[RADIOCARBON, VOL. 11, No. 2, 1969, P. 271-277]

BERLIN RADIOCARBON MEASUREMENTS III

G. KOHL and H. M. MÜLLER

Deutsche Akademie der Wissenschaften zu Berlin, Deutsche Akademie der Landwirtschaftswissenschaften zu Berlin

The following list includes selected geologic and pollen dated samples measured since 1965. After moving to new laboratory quarters, we increased shielding to 470 g/cm² on all sides and 660g/cm² at the top. Background of our Houtermans-Oeschger-type counters filled with 700 mm Hg of acetylene is now:

Counter	*Volume*	*Background*
I	1.85 l	1.35 cpm
IV	2.23 l	1.22 cpm
V	3.6 l	2.25 cpm

Influence of the filling pressure on the net background counting rate is in the range of 0.15 cpm per 100 mm Hg variation of the filling pressure. Pretreatment of samples with 5% hydrochloric acid and 5% sodium hydroxide is routine. This procedure is modified where sample size precludes alkali leaching. Acetylene is prepared by SrC_2-method (Suess, 1954): sample $\rightarrow CO_2 \rightarrow (NH_4)_2CO_3 \rightarrow SrCO_3 \rightarrow SrC_2 \rightarrow C_2H_2$. The reduction of $SrCO_3$ to SrC_2 is modified from Suess (1954). Strontium carbonate, after being heated to 500°C to remove traces of water and ammonia, is reduced to strontium carbide with a mixture of 60 g of $SrCO_3$ to 40 g of Mg-powder. After initiating the reaction by torch, the reduction is completed by heating the mixture to 900°C for 1 hr in an electric furnace. Once the carbide is cooled, the mixture is passed through a screen to obtain satisfactory particle size. To generate acetylene, 10 cc of tritium-free water are added dropwise to the carbide in 60 to 90 min. Over-all yield is 90 to 95%. In some cases acetylene was prepared by Li_2C_2-method. We find Li_2C_2 produced acetylene is not pure enough for counting in gas proportional counting equipment. Therefore, Li_2C_2 produced acetylene is converted with hydrogen into ethylene (Gey, 1964).

After two measurements in our proportional gas counting set, the acetylene samples were converted to benzene with vanadium pentoxide catalyst on silica gel at 20° C (Romanova and Tscherdintsev, pers. commun.). These benzene samples can be stored for a long time and controlled in a scintillation system as a check.

In agreement with international conventions, all calculations of dates are made with the radiocarbon half-life of 5570 yr. The modern standard is 95% of the NBS oxalic acid.

Extensive pollen analyses required the dating of stages of vegetational development. On the one hand, absolute dates are necessary for correlation of diagrams from the plains of East-Germany (GDR); on the other hand, they are necessary for the classification of important vegetational and climatic events in central Europe. Therefore, samples from

TABLE 1

Location		No.	C^{14} yr ± 100 B.P.	
SEM*	Bläneckbruch	Bln-186	438	Younger Sub-Atlantic
	Bläneckbruch	Bln-187	491	
	Moosbruch Serrahn	Bln-188	586	
	Moosbruch Serrahn	Bln-189	805	
	Moosbruch Serrahn	Bln-190	881	
	Moosbruch Zinow	Bln-196	1073	
	Moosbruch Zinow	Bln-197	1115	Older Sub-Atlantic
NEL**	Weisswasser	Bln-663	1329	
	Weisswasser	Bln-540	1234	
SEM	Moosbruch Zinow	Bln-198	1518	
	Moosbruch Zinow	Bln-199	2516	
	Bixbeerenbruch	Bln-193	3824	Sub-Boreal
NEL	Kosel	Bln-486	3899	
SEM	Bixbeerenbruch	Bln-194	4180	
	Bixbeerenbruch	Bln-195	4765	Younger Atlantic
NEL	Hohenleipisch I	Bln-488	5056	
	Hohenleipisch II	Bln-538	5578	Older Atlantic
	Hohenleipisch I	Bln-487	6090	
	Hohenleipisch II	Bln-539	11,283	Alleröd

* SEM = SE Mecklenburg
** NEL = NE Lausitz

https://doi.org/10.1017/S003382220001122X Published online by Cambridge University Press

TABLE 1

Vegetational and historical events	Climatic events
uprooting in moist lowlands *Pinus* curve rises	
intensive uprooting phase	dry phase
maximum of *Fagus* and *Carpinus*, just before human influence	
maximum of *Fagus* and *Carpinus*	wet phase
beginning maximum of *Fagus*	
end of *Pinus* max., increase of *Fagus*	beginning of a wet phase
just before Sub-Boreal max. of *Pinus*, *Fagus* 5%	dry phase
increase of *Alnus, Betula, Quercus*, decr. of *Pinus*	beginning of a wet phase
beginning of a max. of *Alnus* and *Quercus*, last max. of *Corylus*, beginning of sharp increase of *Fagus*	wet phase
max. of *Pinus*	dry phase
end of Atlantic decrease of *Ulmus*	
just before a sharp increase of *Alnus*, decrease of Atlantic max. of *Tilia, Ulmus*, and *Corylus*	beginning of a wet phase
decrease from 1. max. of *Alnus*	beginning of a dry phase
in midst of Ålleröd increase of *Pinus*	

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SE Mecklenburg (SEM) and NE Oberlausitz (NEL) have been dated. Table I gives a summary of dates connected with vegetational-historical events and the climatic interpretation is shown. This table shows that the oldest dates were from NE Oberlausitz (NEL) and the youngest dates were from SE Mecklenburg(SEM). For the period between 5000 and 1100 yr B.P., dates of both areas agree approximately (Bln-488–195, 486-193, 663, 540, 197, 198). They indicate that vegetation-historical changes in E German (GDR) plain far from the shore occurred nearly synchronously.

Of great significance is the dating of late-glacial intensive expansion of pine in the Oberlausitz with 11,283 ± 200 B.P. which shows good agreement with the Alleröd layer in NE Germany, dated by the "Eifeltuffe" (K. Steinberg, 1944; Straka and de Vries, 1956; H. Straka, 1965; Woldstedt, 1958). It appears that there were no large time differences between the expansion of wood species in NE Lausitz and in SE Mecklenburg during the Late-Glacial. Pollen dates of the decrease from Early Atlantic maximum of *Alnus* (Bln-487), of another maximum of *Alnus*, parallel to the Atlantic decrease of *Ulmus* (Bln-488, Bln-195), of the late Sub-Boreal maximum of *Pinus* (Bln-199, Bln-198) and of the Sub-Atlantic maximum of *Fagus* (Bln-190, 196, 197, 540, 663) are important for the chronology of vegetational development in the Holocene.

SAMPLE DESCRIPTIONS

438 ± 120

Bln-186. Blänkbruch **A.D. 1512**

Sphagnum peat from Blänckbruch bog near Carpin, Kreis Neustrelitz (53° 22′ N Lat, 13° 15′ E Long); depth 0.35 to 0.40 m. Coll. and subm. by H. M. Müller, Inst. für Waldkunde, Eberswalde. *Comment*: Pollen Horizon X (Firbas-system); no NaOH pretreatment.

491 ± 100

Bln-187. Blänckbruch **A.D. 1459**

Humified bog-peat from Blänckbruch bog; depth 0.45 to 0.50 m. Pollen Horizon X (Firbas); no NaOH pretreatment.

Serrahn series

Peat samples from Serrahn bog, Kreis Neustrelitz (53° 40′ N Lat, 12° 20′ E Long). Samples taken by excavation. Coll. and subm. 1963 by H. M. Müller.

586 ± 100

Bln-188. Moosbruch Serrahn, 0.22 m **A.D. 1364**

Moderately to highly humified *Sphagnum* peat from above 0.5 cm thick layer at 0.22 m depth. Pollen Horizon X (Firbas); no NaOH pretreatment.

805 ± 100

Bln-189. Moosbruch Serrahn, 0.42 m **A.D. 1145**

Highly humified *Eriophorum* and *Sphagnum* peat. Pollen Horizon X (Firbas).

881 ± 100

Bln-190. Moosbruch Serrahn, 0.50 m **A.D. 1069**

Highly humified *Eriophorum* and *Sphagnum* peat. Pollen Horizon X (Firbas).

Zinow series

Samples from Zinow bog near Thurow, Kreis Neustrelitz. Samples collected by excavation. Bog was drained, surface destroyed by fire in 1952. Peat near surface strongly humified. Coll. and subm. 1963 by H. M. Müller.

1073 ± 100

Bln-196. Zinow, 0.20 to 0.25 m **A.D. 877**

Moderately humified *Sphagnum* peat, 0.20 to 0.25 m below surface, penetrated by modern roots. *Comment*: end of Pollen Horizon IX (Firbas).

1115 ± 100

Bln-197. Zinow, 0.30 to 0.35 m **A.D. 835**

Moderately humified *Sphagnum* and *Eriophorum* peat, penetrated by modern roots. Pollen Horizon IX (Firbas).

1518 ± 100

Bln-198. Zinow, 0.45 to 0.50 m **A.D. 432**

Moderately humified *Sphagnum* peat, penetrated by modern roots. Pollen Horizon IX (Firbas).

2516 ± 100

Bln-199. Zinow, 0.60 to 0.65 m **566 B.C.**

Moderately humified *Sphagnum* peat, penetrated by roots. Pollen Horizon VIII (Firbas).

Bixbeerenbruch series

Peat samples from Bixbeerenbruch bog near Serrahn, Kreis Neustrelitz. Samples collected by excavation. Coll. and subm. 1963 by H. M. Müller.

3027 ± 100

Bln-192. Bixbeerenbruch, 0.30 to 0.35 m **1077 B.C.**

Highly humified stabilized peat, penetrated by modern roots. Pollen Zone VIII (Firbas). Increase of *Fagus*.

3824 ± 100

Bln-193. Bixbeerenbruch, 0.35 to 0.40 m **1874 B.C.**

Highly humified strong stabilized peat, penetrated by modern roots. Pollen Horizon VIII (Firbas). Increase of *Betula, Alnus, Quercus,* decrease of *Pinus*.

4180 ± 100

Bln-194. Bixbeerenbruch, 0.45 to 0.50 m **2230 B.C.**

Highly humified strong stabilized peat, penetrated by modern roots. End of Pollen Horizon VIII (Firbas), 4th *Corylus* maximum.

4765 ± 100
Bln-195. Bixbeerenbruch, 0.60 m **2815 B.C.**

Highly humified peat, slightly wet, somewhat penetrated by modern roots. Pollen Horizon VII (Firbas).

1329 ± 100
Bln-663. Weisswasser **A.D. 621**

Peat from brown coal open mine "Frieden" Profile II (51° 30′ N Lat, 14° 30′ E Long) at depth 0.55 m. Peat contains much birch wood. Coll. 1966 by K. H. Grosser, Inst. für Landesforschung und Naturschutz, Halle, Zweigstelle Potsdam. Subm. by H. M. Müller. *Comment*: *Fagus* maximum of older Sub-Atlantic.

1234 ± 100
Bln-540. Weisswasser **A.D. 716**

Cellulose, isolated from peat of Bln-663 with "Schweizers" reagent.

3899 ± 100
Bln-486. Kosel **1949 B.C.**

Half-bog raw humus from *Picea-Pinus* forest from Kosel Heideanger, Bezirk Cottbus, Lausitz. Depth 0.20 to 0.23 m. Coll. and subm. by H. M. Müller. *Comment*: decrease of *Corylus* maximum, increase to *Fagus* maximum of Sub-boreal, Pollen Zone VIII (Firbas).

Hohenleipisch series

Samples from 2 locations from bog near Hohenleipisch, Bezirk Cottbus, Lausitz (13° 35′ E Long, 51° 30′ N Lat). Profile I: below meadow, 0.65 m peat above 0.75 m mud and underlying sands. Coll. and subm. 1965 by H. M. Müller. No NaOH pretreatment. Profile II: below meadow 1.20 m peat above sands. Coll. and subm. 1966 by H. M. Müller.

5056 ± 100
Bln-488. Hohenleipisch I **3106 B.C.**

Peat from depth 0.32 to 0.35 m. Decrease of *Corylus* maximum of older Atlantic. Pollen Zone VIII (Firbas).

6090 ± 100
Bln-487. Hohenleipisch I **4140 B.C.**

Peat from charred layer 0.50 to 0.55 m deep. Older Atlantic, Pollen Zone VII/VI (Firbas).

5578 ± 100
Bln-538. Hohenleipisch II **3628 B.C.**

Highly humified sedge and *Hypnum* moss peat, depth 0.60 m. Pollen analysis shows: *Picea* 0.9%, *Pinus* 20%, *Betula* 43%, *Alnus* 30%, *Quercus* 4.6%, *Tilia* 0.9%, *Ulmus* 0.9%, *Fraxinus* 0.6%, *Corylus* 8%, *Salix*, 1.6%, non-tree pollen 3%. *Comment*: 1st half of Atlantic, Pollen Zone VI/VII (Firbas).

11,283 ± 200

Bln-539. Hohenleipisch II **9333 B.C.**

Highly humified peat, depth 0.98 to 1.03 m. Pollen analysis shows: *Betula*, 56%, *Pinus* 41%, *Alnus* 3.7%, *Corylus* 0.3%, *Salix* 1%, non-tree pollen 44%. *Comment*: Pollen Zone II (Firbas).

General Comment: dates of vegetational change agree well with those from other regions of Central Europe. Study of numerous pollen profiles permits inferences about paleoclimatic fluctuations in the Holocene. Repeated change in vegetational structure indicates fluctuations of moisture from Pre-Boreal to Sub-Atlantic time. In NE Germany the number of moist and dry phases appears greater than in SE Germany. Absolute dating of changes of moisture availability in different regions indicate a relationship to changes of sea level.

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