stood for us to judge whether this nature is endangered, and if so to appraise how great the danger really is. Populations of various organisms will have to be studied. Of course, man is one of them. But it can hardly be overstressed that different organisms are most favorable for investigation of different aspects of population genetics, and that progress would be obstructed or side-tracked by undue concentration. The way towards understanding of biological aspects of human nature may lead through such lowly creatures as mice, drosophila, and even viruses.

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Heidelberg Natural Radiocarbon Measurements I

K. O. Münnich

Radiocarbon age determinations made at the University of Heidelberg in the period between March 1954 and July 1956 are described in this article (*1*). Tables 1, 2, and 3 contain various calibration measurements; Tables 4 and 5, the age determinations. Proportional counting of carbon dioxide with a gas pressure of roughly 1 atmosphere was used in making the measurements.

The carbon-14 content of a sample was compared with that of an arbitrary recent standard. Our standard is based on wood of the 19th century—that is, on wood that grew before the dilution of carbon-14 in the atmosphere by the industrial combustion of coal and oil (see subsequent paragraphs). For the calculations, a value of 5568 years (*2*) was used for the half-life of carbon-14.

The error given (*3*) is the statistical fluctuation of the carbon-14 measurement; it does not take into account variations resulting from other causes such as small fluctuations in the carbon-14 content of different plants of the same age, the uncertainty of the half-life, and others. These other variations have not been investigated thoroughly enough, and it is difficult to estimate them exactly. Most of the systematic errors are either common to all carbon-14 measurements (uncertainty in the half-life of C^{14}), or at least to all measurements made by the same laboratory (different standards for recent carbon), and radiocarbon dates can easily be corrected for them if new information should prove that correction is necessary.

Because these errors are relatively small, they are unimportant for older samples. However, some of the younger samples have a statistical error of less than 100 years; in these cases, we propose that ±100 years be taken as the error if the figures are to be compared with historical dates, to allow for the afore-mentioned uncertainties.

The determinations listed in this article are numbered as follows: the first number following the letter H (Heidelberg) refers to the position in our sample list, and the second (after the hyphen) is the number of the specific determination.

Fossil organic material was usually treated only with hot, diluted acid, primarily to remove carbonates, but in addition, some samples were also treated with diluted alkali to remove humic acids.

The datings based on bone and antler seem to be unreliable. Even the organic fraction of bone frequently gives lower dates than the archeologic relationships allow. By "organic fraction" is meant the proteinic emulsion that is obtained after the finely ground bone has been dissolved in acid and purified by dialysis. The calcareous fraction of bone and antler (that is, the carbon dioxide generated by treatment with acid) shows even larger deviations from the true age, amounting to up to several thousand years in the case of old bones. Contamination by ground water seems plausible, considering the high carbon-14 content in the dissolved bicarbonate. The hard waters that we investigated (*4*) showed an apparent age of only 1000 to 3000 years.

We also consider it possible that the organic fraction has been contaminated by ground water. The C^{14}-active carbon dioxide in ground water is derived from the humus layer on the surface, and it is by no means impossible that sufficient organic material (*5*) to cause contamination is transferred by the water from this source and absorbed by the proteins in the bone. One cannot remove these absorbed substances from bone as easily as one can from wood, where the cellulose, which is for the most part insoluble, is treated with hot acids and bases and separated by filtering. Proteins, on the other hand, if treated in the same way, would themselves be dissolved. In the special case when the organic and calcareous fractions of a bone give the same age, the age can be accepted as correct, for it is very improbable that both fractions have undergone exactly the same amount of contamination.

Calibration Measurements

A series of carbon-14 determinations of wood dated exactly by dendrochronology has been made. With the age known, the loss of sample activity by radioactivity decay could be eliminated. Thus, after correction, each measurement gives a value for the activity of "recent carbon"—that is, the quantity A_0 in the decay law $A/A_0 = \exp. (-t/\tau)$ on which the calculation of radiocarbon ages is based (A is the measured activity of a sample today, t is the age of the sample, and τ is the mean life of carbon-14). The A_0 used in calculating the age values given is the mean of a preliminary set of measurements of this type. Further measurements shifted the mean slightly, but for practical reasons we have kept our original value of A_0 as a more or less arbitrary standard.

Table 1 contains the individual cali-

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bration measurements showing the percentage deviation from our standard. Although the deviation of the mean of all calibration measurements from the standard is insignificant and the agreement within the several groups is good, it should be stated that the groups differ from each other. We do not intend to go into details about the possible causes, but as can be seen, the definition of a recent standard is, within certain limits, arbitrary. A deviation of ± 1 percent in the activity corresponds to a deviation of ∓ 80 years in the ages to be calculated. If we were to take as an extreme example the mean of our measurements on oak tree rings from the 16th century (corrected for age) as a standard, the carbon-14 ages we give would be higher by 100 ± 27 years. On the other hand, the age we get with our present standard for the exactly dated samples of charcoal found at the Roman settlement of Heidelberg-Neuenheim (samples H169-210, H166-158, and H93-73) is already about 50 ± 40 years too great. Under these conditions, there is a discrepancy of 150 ± 48 years. We mention this only to show the extent to which the error in absolute age from this source may amount. But as has been mentioned already, such an error could easily be corrected for afterward by deducting, for example, 50 years from all carbon-14 ages given by this laboratory. Incidentally, such a correction does not increase with the age of samples and therefore primarily concerns young dates.

To be able to reproduce our recent standard easily we use carbon dioxide from a Na_2CO_3-solution with a specific carbon-14 content roughly 10 times that of recent wood.

Table 2 contains some measurements on modern plants. As in Table 1, the percentage deviation from our standard of recent carbon is given. The lower C^{14}-content of plants living in the 20th century can be ascribed to industrial combustion of coal and oil. The values obtained here are in agreement with those which Suess (*6*) made on plants from the East Coast area of the United States.

Table 3 contains some calibration measurements on bone and antler.

Table 1. Determinations of wood dated by dendrochronology. All tree ring measurements with identical sample numbers (that is, the first number) came from the same tree. The samples were provided by B. Huber and W. von Jazewitsch. All activities were corrected for age. Percentage deviation of activity from recent standard is given in column 3.

Description	Sample	Deviation
19th century		
Oak, rings 1840 to 1850. This tree (No. 1220) came from the Spessart Forest; it contained rings from A.D. 1506 to about 1930.	H11-31	− 0.82 ± 0.47
Oak, rings 1840 to 1850.	H11-81	− 1.81 ± 0.52
Oak, rings 1840 to 1850. This tree (No. 1220/2) came from the Spessart Forest (Rothenbuch, Denkstein section); it contained rings from A.D. 1540 to 1948.	H55-147	− 0.34 ± 0.41
Fir, rings 1840 to 1850. This tree (No. N2/BW136) came from the Bavarian Forest; it contained rings from A.D. 1640 to 1950.	H12-47	+ 0.73 ± 0.35
Fir, rings 1840 to 1850.	H12-80	+ 0.13 ± 0.35
17th century		
Fir, rings 1675 to 1690.	H12-61	+ 0.91 ± 0.35
16th century		
Oak, rings 1505 to 1525.	H11-29	+ 1.51 ± 0.73
Oak, rings 1523 to 1539.	H11-198	+ 0.91 ± 0.73
Oak, rings 1530 to 1560.	H55-50	+ 1.29 ± 0.43
14th century		
Büdingen castle (Hessen). Beam of oak, rings 1382 to 1386.	H152-199	+ 0.47 ± 0.78
Fürsteneck castle (Hessen). Beam of oak, rings 1362 to 1382.	H155-189	− 0.26 ± 0.69
Weighted averages (weight = statistical accuracy of each measurement)		
Oak, 19th century.		− 0.90 ± 0.27
Fir, 19th century.		+ 0.43 ± 0.25
Oak, 16th century.		+ 1.25 ± 0.33
Oak, 14th century.		+ 0.05 ± 0.52
Weighted average of all measurements (= "wood before 1850").		+ 0.26 ± 0.14

Table 2. Effect of industrial combustion of coal and oil on the specific C^{14}-activity of modern plants (compare Table 1). All activities were corrected for age. Percentage deviation of activity from recent standard is given in column 3.

Description	Sample	Deviation
Oak from the Spessart Forest (sample description is in Table 1). Wood from a layer under the bark, 1 mm thick; about A.D. 1930.	H11-69	− 2.80 ± 0.65
Birch twigs (1954) from the Kaltenhofener Moor 15 km north northwest of Kiel, provided by F. Overbeck.	H74-52	− 3.15 ± 0.6
Peat moss from the Kaltenhofener Moor, mostly *Sphagnum recurvum* from a bog (*p*H, 4.5), 1 year old in 1954; provided by F. Overbeck.	H78-58	− 2.63 ± 0.52
Samples from the limestone area (compare *4*) 50 km east of Heidelberg.		
Grass from an open site.	H160-187	− 2.80 ± 0.9
Moss from a ditch in a wood, a relatively badly ventilated site.	H162-162	− 3.23 ± 0.73
Branches from the same site as sample H162 growing about 2 m above the ground.	H161-177	− 3.97 ± 0.82
Weighted average of the C^{14} activity of modern plants (Weight = statistical accuracy).		− 3.02 ± 0.27

Table 3. Carbon-14 activity of bone and antler. All activities were corrected for age. Percentage deviation of activity from recent standard is given in column 3.

Description	Sample	Deviation
Palmed antlers of fallow-deer, about 50 years old, provided by E. Wohlfahrt. Organic fraction.	H135-111	− 2.1 ± 0.65
Recent bone from cattle (1956).	H179-171	− 2.1 ± 0.75

References and Notes

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Table 4. Samples dated archeologically or by pollen analysis. The carbon-14 age is given in years plus or minus the root-mean-square error of counting (*7*).

Description	Sample No.	Age
I. *Europe*		
A. *Late Ice Age*		
Meiendorf, Holstein. Site of Older Hamburg culture, Oldest Dryas (pollen analysis by R. Schütrumpf), older than Poggenwisch (see samples H31 and H32). Collected by A. Rust; submitted by H. Schwabedissen.		
Porous branches of antler (compare *8, 9*) dissolved in hot HCl, one-half of the solution purified by dialysis ("organic fraction").	H38-121A	12,000 ± 200
The other half of the solution was evaporated without further purification.	H38-121B	12,300 ± 300
Carbonate fraction of the antler.	H38-121C	6150 ± 500
Poggenwisch, Holstein. Younger Hamburg culture. Pollen analysis by R. Schütrumpf (*10*): Oldest Dryas, before the Bölling oscillation. Collected by A. Rust; submitted by H. Schwabedissen. Compare sample W-271, 11,750 ± 200 yr (*8*).		
Bone, organic fraction.	H31-67	13,050 ± 270
Calcareous gyttja, carbon content 2.7 percent (organic fraction) plus 1.9 percent (calcareous fraction, corresponding to 16 percent $CaCO_3$).		
1) Residue after treatment with HCl and filtration; compare sample W-93, 15,150 ± 350 yr. (*11*). CO_2 from hard water assimilated by the water plants (*12*) probably caused a lower initial C^{14} content and therefore raised the apparent age.	H32-60	15,700 ± 350
2) Calcareous fraction. Because the apparent age of the chalk is even greater, it seems likely that the subsequent exchange of carbonate between gyttja and water (*4*) was comparatively low.	H32-118a	17,100 ± 560
3) Filtrate obtained from the same portion after treatment with HCl and purified by dialysis—that is, prepared in the same way as the organic fraction in the case of bone.	H32-118c	12,850 ± 500
Wood, small twigs, submitted by A. Rust.	H136-116	12,980 ± 370
Munzingen, Baden-Württemberg. Magdalenian culture layer in loess. Submitted by H. Schwabedissen. Antler, organic fraction. Corresponds to sample W-266, 10,100 ± 250 yr. (*8*). The age must be at least 11,000 to 12,000 yr.	H129-104	10,200 ± 250
Petersfels, near Engen, Baden-Württemberg. Well-known Magdalenian cave excavated by E. Peters; sample submitted by H. Schwabedissen. Antler, organic fraction. Compare with sample W-267, 8200 ± 200 yr. (*8*). The age is at least 10,000 to 12,000 yr.	H130-114	10,150 ± 230
Lake of Gatersleben, Middle Germany. Layers of peat from the first advance of birch trees after the last glaciation (Bölling-Interstadial). According to these measurements, the Bölling-Interstadial lies shortly before the Alleröd period, meaning that the Older Dryas between them lasted only a few centuries (*13*). Samples collected and identified by pollen analysis by H. Müller. Submitted by F. Firbas.		
Wood (*Salix, Betula*) found at a depth of 370 to 380 cm in a rush peat. According to pollen analysis, this sample dates from a time preceding or at the beginning of the Bölling period.	H88-74	13,250 ± 280
Wood from clay with organic sediments at 280 to 290 cm depth, 10 to 20 cm higher than the calcareous sediments belonging to the Bölling period. According to pollen analysis, this sample dates the beginning of Older Dryas (Ic).	H77-54	12,300 ± 260
Wood from the same peat as sample H88, also from immediately before or at the beginning of the Bölling period.	H106-89	12,700 ± 320
Wallensen im Hils. Peat sediments 0 to 2 cm above the layer of volcanic ash between the lake sediments of the Alleröd period. The sample dates the last big eruptions of the volcanic Lake of Laach (Eifel Mountains) and the Alleröd period. The sample has been dated by several laboratories, the results agreeing well (*14*). Submitted by F. Firbas.	H1-8 H1-48	11,900 ± 500 11,800 ± 300
Andernach (Rhine), Martinsberg. Magdalenian site (VIb). Submitted by H. Schwabedissen (*15*).		
Antler, organic fraction.	H85-91	11,300 ± 220
Bone, carbonate fraction.	H193-178	4330 ± 360
Rissen, near Hamburg. Layer from		

Description	Sample No.	Age
the Late Magdalenian culture (Federmessergruppe, *15*). The pollen age determined by R. Schütrumpf is Alleröd. Excavated and submitted by H. Schwabedissen.		
Carbonate-free gyttja sample from a horizon below the culture layer.	H21-18	11,550 ± 280
Wood from the gyttja.	H18-11	11,930 ± 290
Carbonized wood from the culture layer. Compare samples Y-157A and Y-157B, 10,560 ± 200 yr and 9280 ± 290 yr (*9*).	H75-68	11,450 ± 180
Ruds Vedby, Denmark. Wood from the boundary between the Alleröd and Younger Dryas. The reference sample was provided by J. Iversen. Compare sample K-101, 10,890 ± 240 yr. (*16*), and samples W-82 and W-84, 10,260 ± 200 yr and 10,510 ± 180 yr, respectively (*11*).	H105-87	11,500 ± 300
B. *Middle Stone Age*		
Geislingen-Steige, Württemberg, Rohrach Valley. Wood from the "Basismudde" covered by calcareous tufa and other postglacial sediments, representing the first sediments after the glaciation that are datable by pollen analysis. Pollen age, Preboreal. Submitted by P. Groschopf (*17*).	H126-143	9290 ± 190
Duvensee, Schleswig-Holstein. Mesolithic settlement. Pollen age determined by S. Schneider is Early Boreal (VIa). Excavated and submitted by H. Schwabedissen.		
Board with bark of birch from the floor of a hut.	H23-22	9200 ± 300
Hazelnut shells mixed with some carbonized wood. Compare sample Y-161, 8760 ± 70 yr (*9*).	H26-23	9030 ± 350
C. *Neolithic, Bronze, and Iron ages*		
Heidmoor, district of Berlin, Schleswig-Holstein. Neolithic moor settlement. Excavated and submitted by H. Schwabedissen. Compare samples Y-443-b and Y-443-e, 4530 ± 170 yr and 4400 ± 170 yr (*9*).		
Carbonized wood found 5 cm above the top culture layer, Glockenbecher culture, field 719a.	H27-25	3720 ± 150
Wood from 5 cm below the Glokkenbecher culture layer. Part of the piece was located inside the Glockenbecher stratum. Field 719c.	H28-33	3970 ± 170
Wood from field 719h. Early Trichterbecher culture.	H29-146	5140 ± 115
Charcoal from field 719h. Early Trichterbecher culture.	H30-145	5020 ± 105
Ehrenstein, near Ulm (Danube). Neolithic settlement containing Schussenrieder and Michelsberger ceramics. Archeological date 2000 B.C. (*18–20*). Should be older, according to pollen analysis (P. Groschopf): Late Eichenmischwald period. Submitted by P. Groschopf.		
Wood from a house.	H125-107	5200 ± 200
Another piece of wood (a) from this excavation.	H61-149	5140 ± 130
Grünhof-Tesperhude, Schleswig-Holstein. Charcoal from a tumulus, Middle Bronze Age, 1300 to 900 B.C. Collected by K. Kersten; submitted by H. Schwabedissen.	H40-34	3120 ± 160

Description	Sample No.	Age
D. *Roman, Medieval ages*		
Aachen. Cathedral. Planks of oak wood from 2.20 m depth below the cloister courtyard, presumably making up a fresh-water conduit of the Roman period (1st century A.D.). Submitted by F. Kreusch.	H54-44/54	2060 ± 90
Mainz. Beam of the Roman bridge over the Rhine discovered during reconstruction work on the present Rhine bridge. The Roman bridge definitely existed in the 1st century A.D.; it was destroyed and reconstructed several times and then disappeared about A.D. 300. Submitted by R. Immel through W. von Jazewitsch.	H59-57	2010 ± 60
Heidelberg. Roman settlement at Neuenheim. Samples collected and submitted by B. Heukemes.		
Beam from wooden support underneath the pillar of a stone bridge. This bridge was built, according to an inscription, at the close of the 2nd century A.D. The existence of an older wooden bridge at the same place during the close of the 1st century is very probable. The beam possibly originates from this older construction.	H94-72	2060 ± 110
7, Werderstrasse. Charcoal from a layer of iron slag found in the lower level of a Roman cellar (A) dated A.D. 70 to 80. Some larger pieces of charcoal have been identified as oak and beech (W. von Jazewitsch).	H169-210	1930 ± 80
2, Jahnstrasse. Charcoal, consisting mostly of carbonized pine needles, from a Roman garbage pit; about A.D. 100.	H166-158	1915 ± 65
93, Ladenburgerstrasse. Charcoal from pit C dating from the Trajan period, A.D. 100 to 110.	H93-73	1905 ± 65
8, Jahnstrasse. Bones from garbage pit A, organic fraction.	H91-71	2240 ± 70
Another portion of sample H-91.		
1) organic fraction.	H91-126a	1885 ± 80
2) carbonate fraction.	H91-126b	1260 ± 150
Groningen, Netherlands. Wood from the Saint Walburg Church. The reference sample was provided by H. de Vries. By using the standard for recent carbon at the time of measurement 2 years ago, we obtained an age of 1065 ± 130 yr (*21*), which agrees well with the dates obtained by other laboratories (the mean of a great number of determinations at Groningen was 1000 ± 60 yr). Our former standard was the C^{14} content of present-day wood, which was commonly used at that time. Meanwhile, to eliminate the effect of industrial combustion, we changed to the standard described in the text, which is the basis of all the determinations contained in this list.	H8-7	1245 ± 130
Höhbeck, Niedersachsen. Charcoal from the bottom of a ditch of this fortification. Carolingian age (*22*).	H87-76	1070 ± 80
Kassel. Brüderkirche. Beam of oak, mean age of the outmost rings. The rings were dated by C^{14} in order to make the work of dendrochronologic synchronization easier. The C^{14} age in this case is not based on our standard but was obtained by direct comparison with wood from the 16th and 19th	H63-36	508 ± 85

Description	Sample No.	Age
centuries. Meanwhile, dendrochronologically, the last ring has been dated at A.D. 1392 (*23*). Submitted by W. von Jazewitsch.		
E. *Recurrence horizons in German bogs*		
One of the recurrence horizons in German bogs is very striking. It is called the "Grenzhorizont" (C. A. Weber). Weber supposed it to be the result of a stoppage in the growth of the moor lasting about 1000 years. He dated the subsequent setting-in of a moister climate at about 800 B.C., according to the stratigraphic position of an archeologically dated human body found near the horizon. Later on, the Grenzhorizont was generally accepted as being of the same age as the Swedish RY III (600 B.C.). But there have been doubts about the simultaneity of all the horizons. According to our measurements, the recurrence horizons called Grenzhorizont and thought to be of equal age seem to be separated into three groups: at about 600 B.C., 100 B.C. and A.D. 650. The 100 B.C. group is the most strongly represented among the examples investigated so far. A longer interruption in growth we did not find (compare *9*). Measurements on peat samples either purified with alkali or unpurified show the reliability of C^{14}-determinations of peat under such circumstances, as do the dates from wood in the same stratigraphic position. This reliability was questionable. A more thorough description is given by Overbeck (*24*). Submitted by F. Overbeck.		
Rotes Moor, Rhön Mountains. 800 m above sea-level.		
Peat 0 to 2 cm above a younger horizon "RY II."	H70-102	1390 ± 120
Peat 0 to 2 cm below Grenzhorizont.	H67-49	2010 ± 80
Grosses Moor, near Gifhorn (Lüneburger Heide).		
Peat 0 to 2 cm above Grenzhorizont.	H72-88	2050 ± 110
Peat 0 to 2 cm below Grenzhorizont.	H71-85	2100 ± 100
Peat 4 to 6 cm below Potonié-Horizon.	H119-103	4040 ± 150
Hellweger Moor near Bremen.		
Peat 0 to 2 cm above Grenzhorizont; treated with alkali.	H171-163	2100 ± 65
Sprigs of *Calluna* from the horizon; treated with alkali.	H183-217	1965 ± 65
Peat 0 to 2 cm below Grenzhorizont; treated with alkali.	H182-203	2050 ± 75
Moor of Melbeck, near Lüneburg (*2*).		
Peat 0 to 10 cm above Grenzhorizont; treated with alkali. Compare sample C-449, 1129 ± 115 yr.	H163-156	1240 ± 60
Peat 0 to 10 cm below Grenzhorizont; treated with alkali. Compare sample C-450, 1449 ± 200 yr.	H164-160	1500 ± 80
Wittmoor, near Hamburg (*25*).		
Peat 0 to 2 cm above a younger horizon (a), unpurified.	H232-211	1185 ± 70
Wooden plank (oak) from the Younger Plankway lying in this horizon.	H231-204	1265 ± 55
Peat 0 to 2 cm below the horizon; treated with alkali.	H230-235	1360 ± 60
Wood from a stake, 5 cm thick, from the Older Plankway, lying 15 to 20 cm above Grenzhorizont.	H167-159	1840 ± 75
Peat 0 to 5 cm above Grenzhorizont; treated with alkali.	H89-70	2040 ± 50
Humic substances isolated from this sample.	H89-70a	2150 ± 75
Recheck, corresponds to H89-70; treated with alkali.	H89-135	2000 ± 65
Peat 0 to 2 cm above an older recurrence horizon (d); treated with alkali.	H165-157	2920 ± 65
Peat 0 to 2 cm below this horizon; treated with alkali.	H184-202	2915 ± 85
Doosenmoor, near Neumünster, Schleswig.		
Peat 0 to 2 cm above Grenzhorizont; treated with alkali.	H180-173	2560 ± 100
Peat 0 to 2 cm below Grenzhorizont; treated with alkali.	H181-181	2755 ± 100
Grosses Moor von Dätgen, near Neumünster, Schleswig.		
Peat 0 to 2 cm above Grenzhorizont, unpurified.	H150-139	2365 ± 60
Same sample treated with alkali.	H150-148	2460 ± 75
Sprigs of *Andromeda* and roots of *Eriophorum angustofolium* from the horizon; treated with alkali.	H148-128	2540 ± 100
Peat 0 to 2 cm below Grenzhorizont; treated with alkali.	H149-132	2690 ± 75
II. Iraq		
Uruk-Warka. Samples from excavations made by Deutsches Archäologisches Institut and the Deutsche Orientgesellschaft in 1954; submitted by A. Falkenstein.		
Remains of reeds from the deepest strata reached in the profile in Eanna lying on the natural soil. See Nöldeke *et al.* (*26*): "Well-preserved layers of reed" below the index "ground water level 1932."	H138-123	6070 ± 160
Wood from younger strata of temple of Ningischzida in Eanna. Neo-Babylonian or Seleukidian.	H139-129	2200 ± 90
Remains of reeds from layers of mats in the Ziqqurrat of Urnammu in Eanna; see Jordan (*27*, Figs. 9 and 10). The mat derives from the construction work under Urnammu, the first king of the 3rd dynasty or, at the latest, to that under his son and successor, Schulgi. Consequently, according to the chronological calculations of W. F. Albright, it dates to the period between 2070 and 2000 B.C. In order to extract any humic acids which could have infiltrated, the sample was treated with alkali.	H141-120/166	3825 ± 85
Ash with traces of charcoal from the oldest level of Bīt Akītu, from the court just outside the side-cella which is situated near the north corner of the court yard; see Lenzen (*28*, Table 2, room 36).	H142-133	2465 ± 170

Table 5. Dates of samples having an age known only within very wide limits.

Description	Sample No.	Age
Elbe River. Trunks of oak wood found during dredging at different places in the Elbe bed. Submitted by Wasser- und Schiffahrtsdirektion, Hamburg.		
Found in Sept. to Oct. 1954 at the 485.7-km point; length, 7 m; diameter, 0.4 m; 123 year rings.	H100-101	1930 ± 100
Found in Sept. to Oct. 1954 at the 473.7-km point; length, 8 m; diameter, 0.9 m; 112 rings.	H101-115	555 ± 90

Description	Sample No.	Age
Found in Oct. 1953 at the 572-km point; 53 rings.	H102-137	2000 ± 60
Burlafingen, Kreis Neu-Ulm. Oak trunk, 0.8 m in diameter, thought to have been worked in Neolithic times, from a gravel pit in the valley of the Danube under about 4 m of gravel. At the same place, an old valley floor, a great number of trunks have been found. Presumably a wood standing there was destroyed by floods (*29*, *30*). Submitted by P. Groschopf.	H124-138	1850 ± 75
Lage in Lippe. Oak trunk, 0.5 m in diameter, discovered 4.5 m beneath the bottom of the valley in gravel thought to have been deposited during the Last glaciation. Nearby have been found an elk antler, heavily damaged by glacial movement, and a well-preserved skull of a horse which is similar (G. Nobis) to those known to have existed in Germany during the Iron Age and the Roman period. Submitted by O. Suffert.	H168-161	2950 ± 75
Saint Gallen, Switzerland. Remains of a prehistoric wood (*31*) containing 130 trunks, which have been identified, and further remains—for example, seeds—also identified. The ratio of the several species is to a large extent the same as in the natural composition of wood growing in such a location today. The wood was found in a shallow valley about 800 m above sea level; the drainage of the valley was checked by landslides. The valley became a moor, and the wood died. Submitted by H. Oberli.		
Fir with mistletoe from this valley. A C^{14}-determination of another sample from this trunk, in Bern, gave 3200 ± 130 yr (*32*).	H81-62	3040 ± 100
Beech buried in the landslide.	H104-90	3590 ± 130
Schruns, Vorarlberg, Austria. Spruce trunk found at 1700 m above sea level, together with trunks of other species, during construction work of a water power plant. The wood was found after a horizontal gallery had been bored for a distance of 85 m at an underground depth of 70 m. The trunks reached their present position as the result of a landslide. The ratio of the various species of wood found is essentially the same as it is in this locality today (A. Pisek). Submitted by Vorarlberger Illwerke A. G., Schruns. Three other wood samples from this place, dated in Bern, gave 5350 ± 140, 5500 ± 160, and 5500 ± 140 yr (*32*).	H122-100	5860 ± 150
Hredavatn, Iceland. Peaty layer in sediments linked with layers of lava. The eruptions are very likely younger than the peat layer. Submitted by M. Schwarzbach (*33*).	H146-124	3700 ± 120
Heidelberg, bone of a mammoth, discovered during construction work about 1 m deep in a calcareous loess. The age obtained is too small, for mammoths became extinct several thousand years earlier.		
Organic fraction.	H145-117	7480 ± 200
Carbonate fraction; compare Münich (*4*).	H145-127	3370 ± 90

News of Science

Pugwash Statement

At the invitation of British philosopher and author Bertrand Russell, and through the hospitality of Cyrus Eaton, Cleveland industrialist, a group of scientists, drawn from about ten nations and widely representative of different political, economic, and other opinions, met in a conference at Pugwash, Nova Scotia, between 6 and 11 July. The meeting originated in the suggestion contained in the Russell-Einstein appeal, made 2 years ago, that scientists should meet to assess the perils to humanity which have arisen as a result of the development of weapons of mass destruction.

The following scientists participated in the conference: M. L. E. Oliphant, physicist, director of the Post-graduate Research School of Physical Sciences, National University of Australia, Canberra; H. Thirring, physicist, University of Vienna, author of *Theory of Relativity and Einstein Theory*; G. Brock Chisholm, physician, Victoria, B.C., former director general of the United Nations World Health Organization; Chou Pei Yuan, vice rector of Peking University; A. M. B. Lacassagne of l'Institut du Radium, Paris; C. F. Powell, Nobel laureate in physics of the H. H. Wills Physical Laboratory at Bristol, England; J. Rotblat, executive vice president of the Atomic Scientists' Association and physicist at the University of London; I. Ogawa, professor of Tokyo's Rikkyo (St. Paul's) University; H. Yukawa, Nobel laureate in physics and director of the Research Institute for Fundamental Physics, Kyoto University; S. Tomonaga, physicist, Tokyo University of Education; M. Danysz of the University of Warsaw, Poland; D. F. Cavers, associate dean of the Harvard Law School; H. J. Muller, Nobel laureate in physiology, geneticist and professor of zoology at Indiana University; P. Doty of the department of chemistry, Harvard University; E. Rabinowitch of the University of Illinois, editor of *Bulletin of the Atomic Scientists;* W. Selove, physicist, University of Pennsylvania; V. Weisskopf of Massachusetts Institute of Technology; A. M. Kuzin of the U.S.S.R. Academy of Sciences; D. F. Skobeltzyn of the U.S.S.R. Academy of Sciences, director of T. N. Lebedev Institute of Physics, Moscow; A. V. Topchiev, chemist, head of the Institute of Silicates, U.S.S.R. Academy of Sciences.

These men all signed the "Pugwash