

NATIONAL PHYSICAL LABORATORY RADIOCARBON MEASUREMENTS II

W. J. CALLOW, M. J. BAKER and DAPHNE H. PRITCHARD

National Physical Laboratory, Teddington, England

The following list comprises measurements made since those reported in NPL I and is complete to the end of November 1963.

Ages are relative to A.D. 1950 and are calculated using a half-life of 5568 yr. The measurements have been corrected for fractionation and referred to 0.950 times the activity of the NBS oxalic acid as a contemporary reference standard. The quoted uncertainty is one standard deviation derived from a proper combination of the parameter variances, *viz.* those of the standard and background measurements over a rolling twenty-week period, of the sample measurements from at least three independent fillings, of the δC^{13} measurements and of the de Vries effect (assumed to add an additional uncertainty equivalent to a standard deviation of 80 yr). Any uncertainty in the half-life has been excluded so that relative C^{14} ages may be correctly compared. Absolute age assessments, however, should be made using the accepted best value for the half-life and the appropriate uncertainty included. If the net sample activity is less than 4 times the standard error of the difference between the sample and background activities, a lower limit to the age is reported equivalent to a sample activity of 4 times the standard error of this difference.

The description of each sample is based on information provided by the person submitting the sample to the Laboratory.

The work reported forms part of the research programme of the Laboratory and is published by permission of the Director.

A. British Isles

NPL-16. Wybunbury, Cheshire

**10,780 \pm 162
8830 B.C.**

Detritus peat from depth of 5 ft in temporary trench in thick sand bed overlying boulder clay at Lea Farm, Wybunbury (53° 02' 20" N Lat, 2° 26' 40" W Long), Cheshire. Coll. 1960 by G. R. Coope and F. Moseley; subm. by F. Moseley, Univ. of Birmingham. *Comment* (G.R.C. and F.M.): stratigraphical position of sands and boulder clay is controversial, and a correct understanding is fundamental to interpretation of the drift sequence of a large part of the Cheshire Plain. Age of less than 20,000 yr indicates sequence is in Late Glacial II/III.

Romney Marsh series, Kent

Samples to date natural formation and reclamation of 80 sq mi of marshland on landward side of Dungeness. Accurate date for formation of peat underlying much of the ground will provide (a) earliest date for formation of tidal flat and salting deposits which overlie it, (b) date for beginning of trans-formation of coastline from shingle-bar to cusped foreland, (c) information on rate of accumulation of shingle at Dungeness. Coll. 1961 and subm. by J.G.O. Smart, Geol. Survey and Mus., London.

NPL-23. Appledore Dowels**3020 ± 94****1070 B.C.**

Wood (probably birch) from ditch bank in peat layer underlying Estuarine Alluvium, Appledore Dowels (51° 02' 30" N Lat, 0° 49' 20" E Long), Kent.

NPL-24. Walland Marsh**3340 ± 92****1390 B.C.**

Wood (probably birch) from tree-trunk in new ditch cutting of peat layer underlying Estuarine Alluvium, Wheelsgate (50° 58' 50" N Lat, 0° 53' 50" E Long), Kent. *Comment* (J.G.O.S.): determinations confirm period of formation of Romney Marsh peat as Bronze Age. Previously dating was by analogy with submerged forest off Pett Level from which a single flint flake of Neolithic to early Iron-Age had been recovered (Milner and Bull, 1925).

NPL-25. Wheelsgate**1550 ± 120****A.D. 400**

Shell (*Scrobicularia plana*) from new ditch cutting in creek-ridge sand filling channel eroded into the peat in Estuarine Alluvium, Wheelsgate (50° 58' 30" N Lat, 0° 53' 20" E Long) Kent. *Comment*: for this sample we have applied a correction of -470 ± 83 yr obtained from measurements on a sample of *Mya arenaria* (A.D. 1660 to 1670) obtained through the courtesy of the Director of the State Service for Archaeol. Inv. in the Netherlands. The δC^{13} value for the *Mya* was $-5.7 \pm 1\%$ relative to PDB. *Comment* (J.G.O.S.): age is younger than anticipated. The creek-ridge (Green and Askew, 1959) from which specimens were obtained is part of a series of such ridges that are widely distributed upon this marshland. If all ridges are contemporaneous much of marshland thought to have been land since Roman time was not deposited until late in that period. The Rhee Wall (Steers, 1948), which many have thought to be Roman, can be shown to postdate ridge system.

General Comment (J.G.O.S.): creek-ridges overlies and intersect peat. These three determinations provide first precise dates for variations in sealevel during formation of marshland.

NPL-34. Isleworth, Middlesex**>43,500**

Stem fragments in silt at base of gravels comprising a low terrace of the Thames at Isleworth (51° 27' 30" N Lat, 0° 20' 00" W Long), Middlesex. Coll. 1959 by F. W. Shotton and A. Sutcliffe; subm. by F. W. Shotton, Univ. of Birmingham. *Comment* (F.W.S.): fauna associated with plant remains indicate temperate conditions whereas large mammal bones (reindeer, bison, etc.) in overlying gravel indicate marked deterioration of climate. From faunal point of view result fits as late stage of Eemian Interstadial.

NPL-55. Coleshill, I, Warwickshire**32,160 +1780****-1450****30,210 B.C.**

Grass-sedge peat from layer 2 in. thick beneath 12 ft of sand and gravel of early flood plain or low terrace deposits on Coleshill Industrial Estate (52° 31' N Lat, 1° 42' W Long), Warwickshire. Coll. 1962 by M. R. Kelly; subm. by F. W. Shotton. *Comment* (F.W.S.): sample provides date for contained sub-

arctic flora and insect fauna and relates these deposits to chronology of Last Glaciation.

NPL-56. Whitacre Heath, C 1, Warwickshire **10,560 ± 142**
8610 B.C.

Plant detritus from depth of 13 ft near base of terrace gravels overlain by alluvium at Nether Whitacre (52° 32' N Lat, 1° 41' W Long), Warwickshire. Coll. 1962 by M. R. Kelly; subm. by F. W. Shotton.

General Comment (F.W.S.): dates for NPL-27c, Minworth IIb (10,530 ± 156, NPL I), NPL-55, Coleshill I, and NPL-56 were expected to be similar as insect remains in all three strongly support their contemporaneity. Age of 32,000 yr for Coleshill I is close to expectations which would make the result for Whitacre Heath another case of contamination. Like Minworth IIb, it is not impossible for this sample to be contaminated with sewage but it is difficult to believe that two old samples are contaminated to the same extent. They may therefore truly postdate Coleshill I, but this is uncertain.

NPL-57. Tweedsmuir, Peeblesshire **3440 ± 90**
1490 B.C.

Charcoal from Pit 3 in burial cairn 26 ft × 19 ft × 1 ft 6 in. in greatest height at Tweedsmuir (55° 29' 48" N Lat, 3° 26' 54" W Long), Peeblesshire. The cairn, believed to be Early Bronze Age, and surrounding ground were overlain by layer of peat of 1 ft maximum depth. Coll. 1961 and subm. by A. MacLaren, Royal Comm. of the Ancient and Hist. Monuments of Scotland. *Comment* (A. MacL): excavation yielded no direct archaeological dating evidence (e.g. pottery, metal) and as this cairn is first example of its type to be dug, result helps place it in correct chronological context.

B. Australia

Fromm's Landing series, South Australia

Wood charcoal from excavation at Shelter 6, Fromm's Landing (34° 47' S Lat, 139° 34' E Long), South Australia. Coll. 1960 and subm. by D. J. Mulvaney, Univ. of Melbourne. *Comment* (D.J.M.): dates permit chronological comparison and check upon dates obtained from Shelter 2, Fromm's Landing (Mulvaney, 1960, 1961, New Zealand I-V).

NPL-28. Fromm's Landing, 1 **2950 ± 91**
1000 B.C.

Sample 1 from 4 ft 6 in. below surface in well-stratified deposit, associated with small backed blades, termed 'Bondi' points.

NPL-29. Fromm's Landing, 2 **3170 ± 94**
1220 B.C.

Sample 2 from depth of 7 ft, less than 12 in. beneath skeleton of dingo. *Comment* (D.J.M.): this provides first definite chronological data concerning antiquity of the dingo in Australia.

C. Africa

NPL-15B. Wadi Gan, Libya **6500 ± 108**
4550 B.C.

Land snail shells, associated with an Aterian industry, in undisturbed silt of terrace of Wadi Gan, 15 mi E of Garian (32° 20' N Lat, 12° 10' E Long),

Tripolitania. Coll. 1959 by E. S. Higgs and R. Imison; subm. by E. S. Higgs, Univ. of Cambridge. *Comment*: although age of 6500 yr is younger than expected, ca. 16,000 yr, possibility of contamination is negligible since, after outer 1/3 of sample was removed during pretreatment, two gas samples were prepared from remaining shell (corresponding to intermediate and innermost material respectively) and had same activity.

Kisese II Rock Shelter series, Tanganyika

Charred ostrich eggshell from deep deposits in floor of Kisese II Rock Shelter, Kondoa District (4° 25' 15" S Lat, 35° 50' E Long), Tanganyika. Coll. 1956 and subm. by R. R. Inskip, Faculty of Archaeol. and Anthropol., Cambridge. Samples are directly related to an unbroken succession of Stone Age industries distributed vertically through 20 ft of deposit. *Comment* (R.R.I.): it was hoped that results would provide beginning of an absolute chronology for the 2nd Intermediate and Late Stone Age in this part of Africa, corresponding to ages between 3000 and 7000 B.P.

NPL-35. Kisese II/1	14,760 ± 202
Sample from middle part of Late Stone Age sequence.	12,810 B.C.
NPL-36. Kisese II/2	10,720 ± 132
Sample from early Late Stone Age sequence.	8770 B.C.
NPL-37. Kisese II/3	18,190 ± 306
Sample from 1st Intermediate/Late Stone Age transition.	16,240 B.C.
NPL-38. Kisese II/4	31,480 +1640
	29,530 -1350
	29,530 B.C.

Sample from middle part of 2nd Intermediate sequence.

General Comment: in view of careful pretreatment suitability of ostrich eggshell requires investigation.

Muchoya Fen series, Uganda

Peat, separate cores from a Hiller drill, from Muchoya Fen, 8000 ft above sealevel within Echuya Central Forest Reserve (1° 30' S Lat, 30° E Long), Uganda. Coll. 1960 and subm. by M. E. S. Morrison, Makerere Univ. College, Uganda.

NPL-52. Muchoya Fen, 400-450	6570 ± 95
Sample from depth between 400 and 450 cm.	4620 B.C.
NPL-53. Muchoya Fen, 600-650	9340 ± 100
Sample from depth between 600 and 650 cm.	7390 B.C.
NPL-54. Muchoya Fen, 750-800	12,890 ± 130
Sample from depth between 750 and 800 cm.	10,940 B.C.

General Comment (M.E.S.M.): the fen, within area of Bufumbira volcanic

bay, is in equatorial belt and enjoys a somewhat temperate climate throughout the year. The profile was analyzed at consecutive small vertical intervals for its pollen content (Morrison, 1961). Results should be important in correlation of late Quaternary climatic and vegetation sequences in NW Europe and equatorial E Africa.

Tristan da Cunha series, A

Organic layers from fossil soil at alt ca. 2000 to 2100 ft from W side of Big Green Hill in Council Gulch (37° 03' 05" S Lat, 12° 16' 25" W Long), Tristan da Cunha. Coll. 1962 and subm. by J. H. Dickson, Univ. of Cambridge.

NPL-47. Tristan da Cunha, 1 **10,770 ± 156**
8820 B.C.

Sample from layer 12 to 14½ cm below surface of fossil soil overlain by light brown silt, 12 cm thick, and underlain by light brown silty loam, 4 cm thick. Above fossil soil is 4 m of black cinder agglomerate.

NPL-48. Tristan da Cunha, 2 **11,310 ± 168**
9360 B.C.

Sample from layer 18½ to 22½ cm below surface of fossil soil overlain by 4 cm of light brown silty loam that underlies NPL-47, underlain by 3½ cm of light brown silt.

General Comment (J.H.D.): section was exposed recently by minor landslide. Results will enable history of previous eruptions and vegetational history to be established (Hafsten, 1960).

Tristan da Cunha series, B

Lignite from Sea Hen Rock, Nightingale Island (37° 24' 30" S Lat, 12° 28' 20" W Long), Tristan da Cunha. Coll. 1962 by P. E. Baker and R. W. LeMaitre; subm. by J. H. Dickson.

NPL-49. Tristan da Cunha, 3 **39,160 +6090**
-3410
37,210 B.C.

Sample from lignite bed, 5 ft deep, overlain by 30 ft of tuff, underlain by over 100 ft of coarse trachyte.

NPL-50. Tristan da Cunha, 4 **>36,900**

Sample from lignite bed, 6 ft deep, overlain by 25 ft of tuff, underlain by 30 ft of rotting trachytic lava.

General Comment (J.H.D.): the history of previous eruptions and vegetational history should be resolved by these measurements.

D. South America

NPL-60. Calima, La Primavera, Colombia **700 ± 85**
A.D. 1250

Wood charcoal, associated with pottery and stone artefacts from shaft grave, Tomb 1, Calima (4° N Lat, 77° W Long), Colombia. Coll. 1962 and subm. by W. M. Bray, Univ. Mus. of Archaeol. and Ethnology. *Comment* (W.M.B.): many classes of pottery were associated in tomb; several have

parallels in other undated cultures and this material probably represents last phase of occupation in valley before coming of Spaniards.

REFERENCES

Date lists:

- New Zealand I-V Grant-Taylor and Rafter, 1962
 NPL I Callow, Baker and Pritchard, 1962
- Callow, W. J., Baker, M. J., and Pritchard, D. H., 1962, National Physical Laboratory radiocarbon measurements I: *Radiocarbon*, v. 5, p. 34-38.
- Grant-Taylor T., and Rafter, T. A., 1962, New Zealand natural radiocarbon measurements I-V: *Radiocarbon*, v. 5, p. 118-162.
- Green, R. D., and Askew, P. W., 1959, Report Soil Survey Research Board, no. 11, p. 22-27.
- Hafsten, U., 1960, Pleistocene development of vegetation and climate in Tristan da Cunha and Gough Island: *Arbok Univ. i Bergen mat.—Naturv.*, no. 20, 48 p., 8 pl.
- Milner, H. B., and Bull, A. J., 1925, Excursion to Eastbourne and Hastings: *Proc. Geol. Assoc.*, v. 36, p. 291-320.
- Morrison, M. E. S., 1961, Pollen analysis in Uganda: *Nature*, v. 190, no. 4775, p. 483-486.
- Mulvaney, D. J., 1960, Archaeological Excavations at Fromm's Landing on the Lower Murray River: *Royal Soc. Victoria Proc.*, v. 72, p. 53-85.
- 1961, Australian Radio-Carbon Dates: *Antiquity*, v. 35, p. 37-39.
- Steers, J. A., 1948, *The Coastline of England and Wales*: Cambridge, Univ. Press.