

BIRMINGHAM UNIVERSITY RADIOCARBON DATES II

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Measurements have continued with the 6 L counter which has proved reliable at pressures as high as 2.6 atm and as low as 0.3 atm. It has now been enclosed in a double ring of 27 geiger tubes which has reduced the background count to 10 cpm at 2 atm. So far, we have had no success with the 1.5 L Oeschger-type proportional counter. Failure to obtain steady readings is probably due to continued outgassing from the teflon insulation. All insulating parts have now been remanufactured from the same source of teflon as was used in the 6 L counter, and the Oeschger counter is being reassembled.

Results are still given without correction for δC^{13} . Errors quoted refer only to the standard deviation calculated from a statistical analysis of count rates and the Libby half-life of 5570 ± 30 yr.

SAMPLE DESCRIPTIONS

I. BRITISH FULL-GLACIAL

- | | |
|--|----------------------|
| | 32,270 + 1029 |
| | — 971 |
| Birm-10. Brandon, Warwickshire | 30,320 B.C. |
| Twigs in peat from channel at base of gravels of Avon No. 2 Terrace, 1 mi SW of Brandon ($52^{\circ} 22' 28''$ N Lat, $1^{\circ} 25' 35''$ W Long, grid ref. SP 391753). Dateable stratigraphically and by fauna to Upton Warren Interstadial (Mid-Weichselian). Previous date of $28,200 \pm 500$ (NPL-87) refers to same locality (NPL IV, 1966). Subm. by F. W. Shotton. | |
| | 30,766 + 551 |
| | — 520 |
| Birm-27. Brandon, Warwickshire | 28,816 B.C. |
| Independent preparation from same sample of twigs as Birm-10. | |
| | 36,340 + 770 |
| | — 700 |
| Birm-24. Four Ashes, Staffordshire | 34,390 B.C. |
| Plant material (hand sorted) from peat interbedded as lens in gravels underlying red til with Irish Sea erratics 6 mi N of Wolverhampton ($52^{\circ} 40' 13''$ N Lat, $2^{\circ} 07' 24''$ W Long, grid ref. SJ 916082). Subm. by F. W. Shotton. | |
| | 30,655 + 765 |
| | — 700 |
| Birm-25. Four Ashes, Staffordshire | 28,705 B.C. |
| Similar sample to Birm-24, from same gravel pit, but from another lens of peaty silt in gravels. Subm. by F. W. Shotton. | |

Birm-56. Four Ashes, Staffordshire **42,530 ± 1345**
— 1115
40,580 B.C.

Similar sample to Birm-24 and 25, but from another separated lens of organic sediment in same gravel pit. Subm. by A. V. Morgan.

General Comment: these 3 results indicate Four Ashes gravels may cover large time span in Upton Warren Interstadial (Shotton, 1967).

(b) 21,815 ± 629
19,865 B.C.

Birm-46. Fall Bay, Glamorganshire **(c) 22,796 ± 827**
20,846 B.C.

Patella shells from Patella Beach (51° 33' 54" N Lat, 4° 17' 19" W Long, grid ref. SS 414873) regarded as Interglacial (George, 1932). Date given by radiocarbon falls in glacial period when beach could not have been formed. Determination likely to be in error due to contamination and deposit older than this. (b) is middle CO₂ fraction on acid treatment, (c) inner fraction. Subm. by R. E. G. Williams.

II. BRITISH LATE-GLACIAL AND POST-GLACIAL SITES

Birm-8. Church Stretton, Shropshire **8101 ± 138**
6151 B.C.

Carex peat, bottom 7 cm of peat layer between 52 and 231 cm depth below silty clay, in sewer trench between Manholes 20 and 21, ¼ mi NE of Little Stretton (52° 30' 50" N Lat, 2° 49' 20" W Long, grid ref. SO 445924). Overlies strong solifluction gravel; pollen dated VIb. Subm. by P. H. Rowlands.

Birm-9. Church Stretton, Shropshire **11,048 ± 376**
9098 B.C.

Plant material washed from sample between 40 and 41 ft in gray clay containing bands of black organic clay between 32.5 ft and 44 ft in Royal Society Borehole 2, ⅓ mi NE of Church Stretton (52° 32' 23" N Lat, 2° 48' W Long, grid ref. SO 459939). Underlies strong solifluction gravel; pollen dated II. Subm. by P. H. Rowlands.

Birm-11. Roberthill, Dumfriesshire **3911 ± 59**
1961 B.C.

Heartwood of tree trunk imbedded in peaty silt on gravel, in bank of River Annan at Roberthill Farm, near Lockerbie (55° 06' N Lat, 3° 24' W Long, grid ref. NY 110797). Measurement on independent sample of material used for Birm-5 (3847 ± 60). Subm. by G. R. Coope.

Birm-12. Isleham, Cambridgeshire **4201 ± 60**
2251 B.C.

Bog oak with borings of *Cerambyx cerdo*, part of 60-ft tree. In peat ca. 1 mi N of Isleham Parish Church (52° 21' 30" N Lat, 0° 25' E Long,

grid ref. TL 644760). Repeat of Birm-1 (4001 ± 66) on new material. Subm. by E. A. J. Duffy.

Birm-13. Linwood Moss, Renfrewshire **3513 \pm 56**
1563 B.C.

Peat from basal layer of peat moss at height 26.9 ft O.D., overlying gray silt at Linwood Moss, 3 mi NW of Paisley ($55^{\circ} 52'$ N Lat, $4^{\circ} 29'$ W Long, grid ref. NS 439664). Agrees closely with Birm-2 (3572 ± 64) on separated wood fragments from same peat (Birmingham I, 1967). Subm. by W. W. Bishop.

Birm-19. Heywood, Lancashire **9065 \pm 247**
7115 B.C.

Sample at base of peat, depth 3.18 to 3.28 m. Garden of 115 Queens Park Rd., Heywood ($53^{\circ} 36'$ N Lat, $2^{\circ} 13'$ W Long, grid ref. SD 857112). Subm. by D. Lord.

Birm-40. Redkirk Point, Dumfriesshire **10,898 \pm 127**
8948 B.C.

Top 1 in. of peat bed (Peat I), lower of 2 separate beds in silts on foreshore E of Redkirk Point ($54^{\circ} 58' 32''$ N Lat, $3^{\circ} 05' 30''$ W Long, grid ref. NY 303652). Sample dates abundant insect fauna. Subm. by G. R. Coope.

Birm-41. Redkirk Point, Dumfriesshire **11,205 \pm 177**
9255 B.C.

Bottom 2 in. of same peat bed as Birm-40. Subm. by G. R. Coope.

III. BRITISH ANTARCTIC SURVEY

Samples of wood, seaweed, shell, and whalebone coll. by B. S. John and D. E. Sugden from South Shetland Islands. Whalebone samples have not yet been measured. Samples of recent seaweed and shells show hard water effect by having appreciable apparent ages (Broeker, 1963). This makes determinations of seaweed and shells incorporated in raised beach gravels very difficult to interpret. Dates are therefore given without further comment.

Birm-14. Nelson Island **802 \pm 43**
A.D. 1148

Piece of log part-buried in gravels 23 ft above MSL, S end of E-facing bay to S of Rip Point ($62^{\circ} 15'$ S Lat, $58^{\circ} 59'$ W Long). Expected to date 1 of higher beaches, but low figures cast doubt about validity of specimen as true nonanthropogenic constituent of beach. Wood id. by Forest Products Research Lab. at Princes Risborough as heartwood of *Austrocedrus chilensis* (Chilean Pine), now growing in narrow zone between Patagonian and Chilean Andes. Modern *Austrocedrus* trees commonly reach 100 yr but rarely as much as 250. Tree probably not recent, but possibly piece of ship's furniture. Subm. by B. S. John.

Birm-15. King George Island **2513 ± 50**
563 B.C.

Modern seaweed coll. from shoreline as check against similar material in raised beaches, E of South Spit on S shore of Marian Cove (62° 14' S Lat, 58° 48' W Long). Subm. by B. S. John.

Birm-16. King George Island **1223 ± 81**
A.D. 727

Seaweed from ca. 1 ft depth in raised beach gravel truncating inclined gravel sheets of beach, 16 to 17 ft above MSL; low cliff cut into gravels E of South Spit S shore Marian Cove (62° 14' S Lat, 58° 48' W Long). Apparently younger than modern seaweed Birm-15. Subm. by B. S. John.

Birm-23. King George Island **7683 ± 86**
5733 B.C.

Seaweed from weathered layer ca. 14 ft above MSL in horizontally bedded gravels, overlain by 4 to 5 ft till rising to 19 ft above MSL, S shore of Potter Cove (62° 14' S Lat, 58° 41' W. Long). Subm. by B. S. John.

(a) **850 ± 145**
A.D. 1100

Birm-47. King George Island (b) **586 ± 113**
A.D. 1364

Modern bivalve shells (mostly *Mya*) from beach on S shore of Potter Cove (62° 14' S Lat, 58° 41' W Long), just above high water mark. Samples from acid treatment of inner (a) and outer (b) shell layers. Subm. by B. S. John.

IV. SPITSBERGEN

Birm-18. N. Moraine, Balhallfonna, Ny Friesland **9125 ± 161**
7175 B.C.

Probable marine algae in bedded sands and gravels overridden by thrust tills of terminal moraine, 1.5 km from beach (79° 50' N Lat, 17° 50' E Long). Age possibly overestimated due to hard water effect (Broecker, 1963). Subm. by G. S. Boulton.

Birm-21. S end of Werenskiold Glacier, S.W. Spitsbergen $\delta C^{14}\text{‰} = + 21.7 \pm 11.0$

Specimen of moss amongst boulders (77° 04' 41" N Lat, 15° 13' 23" E Long) 30 m above sea level. N of 1957 glacier termination, S of 1958 ice surface, and believed to be vegetation uncovered by retreat and representing plants growing before earlier advance of glacier. Determination shows, however, that plants are modern with activity slightly above oxalic acid standard. Subm. by S. Baranowski.

Birm-37. Head of Sorgfjord, Vestspitsbergen **6526 ± 80**
4576 B.C.

Pine wood, piece of drift wood imbedded in top surface of 60 ft raised beach, at head of Sorgfjord, 400 yd from terminus of Dunerbeen. Sample dates part of history of post-glacial sea-level changes in Spitsbergen. Subm. by G. S. Boulton.

V. VOLCANIC DEPOSITS

Birm-35. San Miguel, Azores **4672 ± 100**
2722 B.C.

Carbonized wood enclosed in lahar (pyroclastic flow deposit) assoc. with last very large explosive eruption of Fogo Volcano, 5 km N of Villa Franco (37° 45' N Lat, 25° 25' W Long). Subm. by G. P. L. Walker.

Birm-51. Mansion Village, S. Kitts, W. Indies **3658 ± 94**
1708 B.C.

Carbonized wood in ash layer beneath pumice layer, ca. 4 ft below surface in road cutting S of Mansion Village. Pumice layer is from last major eruption of Mt. Misery Volcano (17° 22' 50" N Lat, 62° 45' 28" W Long). Subm. by P. E. Baker (Robson and Tomblin, 1966).

Birm-52. Soufriere Hills, Montserrat, W. Indies **23,566 ± 886**
21,616 B.C.

Charcoal at base of 20-ft-thick pyroclast flow representing last major activity of Soufriere Hills Volcano, 270 ft above MSL, Peat Gut, N side Bethel Village, Montserrat (16° 45' N Lat, 62° 10' W Long). Subm. by P. E. Baker (McGregor, 1938).

VI. ARCHAEOLOGIC SAMPLES

*A. British***Birm-26. Ryton on Dunsmore, Warwickshire** **2701 ± 41**
751 B.C.

Charcoal from pit containing urn of Bronze age 27 in. below modern ground surface ca. 1.5 mi SW Ryton on Dunsmore (52° 20' 40" N Lat, 1° 27' 15" W Long, grid ref. SP. 372725). Dates urn at Late Bronze age and helps determine chronology of Bronze age in English Midlands. Subm. by J. Bateman and V. S. White.

Birm-36. Fladbury, Worcestershire **1099 ± 81**
A.D. 851

Charred wood from floor of oven covered by layer of large pieces of burnt daub and then by black earth with pottery pre-1200 A.D. In Fladbury village (52° 06' 55" N Lat, 2° 00' 28" W Long, grid ref SO 995464). Late Saxon date of structure is significant. Subm. by D. P. S. Peacock.

B. Non-British

Birm-22. Huenque Valley, Peno, Peru **580 ± 76**
A.D. 1370

Carbonized material from hearth in cave ca. 4000 m above sea level close to road Ilave to Tacna, ca. 40 km from Ilave (16° 40' S Lat, 69° 40' E Long). Date of occupation later than anticipated. Subm. by P. S. Gelling.

Birm-28. Kintampo, Ghana, Cave KT 1 **2007 ± 68**
57 B.C.

Four aggregated samples of charcoal from Layers 2 to 5 of Cave KT 1 in Inselberg N of Kintampo-Tamale Rd. at Milestone 136 (8° 04' N Lat, 1° 44' W Long). Figure dates upper levels of cave earth which contain debris of quern factory. Subm. by P. A. Rahtz.

Birm-30. Kintampo, Ghana, Cave KT 1 **3339 ± 35**
1389 B.C.

Three aggregated samples of charcoal from Layers 8 and 8b of Cave KT 1 (see Birm-28). Dates lower occupation levels of cave. Subm. by P. A. Rahtz.

Birm-29. Kintampo, Ghana, Cave K 6 **3570 ± 84**
1620 B.C.

Broken husks of fruit (*Celtis adolphifrideric*), 76 to 77 in. depth in cave floor in ashy layer of test pit. Assoc. with pottery and stone axes (8° 01' N Lat, 1° 45' W Long). Husks are almost entirely CaCO₃; age was measured on CH₄ from acid-generated CO₂. There is possibility of "hard-water" error. Subm. by P. A. Rahtz.

Birm-31. Kintampo, Ghana, Cave K 8 **3401 ± 74**
1451 B.C.

Broken husks of fruits (*Celtis adolphifrideric*) from cave earth of Cave K 8, Buobini 0.5 mi W of Kintampo (8° 04' N Lat, 1° 44' 33" W Long). Dates newly defined Buobini culture (but cf. Birm-29, possibility of overestimate of age due to mineral carbonate). Subm. by P. A. Rahtz.

Birm-34. Ledro, Trento, Italy **3659 ± 66**
1709 B.C.
3642 ± 36
1692 B.C.

Wooden beam found in waterlogged layer of Bronze age settlement at Molina di Ledro, Trento Province, (Battaglia, 1943). Two figures are independent determinations on gas from same specimen. Date is important in settling disputed age of Early Bronze age Polada culture. Subm. by L. H. Barfield.

VII. MISCELLANEOUS SAMPLES

(a) 4224 ± 97
2274 B.C.

Birm-20. Tarkhan II Linen

(b) 4206 ± 68
2256 B.C.

Sample provided by British Mus. is same material dated 4265 ± 80 (UCLA-739) 4200 ± 90 (A-569), 4310 ± 90 (NPL-5), and 4150 ± 110 (Burleigh, pers. commun., by British Mus.) (a) represents 1000 mins of counting at 1 atm and (b) 1000 mins at 2 atm. Determination to check calibration of Birmingham Lab.

Birm-42. Piazzo del Cuoma, Pisa, Italy

3877 ± 116
1927 B.C.

Wood in "Upper Sand," Sample 8 of Borehole 110, testing stratigraphical sequence around Leaning Tower, 9.4 m below ground level and 6.4 m below sea level. Subm. by A. W. Skempton.

Birm-54. Lake Katwe, Uganda

1208 ± 24
A.D. 742

Wood from mud layer 7 ft deep in pit 3600 ft from SW edge of Lake Katwe (Sample 4), ($0^{\circ} 08' S$ Lat, $29^{\circ} 53' E$ Long, U.T.M. grid ref. RK 1885). One of series to test sedimentation rate. Subm. by W. H. Morton, Geol. Survey, Uganda.

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