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UNIVERSITY OF BONN NATURAL RADIOCARBON MEASUREMENTS II

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This list includes most of the dates produced from September 1967 to April 1968. The laboratory continues to use the benzene method of the previous date list (Radiocarbon, 1968, v. 10, p. 8-28); however, the counter and chemical treatment equipment were transferred to a field laboratory in order to avoid any possibility of contamination. Two new benzene synthesis lines of our own construction were added to the commercial unit. Their operation is excellent and over-all costs were nominal.

Radiocarbon dates in this list are based on 95% of the activity of NBS oxalic acid as the modern standard and were calculated using 5568 yrs as the half-life of C-14. Errors quoted with the dates are standard deviations originating from the statistical nature of the radioactive disintegration process.

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SAMPLE DESCRIPTIONS

I. GROUND WATER SAMPLES

Radiocarbon measurements were repeated, after a period of 1 yr, on same wells of Cologne 07 sand aquifer reported in previous date list (Radiocarbon, 1968, v. 10, p. 8-28). This is continuing study (Tamers, Balke, and Scharpenseel, 1968) of water movements utilizing nuclear weapon produced C-14 excesses whose variation over the past decade is known (cf. sec. IV). Carbonate species extraction methods are those of Tamers (1967). Coll. 1968 and subm. by members of the Radiocarbon Dating Lab.

	C^{14} (% of modern)
BONN-215. Königsdorf (50° 56′ N Lat, 6° 46′ E Long)	**4.26 ± 0.09**
BONN-216. Herbertskarl (50° 54′ N Lat, 6° 48′ E Long)	**2.23 ± 0.18**
BONN-217. Ingendorf (51° 1′ N Lat, 6° 44′ E Long)	**86.0 ± 0.5**
BONN-218. Widdersdorf (50° 58′ N Lat, 6° 50′ E Long)	**46.5 ± 0.7**

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BONN-219. Marsdorf **13.2 ± 0.5**
(50° 55′ N Lat, 6° 52′ E Long)

BONN-220. Sinthern **74.6 ± 0.5**
(50° 58′ N Lat, 6° 47′ E Long)

BONN-221. Dansweiler **25.9 ± 0.3**
(50° 57′ N Lat, 6° 46′ E Long)

BONN-222. Buschbell **60.9 ± 0.5**
(50° 56′ N Lat, 6° 48′ E Long)

BONN-223. Bottenbroich **4.90 ± 0.07**
(50° 55′ N Lat, 6° 44′ E Long)

BONN-224. Glessen **85.5 ± 0.7**
(50° 58′ N Lat, 6° 45′ E Long)

II. SOIL SAMPLES

Soil samples were freed from roots and organic cell debris following method described in (Radiocarbon, 1968, v. 10, p. 8-28). Also, as described samples were always taken subhorizonwise in layers of 5 to 15-cm width, to obtain age vs. depth curve for each soil profile, whose shape sometimes allows conclusions regarding milieu conditions at time of origin. Beginning with BONN-326 each original soil sample, before treatment for carbon enrichment, root removal, and carbonate destruction, was analyzed for its total carbon content by method of Rauterberg and Kremkus (1951).

A. Rendolls

Two rendzina soils formed at alt. 1800 to 2000 m on limestone in Alps are dated to reveal age of mountanous mollisols in comparison to those of plain. Also results elucidate mean residence time of humus in various depths at high precipitation level.

BONN-318. Tangelrendzina Kramer, OF **530 ± 60**
10 to 15 cm **A.D. 1420**

BONN-319. Tangelrendzina Kramer, OH_{11} **820 ± 60**
20 to 35 cm **A.D. 1130**

BONN-320. Tangelrendzina Kramer, OH_{12} **2050 ± 50**
45 to 55 cm **100 B.C.**

BONN-321. Tangelrendzina Kramer, OH_{21} **3740 ± 90**
60 to 70 cm **1790 B.C.**

BONN-322. Tangelrendzina Kramer, OH_{22} **4180 ± 70**
75 to 80 cm **2230 B.C.**

Samples belong to different genetic horizons of "Tangelrendzina" (Kubiena, 1953) on limestone of Mt. Kramer, German Alps (47° 31′ N Lat, 11° 4′ E Long). Coll. 1967 and subm. by Th. Dietz, Bayrisches

Geolog. Landesamt, Münich. *Comment*: age of deepest humus layers higher than expected. Under consideration of leaching and vertical rejuvenation due to high precipitation, corrected age is estimated to be 6 to 8000 yr (Atlantic and Boreal), like that of Mollisols of plain (Bonn I; BONN-32, BONN-39, BONN-105, BONN-113, BONN-119, BONN-127, BONN-3, BONN-4, BONN-22, BONN-96).

BONN-324. Moderrendzina Krottenkopf, OH 0 to 15 cm — **600 ± 50 A.D. 1350**

Sample of more shallow "Moderrendzina" on limestone of Mt. Krottenkopf, German Alps (47° 33′ N Lat, 11° 11′ E Long). Coll. 1967 and subm. by Th. Dietz. *Comment*: shallower and younger than BONN 318-322 mainly due to stronger erosion.

B. Fossil A-horizon of Udoll as B_t horizon of Udalf

Clay-accumulation B_t horizons in Udalfs are sometimes not only superior in clay content, but also in concentration of organic matter. This has been explained by migration of clay in form of organo-mineralic complexes. Observations of structural changes within B_t horizon in such Udalfs, however, have in some cases raised suspicion that upper part of B_t horizon (platy structure) might be colluvium, while lower part (polyhedral structure) might be in reality a relict of an ancient zonal Chernozem soil (hapl-, vermudoll).

Brown steppe soil/parabrownearth profile, Eltville, Pfalz, Germany.

BONN-326. Steppenboden, Parabrownearth, Eltville, 0.8% C, A_p 25 to 33 cm — **1010 ± 70 A.D. 940**

BONN-327. Steppenboden, Parabrownearth, Eltville, 0.5% C, B_v 33 to 45 cm — **1530 ± 60 A.D. 420**

BONN-328. Steppenboden, Parabrownearth, Eltville, 0.3% C, B_vC 45 to 60 cm — **1610 ± 60 A.D. 340**

BONN-329. Steppenboden, Parabrownearth, Eltville, 0.9% C, AB_t 70 to 85 cm — **3870 ± 70 1920 B.C.**

BONN-330. Steppenboden, Parabrownearth, Eltville, 0.5% C, AB_{t2} 85 to 95 cm — **2890 ± 80 940 B.C.**

BONN-331. Steppenboden, Parabrownearth, Eltville, 0.4% C, C,C_c 95 to 110 cm — **4940 ± 80 2990 B.C.**

Samples of steppe soil/parabrownearth profile Eltville/Pfalz (50° 03′ N Lat, 8° 10.5′ E Long). Coll. 1967 and subm. by W. Kerpen and F. Pietig. Inst. f. Bodenkunde, Univ. Bonn. *Comment*: at 70 cm break, sharp rise in C-content and C^{14}-age; from 70 cm downward to parent material of calcareous Würm loess, fossil A-horizon.

Ditch, bordering region of brown coal quarry, Inden, Germany (6 km long).

BONN-334.	**Parabrownearth, Inden, 0.3% C, A_fB_{t1} 45 to 70 cm**	**3690 ± 80 1740 B.C.**
BONN-335.	**Parabrownearth, Inden, 0.3% C, B_{t1} 90 to 125 cm**	**1360 ± 60 A.D. 590**
BONN-336.	**Parabrownearth, Inden, 0.6% C, A_fB_{t1} 60 to 85 cm**	**3270 ± 70 1320 B.C.**
BONN-337.	**Horizons of same profile, parabrownearth, Inden, 1.4% C, A_p 10 to 25 cm**	**2130 ± 70 180 B.C.**
BONN-338.	**Horizons of same profile, parabrownearth, Inden, 0.3% C, B_{t1} 45 to 60 cm**	**2330 ± 50 380 B.C.**
BONN-339.	**Horizons of same profile, parabrownearth, Inden, 0.8% C, A_fB_{t1} 62 to 85 cm**	**3480 ± 70 1530 B.C.**
BONN-340.	**Horizons of another nearby profile, parabrownearth, Inden, 1.4% C, A_p 5 to 20 cm**	**2250 ± 70 300 B.C.**
BONN-341.	**Horizons of another nearby profile, parabrownearth, Inden, 0.4% C, B_{t1} 40 to 58 cm**	**1670 ± 70 A.D. 280**
BONN-342.	**Horizons of another nearby profile, parabrownearth, Inden, 0.4% C, A_fB_{t1} 68 to 85 cm**	**4170 ± 70 2220 B.C.**

Samples BONN-334-342 of parabrownearth (Hapludalf) from long bordering ditch of brown-coal area near Inden, W. Germany (50° 51′ N Lat, 6° 22′ E Long). Coll. 1967 and subm. by Dr. Schalich, Geol. Landesamt, Krefeld and H. W. Scharpenseel. *Comment*: due to structural change within B_t horizon from platy to polyhedral, suspicion arose about a substrate change, whereby lower part of B_t horizon would be id. as relict A horizon of ancient zonal Chernozem. Gap in age between platy B_{t1} and underlying polyhedral A_fB_{t1} horizons confirms this. Clay-accumulation horizon B_t of parabrownearth (hapludalf) is in its lower part a relict A horizon. Effects of these findings on general concept of loessic parabrownearth are now to be studied on more examples from other areas.

Haaren-Sintfeld near Paderborn, Westfalia, darker soil horizon in lower part of brown earth developed in calcareous loess loam, superimposed on marl of Cenomanian age.

BONN-355.	**Brownearth Haaren-Sintfeld I 1.2% C, 35 to 45 cm**	**900 ± 40 A.D. 1050**
BONN-356.	**Brownearth Haaren-Sintfeld II 1.2% C, 75 to 95 cm**	**1270 ± 60 A.D. 680**

BONN-357.	**Brownearth Haaren-Sintfeld III** **0.9% C, 50 to 65 cm**	**560 ± 30** **A.D. 1390**
BONN-358.	**Brownearth Haaren-Sintfeld III** **1.3% C, 85 to 95 cm**	**1580 ± 50** **A.D. 370**

Samples of brownearth Haaren-Sintfeld, near Paderborn, Westfalia (51° 33′ N Lat, 8° 43′ E Long). Coll. 1967 and subm. by H. Mertens, Geol. Landesamt, Krefeld and H. W. Scharpenseel. *Comment*: dark horizon of fairly high humus content beneath young A and B horizons of brownearth profile suggested existence of relict A horizon. BONN-355 to 358 show this assumption erroneous, but young age of underlying humus reflects erosion following medieval deforestation.

Fellbach, near Stuttgart, Chernozems with extensive clay-accumulation horizon (Argiudoll).

BONN-372.	**Parachernozem, Fellbach** **1.2% C, 10 to 20 cm**	**90 ± 70** **A.D. 1860**
BONN-373.	**Parachernozem, Fellbach** **1.2% C, 20 to 30 cm**	**1840 ± 50** **A.D. 110**
BONN-374.	**Parachernozem, Fellbach** **1.1% C, 30 to 40 cm**	**1770 ± 70** **A.D. 180**
BONN-375.	**Parachernozem, Fellbach** **1.0% C, 40 to 50 cm**	**1640 ± 50** **A.D. 310**
BONN-376.	**Parachernozem, Fellbach** **0.7% C, 50 to 60 cm**	**1210 ± 50** **A.D. 740**
BONN-377.	**Parachernozem, Fellbach** **0.6% C, 60 to 75 cm**	**2060 ± 60** **110 B.C.**
BONN-378.	**Parachernozem, Fellbach** **0.7% C, 75 to 85 cm**	**2020 ± 60** **70 B.C.**
BONN-379.	**Parachernozem, Fellbach** **0.5% C, 85 to 100 cm**	**2730 ± 70** **780 B.C.**

Samples BONN-372 to 379 of parachernozem (Argiudoll), developed from Würm loess upon Lettenkeuper, from ditch NE of Fellbach near Stuttgart close to r.r. track to Waiblingen (48° 51′ N Lat, 9° 17′ E Long). Coll. 1967 by H. W. Scharpenseel and H. Gewehr, Inst. f. Bodenkunde, Univ. Bonn.

BONN-380.	**Parachernozem from brick pit, Fellbach** **0.5% C, 15 to 30 cm**	**1090 ± 50** **A.D. 860**
BONN-381.	**Parachernozem from brick pit, Fellbach** **0.6% C, 30 to 45 cm**	**2170 ± 60** **220 B.C.**
BONN-382.	**Parachernozem from brick pit, Fellbach** **1.0% C, 45 to 60 cm**	**3490 ± 60** **1540 B.C.**

BONN-383. Parachernozem from brick pit, Fellbach 0.9% C, 60 to 75 cm **4190 ± 50 B.P. 2240 B.C.**

BONN-384. Parachernozem from brick pit, Fellbach 0.6% C, 75 to 90 cm **3690 ± 50 B.P. 1740 B.C.**

Samples BONN-381 to 384 of parachernozem (Argiudoll) from NW corner, brick pit, Fellbach, from Würm loess, topping calcareous lettenkeuper (48° 50′ N Lat, 9° 17′ E Long). Coll. 1967 by H. W. Scharpenseel and H. Gewehr. *Comment*: less pronounced than in BONN-326 to 331 as well as BONN-334 to 342, however, clearly distinguishable; both profiles show abrupt increase in age within clay-accumulation horizon (BONN-377 and BONN-382). Age increment within B_t horizon can be explained only by existence of relict A horizon, or by assumption that B_t (clay-accumulation) horizon constitutes an especially stable land surface that resists erosion, whereas horizons overlying B_t are translocated much more easily by erosion, which leads to permanently much younger A_p and A_1 cover due to colluviation. Specific geomorphology of location determines validity of 1st or 2nd explanation.

C. Dates of plaggen soils (Plaggepts)

Plaggen-soil dates were reported in Bonn I as BONN-9 to 13, 43 to 54, and 129 to 135. Dates obtained from deeper region of plaggen cover vary between 800 and 1300 B.P. Further plaggen-soil samples were taken from area of "Gemeinde Rietberg, Landkreis Wiedenbrück."

BONN-343. Plaggen soil, 5 km SE Rietberg A_h, 4.0% C, 35 to 45 cm **1200 ± 70 B.P. A.D. 750**

BONN-344. Plaggen soil, 5 km SE Rietberg A_h/A_e, 10.5% C, 45 to 55 cm **1140 ± 70 B.P. A.D. 910**

BONN-345. Plaggen soil, 5 km SE Rietberg A_e, 3.6% C, 55 to 65 cm **450 ± 80 B.P. A.D. 1500**

Samples BONN-343 to 345 of gray-brown plaggen soil on top of gley-podzol (Aquod), 5 km SE Rietberg near Speith farm (51° 46′ N Lat, 8° 27′ E Long). Coll. 1967 by H. Mertens and H. W. Scharpenseel.

BONN-348. Plaggen soil Brede near Rietberg A_p, 2.0% C, 40 to 55 cm **720 ± 70 B.P. A.D. 1230**

Sample BONN-348 of gray-brown plaggen soil Brede near Rietberg (51° 48′ N Lat, 8° 25′ E Long). Coll. 1967 by H. Mertens and H. W. Scharpenseel.

BONN-349. Plaggen soil, Hoffeld, A_{p1}, 1.4% C, 55 to 70 cm **1080 ± 60 B.P. A.D. 870**

BONN-350. Plaggen soil, Hoffeld, A_{p2}, 2.0% C, 70 to 90 cm **1130 ± 70 B.P. A.D. 820**

Samples BONN-349 to 350 of dark-brown plaggen soil, Hoffeld, 1.5 km S Rietberg (51° 48′ N Lat, 8° 25′ E Long). Coll. 1967 by H. Mertens and H. W. Scharpenseel.

BONN-351. Plaggen soil, Sinnesche Brede **1540 ± 60**
A_{p2}, 2.1% C, 35 to 55 cm **A.D. 410**

Sample BONN-351 brown plaggen soil, Sinnesche Brede, 3.5 km S Rietberg (51° 47′ N Lat, 8° 25′ E Long). Coll. 1967 by H. Mertens and H. W. Scharpenseel.

BONN-352. Plaggen soil, Am Hohen Lande **810 ± 70**
A_{p2}, 2.7% C, 40 to 50 cm **A.D. 1140**

Sample BONN-352 gray-brown plaggen soil "Am Hohen Lande," 3 km SSE Rietberg (51° 47′ N Lat, 8° 25′ E Long). Coll. 1967 by H. Mertens and H. W. Scharpenseel.

BONN-353. Plaggen soil, Krax r.r. sta. **900 ± 60**
A_{p2}, 1.0% C, 60 to 80 cm **A.D. 1050**

Sample BONN-353 brown plaggen soil "Auf den Langen Stacken," near Krax r.r. sta., close to Varensell, 5 km NNE Neuenkirchen (51° 52′ N Lat, 8° 28′ E Long). Coll. 1967 by H. Mertens and H. W. Scharpenseel.

General Comment—all plaggen dates: plaggen soils of Rietberg area confirmed age of plaggen soils reported in Bonn I. Low radiocarbon age of BONN-345 is explainable only as local disturbance. BONN-351 ranks highest of all our plaggen soil dates with 1540 ± 60, and indicates, in our opinion, upper limit of expected plaggen age. Thus, scope of maximum age of tested plaggen soil profiles has widened to 800 to 1550 B.P.

3250 ± 50
BONN-359. Fossil tree stem, Gahlen **1300 B.C.**

Sample from fossil tree stem found in Riss moraine material near Gahlen, Kreis Dinslaken, Rhineland, W. Germany (51° 34′ N Lat, 6° 46′ E Long). Coll. 1967 and subm. by Dr. Erkwoh, Geolog. Landesamt, Krefeld. Oak wood found in Riss moraine loam, on top of septorien clay of middle Oligocene, and covered by Pleistocene sand. Provided material embedding wood sample is Rissian moraine loam, age of wood should be out of radiocarbon range. Young age of only 3250 ± 50 B.P. disproves hypothesis or necessitates assumption of later incorporation of oak stem in moraine loam.

III. ARCHAEOLOGIC SAMPLES

BONN-333. Charcoal of old melting furnace, near Iserlohn, Westfalia **940 ± 60**
A.D. 1010

Sample from historic furnace slag hill, Balver Wood near Deilinghofen, Brockhausen, Kreis Iserlohn, Westfalia, W. Germany (51° 23′ N Lat, 7° 40′ E Long). Coll. 1967 and subm. by H. Conrad, Bergbaumuseum Bochum. Estimated age either 300 to 100 B.C. or 10th to 12th century. Radiocarbon date proves origin in 11th century.

BONN-435. Oak wood sample Wallerfangen, Saargebiet, W. Germany **260 ± 50**
A.D. 1690

Sample found in copper-containing water in Buntsandstone, Saargebiet, Amt Wallerfangen, Gemeinde St. Barbara, District Blauwald, W.

Germany (49° 22′ N Lat, 6° 43′ E Long). Coll. 1968 and subm. by H. Conrad. Sample dates primitive copper mining in this area, "Pingenbau." Estimated age Roman time, 1st to 3rd century. *Comment*: radiocarbon age too young for Roman period.

IV. MODERN SAMPLES

Modern samples were coll. to investigate nuclear weapon contamination of radiocarbon as continuation of studies already reported in Radiocarbon, 1968, v. 10, p. 24-27 as BONN-56 to 77, 143 to 155. Ultimate aim of modern sample measurement is establishment of bomb carbon calibration curve for dating of young ground water aquifers (Tamers, Balke, and Scharpenseel, 1968).

Grass series, Reichelsheim/Odenwald

Grass samples coll. by members of Landwirtschaftliche Untersuchungs- und Forschungsanstalt (LUFA), Darmstadt, beginning of June of respective yrs, and are derived from meadow fertilization test site Reichelsheim (49° 43′ N Lat, 8° 50.5′ E Long) test Nr. 1187.

BONN-172.	**Grass**	**1957**	**111.4 ± 0.6%**	**modern**
BONN-173.	**Grass**	**1958**	**110.8 ± 0.8%**	**modern**
BONN-174.	**Grass**	**1959**	**122.3 ± 0.8%**	**modern**
BONN-175.	**Grass**	**1960**	**120.2 ± 0.8%**	**modern**
BONN-176.	**Grass**	**1961**	**116.3 ± 0.7%**	**modern**
BONN-177.	**Grass**	**1962**	**131.2 ± 0.8%**	**modern**
BONN-178.	**Grass**	**1963**	**160.6 ± 1.0%**	**modern**
BONN-179.	**Grass**	**1964**	**181.5 ± 1.0%**	**modern**
BONN-180.	**Grass**	**1965**	**171.3 ± 1.0%**	**modern**
BONN-181.	**Grass**	**1966**	**169.1 ± 0.9%**	**modern**

Comment: peak activity occurred in 1964/65, and a minor peak in 1959.

Grass series, Hüttenfeld/Ried

Grass samples coll. by members of LUFA Darmstadt, beginning of June of respective yrs. Samples are part of crops harvested annually from meadow fertilizer test Nr. 1187 in Hüttenfeld (49° 32′ N Lat, 8° 36′ E Long).

BONN-182.	**Grass**	**1957**	**110.7 ± 0.7%**	**modern**
BONN-183.	**Grass**	**1958**	**158.9 ± 0.8%**	**modern**
BONN-184.	**Grass**	**1959**	**123.5 ± 0.8%**	**modern**
BONN-185.	**Grass**	**1960**	**127.2 ± 0.7%**	**modern**
BONN-186.	**Grass**	**1961**	**117.5 ± 0.8%**	**modern**

BONN-187.	**Grass**	**1962**	**130.2 ± 0.8% modern**
BONN-188.	**Grass**	**1963**	**155.3 ± 0.9% modern**
BONN-189.	**Grass**	**1964**	**176.3 ± 0.8% modern**
BONN-190.	**Grass**	**1965**	**164.4 ± 2.6% modern**
BONN-191.	**Grass**	**1966**	**165.8 ± 1.1% modern**

Comment: two pronounced activity peaks appear in 1958 and 1964.

Grass series, Beerfelden/Odenwald

Grass samples coll. by members of LUFA Darmstadt, beginning of June of respective yrs. Samples are harvested materials from meadow fertilizer test Nr. 142 in Beerfelden (49° 34′ N Lat, 8° 58′ E Long).

BONN-192.	**Grass**	**1957**	**109.2 ± 0.7% modern**
BONN-193.	**Grass**	**1958**	**112.2 ± 0.7% modern**
BONN-194.	**Grass**	**1959**	**124.4 ± 0.8% modern**
BONN-195.	**Grass**	**1961**	**116.5 ± 0.8% modern**
BONN-196.	**Grass**	**1962**	**130.7 ± 0.8% modern**
BONN-197.	**Grass**	**1963**	**158.4 ± 0.8% modern**
BONN-198.	**Grass**	**1964**	**185.2 ± 1.1% modern**
BONN-199.	**Grass**	**1965**	**169.2 ± 0.9% modern**
BONN-200.	**Grass**	**1966**	**166.1 ± 2.3% modern**

Comment: one pronounced peak of activity in 1964, one smaller peak in 1959.

Grass series, Darmstadt/Kranichstein

Grass samples coll. by members of LUFA Darmstadt, beginning of June 1958 and 1965. Samples are harvested materials from meadow fertilizer test Nr. 452 in Kranichstein (49° 54′ N Lat, 8° 40′ E Long).

BONN-301.	**Grass**	**1958**	**114.8 ± 0.8% modern**
BONN-302.	**Grass**	**1965**	**173.2 ± 0.8% modern**

Comment: samples of expectedly high natural C^{14} levels are tested. While BONN-301 of 1958 does not indicate a maximum, BONN-302 of 1965 ranks as usual highest in activity.

Straw series, Ernsthofen/Odenwald

Rye and wheat straw samples coll. by members of LUFA Darmstadt, beginning of August 1958 and 1965. Samples are harvested materials from cereal fertilizer test Nr. 739 in Ernsthofen (49° 48′ N Lat, 8° 43′ E Long).

BONN-303.	**Rye straw**	**1958**	**120.1 ± 0.9% modern**

BONN-304. Wheat straw 1965 171.4 ± 1.0% modern

Comment: results similar to preceding grass series.

Straw series, Zeilhard/Vorderer Odenwald

Barley and wheat straw samples coll. by members of LUFA Darmstadt, end of July 1958 as well as beginning of August 1965. Samples are harvested materials from cereal fertilizer test Nr. 190 in Zeilhard (49° 50′ N Lat, 8° 42′ E Long).

BONN-305. Winter barley straw 1958 115.4 ± 0.6% modern

BONN-306. Winter wheat straw 1965 204.6 ± 0.4% modern

Comment: results similar to preceding grass and straw series.

Crop rotation series, Rockenberg/Wetterau

All samples of crop rotation coll. by members of LUFA Darmstadt; barley, rye, wheat, and oat straw first half of August, potatoes beginning of October, sugar beet leaves end of October. Samples are harvested materials from crop rotation fertilizer test Nr. 991 in Rockenberg (50° 26′ N Lat, 8° 45′ E Long).

BONN-307. Summer barley straw 1958 112.2 ± 0.8% modern

BONN-308. Potatoes 1959 139.4 ± 0.7% modern

BONN-309. Winter wheat straw 1960 119.3 ± 0.8% modern

BONN-310. Winter rye straw 1961 120.1 ± 0.5% modern

BONN-311. Potatoes 1962 139.7 ± 0.5% modern

BONN-312. Winter wheat straw 1963 169.7 ± 1.0% modern

BONN-313. Oat straw 1964 184.5 ± 1.0% modern

BONN-314. Sugar beet leaves 1965 174.9 ± 0.9% modern

BONN-315. Winter wheat straw 1966 166.4 ± 0.9% modern

Comment: one small peak of activity corresponds to 1959, another bigger one to 1964 as shown in preceding grass series.

Rye straw, potato series, Würzburg/Odenwald

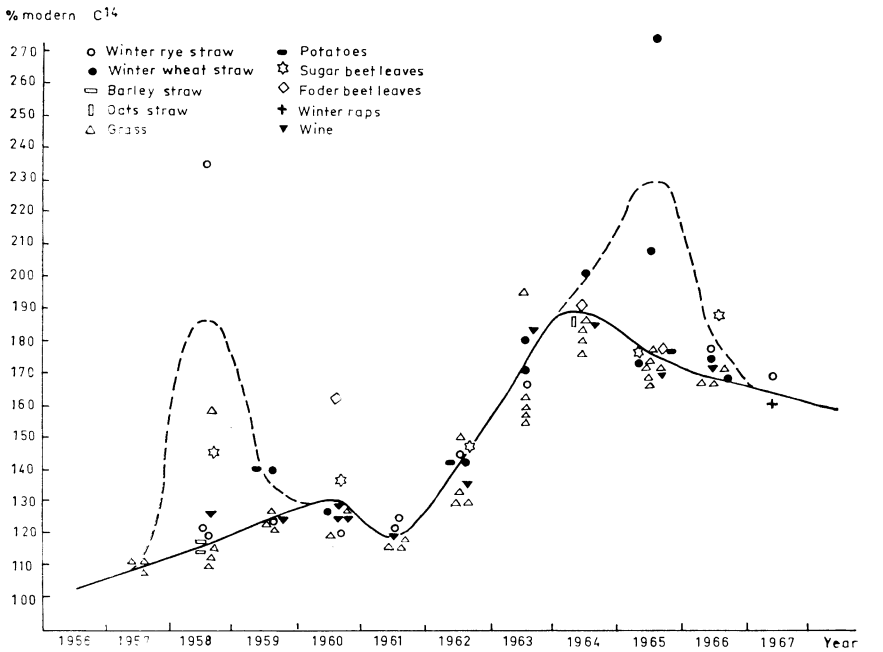
Winter rye straw and potato samples coll. by members of LUFA Darmstadt, beginning of August as well as end of September. Samples are harvested materials from fertilizer test Nr. 992 in Würzburg (49° 48.5′ N Lat, 9° 56.5′ E Long).

BONN-316. Winter rye straw 1958 118.3 ± 0.9% modern

BONN-317. Potatoes 1965 178.4 ± 0.9% modern

Comment: results similar to preceding grass, straw, and crop rotation series.

General Comment: modern radiocarbon measurements BONN-56-77, 143-155, 172-200, 301-317, are plotted in fig. 1, and are used as a calibration curve for dating on recent water, for flow speed measurement of subterranean water, by scanning of wells and piezometric tubes for modern C^{14} (Tamers, Balke, and Scharpenseel, 1968). The calibration curve is used to study sequence of formation of various humic matter fractions (fulvic acid, hymatomelanic acid, brown humic acid, gray humic acid, humine, and humus coal) within pool of young soil organic matter, such as in reclamation land (Nakhla and Delibrias, 1967).



Curve of bomb-influenced natural C-14 activity, obtained from different plant materials

Fig. 1

The modern radiocarbon curve in fig. 1 shows definite activity maximum in 1958/59 and 1964/65, while the Tritium maximum was observed by Münnich, Roether, and Thilo (1967) earlier in 1963. Exceptionally high activities found in BONN-57 for 1958, and BONN-67 for 1965 were confirmed by 2 repetitions. Contamination can be excluded. Similar cases of very high natural C^{14} levels were reported by Olsson and Stenberg (1967) Olsson and Karlén (1965) as well as by Ogden and Hay (1965). In order to study seasonal or random fluctuations, samples are now taken monthly from same location and tested for natural radiocarbon content.

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