain by marine silty clay. Coll. 1959 and subm. by Rudolph Fleischmann and Heinz Voigt, Niedersächsisches Landesamt für Bodenforschung, Hannover (in the following text abbr. NLFb). *Comment*: sample dates the beginning of flooding of the Colmar area by the North Sea. From thickness of peat layers and earlier C¹⁴ dates (Wendt, Schneekloth and Budde, 1962), the date had been thought to be ca. 2000 B.C.

Barnstorf bog series, Niedersachsen

Peat from a surface digging in Grosses Moor, near Barnstorf (52° 42' 06" N Lat, 8° 22' 37" E Long). Profile description: 0 to 190 cm, raised-bog peat; 190 to 225 cm, Carex peat with birch and pine wood; 225 to 250 cm, bog-forest peat; 250 to 280 cm, Carex peat with wood; 280 to 295 cm, sandy bog-forest peat. Coll. 1959 by H. U. Steckhan; subm. by Heinrich Schneekloth.

Hv-77. Barnstorf, 117 to 120 cm 1820 ± 75

Much decomposed Sphagnum peat, directly below the recurrence horizon (= contact plane between underlying dark, much decomposed and overlying light, slightly decomposed Sphagnum peat).

Hv-75. Barnstorf, 200 to 218 cm 2980 ± 100

Carex peat.

Hv-76. Barnstorf, 244 to 248 cm 2960 ± 80

Bog forest peat. *Comment:* Hv-75 dates the Carpinus immigration and the last Corylus maximum in the region. Hv-76 dates the beginning of bog growth and immigration of Fagus. Hv-77 dates the recurrence horizon of Grosses Moor, and the beginning of grain cultivation. There are no discrepancies between our dates and the pollen investigations of Schneider and Steckhan (1962).

Hv-112. Lathen, Niedersachsen 2200 ± 80

Humic acid fraction from humic soil with 3.8% organic matter from 65 to 70 cm depth (52° 50' 30" N Lat, 7° 12' 8" E Long). The profile shows a fossil podsolc soil at 64 to 70 cm depth below a recent podsolc soil at the surface. Coll. 1958 and subm. by Rudolf Lüders, NLFb. *Comment:* pollen content shows the sample probably belongs to the end of the Atlantic Period (Zone VII of Firbas, 4000-2500 B.C.). The results are discussed by Lüders (1961).

Hv-129. Isernhagen, Niedersachsen 1900 ± 70

Roots from 75 to 130 cm depth in a digging in the village Isernhagen near Hannover (52° 28' 30" Lat, 9° 45' 52" E Long). Coll. 1960 and subm. by H. D. Lang, NLFb. *Comment:* a silty clayey layer above the roots was deformed, probably by freezing during early Dryas time. The roots were supposed to have belonged to vegetation that grew in the Alleröd layer. Date, much to young for Alleröd, is maximum for eolian sand, which overlies the deformed section.

Weisses Moor series, Niedersachsen

Peat from borings and peat diggings from the raised bog Weisses Moor near the village Kirchwalsede. Coll. 1960 and subm. by Heinrich Schneekloth. Samples date a recurrence horizon and characteristic features of pollen diagram.

Hv-135. Weisses Moor 13, 85 to 90 cm 990 ± 90

(53° 3' 20" N Lat, 9° 23' 35" E Long). Humic acid from slightly decomposed Sphagnum peat, 200 cm thick, overlying Scheuchzeria-cuspidata peat and Carex-bog-forest peat.

Hv-137. Weisses Moor 13, 215 to 225 cm 1560 ± 90

Humic acid from Scheuchzeria-cuspidata peat from the same boring as Hv-135. *Comment:* Hv-137 dates beginning of growth of light peat (lower part of Zone XI of Overbeck; see Schneekloth, 1962). Hv-135 dates beginning of intensive human settlement. According to Schneekloth (1962) settlement became important in the early Middle Ages.

Hv-139. Weisses Moor 37, 70 to 80 cm 2190 ± 150

(53° 3' 35" N Lat, 9° 21' 50" E Long). Peat from 70 to 80 cm depth. In the profile 80 cm of slightly decomposed Sphagnum peat covers 70 cm of strongly decomposed Sphagnum peat.

Hv-139 a. Weisses Moor 37, humic acid 1800 ± 110

Humic-acid fraction from Hv-139.

Hv-140. Weisses Moor 6, 100 to 110 cm 1870 ± 100

(53° 3' 25" N Lat, 9° 24' 38" E Long). Humic acid from peat from 100 to 110 cm depth. In the profile 110 cm of slightly decomposed Sphagnum peat covers 70 cm of strongly decomposed Sphagnum peat. *Comment*: humic-acid dates seem to establish that the recurrence horizon is of uniform age throughout the bog. The pollen study (Schneekloth, 1962) suggests that Hv-139 could be somewhat older than Hv-140. The different values for Hv-139 show that the discrepancy may result from contamination by younger humic acid.

Hv-128. Liebenau, Niedersachsen 1875 ± 115

Wood of a man-made bank protection from 200 cm depth in a surface digging near the town Liebenau (52° 36' 57" N Lat, 9° 8' 26" E Long), collected in river gravel beneath floodplain alluvium. Coll. 1960 and subm. by Konrad Richter, NLFB. *Comment*: date points to beginning of sedimentation of floodplain alluvium and sheds light on the history of human settlement. See also sample Hv-15, 1550 ± 80, in Wendt, Schneekloth and Budde, 1962.

Hv-134. Badbergen, Niedersachsen 12,600 ± 240

Silty sand with remnants of vegetation from 420 cm depth from Sandmann sand pit near Badbergen (52° 38' 00" N Lat, 7° 58' 28" E Long). Coll. 1960 and subm. by Konrad Richter. *Comment*: pollen study by H. Schneekloth shows horizon at 310 cm belongs to the Younger Dryas (ca. 8500 B.C.).

Hv-98-99-90. Kiel, Schleswig-Holstein 11,270 ± 130

Birch and willow wood from 22.35 to 26.30 m depth in core boring in Kiel Harbor, near Kiel Castle (54° 19' 40" N Lat, 10° 8' 51" E Long). Wood from three samples was combined before pretreatment. The profile shows marine sediments down to 20 m depth, above interbedded gravel, sand, and gyttja. Coll. 1959 and subm. by Alfred Dücker, Geol. Landesamt Schleswig-Holstein. *Comment*: samples date one or more interstadials of the last (Weichsel) glaciation.

Viel-Moor series, Schleswig-Holstein

Peat from surface diggings in the raised bog Viel-Moor, near Barnstedt (53° 47' 00" N Lat, 9° 51' 36" E Long). The profile shows two sequences of strongly decomposed below slightly decomposed Sphagnum-peat, i.e. there are two recurrence horizons. Coll. 1960 by F. R. Averdieck; subm. by Alfred Dücker.

Hv-93. Viel-Moor, 84 to 90 cm 1410 ± 110

Peat from 6 cm above the upper recurrence horizon.

Hv-94. Viel-Moor, 91 to 98 cm 1550 ± 110

Peat from 7 cm below the upper recurrence horizon. *Comment*: samples are correlated by pollen with the upper part of Zone IX of Firbas. The stratigraphy of Viel-Moor is given by Averdieck (1957).

Hv-95. Viel-Moor, 111 to 117 cm 1775 ± 115

Peat from 6 cm above the lower recurrence horizon.

Hv-96. Viel-Moor, 123 to 129 cm 1800 ± 115

Peat from 6 cm below the lower recurrence horizon. *Comment*: samples are correlated by pollen with the middle part of Zone IX of Firbas. Dates do not conflict with the concept of Overbeck et al. (1957) as to the ages of recurrence horizons in North Germany or with the special investigations of the age of the recurrence horizon of Wittmoor near Hamburg by Averdieck and Münnich (1957).

Miele series, Schleswig-Holstein

Peat and gyttja from borings in the Miele River area. Coll. 1959 by F. R. Averdieck; subm. by Alfred Dücker. Samples date various phases of flooding of the Miele area by the North Sea.

Hv-71. Fiel 2370 ± 90

(54° 8' 25" N Lat, 9° 8' 13" E Long). Gytja from 86 to 95 cm below surface, underlain and overlain by marine clay beneath surface peat.

Hv-65. Bargaenstedt, 40 to 47 cm 1850 ± 120

(54° 6' 46" N Lat, 9° 7' 22" E Long). Humic acid from Phragmites peat from 40 to 47 cm depth, underlain and overlain by marine clay.

Hv-66. Bargaenstedt, 56 to 62 cm 2280 ± 100

Clayey gyttja from 56 to 62 cm below surface in the same boring as Hv-65.

Hv-67. Volkerswurth-Süd, 47 to 54 cm 2250 ± 120

(54° 8' 30" N Lat, 9° 6' 29" Long). Gytja from 47 to 54 cm below surface, underlain and overlain by marine clay.

Hv-67 a. Volkerswurth-Süd, 47 to 54, humic acid 1680 ± 90

Humic-acid fraction of Hv-67.

Hv-68. Volkerswurth-Süd, 40 to 45 cm 1820 ± 100

Humic acid from Phragmites peat from 40 to 45 cm depth in the same boring as Hv-67.

Hv-69. Volkerswurth-Süd, 58 to 63 cm 1870 ± 130

Humic acid from gyttja from 58 to 63 cm depth in the same boring as Hv-67. *Comment*: samples of the Miele series date a penultimate marine submergence (u_2 of Dechend, 1956). Hv-66 and Hv-67 agree with expectation. Humic acid samples seem to be too young.

Hv-159. Langenau, Baden-Württemberg 2300 ± 105

Wood from a gravel pit, 4 m depth (48° 26' 14" N Lat, 10° 6' 11" E Long). The profile shows a stump horizon at 4 cm below surface, overlain by gravel with humic inclusions and underlain by gravel. Coll. 1960 and subm. by Paul Groschopf, Geol. Landesamt Baden-Württemberg. *Comment*: at 450 cm beneath the floodplain of the Iller River, in the Ulm district, an extensive horizon with stumps and peat occurs. Pollen study suggested a late Neolithic or

Bronze Age correlation. The result has been confirmed by other investigations (Graul and Groschopf, 1952).

Hv-160. Plüderhausen, Baden-Württemberg 3140 ± 100

Wood from a gravel pit, 260 cm depth (48° 47' 16" N Lat, 9° 36' 29" E Long). Coll. 1960 and subm. by Eugen Eisenhut, Geol. Landesamt Baden-Württemberg. *Comment*: dates floodplain sediments of Rems River. Although younger than expected, the date compares with Hv-161, below.

Hv-162. Weissach, Baden-Württemberg 1630 ± 105

Wood from H. Gauger excavation (48° 48' 16" N Lat, 8° 51' 2" E Long), 230 cm depth beneath clayey silt. Coll. 1960 and subm. by Eugen Eisenhut. *Comment*: dates the basement of a valley.

Hv-165. Friedrichshafen, Baden-Württemberg 2980 ± 100

Wood below diocesan building foundation, Friedrichshafen (47° 39' 23" N Lat, 9° 29' 51" E Long), 4 m depth, from sand and gravel below water table. Coll. 1961 and subm. by Paul Groschopf. *Comment*: dates sand and gravel sedimentation related to postglacial lake-level fluctuation of the Bodensee.

Hv-161. Regensburg (city), Bayern 3270 ± 100

Wood from oak stump at 5 m depth, beneath sand and gravel of Donau River floodplain (49° 0' N Lat, 12° 7' E Long). Coll. 1959 and subm. by Paul Groschopf. *Comment*: as stratigraphic position is similar to Hv-159, an age of ca. 2000 yr was predicted. Evidently postglacial river sedimentation has not been uniform.

B. Poland

Hv-122. Kruklin Lake, Gizyko 11,390 ± 210

Wood from a fossiliferous soil horizon, 35 to 40 cm depth (45° 3' 30" N Lat, 21° 54' 0" E Long). The sandy and gravelly sample layer, which for 100 yr has lain above the water level of the lake, is covered successively by 30 cm of lake clay and 32 cm of lacustrine chalk with shells. Coll. 1960 by Stasiak Jadwiga; subm. by Edmund Rutkowsky, Inst. Geol., Warszawa. *Comment*: pollen study of the sample horizon by Boriosko Duzakowa indicated Pleistocene or early Holocene Age, in agreement with the date.

Hv-123. Laska near Brusy 9680 ± 190

Gyttja, noncalcareous, from a core boring (53° 57' 22" N Lat, 17° 32' 18" E Long). Coll. 1960 by Wadislaw Sonina; subm. by Edmund Rutkowsky. *Comment*: pollen study by Boriosko Duzakowa predicted an age of not more than 10,000 yr.

Hamernia series, Poland

Peat from a core boring from Hamernia near Jaroslaw (55° 5' N Lat, 22° 58' E Long), overlain by sand and gravel and underlain by gyttja and clay. Coll. 1960 by Kazimiera Mamakowa; subm. by Edmund Rutkowsky.

Hv-171. Hamernia I > 30,000

Sandy peat from 180 to 187 cm depth.

Hv-172. Hamernia II > 30,000

Silty peat from 222 to 230 cm depth. *Comment:* the peat of Hamernia was classified by Szafer (1931) as being older Pleistocene, and by Rühle (1952) as being postglacial.

II. ARCHAEOLOGIC SAMPLES

Emsland Plaggenboden series, Niedersachsen

Humic sand from Plaggenboden layers (man-made layers) built by piling up, over centuries, the upper humic layer of the mineral soil dug from below a heath (Callunetum), to act as fertilizer. Coll. 1960 and subm. by Hans Fastabend, NLFb.

Hv-141. Plaggenboden I 2475 ± 115

Humic sand filling a ditch beneath a Plaggenboden near Engden (52° 23' 41" N Lat, 7° 9' 19" E Long), 55 to 60 cm depth.

Hv-143. Plaggenboden II 1300 ± 110

Humic sand from base of a Plaggenboden near Drievorden (52° 22' 37" N Lat, 7° 12' 32" E Long), 70 to 80 cm depth.

Hv-145. Plaggenboden III 1250 ± 115

Humic sand from base of a Plaggenboden near Leschede (52° 24' 18" N Lat, 7° 10' 27" E Long), 70 to 75 cm depth. *Comment:* Raupach (1955) and Fastabend and Raupach (1961) believed the use of Plaggen to have begun later than A.D. 700. This is confirmed by our dates Hv-143 and Hv-145. Hv-141, from below the Plaggenboden, was expected to be considerably older. See also Niemeier (1959).

Hv-146. Göttingen, chair < 90

Wood from an ancient chair in the Museum of Göttingen, Niedersachsen. Subm. 1960 by E. F. Hellige, Mus. of Göttingen. *Comment:* dates a chair believed to be either a 13th Century object from the monastery of Pöhlde, or a 19th Century imitation.

REFERENCES

- Averdieck, F. R., 1957, Zur Geschichte der Moore und Wälder Holsteins: Nova acta Leopoldina, Neue Folge, no. 130, v. 19, p. 1-52.
- Averdieck, F. R., and Münnich, K. O., 1957, Palynologische Betrachtungen zur Siedlungsgeschichte im Norden Hamburgs unter Zuhilfenahme neuerer Datierungsmethoden: Hammaburg, v. 5, no. 11, p. 9-22, 4 pls.
- Dechend, W., 1956, Der Ablauf der holozänen Nordsee-Transgression im oldenburgisch-ostfriesischen Raum insbesondere im Gebiet von Jever i.O.: Geol. Jahrb., v. 72, p. 295.
- Fastabend, H., and von Raupach, F., 1961, Zur Kenntnis der Plaggenböden in Nordwestdeutschland: Geol. Jahrb., v. 78, p. 139.
- Graul, Hans and Groschopf, Paul, 1952, Geologische und morphologische Betrachtungen zum Illerschwemmkegel bei Ulm: Naturforschende Gesellschaft, Bericht, v. 5, p. 3-27 [Augsburg].
- Groschopf, P., 1961, Beiträge zur Holozänstratigraphie Südwestdeutschlands nach C¹⁴-Bestimmungen: Geol. Jahrb. Landesamt Baden-W., v. 4, p. 137.

- Lüders, R., 1961, Altersbestimmung an einem doppelten Podsolprofil aus dem Emsland: *Zeitschrift für Pflanzenernährung, Düngung und Bodenkunde*, v. 94, p. 47.
- Niemeier, G., 1959, Datierungen der Kulturlandwirtschaftsgeschichte Norwestdeutschlands: *Braunschweigische Wissenschaftliche Gesellschaft, Abhandlungen*, v. 11, p. 87.
- Overbeck, F., Münnich, K. O., Aletsee, L. and Averdieck, F. R., 1957, Das Alter des "Grenzhorizonts" norddeutscher Hochmoore nach Radiocarbon datierungen: *Flora*, v. 145, p. 37-71.
- Raupach, von F., 1955, Die Plaggenböden des südwestlichen Ammerlandes: *Oldenb. Jahrb.*, v. 55, no. 2, p. 125.
- Rühle, E., 1952, Geological section of Lubaczowka valley near Hamernia: *Warsaw Panstwowy Inst. Geol. Bull.*, v. 66.
- Schneekloth, H., 1962, Beiträge zur Kenntnis niedersächsischer Torflagerstätten, II. Das Weisse Moor bei Kirchwalsede (Krs. Rotenburg Hannover): *Geol. Jahrb. Beiheft* no. 55.
- Schneider, S., and Steckhan, H. U., 1962, Beiträge zur Kenntnis niedersächsischer Torflagerstätten. III. Das Grosse Moor bei Barnstorf [Krs. Grafschaft Diepholz]: *Geol. Jahrb., Beiheft* no. 55.
- Szafer, W., 1931, The oldest Interglacial in Poland: *Internat. Academie Polonaise des Sciences et des Lettres, Bull.*, ser. B. [Cracovic].
- Wentd, I., Schneekloth, H., and Budde, E., 1962, Hannover radiocarbon measurements I: *Radiocarbon*, v. 4, p. 100-108.