

BIRMINGHAM UNIVERSITY RADIOCARBON DATES I

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A radiocarbon laboratory has been set up to assist with the Pleistocene research undertaken in the Geology Department at Birmingham and has been designed for the measurement of ages of geological material up to at least 50,000 yr old. Construction began in May, 1965 and routine dating commenced in October, 1966. This is carried out using a CH_4 proportional counter.

Samples, usually of peat or wood, are pretreated by washing in distilled water followed by successive boilings in 5% HCl, 2% NaOH and again with 5% HCl solutions and then oven dried for about 24 hours at 110°C. The sample is combusted to give CO_2 which is purified using standard procedures. The CO_2 is hydrogenated to CH_4 using tritium-free hydrogen with a ruthenium catalyst (Fairhall, Schell and Takashima, 1961). It is stored under pressure in a steel cylinder for at least a month before measurement of the activity.

The counting laboratory is situated in a basement cellar, air-conditioned to provide a constant temperature of 17°C and 40% humidity. The incoming air is filtered through a 5-micron mesh. The proportional counter, with a volume of 6 L, is constructed of O.H.F.C. copper tube with stainless steel end plates and teflon insulation. It is guarded by a ring of 15 brass-walled geiger counters (20th Century G84) connected in anticoincidence, and surrounded by 5 cm of selected old lead, 10 cm of boron-loaded paraffin wax, and a further 15 cm of old lead. Beckman Lowbeta electronics are used. The counter is filled to 2 to 3 atm pressure and operated between 5750 and 7250 v. The background count varies only slightly with filling pressure and is 16 cpm at 2 atm. The net modern activity (95% of NBS oxalic acid) is given by 76 cpm at 2 atm. In addition a 1.5 L Oeschger-type proportional counter is being installed for operation with CH_4 at up to 3 atm pressure.

Ages of samples are determined from counts of at least 1000 min duration sandwiched between background counts. Running totals of net β and gross β counts are monitored every 10 min for statistical analysis. Corrections for fluctuations in $\text{C}^{13}/\text{C}^{12}$ ratios have not been applied, but facilities will become available shortly. Dates are given in terms of the Libby half-life of 5570 yr. Standard deviations are calculated from the variances of the standard and background measurements taken over two-week periods.

SAMPLE DESCRIPTIONS

	4001 ± 66
Birm-1. Isleham, Cambridgeshire	2051 B.C.

Bog oak with borings of *Cerambyx cerdo*, part of a 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). A complete beetle occupied one of the borings. At present this species is regarded as British only by sporadic introduction. The specimen gives one date when it was indigenous. Subm. by E.A.J. Duffy.

3572 ± 64**Birm-2. Linwood Moss, Renfrewshire****1622 B.C.**

Wood fragments in peat from basal layer of peat moss at height of 26.9 ft. O.D., overlying gray silt at Linwood Moss, 3 mi NW of Paisley (55° 52' N Lat, 4° 29' W Long, grid ref. NS 439664). Value of a date for this specimen is in relation to Birm-3, from another point in Linwood Moss where peat/silt junction is considerably higher above O.D., and also in relation to age of Birm-4. Deposits beneath peat are mapped as "Late Glacial Sea (100 ft Raised Beach) and later deposits," by Geol. Survey. Manner in which peat grades down into silt suggests there was some "25 ft Beach" or other similar deposit above the shelly Late-Glacial clay that has been mapped extensively in Linwood Moss area. Described by W.W. Bishop.

9231 ± 96**Birm-3. Clippens Farm, Renfrewshire****7281 B.C.**

Wood from basal layer of peat moss (at height of 4 ft O.D.) near Clippens Farm, Linwood, 3 mi N of Paisley (55° 51' N Lat, 4° 31' W Long, grid ref. NS 433654). Described by W.W. Bishop.

8039 ± 128**Birm-4. Wester Fulwood, Renfrewshire****6089 B.C.**

Wood from bed of black, unsorted sand with gravel, sub-angular boulders and abundant organic material, 6 to 18 in. thick, in steep face of a "terrace" rising from floodplain of River Gryfe at Wester Fulwood, 4 mi NW of Paisley (55° 52' N Lat, 4° 31' W Long, grid ref. NS 432669). Bed is ca. 11 ft. O.D., overlying clay, with stones and cold marine microfauna, attributed by Geol. Survey to "100 ft Raised Beach" sea. Bed is overlain by iron pan above which are sand and gravel. Described by W.W. Bishop.

3847 ± 60**Birm-5. Roberthill, Dumfriesshire****1897 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). Coll. at Loc. 15 on western limb of western "anticline" shown by Bishop (1963, Fig. 4). An earlier C¹⁴ date Q-643 (Cambridge VI) on wood from what is apparently same bed 400 ft further E on crest of eastern "anticline" gave value of 12,940 ± 250 yr B.P. but insect fauna and flora associated with Birm-5 indicates a much later date.

Birm-7. Barford, Warwickshire**4366 ± 64
2416 B.C.**

Carbonized fragments of large wooden platter (ca. 105 x 75 x 4 cm) from excavations of henge site on terrace gravel of River Avon at Barford (52° 16' N Lat, 1° 35' W Long, grid ref. SP 289629). Platter dates the last of several phases of construction of henge monument. Subm. by A.H. Oswald on behalf of Avon-Severn Research Comm.

REFERENCES

Date list:

- Cambridge VI Godwin and Willis, 1964.
- Bishop, W. W., 1963, Late-Glacial deposits near Lockerbie, Dumfriesshire: *Trans. Dumfriesshire and Galloway Nat. History and Antiquarian Soc.*, v. 40, p. 117-132.
- Fairhall, A. W., Schell, W. R., and Takashima, Y., 1961, Apparatus for methane synthesis for radiocarbon dating: *Rev. Sci. Instruments*, v. 32, no. 3, p. 323-25.
- Godwin, H., and Willis, E. H., 1964, Cambridge University natural radiocarbon measurements VI: *Radiocarbon*, v. 6, p. 116-137.