

GLIWICE RADIOCARBON DATES IX

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The following list contains most of the measurements of geologic samples made during 1979 and 1980 using carbon-dioxide-filled proportional counters. Samples with laboratory numbers > 1000 were counted with counter No. 1 (L1), and those with numbers < 1000 , with counter No. 3 (L3), described by Mościcki and Zastawny (1977). Actual parameters of both counters were given in our previous date list (R, 1982, v 24, p 172).

Methods of sample pretreatment follow, with some minor modifications, those described by Olsson (1979). Some samples of peat, peaty mud, and gyttja were dated using both alkali-soluble fractions, precipitated by adding appropriate amounts of hydrochloric acid, and insoluble residue. The results obtained for series of such paired samples were discussed by Pazdur (1982) and conclusions are similar to those of Sheppard, Ali, and Mehringer (1979).

Combustion and purification lines were described by Pazdur *et al* (1979), the electronic system, designed and described by Bluszcz and Walanus (1980), is built of CAMAC units produced by POLON Enterprise, Warsaw. Measurement of any sample, including background and modern samples, consists of a series of 20 to 25 partial measurements of 100 minutes duration. Partial results obtained in such series were analyzed automatically at the computing center (Pazdur and Walanus, 1979a). Age calculations are based on contemporary value equal to 0.95 of the activity of NBS Oxalic Acid standard and on the Libby half-life of ^{14}C . Ages are reported as conventional ^{14}C dates in years before AD 1950. No corrections for isotopic fractionation in nature are made for samples presented in this list. Errors quoted ($\pm 1\sigma$) include estimated overall standard deviations of count rates of the unknown sample, contemporary standard, and background (Pazdur & Walanus, 1979a). In spite of our proposition (Walanus & Pazdur, 1980), infinite dates are reported according to 2σ criterion, as recommended by Stuiver and Polach (1977, p 362).

Most samples in this list were dated for investigations within the IGCP 158 Project "Paleohydrology of the temperate zone", Subproject A "Fluvial environment". A brief report on the activities of the Polish Group of the IGCP 158 Project was given by Starkel (1981a), the results obtained up to 1981 were presented at the Symposium "Paleohydrology of the temperate zone", Poznań, Poland, 1981, Sept 22-28 (Kozarski & Tobolski, 1981; Starkel, 1981b,c). All dates made for studies connected with Subproject 158B "Lake and mire environments" (Berglund, 1979) will be included in our next date list.

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SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

*A. Poland***Gardno series**

Peat from layers of varying thickness overlying sandy deposits and underlying gyttja in basin of Gardno Lake, Slovinian coastline. Coll and subm 1980 by Adam Wojciechowski, Inst Geog, Adam Mickiewicz Univ, Poznań. Samples dated for geomorphol and strat studies of basal deposits of Gardno Lake. Deposits underwent pollen (Zachowicz, 1977) and diatom analysis (Zaborowska, 1977). Profile Ga-A3 is 1200m W of Łupawa R mouth to Gardno Lake (54° 39' N, 17° 09' E); coll Jan 1980. Profile Ga-D2 taken at S shore of lake ca 600m N of Retowo village (54° 38' 20" N, 17° 07' 30" E); coll Feb 1980.

Gd-1286. Gardno Ga-A3a **9090 ± 70**

Carex peat from depth 255 to 260cm below water level, top of peat layer ca 1m thick, overlain by shell gyttja.

Gd-1288. Gardno Ga-A3b **10,280 ± 120**

Carex-Phragmites peat from base of peat layer at depth 350 to 356cm below water level, at contact of medium-grained sands.

Gd-1285. Gardno Ga-D2a **5380 ± 50**

Carex-Phragmites peat from depth 135 to 140cm below water level, top of peat layer ca 1.2m thick, overlain by brown gyttja.

Gd-827. Gardno Ga-D2b **10,140 ± 150**

Carex-Phragmites peat from base of peat layer at contact with gray humus sand, depth 245 to 252cm below water level.

Lubiatowo series

Peat from layer ranging from 1.5 to 3m underlain by medium and coarse-grained sands and overlain by fine-grained eolian (?) sands and peaty soil on coastal river plain near Baltic shore 1km W of Lubiatowo village (54° 48' N, 17° 51' E), E of Łeba, Gardno-Łeba Plain, Slovinian coastline. Coll Aug 1979 and subm by Sylwester Skompski, Geol Inst, Warsaw.

Gd-749. Lubiatowo L-8:sol **8640 ± 200**

From lowermost part of peat layer at contact with sands, depth 2.9 to 3m, alkali-soluble fraction. *Comment*: undersized, diluted.

Gd-1216. Lubiatowo L-8:ins **8200 ± 100**

Same sample, insoluble fraction.

Gd-748. Lubiatowo L-1:sol 1350 ± 70

From uppermost part of peat layer at contact with sands, depth 1.5 to 1.7m, alkali-soluble fraction.

Gd-1215. Lubiatowo L-1:ins 1030 ± 60

Same sample, insoluble fraction.

Białogóra series

Peat from layer in fine-grained sands ranging from 0.7 to 2.4m on coastal river plain, 1.2km ENE of Białogóra village (54° 49' N, 17° 59' E), NW of Zarnowieckie Lake, W part of Karwieńska Plain, 5m asl. Coll July 1979 and subm by Sylwester Skompski.

Gd-746. Białogóra B-7:sol 4470 ± 220

From lowermost part of peat layer, depth 2.3 to 2.4m, alkali-soluble fraction. *Comment*: undersized, diluted.

Gd-745. Białogóra B-7:ins 4820 ± 100

Same sample, insoluble fraction.

Gd-747. Białogóra B-1:sol 1750 ± 80

From uppermost part of peat layer, depth 0.8 to 1m, alkali-soluble fraction.

Gd-1211. Białogóra B-1:ins 1620 ± 80

Same sample, insoluble fraction.

Zalew Wislany series

Organogenic sediments from Zalew Wiślany (54° 23' 07" N, 19° 42' 47" E). Core 3a, 10m long taken at water depth 3m, reaching Pleistocene gray morainic till at depth 8.8m. Coll April 1979 and subm by Bogusław Rosa, Inst Geog, Dept Geomorphol and Quaternary Geol, Gdańsk Univ, Gdynia.

Gd-1238. Zalew Wislany 1 6730 ± 60

Highly-decomposed homogeneous peaty slime without visible faunal remains, depth 5.5 to 5.75m, central part of peaty mud horizon ranging from 5.26 to 5.91m, overlain by poludine horizon.

Gd-1237. Zalew Wislany 2 7120 ± 100

Highly-decomposed peat, brown at top and dark gray at base, depth 6 to 6.27m.

Gd-1239. Zalew Wislany 3 7600 ± 90

Gray clotty peat, depth 6.9 to 7.15m. *Comment* (BR): characteristic consistency of this peat layer indicates temporal drying of peat-bog surface which means lowering of groundwater level and, at depth 6.88m, contact with local transgression or beginning of local flood.

Gd-1240. Zalew Wislany 4 9390 ± 110

Highly-decomposed peat, depth 7.3 to 7.5m.

Gd-772. Zalew Wislany 5 11,090 ± 150

Highly-decomposed peat, depth 7.5 to 7.7m.

Gd-773. Zalew Wislany 6 11,240 ± 110

Peaty slime rich in organic matter, brown at top and brown-gray at base, depth 7.7 to 7.95m.

Pomorsko station series

Sandy peat from top of peat layer filling up Odra R paleomeander and overlain by sandy sediments forming alluvial cones, 1km SE of Pomorsko RR sta (52° 02' 40" N, 15° 32' 40" E), 7.5km SW of Sulechów, Cigacice-Krosno sec of Warsaw-Berlin Pradolina. Coll and subm 1979 by Bolesław Nowaczyk, Inst Geog, Adam Mickiewicz Univ, Poznań.

Gd-1195. Pomorsko sta 15/79/BN:sol 1460 ± 50

Below older alluvial cone, depth 351 to 361cm, coll Aug 1979, alkali-soluble fraction dated.

Gd-726. Pomorsko sta 15/79/BN:ins 1720 ± 70

Same sample, insoluble fraction.

Gd-1189. Pomorsko sta 16/79/BN:ins 1520 ± 80

Below younger alluvial cone, depth 92 to 100cm, coll Oct 1979, insoluble fraction dated. *Comment* (BN&MFP): samples dated for systematic geomorphol and strat studies of dunes and lacustrine sediments in vicinity of Pomorsko (Nowaczyk, 1974; 1976; 1979; Nowaczyk & Tobolski, 1979; 1981); for other dates from this area, see Nowaczyk *et al* (1982) and next sec.

Czmoniec series

Organic sediments from peaty paleomeander of younger generation, Warta R valley near Czmoniec, ca 10km N of Srem, Great Poland Lowland (52° 11' N, 17° 00' E). Coll July 1978 by Stefan Kozarski and Kazimierz Tobolski; subm 1980 by KT to supplement earlier dates from this site (R, 1982, v 24, p 187). Dated for systematic studies of Warta R paleomeanders initiated by Stefan Kozarski in 1967 and now included into IGCP 158A Project (Kozarski, 1981b,c; Okuniewska & Tobolski, 1981; Tobolski, 1981).

Gd-818. Czmoniec Cz I/78A/110-115 3300 ± 120Wood peat with sand, top of peat layer at contact with detritus gyttja, depth 110 to 115cm. *Comment*: undersized, diluted.**Gd-817. Czmoniec Cz I/78A/144-150 3550 ± 80**

Coarse detritus gyttja, with sand, top of gyttja layer at contact with wood peat layer, depth 144 to 150cm.

Zabno series

Channel deposits from paleochannels on terrace III of Warta R valley (Antczak, 1981; Kozarski, 1981b; Kozarski & Rotnicki, 1977) with traces of braided river flow, ca 3km W of recent Warta R channel at Zabno village (52° 11' 32" N, 16° 54' 09" E), 30km S of Poznań, Srem sec of Warsaw-Berlin Pradolina. Coll March 1980 by Barbara Antczak; subm 1980 by Stefan Kozarski, Inst Geog, Adam Mickiewicz Univ, Poznań. Dated for investigations in IGCP 158A Project.

Gd-812. Zabno IM 6300 ± 790

Organogenic silt from layer 30cm thick between two series of coarse and medium-grained sands, depth 1.06m. *Comment:* very small sample, undersized, diluted.

Gd-819. Zabno III Da 2200 ± 270

Wood remnants, coarse fraction, from series of coarse- and medium-grained sands, depth 1.1m. *Comment:* undersized, diluted.

Gd-810. Zabno III Db 4560 ± 120

Wood remnants, fine fraction from same series of sands.

General Comment (BA): samples dated to estimate end of period of water outflow on terrace III. Dates younger than expected, other dates from organic deposits filling up paleomeanders on terrace II are Gd-387, 11,430 ± 630; Gd-381, 9780 ± 340; Gd-380, 9770 ± 230 (R, 1979, v 21, p 167) and Gd-239, 9650 ± 240 (R, 1978, v 20, p 406); for general discussion of problem, see Kozarski (1981b) and Kozarski and Rotnicki (1977).

Gd-851. Sław-1 7320 ± 170

Wood, single fragments found at depth 2m in layer of sedge-reed peat in fossil peat bog at SW part of Sławskie Lake (51° 52' 40" N, 16° 02' 22" E), ca 1km NW of Radzyń village, Sławskie Lakeland, Great Poland Lowland. Coll May 1979 and subm by Jerzy Janczak, Inst Meteorol and Water Economy, Poznań.

Wieruszów series

Samples from base layers of organic deposits filling up cut-off paleomeander channels on valley floor of Prosna R near Wieruszów, SE part of Great Poland Lowland. Coll March 1980 and subm by Karol Rotnicki, Inst Geog, Adam Mickiewicz Univ, Poznań. Samples dated for reconstruction of paleohydrological conditions in middle course of Prosna R during Holocene in connection with IGCP 158A Project (Kozarski & Rotnicki, 1977).

Gd-1274. Szpot 1/80KR 6390 ± 60

Silt with admixture of plant remnants, depth 115 to 125cm, overlying coarse-grained sands and covered with peat, 850m N of small village Szpot, 6.5km S of Wieruszów (51° 14' 20" N, 18° 10' 17" E).

Gd-1275. Szpot 4/80KR 5660 ± 60

Silt with plant remnants, depth ca 1m, 550m W of Prosna R, 7.5km S of Wieruszów (51° 13' 53" N, 18° 10' 13" E).

Gd-1280. Dobrygosć 9/80KR 5600 ± 60

Peaty gyttja from base of layer separating two peat layers, depth 78 to 85cm, 300m SE of forester lodge Dobrygosć, 300m W of Prosna R, 5km S of Wieruszów (51° 15' 00" N, 18° 10' 02" E).

Gd-1283. Dobrygosć 11/80KR 8590 ± 70

Peat from base of lower peat layer, depth 142 to 150cm, same loc.

Gd-811. Dobrygosć 17/80KR 6320 ± 80

Peat from base of peat layer overlying thin layers of organic silt and silt with plant remnants, depth 170 to 180cm, 1km S of forester lodge Dobrygosć, 5.5km S of Wieruszów (51° 14' 46" N, 18° 09' 52" E).

Gd-1284. Dobrygosć 18/80KR 9050 ± 80

Silt with admixture of plant remnants, depth 200 to 210cm, same loc.

Sobieseki series

Organic deposits in form of layers in Würmian flood deposits on terrace 2 of Prosna R in N part of Grabów Basin, built of lacustrine silts, flood silts, and fine-grained sands and thin layers of peat, peaty silt, and silty peat with sand admixture, from 20 to 30cm thickness, accumulated from beginning of Würm till first phase of Upper Pleni-Würm. Total thickness of deposits on terrace 2 exceeds 35m. Two profiles were taken near Sobieseki village (51° 38' N, 18° 18' E), ca 19km SE of Kalisz, profile I; coll June 1979 by Józef Wiśniewski; profile II coll Nov 1979 by Karol Rotnicki; subm 1980 by Karol Rotnicki. Samples dated for systematic studies of paleogeog and stratigraphy of Würmian deposits in Great Poland Lowland (Rotnicki, 1966).

Gd-758. Sobieseki SO-IA/79:sol 26,070 ± 900

Peaty silt with sand admixture, depth 835 to 840cm, alkali-soluble fraction.

Gd-1219. Sobieseki SO-IA/79:ins 26,080 ± 550

Same sample, insoluble fraction.

Gd-755. Sobieseki SO-IB/79:sol 26,070 ± 910

Peaty silt with sand admixture, depth 840 to 845cm, alkali-soluble fraction.

Gd-1220. Sobieseki SO-IB/79:ins 25,460 ± 450

Same sample, insoluble fraction.

Gd-752. Sobieseki SO-IIA/79:sol 26,300 ± 1200

Peaty silt with sand admixture, depth 535 to 550cm, alkali-soluble fraction.

Gd-753. Sobieseki SO-IIA/79:ins 27,000 ± 1100

Same sample, insoluble fraction.

Gd-756. Sobieseki SO-IIB/79:sol 27,960 ± 680

Sandy peat, depth 705 to 725cm, alkali-soluble fraction.

Gd-757. Sobieseki SO-IIB/79:ins 27,780 ± 590

Same sample, insoluble fraction.

General Comment (KR): organic silt from continuous layer at depth 520 to 550cm in Weglewiec, 30km S of Sobieseki, from similar strat position, yielded dates $35,100 \pm 1000$ and $36,400 \pm 1200$; Lu-1632 and -1632A, (R, 1980, v 22, p 1055-1056).

Konin-Maliniec series

Organogenic interbeddings in series of sediments of stagnant water overlain by series of cross-stratified fluvioglacial sandy gravel sediments and morainic sediments in form of two-partite flow till of Leszno phase of Vistulian Glaciation in Konin-Maliniec site, ca 5km N of Konin (52° 16' N, 18° 15' E); coll and subm 1979 by Wojciech Stankowski, Inst Geog, Adam Mickiewicz Univ, Poznań. Konin-Maliniec site was presented during field excursion of Symposium on Vistulian Stratigraphy as one of ref sites of Vistulian in Poland (Kozarski, 1980; 1981a). Morphology, stratigraphy, and chronology of site in morainic upland in hinterland of marginal zone of Poznań phase was studied by Borówko-Dłużakowa (1967; 1979), Stankowski (1979; 1980), Stankowska and Stankowski (1979), Tobolski (1979a,b) and Pazdur and Walanus (1979b), whose results were summarized briefly by Pazdur, Stankowski, and Tobolski (1980). Upper fossil flora level, 5 to 10cm thick, Maliniec II, found at depth 431 to 439cm in fine-grained sands with load deformation structures which penetrate to half thickness of fluvioglacial series, is composed of strongly sanded silts, lime silts with abundant plant detritus, and sanded and silted mossy peats with dominant macrofossils of *Drepanocladus resolvens* (main component), *Calliergon turgescens*, and *C. trifarium* (id. by K Karczmarz) and represents accumulation in shallow, very wet tundra peat bog with calciphile mosses growing together with sedges in area of dwarf shrub willows. Lower fossil flora level, Maliniec I, at depth 678 to 753cm, is composed of 8 layers different in lithology and containing genetically different organogenic sediments with no traces of post-sedimentary deformations and representing complete sequence of climatic and vegetational changes of cool interstadial period with 4 distinct pollen zones (Tobolski, 1979a,b). Maliniec I level could be provisionally assigned to Moershoofd interstadial complex (Tobolski, 1979a; Kozarski, 1980; 1981a).

Gd-646. Maliniec II; KM-XII-B 22,230 ± 480

From Maliniec II level, layer XII, depth 431 to 439cm, alkali-soluble fraction.

Gd-645. Maliniec II; KM-XII-C **22,050 ± 450**

Same sample, insoluble fraction.

+ 2300

Gd-647. Maliniec I; KM-VII-A **34,000**
– 1800

From top of Maliniec I level, layer VIII, depth 678 to 690cm, pollen zone D with *Betula nana*, *Empectrum*, and *Arctostophylos uva-ursi*. *Comment* (MFP): acid-soluble fraction dated, undersized, diluted.

Gd-1077. Maliniec I; KM-VIII-B **>42,900**

Same sample, alkali-soluble fraction.

Gd-1076. Maliniec I; KM-VIII-C **>42,500**

Same sample, insoluble fraction.

Gd-668. Maliniec I; KM-I-A **25,000 ± 1000**

From base of Maliniec I level, layer I, depth 740 to 748cm, pollen zone A with *Salix* and *Equisetum*. *Comment* (MFP): acid-soluble fraction dated, undersized, diluted.

Gd-1105. Maliniec I; KM-I-B **>41,200**

Same sample, alkali-soluble fraction.

Gd-671. Maliniec I; KM-I-C **>40,700**

Same sample, insoluble fraction.

General Comment (MFP): for general discussion of significance of Konin-Maliniec site for chronology and strat of Vistulian in Poland, see Kozarski (1980; 1981a). Organic horizons with ¹⁴C dates close to those from Maliniec II level from profiles in German Democratic Republic and European part of USSR were described by Cepek (1965) and Krasnov (1978), respectively.

Gd-769. Młodocin 5 **1150 ± 90**

Black earth soil in form of thin layer at depth 60cm overlain by series of fluvial and lacustrine fine-grained sands in Noteć R valley in Młodocin village (52° 53' 29" N, 17° 52' E), 750m NW of Wolickie Lake. Coll Aug 1977 by M Sinkiewicz; subm 1979 by Władysław Niewiarowski, Inst Geog, Mikołaj Kopernik Univ, Toruń.

Tuliszków series

Organic deposits of Vistulian age from vicinity of Tuliszków, Turek Uplands, Great Poland Lowland, S of Warta Pradolina. Coll Oct 1979 and subm by Alicja Mańkowska, Geol Inst, Warsaw. Dated to establish reach-line of Vistulian Glaciation in Konin-Tuliszków-Turek area and determine age and genesis of Złote Góry Mts glacial forms (Kawecki, 1969; Mańkowska, 1975).

Gd-785. Wymysłów s1193 **31,200 ± 800**

Peaty mud in form of layer in fossil river channel at depth 1.9 to 2.1m in Wymysłów village (52° 04' N, 18° 20' E) near Tuliszków, overlain by fossil soil, fine- and medium-grained sands, and boulder clay.

Gd-786. Zdzary s466 **>27,000**

Peat from series of paludal sediments, depth 2.1 to 2.2m in Zdzary village (52° 08' N, 18° 16' E), overlain by fine sands and boulder clay. *Comment*: undersized, diluted.

Gd-1251. Zdzary s743 **41,400**
+ 3000
- 2200

Peaty mud from series of lacustrine sediments at depth 1.6 to 1.7m overlain by clayey mud, silt, and boulder clay in Zdzary village (52° 08' 30" N, 18° 16' E). *Comment* (AM): pollen analysis by Zofia Borówko-Dłużakowa indicates pollen spectrum representing cold phitophases of pine-birch forest of Pleistocene period.

General Comment (MFP): all dates of this series obtained on alkali-soluble fraction of sample, precipitated by adding appropriate amount of HCl.

Przyłubie series

Peat from thin fossil organic layer in substratum of flood plain of Wisła R valley, Toruń-Bydgoszcz Basin, ca 17km W of Toruń, near Przyłubie village (53° 03' 24" N, 18° 19' 20" E); coll and subm 1979 by Anna Tomczak, Inst Geog, Mikołaj Kopernik Univ, Toruń (Galon, 1934; Niewiarowski & Tomczak, 1969; Tomczak, 1981).

Gd-1248. Przyłubie A **1870 ± 70**

From top part of organic layer, depth 60cm, at contact with overlying layer of clayey silt with admixture of organic matter.

Gd-1249. Przyłubie B **5480 ± 60**

From base of organic layer at contact with underlying fine-grained sands, depth 1.85m. *Comment* (AT): pollen analysis of base layer of peat indicates Atlantic or younger age.

Podgórz series

Peat from series of organic sediments filling former bed of Wisła R, flood plain on left bank of Wisła R valley, Toruń-Bydgoszcz Basin, Podgórz, Toruń (52° 59' 30" N, 18° 35' E); coll Nov 1979 and subm by Anna Tomczak.

Gd-1250. Podgórz A **710 ± 45**

Well-decomposed black peat from top of uppermost peat layer at contact with overlying series of clayey silt with plant fragments, depth 90 to 95cm.

Gd-784. Podgórz B **3190 ± 280**

Wood peat with undecomposed plant fragments from base of lowermost peat layer, depth 4.8 to 4.85m, at contact with underlying sands. *Comment* (AT): pollen analysis of lowermost peat layer by Bożena Noryśkiewicz indicate Atlantic or younger age.

Rzeczkowo series

Organic sediments filling up former bed of Wisła R, flood plain on right bank of Wisła R valley, Toruń-Bydgoszcz Basin, ca 17km W of Toruń, near Rzeczkowo village (53° 07' 06" N, 18° 21' 27" E). Coll Oct 1979 by Anna Tomczak and Władysław Niewiarowski; subm 1980 by Anna Tomczak.

Gd-1246. Rzeczkowo A 940 ± 60

Well-decomposed peat from top of peat layer, depth 30 to 35cm, overlain by clayey silt.

Gd-780. Rzeczkowo B 5580 ± 120

Black peat from base of peat layer, depth 1.4 to 1.47m.

Gd-781. Rzeczkowo C 9760 ± 260

Gray clayey gyttja from base of gyttja layer, depth 2.15 to 2.2m. *Comment:* undersized, diluted.

General Comment (AT): introductory pollen analysis of profile by Bożena Noryśkiewicz yielded following age estimates: A—younger than Atlantic, B—Atlantic, C—Younger Dryas. Samples from Przyłubie, Podgórz, and Rzeczkowo profiles dated for studies of changes of Wisła R valley between Toruń and Solec Kujawski during Late Glacial and Holocene, as part of IGCP 158A Project.

Warsaw-Płock Wisła River valley series

Peat and gyttja from base of organogenic layers filling paleochannels on Wisła R flood plain, Wisła R valley between Warsaw Depression and Płock Depression (Wiśniewski, 1981). Coll Sept 1979 and subm 1980 by Edward Wiśniewski, Inst Geog & Spatial Org, Dept Geomorphol & Hydrol of Lowland, Polish Acad Sci, Toruń.

Gd-741. Wasosz 1:sol 5200 ± 150

Gyttja from depth 3.95 to 4.25m, in Wasosz near Piaski village (52° 26' N, 19° 49' E), 6km NE of Gąbin, alkali-soluble fraction.

Gd-740. Wasosz 1:ins 5250 ± 250

Same sample, insoluble fraction. *Comment:* undersized, diluted.

Gd-733. Wykowo 5:sol 3360 ± 150

Gyttja from depth 3.7 to 3.95m from Wykowo village (52° 29' N, 19° 52' E), 13km SE of Płock, alkali-soluble fraction.

Gd-735. Wykowo 5:ins 3850 ± 100

Same sample, insoluble fraction.

Gd-1199. Wola Ładowska 2:sol 8450 ± 100

Peat from depth 1.52 to 1.72m in Wola Ładowska village (52° 02' N, 20° 02' E), 2.5km N of Hłowo, alkali-soluble fraction.

Gd-1200. Wola Ładowska 2:ins 7520 ± 100

Same sample, insoluble fraction.

Gd-1207. Podgórze 4:sol 5610 ± 70

Peat from depth 0.8 to 1m in Podgórze village (52° 04' N, 20° 03' E), 10km W of Wyszogród, alkali-soluble fraction.

Gd-1204. Podgórze 4:ins 6290 ± 60

Same sample, insoluble fraction.

Gd-732. Nowa Wies 3:sol 9540 ± 240

Gyttja from depth 3.95 to 4.2m in Nowa Wieś (52° 21' N, 20° 08' E), 6:5km ENE of Howo, alkali-soluble fraction. *Comment:* undersized, diluted.

Gd-1202. Nowa Wies 3:ins 9660 ± 110

Same sample, insoluble fraction.

Rembertów series

Sandy peat from layer at depth 1.5 to 1.55m overlain by dune sands on uppermost flood terrace of Wisła R, Mazowiecka Plain, 1km NE of Rembertów (51° 16' N, 21° 13' E). Coll Oct 1978 by Zdzisława Sarnacka; subm 1980 by M D Baraniecka, Geol Inst, Warsaw.

Gd-1236. Rembertów:sol 410 ± 45

Alkali-soluble fraction.

Gd-770. Rembertów:ins 440 ± 60

Same sample, insoluble fraction.

Kobylarnia series

Peat from layer 1.8m thick underlain by silt, Wisła R valley, Kobylarnia village, N part of Sandomierz Basin (50° 33' N, 21° 48' E). Coll Sept 1979 and subm 1980 by Elzbieta Mycielska-Dowgiałło, Dept Geog & Regional Studies, Warsaw Univ (Mycielska-Dowgiałło, 1972).

Gd-1297. Kobylarnia 1a 6890 ± 70

From depth 70cm.

Gd-1298. Kobylarnia 1b 8570 ± 100

From depth 1.3 to 1.5m.

Gd-1299. Kobylarnia 1c 11,640 ± 100

From lowermost layer, depth 1.8m.

Gd-808. Dobromierz S-79-73 1150 ± 110

Peat from thin layer between two series of gravels in alluvial fan, depth 1m, Dobromierz (50° 50' N, 16° 20' E), Sudety Mts. Coll Nov 1979 and subm 1980 by Alfred Jahn, Geog Inst, Wrocław Univ, Wrocław.

Gd-194. Smogornia 4900 ± 100

Peat from base of peat-bog Smogornia in Karkonosze, Sudety Mts, S Poland (50° 41' N, 15° 40' E), alt 1400m asl, depth 2m, in contact with thin layer of sandy clay overlying 45cm thick layer of granitic rubble (regolith). Coll and subm 1972 by Alfred Jahn. *Comment* (AJ): base of other peat bog in Jakuszyce, same region, was dated to 10,075 ± 210 BP (Dumanowski, Jahn, & Szczepankiewicz, 1962).

Jasiołka River valley series

Peat from base of peat layer at contact with lacustrine chalk, overlain by clays and ablation till in Jasiołka R valley, Jasło-Sanok Depression. Coll Aug 1979 and subm by Antoni Wójcik, Geol Inst, Carpathian Branch, Cracow.

Gd-1233. Roztoki 1:ins 9870 ± 110

From fossil lake sediments on terrace of Jasiołka R valley, profile XVI, depth 3.95 to 4m, in Roztoki village (49° 44' 44" N, 21° 32' 50" E) (Szafer & Jaroń, 1935; Szafer, 1948). *Comment*: insoluble fraction dated.

Gd-1232. Roztoki 1: 1st sol 9850 ± 110

Same sample, 1st alkali-soluble extract dated.

Gd-766. Roztoki 1: 2nd sol 9920 ± 100

Same sample, 2nd alkali-soluble extract dated.

General Comment (AW): both early studies (Szafer & Jaroń, 1935; Szafer, 1948) as well as results of actual pollen analysis indicate cold period from end of Pleistocene.

Gd-1235. Roztoki 3 10,950 ± 120

From fossil lake sediments on terrace of Jasiołka R valley, profile XV (Szafer, 1948) in Roztoki village (49° 44' 36" N, 21° 32' 52" E), depth 2.66 to 2.7m. *Comment* (AW): preliminary results of pollen analysis indicate cold period; expected age: Late Glacial.

Gd-767. Tarnowiec 5 7930 ± 110

From contact of peat layer with uppermost layer of lacustrine chalk, valley floor of left tributary of Jasiołka R, ca 1.1km from Tarnowiec (49° 44' 25" N, 21° 35' 55" E), depth 1.4 to 1.45m. *Comment* (AW): expected age based on provisional pollen analysis by Krystyna Harmata—beginning of Holocene/end of Pleistocene.

Gd-1243. Jedlicze 8 36,700 ± 2100

Wood (*Picea* or *Larix* sp), id. by Kazimierz Szczepanek, in lowest part of peat layer 0.8m thick at depth 4.3 to 4.4m in Jedlicze, Brzozowa St (49° 43' 30" N, 21° 39' 30" E). Coll Oct 1979 by Kazimierz Szczepanek and Antoni Wójcik; subm by Antoni Wójcik. Peat layer overlain by clay, fossil soil, and 2 layers of till separated by thin layer of fossil soil. *Comment* (AW): results of provisional pollen analysis of peat layer indicate Brorup Interstadial.

San River series

Wood from San R valley, Sandomierz Basin. Coll May 1980 and subm by Andrzej Szumański, Dept Geol, Wasaw Univ, Warsaw. Dated for studies of evolution of San R valley during Late Glacial and Holocene in connection with IGCP 158A Project (Szumański, 1972; 1981).

Gd-838. Lezajsk S1 7080 ± 90

From layer of gray-black silt with plant remains, depth 3m, overlain by gray-yellow loamy mud and yellow loess-like mud in buried oxbow of San R, rendzina terrace B. Coll from exposure at channel bank near Lezajsk (50° 30' N, 22° 40' E).

Gd-1300. Rudnik S2 660 ± 50

From top of series of gray fine-grained sands diagonally laminated with single trunks, overlain by gray-brown loamy mud and yellow loess-like mud, terrace 3 of San R valley at Rudnik (50° 50' N, 22° 22' E), depth 3m.

Grabiny-Latoszyn series

Wood, mostly from individual oak trunks, and charcoal from alluvial sequence in gravel pit between Grabiny and Latoszyn, left bank of Wisłoka R valley (50° 03' N, 21° 22' E), ca 4km SW of Dębica, Carpathian Foreland. Gravel-pit Latoszyn, ca 1.5km long, belongs to series of ref sites in Wisłoka R valley studied in IGCP 158A Project by Leszek Starkel and coworkers (Starkel, 1981d). S part of gravel-pit with profiles A and C is on terrace level IID, 189 to 190.5m asl (Mamakowa *et al*, 1981, p 64-67, fig 26), gently inclined to E and encompassing large mature paleochannel with cut meander neck resembling present channel, with outcrops revealing 4 parts of sediments of different age within exposed sequence, ca 7m, underlain by series of gravels ca 14m thick. N part of gravel pit with profile B is on terrace level IIA, ca 187m asl with sequence of sediments, 7 to 14m thick, consisting of top sandy alluvial loam, upper gravels, sands, and lower gravels. All samples but one coll 1978 and 1979 by Ewa Niedziałkowska, Leszek Starkel, and members of ¹⁴C lab staff; subm by Leszek Starkel, Dept Geomorphol & Hydrol, Inst Geog, Polish Acad Sci, Cracow.

Gd-509. Grabiny-Latoszyn NII 2260 ± 120

Oak wood, external fragment of trunk ca 1m diam, N part of gravel pit, provenience unknown. Coll and subm 1977 by Bolesław Kawalec, Rzeszów.

Gd-1011. Grabiny-Latoszyn 070878/1 2730 ± 70

Wood, small trunk ca 3cm diam from silty organic detritus layer at depth ca 3.5m in profile B, N part of gravel-pit. *Comment* (MFP): pollen spectrum of silty detritus layer (Mamakowa *et al*, 1981, p 67, fig 27) reveals high frequency of *Abies*.

Gd-582. Grabiny-Latoszyn 180578/1 2420 ± 50

Oak trunk from gravels overlying sandy muds, profile B in N part of gravel pit, depth ca 2.5m.

Gd-581. Grabiny-Latoszyn 170878/4 5990 ± 80

Oak trunk, 50cm diam, from profile A1 in S part of gravel pit, from series of lower gravels at depth 5.3m. *Comment* (MFP): pollen analysis of clayey mud sample coll from environs of this trunk made by Kazimiera Mamakowa reveals *Abies* pollens, numerous culture indicators with different types of cereals (*Secale cereale*, *Triticum* type, *Hordeum* type, and high frequency of *Plantago lanceolata*) (Mamakowa *et al*, 1981, p 65, fig 27).

Gd-600. Grabiny-Latoszyn 170878/2 5950 ± 70

Oak trunk 50cm diam from profile A1bis, ca 5m E of profile A1, same series of lower gravels at depth ca 5m. *Comment* (MFP): sample of clayey mud from environs of this trunk reveals high frequency of *Abies* pollen.

Gd-580. Grabiny-Latoszyn 170878/1 5920 ± 60

Oak trunk 50cm diam from S part of gravel pit, same series of lower gravels at depth ca 5m, ca 25m N of samples Gd-581 and -600.

Gd-1009. Grabiny-Latoszyn 160878/3 960 ± 70

Oak trunk 60cm diam from series of upper gravels in S part of gravel pit at depth ca 2m, ca 10m E of sample Gd-600.

Gd-1012. Grabiny-Latoszyn 160878/1 890 ± 70

Oak trunk 25cm diam, same loc.

Gd-1014. Grabiny-Latoszyn 170878/LS 105 ± 45

Charcoal from series of unconsolidated covering deposits consisting of clayey, silty and sandy layers on E slope of terrace IID, S part of gravel pit near profile A4 at depth ca 1m. *Comment* (LS&MFP): top layer of this series was previously destroyed. Using Stuiver (1978) correction curve, calendar age of sample can be estimated as < 300 BP. This implies that migration of channel did not take place before 2nd half of 17th century AD. This agrees well with observations of Strzelecka (1958) from Wisłok R valley where old sinuous paleochannels were active to mid-18th century.

Gd-597. Grabiny-Latoszyn 101078/LS 7990 ± 110

Rounded piece of wood from same series near sample Gd-1014. *Comment* (LS): probably redeposited from right bank sites of early Holocene deposits in Podgródzie area ca 4km upstream (Alexandrowicz *et al*, 1981; Mamakowa & Starkel, 1977).

Gd-1145. Grabiny-Latoszyn A-14 710 ± 80

Wood from tree-trunk with branches found in profile A-14, S part of gravel pit ca 120m N of profile A1, at base of upper series of sandy gravels, depth ca 2m.

Gd-707. Grabiny-Latoszyn A-15 2860 ± 150

Organic detritus from series of sands and silts of ob facies at top of gravel series, profile A-15 in S part of gravel pit, depth ca 3m. *Comment*: undersized, diluted.

Gd-1146. Grabiny-Latoszyn C-5 480 ± 60

Wood fragments from series of muds with organic detritus overlain by sands with some gravels, ca 1.5m below sandy base of paleochannel visible in relief, profile C-5 close to profile A-14, S part of gravel pit, depth 3.5m. *Comment* (LS): this paleochannel does not appear active on Mieg's map from AD 1780 (Mieg, 1779-1782).

Gd-1148. Grabiny-Latoszyn C-5a 1830 ± 70

Twigs from same layer, probably redeposited material.

Gd-583. Grabiny-Latoszyn 170878/4 5540 ± 80

Oak trunk 50cm diam from lower gravel series near profile A1 in S part of gravel-pit.

Gd-578. Grabiny-Latoszyn 080878/1 4540 ± 60

Oak trunk 55cm diam, S part of gravel pit. *Comment* (MFP): displaced, provenience unknown.

General Comment (LS): based on results of palynol investigations showing *Abies* pollens and numerous culture indicators, our previous view (Awsiuk *et al*, 1980) on age of gravels should be revised assuming that tree trunks of *Quercus* sp were reworked from lower bed at break of Subatlantic period. Only strongly consolidated gravels below 5.9m can be recognized as Atlantic.

*B. Norway***Gd-660. Elisebreen 1660 ± 130**

Tundra peat in form of layer 5cm thick underlain by brown loamy gravels and covered with fresh lodgement till, depth 60cm, in forefield of Elisebreen Glacier, Oscar II Land, NW Spitsbergen (78° 37' 45" N, 12° 07' E). Coll July 1978 by Bozena Noryśkiewicz; subm by Władysław Niewiarowski. Dated to establish age of Elisebreen Glacier transgression (Niewiarowski, 1982).

Werenskiold series

Peat from surface of ice in marginal part of Werenskiold Glacier, SW Spitsbergen (77° 04' 55" N, 15° 15' 20" E). Coll July 1979 by Henryk Chmal; subm 1980 by Alfred Jahn.

Gd-803. Werenskiold W-1 510 ± 50

Found 150m from ice front.

Gd-1267. Werenskiold W-2 750 ± 60

Found 200m from ice front.

Ytre Kjaes series

Peat from palsa hill in peat bog on coastal plain, Ytre Kjaes, Porsangen Fjord, Nord Norway (70° 30' N, 25° 30' E). Coll June 1979 and subm 1980 by Alfred Jahn.

Gd-1266. Ytre Kjaes N-79-7 **970 ± 45**

From contact of unfrozen peat with permafrost, depth 30cm.

Gd-809. Ytre Kjaes N-79-6 **4760 ± 120**

From lowermost unfrozen peat layer 10cm thick at depth ca 1.2m. *Comment* (MFP): for earlier dates from palsa and thufur-type hills and other permafrost structures, see R, 1980, v 22, p 63-64.

C. Mongolia

Gd-823. Tot 225/KR **17,860 ± 230**

Remnants of rush plants with admixture of lake clay in continuous layer at depth 4.75m, overlain by layer, 2m thick, of lacustrine silt with plant admixture and lacustrine clay covered with stratified fluvial sands, in Tot-Nuurin Khot-nor Basin, 5km SW of Tot Lake, ca 20km S of small village Gallut (46° 40' N, 100° 5' E), S Khangai Mts. Coll July 1975 and subm 1980 by Karol Rotnicki. Sampling point is in central part of tectonic basin filled with lacustrine sediments of great Pleistocene pluvial lake, alt ca 2000m asl. *Comment* (KR): upper layer of plant remnants yielded date 17,220 ± 155. For more detailed inf, see Klimek and Rotnicki (1978).

II. SOIL SAMPLES

Fractions of soil organic matter from fossil soil horizons in dune sands were dated to check suitability of simple pretreatment procedure, consisting of acid-alkali-acid treatment, for reliable dating of fossil soil horizons developed from dune sands. Pretreatment of soil samples, described by Pazdur (1982), includes enrichment of organic matter by sedimentation in distilled water, treatment with 2% HCl at 80°C or 100°C for 1 hr (or at room temp for 24 hr), evaporation of acid-soluble fraction and washing of acid-insoluble fraction, similar treatment with sodium hydroxide, precipitation of alkali-soluble fraction by adding appropriate amount of HCl, washing of alkali-insoluble residue, and final treatment of acid-insoluble, alkali-insoluble residue with 2% HCl at 80°C for 30 min or with 1% HCl at room temp for ca 24 hr. Samples from soil horizons in Troszyn pretreated with 4% solutions of HCl and NaOH yielded amount of insoluble residue too small for accurate dating. For some soil samples age measurements were also made on total soil organic matter.

Troszyn series

Soil fraction samples from 3 fossil soil horizons in N part of parabolic dune, Troszyn, 7km E of Wolin, W Pomerania (53° 32' N, 14° 45' E). Coll and subm Nov 1978 by Bolesław Nowaczyk and M F Pazdur.

Gd-1087. Troszyn 78/1: total **720 ± 50**

Gd-664. Troszyn 78/1: acid-sol 510 ± 110

Gd-665. Troszyn 78/1: alkali-sol 1010 ± 60

From upper soil horizon at depth ca 80cm. *Comment* (MFP): charcoal from this soil horizon yielded date 1580 ± 70, Gd-546 (R, 1982, v 24, p 183).

Gd-657. Troszyn 78/2: total 2170 ± 70

Gd-690. Troszyn 78/2: acid-sol 2020 ± 210

Gd-1100. Troszyn 78/2: alkali-sol 2320 ± 50

From middle soil horizon at depth 3.8m. *Comment* (MFP): 2 charcoal samples assoc with this horizon yielded dates, 2300 ± 170 and 2440 ± 60, Gd-528 and -537 (R, 1982, v 24, p 183).

Gd-1088. Troszyn 78/3: total 3500 ± 60

Gd-683. Troszyn 78/3: acid-sol 2790 ± 220

Gd-666. Troszyn 78/3: alkali-sol 3600 ± 70

From lowest soil horizon at depth 6.4m. *Comment* (MFP): charcoal from fire-layer at top of soil horizon yielded date, 3130 ± 70, Gd-529 (R, 1982, v 24, p 183).

General Comment (MFP&BN): acid-soluble fractions of all samples did not produce enough CO₂ to fill counter to normal pressure. Dates on both total organic matter and alkali-soluble fraction agree well with corresponding dates on charcoal for middle and lowest soil horizons. For youngest soil level, rejuvenation due to rootlet penetration and infiltration of recent soluble organic matter is possible. More detailed discussion of dune structure and results of ¹⁴C dating is given by Karczewski and Nowaczyk (1978) and Nowaczyk and Pazdur (1982).

Pomorsko series

Soil and wood samples from 4 horizons of semihydromorphic and peaty soils in transverse dune close to glacial trough filled with lime gyttja and peat, Pomorsko (52° 05' 06" N, 15° 31' 50" E), Cigacice-Krosno sec of Warsaw-Berlin Pradolina, Great Poland Lowland. Coll and subm Nov 1978 by Bolesław Nowaczyk and M F Pazdur. Geomorphol and geol investigations of dune and glacial trough were made by Nowaczyk (1974; 1976; 1979); pollen analysis of biogenic sediments by Nowaczyk and Tobolski (1979; 1981); malacol analysis by Alexandrowicz (1980) and Alexandrowicz and Nowaczyk (1982), and pedol studies by Kowalkowski (1977a,b). Numerous flint artifacts from top of dune were analyzed by Michał Kobusiewicz (Nowaczyk *et al*, 1982) indicating several phases of human occupation by Komorniki, Janisławice, Swiderian, and Lusatian cultures. Descriptions of organic horizons and content of organic matter are given by Kowalkowski (1977a, fig 3).

Gd-739. Pomorsko 78/1: acid-sol 1100 ± 210

Gd-1064. Pomorsko 78/1: alkali-sol 710 ± 40

Semihydromorphic muck soil developed postsedimentarily in upper part of younger eolian sands; coll from top of organic layer at depth 100 to 105cm. Organic matter content ca 4%.

Gd-642. Pomorsko 78/1H: acid-sol 1250 ± 70**Gd-634. Pomorsko 78/1H: alkali-sol 1310 ± 60**

Same level, from base of soil layer at depth 105 to 115cm, organic matter content 2%.

Gd-636. Pomorsko 78/2: acid-sol 1850 ± 50**Gd-1067. Pomorsko 78/2: alkali-sol 2440 ± 60****Gd-1069. Pomorsko 78/2: res 2580 ± 60**

Semihydromorphic postsedimentary peaty soil in lower part of younger eolian sands, top of organic layer at depth ca 1.9m, organic matter content 5%.

Gd-637. Pomorsko 78/2H: acid-sol 1790 ± 100**Gd-1068. Pomorsko 78/2H: alkali-sol 2270 ± 50**

Sample from top of same layer, ca 2m from previous sampling point.

Gd-641. Pomorsko 78/3H: acid-sol 2770 ± 60**Gd-1070. Pomorsko 78/3H: alkali-sol 3070 ± 60****Gd-648. Pomorsko 78/3H: res 2200 ± 70**

From semihydromorphic horizon of boggy soil with marked postsedimentary features, depth ca 2.5m, organic matter content ca 6%.

Gd-653. Pomorsko 78/4H: acid-sol 3650 ± 80**Gd-1086. Pomorsko 78/4H: alkali-sol 4110 ± 60****Gd-655. Pomorsko 78/4H: res 3480 ± 70**

From trisegmentary organic horizon 10cm thick, consisting of lower muck horizon formed postsedimentarily in stabilized boggy sands and upper synsedimentary muck horizon separated by thin peat layer, depth 2.8m, organic matter content from 10 to 20%.

Gd-1043. Pomorsko 78/5A 7090 ± 50

Pinus and *Larix* cones from thin layer of eolian sands overlying layer of calcareous gyttja, 5m thick, underlying oldest soil, depth 3m.

Gd-643. Pomorsko 78/5B 10,200 ± 120

Unid. wood fragments, same loc. *Comment* (BN&MFP): date of Gd-1043 determines end of accumulation of calcareous gyttja; date of Gd-643 on wood seems too old, probably wood fragments redeposited from older sediments. Oldest layer of calcareous gyttja from pine phase of Alleröd

dated palynologically by Kazimierz Tobolski (see Nowaczyk, 1976) has ^{14}C date, $11,380 \pm 275$, Gd-378 (R, 1979, v 21, p 166). Detailed discussion of validity of ^{14}C dates of soil fractions and comparison with results of other studies is given by Nowaczyk *et al* (1982).

Rabsztyn series

Soil and charcoal samples from fossil soil levels covered by dune sands in Rabsztyn, 4km NE of Olkusz, NW part of Ojców Plateau ($50^{\circ} 18' 30''$ N, $19^{\circ} 36' 30''$ E). Coll and subm May 1979 by Bolesław Nowaczyk and Tadeusz Szczypek.

Gd-1206. Rabsztyn 79/1: alkali-sol	430 ± 50
Gd-736. Rabsztyn 79/1: res	260 ± 120
From uppermost soil horizon covered with series of well-stratified sands and recent soil; Site 1 in N part of dune, depth 0.6m.	
Gd-1118. Rabsztyn 79/2: total	1170 ± 60
Gd-680. Rabsztyn 79/2: alkali-sol	1360 ± 70
Gd-679. Rabsztyn 79/2: res	1320 ± 70
From middle soil horizon overlain by well-laminated sands, same loc, depth ca 2m.	
Gd-718. Rabsztyn 79/2W: charcoal	2640 ± 150
Fine charcoal from same soil horizon. <i>Comment</i> : undersized, diluted.	
Gd-1120. Rabsztyn 79/3: total	6460 ± 70
Gd-681. Rabsztyn 79/3: alkali-sol	6630 ± 80
From lowermost soil horizon between 2 series of unstratified sands, depth ca 3m, same loc.	
Gd-729. Rabsztyn 79/4: alkali-sol	800 ± 60
Gd-1197. Rabsztyn 79/4: res	750 ± 60
From soil horizon 20cm thick in central part of dune, Site 2, depth 2.5m.	
Gd-1122. Rabsztyn 79/5: total	1380 ± 60
Gd-1121. Rabsztyn 79/5: alkali-sol	1390 ± 60
Gd-1117. Rabsztyn 79/5: res	1480 ± 60
From soil horizon in S part of dune, Site 3, depth ca 2m.	
Gd-1116. Rabsztyn 79/6: total	840 ± 60
Gd-728. Rabsztyn 79/6: alkali-sol	900 ± 70
Gd-730. Rabsztyn 79/6: res	920 ± 130
From soil horizon in E part of dune, Site 4, depth 2m.	

Gd-1114. Rabsztyn 79/6W: charcoal 810 ± 60

Large pieces of charcoal from same loc.

General Comment (MFP): in general, good agreement is seen between dates of alkali-soluble fraction and insoluble residue for all dated samples of soil humus; dates on total soil organic matter are in all cases younger than other corresponding dates from same sample. Detailed discussion of results of ^{14}C dating and their comparison with results of geomorphol, geol, and strat studies of dune is given by Nowaczyk, Pazdur, and Szczypek (1982); background inf on geomorphol and chronol of dune-forming processes in vicinity is given by Szczypek (1977; 1980).

Grodzewe series

Charcoal and sandy humus from fossil soil horizons in dune at Grodzewo (52° 34' N, 14° 08' E), 25km W of Skwierzyna, Toruń-Eberswald Pradolina, W part of Gorzów Basin, Great Poland Lowland. Coll and subm Nov 1978 by Bolesław Nowaczyk and M F Pazdur.

Gd-632. Grodzewo 78/1W 2160 ± 60

Fine charcoal from upper part of middle soil level, depth 1.6 to 1.73m.

Gd-629. Grodzewo 78/2W 2590 ± 60

Fine charcoal from lower part of middle soil level, depth 1.86 to 2.03m.

Gd-779. Grodzewo 78/3H: alkali-sol 4120 ± 130**Gd-783. Grodzewo 78/3H: res 4000 ± 180**

Soil fractions from lowest soil horizon, depth 2.42 to 2.73m. *Comment*: undersized, diluted.

Budzyń series

Charcoal and sandy humus from fossil soil level in parabolic dune 5km W of Budzyń (52° 53' 30" N, 16° 56' 50" E), Gniezno Uplands, Great Poland Lowland. Coll 1979 and subm 1980 by Bolesław Nowaczyk.

Gd-1208. Budzyń 17/79H: alkali-sol 970 ± 60**Gd-1209. Budzyń 17/79H: res 990 ± 50**

Soil fractions, depth 2m.

Gd-1201. Budzyń 17/79W 1120 ± 60

Charcoal, same loc.

General Comment (BN): other dates on charcoal from soil horizons in dune are $11,400 \pm 320$ and 925 ± 125 , Gd-357 and -371 (R, 1979, v 21, p 166).

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