

BIRMINGHAM UNIVERSITY RADIOCARBON DATES IV

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Measurements have continued with both the 1 L and 6 L counters. Results are not corrected for C^{13} fractionation. Errors quoted refer only to the standard deviation calculated from a statistical analysis of sample and background count rates and the Libby half-life of 5570 ± 30 yr. Pretreatment has been continued as described previously (Shotton, Blundell, and Williams, 1969).

SAMPLE DESCRIPTIONS**I. BRITISH FULL-GLACIAL****Birm-32. Stretton-under-Fosse, Warwickshire** **>26,000**

Wood (*Ulmus*) in Lower Wolston Clay from 15.5 m depth in Borehole 1285 Midland Connection Motorway near Stretton-under-Fosse, Warwickshire ($52^{\circ} 26' N$ Lat, $1^{\circ} 19' W$ Long, Grid. Ref. SP463813). Coll. 1967 and subm. by A. Horton. *Comment*: measurement helps confirm stratigraphic interpretation.

Birm-74. Four Ashes, Staffordshire **>43,500**

Plant fragments and twigs from fine gray silt ca. 1 m depth (Site 20) in Four Ashes Gravel at Four Ashes, Staffordshire ($52^{\circ} 40' 13'' N$ Lat, $2^{\circ} 07' 24'' W$ Long, Grid. Ref. SJ916082). Coll. 1968 and subm. by Anne Morgan. *Comment*: fauna in sample included *Lepidurus* and many exclusively N insect species, indicating cold conditions.

+1550**(a) 34,250****-1300****Birm-114. Trysull, Staffordshire** **32,300 B.C.****(b) >25,000****(c) >34,000**

Inner (a) middle (b) and outer (c) fractions from shells (Opercula of *Bithynia tentaculata*) sieved from calcareous silty clay at ca. 2 m depth overlying coarse kame gravel and sand at Church Lane Pit, Trysull, Staffordshire ($52^{\circ} 33' 0'' N$ Lat, $2^{\circ} 13' 25'' W$ Long, Grid Ref. SO848946). Coll. 1968 and subm. by A. V. Morgan. *Comment*: stratigraphy and contained fauna suggest figures are minimum ages. Probably Ipswichian.

+2300**47,000****-1800****Birm-157. Farm Wood Quarry, Chelford, Cheshire** **45,050 B.C.**

Wood (*Pinus sylvestris*) from main organic horizon at 10 m depth in quarry sec. in Chelford Sands formation at Farm Wood Quarry, Chel-

ford, Cheshire (53° 15' N Lat, 2° 17' W Long, Grid Ref. SJ812731). Coll. 1967 and subm. by P. Worsley. *Comment*: sample from deposit previously dated at >52,000 (GrN-1292) and subsequently by isotopic enrichment at 60,800 ± 1500 (GrN-1475) (Vogel and Zagwijn, 1967). Deposit believed to have unique and critical position in Early Devensian (Weichselian) of England and to be equivalent to Brörup Interstadial (Simpson and West, 1958; Worsley, 1967; Evans, 1968, p. 213). Sample subm. by Worsley to Hannover lab gave values (Hv-1978, 32,850 ± 480, unpub.) and (Hv-1979b, 26,200 ± 390, unpub.) for humate extract. Birmingham date done on another piece of same trunk subm. to Hannover, measured after 4 successive NaOH treatments to remove possible contamination. Counter reading of activity slightly exceeded 4σ after atmosph. pressure correction. If this experimentally obtained coefficient is only slightly inaccurate, result might have been more correctly expressed as >47,000. General conclusion is that Hannover date is too young, as result of contamination, and that there is no case for substantial alteration of Groningen figures.

25,780 ± 870

Birm-113. Thrapston, Huntingdonshire **23,830 B.C.**

Twigs from organic-silt lens containing mature tundra assemblage of coleoptera ca. 5 m depth in terrace gravels of R. Nene, Thrapston, Huntingdonshire (52° 24' 40" N Lat, 0° 32' 50" W Long, Grid Ref. JP988805). Coll. 1967 and subm. by G. R. Coope.

+2160

(a) 36,300

-1700

Birm-161. Scandal Beck, Westmorland **34,350 B.C.**

(b) >25,800

Sample after alkali pretreatment (a) and humate extract (b) from peat from lower of 2 organic horizons in sandy silt overlain by 1.5 m till at ca. 3 m depth on W bank Scandal Beck, 64 m SSW Brunt Hill Farm, Ravenstonedale, Westmorland (54° 25' N Lat, 2° 24' W Long, Grid Ref. NY743024). Coll. 1969 and subm. by G. A. L. Johnson. *Comment*: indicates late Devensian (Weichselian) till upon deposits of Upton Warren interstadial.

Birm-93. Kilmaurs, Ayrshire **>40,000**

Collagen fraction from antler of *Rangifer tarandus* from gravel ca. 12 m deep below till 5 m thick (part of V 5187, Fig. 1b, p. 4, Gregory and Currie, 1928) at Woodhill Quarry, Kilmaurs, Ayrshire (55° 38' N Lat, 4° 32' W Long, Grid Ref. NS410410). Coll. 1865 by J. Bryce; subm. by W. D. Rolfe and W. W. Bishop. *Comment*: although long stored in

museum, antler was free from preservative. Date contrasts with 13,700 $\pm$ 1700 (GX-0634, unpub.) on mammoth tusk from same deposit (Sissons, 1967).

Birm-165. Ballymakegoge, Co. Kerry, Ireland **>42,500**

Laminated peat exposed below high tide level at Ballymakegoge, near Tralee, Co. Kerry, Ireland (52° 16' N Lat, 9° 48' W Long). Coll. 1969 and subm. by G. F. Mitchell. *Comment*: determination supports Mitchell's interpretation as Hoxnian.

+1170
30,500
-1030

Birm-166. Derryvree, Co. Fermanagh, Ireland **28,550 B.C.**

Plant debris in laminated sand lens at 3.5 m depth between upper and lower tills (upper in drumlin form) at Derryvree, near Maguire's Bridge, Co. Fermanagh, Ireland (54° 18' N Lat, 7° 27' W Long, Grid Ref. H361390). Coll. 1969 by E. Colhoun; subm. by G. F. Mitchell. *Comment*: 2 tills are separated by interstadial deposits of Upton Warren date containing cold climate plants and beetles consistent with this dating.

II. BRITISH LATE-GLACIAL AND HOLOCENE

Church Stretton series, Shropshire

Samples from borehole near sewer manhole MH 60 at Church Stretton, Shropshire (52° 32' 30" N Lat, 2° 48' 10" W Long, Grid Ref. SO456941). From 1.65 m clay, silt, and peat, underlying 1.3 m solifluction gravel and overlying 1.32 m+ pebbly clay and gravel upon till. Coll. 1967 by P. J. Osborne; subm. by F. W. Shotton.

11,000 $\pm$ 200
Birm-148. **9050 B.C.**

Plant fragments from gray clay, 0 to 0.2 m below solifluction gravel.

12,135 $\pm$ 200
Birm-158. **10,185 B.C.**

Plant fragments from peat between 1.02 and 1.29 m below solifluction gravel.

13,555 $\pm$ 620
Birm-149. **11,605 B.C.**

Plant fragments washed from gray clay between 1.29 and 1.45 m below solifluction gravel. Sample small, hence high standard deviation. *General Comment*: dates confirm evidence (plants and coleoptera) that sequence covers Zones II and I, setting limiting dates to overlying solifluction gravels and underlying till. Birm-148 differs appreciably from NPL-81 (11,790 $\pm$ 140, Callow, Baker, and Hassall, 1965) which refers to an intermediate between 148 and 158 horizon in adjacent trench sec.

- 10,300 $\pm$ 170**
8350 B.C.
- Birm-92. Rodbaston Hall, Staffordshire**
Peat from core ca. 2 m depth in borehole, Rodbaston Hall, Staffordshire (52° 41' 40" N Lat, 2° 06' 30" W Long, Grid Ref. SJ928110). Coll. 1966 by C. H. S. Sands; subm. by A. C. Ashworth. Sample from horizon where extreme N coleoptera disappeared from faunal spectrum.
- 11,580 $\pm$ 140**
9630 B.C.
- Birm-118. Penkridge, Staffordshire**
Plant material from sandy peat at 2.8 m depth in gravels overlying Keuper Sandstone at Penkridge, Staffordshire (52° 43' 35" N Lat, 2° 06' 45" W Long, Grid Ref. SJ924143). Coll. 1968 and subm. by A. V. Morgan.
- 11,660 $\pm$ 250**
9710 B.C.
- Birm-131. Pillaton Hall, Staffordshire**
Plant material from base of sandy peat overlying sand at ca. 3 m depth in peat bog, at Pillaton Hall near Penkridge, Staffordshire (52° 42' 52" N Lat, 2° 05' 12" W Long, Grid Ref. SJ941130). Coll. and subm. by A. V. Morgan. *Comment*: dates beginning of organic filling of hollow of kettle form.
- 13,490 $\pm$ 380**
11,540 B.C.
- Birm-150. Borehole 12, Stafford**
Plant fragments from dark gray silt at 15.6 m depth in Borehole 12 of Inner Relief Rd., Stafford (52° 48' 24" N Lat, 2° 06' 30" W Long, Grid Ref. SJ927233). Coll. 1969 and subm. by A. V. Morgan. *Comment*: dates base of unusually thick peaty silts resting on 9 m fluvioglacial deposits.
- 9030 $\pm$ 200**
7080 B.C.
- Birm-135. Fladbury, Worcestershire**
Roots (probably sedges) from silty peat beneath 1.5 m red clay-sand and above 4 m gravel of Avon No. 1 terrace at Fladbury Lower Moor, Worcestershire (52° 06' 45" N Lat, 2° 01' 45" W Long, Grid Ref. SO 981461). Coll. 1969 by P. Buckland; subm. by F. W. Shotton. *Comment*: 1st date from this terrace, lowest of Avon series.
- 2060 $\pm$ 170**
110 B.C.
- Birm-153. Bransford, Worcestershire**
Wood imbedded at 5.1 m depth in alluvial gravel of R. Teme with remains of *Cervus elaphus*, at New House Farm, Bransford, Worcestershire (52° 10' 30" N Lat, 2° 18' W Long, Grid Ref. SO798533). Coll. 1969 and subm. by G. R. Coope.
- 11,730 $\pm$ 770**
9780 B.C.
- Birm-82. Orleton, Herefordshire**
Moss fragments hand picked from laminated calcareous silt lens in outwash gravels of Wye glacier at Orleton, Herefordshire (52° 18' 20"

N Lat, 2° 44' 30" W Long, Grid Ref. SO497677). Coll. 1967 by P. Cross; subm. by G. R. Coope. *Comment*: no alkali pretreatment because sample small. Modern roots known to penetrate sample so no guarantee that all contamination removed. Date older than previous determination of bulk sample (5020 ± 130) but must be regarded as minimal age only.

**11,250 $\pm$ 100
9300 B.C.**

Birm-105. Northmoor, Oxfordshire

Peat from silt lens containing coleoptera ca. 1.5 m depth in terrace gravel at Brown's Pit ca. 1.2 m NNW of church, Northmoor, Oxfordshire (51° 44' 00" N Lat, 1° 23' 35" W Long, Grid Ref. SP419041). Coll. 1968 by H. P. Powell; subm. by J. M. Edmonds.

**2170 $\pm$ 280
220 B.C.**

Birm-123. Rockingham, Northamptonshire

Charcoal fragments from old soil B horizon disturbed by slipped mass of Upper Lias clay at Gretton Wood, Rockingham, Northamptonshire (52° 31' N Lat, 0° 41' W Long, Grid Ref. SP883923). Coll. 1968 and subm. by R. J. Chandler. *Comment*: provides lower limit to date of landslip.

**11,900 $\pm$ 540
9950 B.C.**

Birm-106. Oaze Deep, River Thames

Shells (mainly *Cardium* and *Mytilus*) in laminated silty clay from core at -19 m alt, 6.7 m below bed of Thames Estuary at Oaze Deep (51° 32' 25" N Lat, 1° 08' 10" E Long). Coll. 1966 by George Wimpey and Co.; subm. by R. J. Maddrell. *Comment*: because of small sample, measurement made on whole sample.

**5670 $\pm$ 170
3720 B.C.**

Birm-167. Lewes Brooks, Sussex

Plant fragments from silty peat between 6.7 and 6.9 m depth (ca. -4 m alt) in Borehole B 117 at Lewes Brooks, Lower Ouse Valley, Sussex (50° 52' N Lat, 0° 0' Long, Grid Ref. TQ413092). Coll. 1969 and subm. by A. Thorley and D. K. Jones.

**6290 $\pm$ 180
4340 B.C.**

Birm-168. Lewes Brooks, Sussex

Plant material from silty peat at 9.5 to 9.8 m depth (ca. -5.6 m alt) underlying silt, in Borehole B 123 at Lewes Brooks, Lower Ouse Valley, Sussex (50° 42' N Lat, 0° 0' Long, Grid Ref. TQ413013). Coll. 1969 and subm. by A. Thorley and D. K. Jones. *Comment*: with Birm-167 dates events in Holocene vegetational history of SE England and provides limiting dates to marine transgression in Lower Ouse Valley.

Red Moss series, Lancashire

Peat samples from borehole at Red Moss, near Horwich, Lancashire (53° 35' 23" N Lat, 2° 34' 36" W Long, Grid Ref. SD632102). Coll. 1968 and subm. by A. C. Ashworth.

+700
 (a) 9800
 -650
 7850 B.C.

Birm-124.

(b) 8390 ± 100
 6440 B.C.

Sample after alkali pretreatment (a) and humate extract (b) from base of woody peat layer above gray silty clay.

Birm-128. 10,850 ± 120
 8900 B.C.

Sample from top of peat layer, immediately underlying gray silty clay, 0.3 m below Birm-124.

Birm-127. 12,160 ± 140
 10,210 B.C.

Sample from base of peat layer 0.35 m below gray silty clay and 0.55 m below sample Birm-124.

General Comment: sec. contains coleopterous fauna studied by A.C.A. Fauna of Birm-127 does not indicate cold climate, Birm-128 marks incoming of cold species, and Birm-124 dates disappearance of arctic stenotherms.

Heysham series, Lancashire

Plant material from sedge peat beneath marine clay and sand, overlying sand and boulder clay in offshore boreholes drilled 1967 near Heysham, Lancashire (54° 02' N Lat, 2° 56' W Long). Coll. 1968 by A. Ashworth; subm. by F. W. Shotton.

Birm-139. Borehole M1 9195 ± 155
 7245 B.C.

Sample at -16.4 m alt, Grid Ref. SD395599.

Birm-140. Borehole M2 8925 ± 200
 6975 B.C.

Sample from -15.8 to -16.3 m alt, Grid Ref. SD394599.

Birm-141. Borehole M3 9270 ± 200
 7320 B.C.

Sample from -17.6 m alt, Grid Ref. SD393599.

General Comment: series gives evidence for Post Glacial rise of sea level in Morecambe Bay.

Birm-147. Holcombe Moor, Lancashire 3540 ± 120
 1590 B.C.

Twigs (*Betula*) at 0.9 m depth in 0.25 m thick basal layer of peat bog at Holcombe Moor, Lancashire (53° 38' N Lat, 2° 20' W Long, Grid

Ref. SD777169). Coll. 1969 and subm. by J. H. Tallis. *Comment*: sample helps give time scale for moorland peat accumulation.

Birm-120. Greenock, Renfrewshire

**9890 $\pm$ 160
7940 B.C.**

Shells (*Mya truncata*) in silty sands exposed at -1.4 m alt in excavations for Garvel Graving Dock, Greenock, Renfrewshire (55° 56' N Lat, 4° 43' W Long, Grid Ref. NS307752). Coll. 1962 and subm. by W. W. Bishop.

Birm-121. Greenock, Renfrewshire

**10,560 $\pm$ 180
8610 B.C.**

Shells (*Astarte sulcata*) from shelly brown-gray silt at -3.5 m alt above varved clay and till in excavation for Garvel Graving Dock, Greenock, Renfrewshire (55° 56' N Lat, 4° 43' W Long, Grid Ref. NS307752). Coll. 1962 and subm. by W. W. Bishop. *Comment*: this and Birm-120 coll. to establish age of Clyde Valley Late Glacial sediments.

Birm-122. Wester Fulwood, Renfrewshire

**(a) 12,650 $\pm$ 200
10,700 B.C.
(b) 13,020 $\pm$ 220
11,070 B.C.**

Inner (a) and outer fraction (b) of shells (*Arctica islandica*) from Paisley Clay underlying terrace gravels of R. Gryfe at Wester Fulwood, Renfrewshire (55° 52' N Lat, 4° 31' W Long, Grid Ref. NS432669). Coll. 1962 and subm. by W. W. Bishop. *Comment*: figures suggest no isotopic replacement. Dates early Late Glacial sea in Clyde Valley.

Birm-134. Sgor Mor, Aberdeenshire

**4130 $\pm$ 110
2180 B.C.**

Wood (*Pinus sylvestris*) at base of hill peat, ca. 1 m thick on bed rock at Sgor Mor, Aberdeenshire (57° 10' N Lat, 3° 38' W Long, Grid Ref. NO004908). Coll. 1968 and subm. by N. V. Peers. *Comment*: provides additional evidence dating Scottish deforestation and change of tree line.

III. MISCELLANEOUS GEOLOGIC SITES

**+1650
28,070
-1370
26,120 B.C.**

Birm-169. Herquemoulin, France

Wood from compressed peat on foreshore at Herquemoulin, Manche, France (49° 39' N Lat, 1° 52' W Long). Same peat layer visible in adjacent cliff beneath 14 m of head and resting on low marine platform. Coll. 1969 by F. W. Shotton; subm. by A. Larssonneur. *Comment*: date much older than Gif-370, 15,020 $\pm$ 400 (Delibrias, Guillier, and Labeyrie, 1969) given to same deposit at closely adjacent locality (Delibrias and Larssonneur, 1966, p. 1023).

Sorgfjord series, Vestspitsbergen

Samples coll. in Sorgfjord region, Vestspitsbergen to help give rate of isostatic uplift. These form series together with Birm-37 (Shotton, Blundell, and Williams, 1968, p. 204) and Birm-68 (Shotton, Blundell, and Williams, 1969, p. 266). Coll. 1965 by G. S. Boulton and M. Rhodes; subm. by G. S. Boulton.

Birm-33.

1000 ± 370
A.D. 950

Moss fragments from base of push moraine by W lake Dunerbreen (79° 40' N Lat, 16° 50' W Long). Large error due to small sample.

Birm-67.

(a) **10,000 ± 300**
8050 B.C.
(b) **9840 ± 290**
7890 B.C.

Inner (a) and outer (b) fractions of shell (*Mya arctica*) in 25 m raised beach, Sorgfjord (79° 50' N Lat, 16° 50' E Long). *Comment*: figures suggest no isotopic replacement.

Birm-73.

(a) **8550 ± 310**
6600 B.C.
(b) **8150 ± 360**
6200 B.C.
(c) **8400 ± 370**
6450 B.C.

Inner (a), middle (b), and outer (c) fractions of shell (*Mya*) at 1.5 m depth in 30 m raised beach at head of Sorgfjord (79° 50' N Lat, 16° 50' E Long). *Comment*: figures suggest no isotopic replacement.

Birm-53. Lake Katwe, Uganda

11,200 ± 600
9250 B.C.

Sedge from base of varved marl 1 m thick, 90 m E of E shore Lake Katwe, Uganda (0° 08' S Lat, 29° 53' E Long, U.T.M. Grid Ref. RK1885). Coll. 1967 and subm. by W. H. Morton. *Comment*: sample represents early stage in evolution of lake prior to precipitation of sodium salts.

Birm-84. Lake Katwe, Uganda

0 ± 440
A.D. 1950

Wood from mud layer in salt crust 0.6 m depth in pit 120 m from SW side Lake Katwe, Uganda (0° 08' S Lat, 29° 53' E Long, U.T.M. Grid Ref. RK1885). Coll. 1967 and subm. by W. H. Morton. *Comment*: not separable from present.

Birm-125. Sao Miguel, Azores

3240 ± 90
1290 B.C.

Wood buried in 2nd ash layer of 5 overlying 1 containing Birm-35 (4670 ± 100, Shotton, Blundell, and Williams, 1968, p. 204) and Birm-90 (4435 ± 99, Shotton, Blundell, and Williams, 1969, p. 266) from rd.

sec. on N side Agua de Pau volcano 1.5 km NE of Lombadas, Sao Miguel, Azores (37° 47' N Lat, 25° 27' W Long). Coll. 1968 and subm. by G. P. L. Walker.

Birm-126. Faial, Azores **1200 ± 70**
A.D. 750

Charcoal from 2nd from top of 11 ash beds from summit caldera of Faial, Azores, exposed in rd. sec. 2.5 km N of edge of caldera (38° 36' 30" N Lat, 28° 42' 30" W Long). Coll. 1968 and subm. by G. P. L. Walker.

Birm-156. Tuitts' Ghaut, Montserrat, W Indies **18,390 ± 360**
16,440 B.C.

Charcoal from base of ca. 50 m thick pumice flow believed assoc. with formation of English's Crater and in upper part of Soufriere Hills pyroclast flow succession at Tuitts' Ghaut, Montserrat, W Indies (16° 44' 33" N Lat, 62° 09' 20" W Long). Coll. 1967 and subm. by W. J. Rea.

Birm-115. King Point, Yukon, Canada **+2800**
37,900
-2100
35,950 B.C.

Wood at +8 m alt imbedded in 25 m thick unconsolidated sand and silt underlying sand and gravel exposed in vertical coastal cliff 1.6 km W of King Point, Yukon, Canada (69° 07' N Lat, 138° 01' W Long, Grid Ref. 117A/East). Coll. 1968 by D. McIntyre; subm. by D. Naylor. *Comment*: overlying gravel, dated at 6000 (unpub.), lies unconformably (Naylor, unpub.) or is overthrust (Mackay, 1959) upon earlier sediments here dated.

Birm-96. Monte Amargo, Chile **880 ± 120**
A.D. 1070

Collagen fraction from bone of medium-size herbivore in dry marsh on S bank R. Copiapó, near Monte Amargo, Chile (27° 22' S Lat, 70° 43' W Long). Coll. 1967 and subm. by C. Mortimer. *Comment*: dates a time in pluvial period that preceded desiccation of low-level terrace of Rio Copiapó.

Birm-17. Marian Cove, King George Island **1430 ± 470**
A.D. 520

Seaweed from ca. 2.7 m depth in bedded gravels underlying raised beach at +5 m alt E of South Spit S shore Marian Cove, King George I., Antarctica (62° 14' S Lat, 58° 48' W Long). Coll. 1966 by D. E. Sugden; subm. by B. S. John. *Comment*: sample should be older than modern seaweed. Birm-16 1223 ± 81 (Shotton, Blundell, and Williams, 1968, p. 203) but result inconclusive. Large error due to small sample.

2600 ± 100

Birm-145. Tongariro, North Island, New Zealand **650 B.C.**

Carbonized branch imbedded in Wanganui pumice gravel S side rd. sec. State Hwy. 47 at Tongariro, North I., New Zealand (39° 3' 40" S Lat, 175° 35' E Long). Coll. 1969 and subm. by C. A. Fleming. *Comment*: duplicate sample sent to Inst. Nuclear Sci., New Zealand, for dating. Confirms that this ash shower antedates Taupo Ash (Healy, Vucetich, and Pullar, 1964).

IV. ARCHAEOLOGIC SAMPLES

A. British

2140 ± 180

Birm-58. Wadden Hill, Dorset **190 B.C.**

Charcoal from ca. 1.5 m depth in pit at Roman Fort occupied A.D. 45 to 60 (Webster, 1965) at Wadden Hill near Stoke Abbott, Dorset (50° 48' N Lat, 2° 47' W Long, Grid Ref. 450015). Coll. 1968 and subm. by G. Webster. *Comment*: indicates problem of dating charcoal when it may be derived from wood of old trees.

1541 ± 80

Birm-109. Tamworth, Staffordshire **A.D. 409**

Oak plank ca. 4 m deep in filling of main Saxon defensive ditch of Tamworth (52° 38' N Lat, 1° 42' W Long, Grid Ref. SK206038). Coll. 1968 by C. S. Young; subm. by P. A. Rahtz. *Comment*: maximum date, since plank probably comes from timber structure assoc. with defenses.

Hereford series

Charcoal samples from excavations at Hereford (52° 04' N Lat, 2° 44' W Long, Grid Ref. SO508404). Coll. 1968 and subm. by P. A. Rahtz.

1189 ± 83

Birm-111. **A.D. 761**

Charcoal from pit of corn-drying oven beneath rampart of Birm-110.

1335 ± 67

Birm-110. **A.D. 615**

Charcoal residue of large structural timbers at ca. 2 m depth in major defensive rampart of Saxon town.

(a) 700 ± 220

Birm-159. **A.D. 1250**

(b) 1330 ± 200

A.D. 620

Sample after alkali pretreatment (a) and humate extract (b) of charcoal residue from large structural timbers at ca. 1 m depth in major defensive rampart.

289 ± 79**Birm-112. Metchley Camp, Birmingham** **A.D. 1661**

Brushwood at ca. 0.7 m depth at base of trench which cuts all Roman structures at Metchley Camp, Birmingham (52° 27' 0" N Lat, 1° 56' 20" W Long, Grid Ref. SP042836). Coll. 1968 and subm. by T. Rowley. *Comment:* last trench cutting complex of Roman structures, hopefully dating end of Roman occupation, but proving to be recent.

2473 ± 84**Birm-119. South Barrule, Isle of Man** **523 B.C.**

Charcoal assoc. with pottery, from upper hearth level of hut in hill-fort (Gelling, 1963) on South Barrule, Isle of Man (54° 09' N Lat, 4° 40' W Long, Grid Ref. SC258759). Coll. 1968 and subm. by P. S. Gelling. *Comment:* proof of early Iron age.

1910 ± 90**Birm-129. Dorstone, Herefordshire** **A.D. 40**

Charcoal from supposed Neolithic hearth cut by post hole. Later Roman-British occupation of site, Dorstone Hill, Herefordshire (52° 04' N Lat, 2° 59' W Long, Grid Ref. SO326423). Coll. 1968 and subm. by W. R. Pye. *Comment:* hearth is part of Romano-British complex.

1850 ± 110**Birm-130. Rowington, Warwickshire** **A.D. 100**

Charcoal from 1.5 m depth in stake hole of Roman tile kiln at Rowington, Warwickshire (52° 19' 30" N Lat, 1° 43' 30" W Long, Grid Ref. SP187698). Coll. 1969 and subm. by G. Webster.

2180 ± 110**Birm-132. Holme Pierrepont, Nottinghamshire** **230 B.C.**

Wood from gunwale of dugout canoe at base of 3 m thick sand and gravel layer overlying Keuper marl at Holme Pierrepont, Nottinghamshire (52° 57' N Lat, 1° 04' W Long, Grid Ref. SK630396). Coll. 1969 and subm. by A. G. MacCormick. *Comment:* Iron age date; also useful in dating rate of migration of old course of Trent.

970 ± 290**Birm-133. Hen Domen, Montgomeryshire** **A.D. 980**

Charcoal from soil layer buried by rampart of castle, built ca. A.D. 1070, and above pebble floor of pre-rampart building at Hen Domen, Montgomeryshire (52° 34' N Lat, 3° 09' W Long, Grid Ref. SO214981). Coll. 1968 and subm. by P. A. Barker.

978 ± 170**Birm-138. Stafford** **A.D. 972**

Wooden dish found at ca. 1 m depth in stream bed, originally drainage ditch, at Stafford (52° 47' N Lat, 2° 06' W Long, Grid Ref. SJ928214). Coll. 1966 by G. Turner; subm. by P. H. Robinson. *Comment:* dates artifact otherwise undatable.

Midsummer Camp series, Herefordshire

Samples assoc. with successive building of 17 gates throughout long period of defense of hill fort, Midsummer Camp, Eastnor, Herefordshire (52° 02' N Lat, 2° 21' W Long, Grid Ref. SO761374). Coll. 1967 and subm. by S. C. Stanford.

2370 ± 190**420 B.C.****Birm-142.**

Wood from quarry ditch floor at 1 m depth, W of S gateway, assoc. with 1st gate.

2000 ± 100**50 B.C.****Birm-143.**

Carbonized grain at 1 m depth, E side S gateway, assoc. with destruction of 8th gate.

3000 ± 200**Birm-144. Croft Ambrey, Aymestry, Herefordshire 1050 B.C.**

Carbonized grain from 1 m depth in quarry-ditch behind main rampart of Croft Ambrey Hill Fort, Aymestry, Herefordshire (52° 18' N Lat, 2° 49' W Long, Grid Ref. SO445668). Coll. 1962 and subm. by S. C. Stanford. *Comment:* date anomalously old.

2170 ± 120**220 B.C.****Birm-151. Sandyden Gill, Mayfield, Sussex**

Charcoal from closely packed slag and burnt clay at 0.7 m depth at Sandyden Gill Bloomery, Mayfield, Sussex (51° 03' 16" N Lat, 0° 15' 44" E Long, Grid Ref. TQ586309). Coll. 1969 and subm. by C. S. Cattell.

1400 ± 240**Birm-152. Long Gill, Mayfield, Sussex****A.D. 550**

Charcoal from closely packed slag and burnt clay at 0.5 m depth at Long Gill Bloomery, Mayfield, Sussex (51° 02' 30" N Lat, 0° 16' 0" E Long, Grid Ref. TQ589294). Coll. 1969 and subm. by C. S. Cattell. *General Comment:* Birm-151 and 152 help establish time scale for ancient Wealden iron industry.

*B. Non-British***Veneto series, Italy**

Excavations in Rivoli region established threefold sequence for Neolithic of Veneto: (1) Quinzano, (2) Chiozza, and (3) Rivoli Rocca. Samples subm. by L. H. Barfield.

3810 ± 80**Birm-102. Quinzano****1860 B.C.**

Collagen fraction of bone (*Homo sapiens*) from Quinzano type Neolithic burial remains, Vela, Trento, Italy (46° 14' N Lat, 11° 07' E Long). Coll. 1960 by G. Tomasoni.

Birm-103. Chiozza**5520 ± 120****3270 B.C.**

Collagen fraction of bone (*Bos*) in pit assoc. with Chiozza phase at Monte Rocca, Rivoli, Italy (46° 00' N Lat, 10° 50' E Long). Coll. 1967 by L. H. Barfield.

Birm-104. Rivoli Rocca**5670 ± 130****3720 B.C.**

Collagen fraction of mixed bone (mainly *Bos* and *Sus*) from storage pit assoc. with Rivoli Rocca phase, Monte Rocca, Rivoli, Italy (45° 50' N Lat, 10° 50' E Long). Coll. 1967 by L. H. Barfield.

Molino Casarotto series, Italy

Charcoal and wood samples from site of early Neolithic occupation at Molino Casarotto, Arcugnano, Vicenza, Italy (45° 28' N Lat, 11° 36' E Long). Coll. 1969 and subm. by L. H. Barfield. Nine other samples from site subm. to Rome for radiocarbon dating.

Birm-172. Sample 10**6240 ± 100****4290 B.C.**

Charcoal fragments in body of shell midden lying on lake marl, below peat and ca. 0.5 m thick clay, in Sqs. 38 N, O and P, Site 4.

Birm-173. Sample 11**6290 ± 150****4340 B.C.**

Charcoal fragments contained in shell midden lying on marl and below peat in Sq. 41A, Site 4.

Birm-174. Sample 12**6350 ± 140****4400 B.C.**

Charcoal from bottom horizon of multilevel hearth in center of wooden house, Sq. 38L, Site 4.

Birm-175. Sample 13**6450 ± 110****4500 B.C.**

Wood from 3rd layer of cross set timbers in platform, preserved in peat below ca. 0.5 m clay, assoc. with Neolithic artifacts, from Trench 2, Site 3.

Birm-176. Sample 14**6470 ± 150****4520 B.C.**

Wood from beam forming part of substructure of wooden house, underlying hearth of Birm-174, from Sq. 37K, Site 4.

Birm-177. Sample 15**6125 ± 150****4175 B.C.**

Peat from deposit surrounding hearth and wooden house, belonging to final phase of settlement, from Level 3, Site 4.

Birm-107. Apliki Mine, Cyprus **2330 ± 90**
380 B.C.

Wood (*Pinus brutia*) saturated in sulphide copper ore at +291 m alt from Apliki Open Pit 4 km S of Lefka, Cyprus (34° 00' N Lat, 32° 20' E Long). Coll. 1967 and subm. by M. J. Bishop. *Comment*: date confirms antiquity of mines.

Birm-116. Gressvannet, Nordland, Norway **3090 ± 180**
1140 B.C.

Charcoal assoc. with quartzite arrowheads, of Younger Stone age culture from base of peat deposit, Gressvannet, Nordland, Norway (66° 03' N Lat, 14° 30' E Long). Coll. 1968 and subm. by D. P. S. Peacock.

Birm-117. Gressvannet, Nordland, Norway **6990 ± 120**
5040 B.C.

Charcoal assoc. with crude scrapers of older stone age culture in sandy soil underlying peat bed containing sample Birm-116, Gressvannet, Nordland, Norway (66° 03' N Lat, 14° 30' E Long). Coll. 1968 and subm. by D. P. S. Peacock.

Birm-154. Dumpo Quarter, Brong/Ahafo, Ghana **707 ± 92**
A.D. 1243

Charcoal ca. 0.8 m deep at top of Spit 4 in occupation mound at Dumpo Quarter, Brong/Ahafo, Ghana (7° 56' 30" N Lat, 2° 26' 0" W Long). Coll. 1967 and subm. by R. D. Mathewson.

Birm-155. Dumpo Quarter, Brong/Ahafo, Ghana **250 ± 150**
A.D. 1700

Charcoal from ca. 0.5 m depth at base of latest burial level in Spit 2 of occupation mound at Dumpo Quarter, Brong/Ahafo, Ghana (7° 56' 30" N Lat, 2° 26' 0" W Long). Coll. 1967 and subm. by R. D. Mathewson. *Comment*: this and Birm-154 continue series started by Birm-71, 79, and 80 (Shotton, Blundell, and Williams, 1969, p. 269). Results inconsistent with earlier dates, as both underlie Birm-71, 931 ± 158. Both samples alkali pretreated and figures suggest disturbed stratigraphy.

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