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UNIVERSITY OF NEW SOUTH WALES RADIOCARBON DATES I

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The dates listed were obtained using a stainless steel counter with an active volume of 1.3 L and a background of 16.3 cpm at an absolute filling pressure of 152 cm Hg. The present proportional counter in use is made of O.F.H.C. copper, and has an active volume of 1.25 L and a background of 5.2 cpm, at an absolute counter filling pressure of 152 cm Hg. CO_2 is used as the counting gas and the counter is filled to a pressure of between 76 cm and 228 cm of Hg (depending on the sample size) at a temperature of 23 $\pm$ 0.3°C. The counter is shielded, starting from the top, by 5 cm of lead and 26 cm of iron, and is surrounded by an array of 22 Geiger tubes, and then finally by 2.5 cm of mercury. The thickness of the sides and base is greater than 10 cm of iron. As yet no neutron shielding is used and this probably accounts for the large fluctuations of background with barometric pressure (0.32 cpm per 1 cm Hg change in the pressure).

Counter plateaus are about 600 V long and have a slope of .3% per 100 V. So that the same gas gain is obtained, irrespective of traces of electronegative ions in the gas, the E.H.T. to the counter automatically adjusts to compensate. This is achieved by dividing the coincidencc counts equally into a high and a low energy group and using the difference as a feed back via a D.C. amplifier to the grid of the E.H.T. oscillator. The basic features of the electronic equipment have been described earlier (Bell, Neuhaus and Green, 1962).

Samples are prepared by physical sorting and treatment with 2N HCl and/or 2N NaOH as desired before combustion to CO_2. The CO_2 is purified in a manner essentially the same as Rafter's (1955) by scrubbing in (a) 10% KI: 1% I_2; (b) $AgNO_3$, 0.2N; (c) 1 conc. H_3PO_4: 2 of solution d; (d) Sat. chromic acid in conc. sulphuric. The gas is freed of radon by absorption-desorption on lime and may be counted immediately, if desired. This is because the lime has been purified of radium by a method specially developed to remove Ra^{226} (Pallister and Green, 1964). Repeated tests have shown the CO_2 to be free of radon.

Samples are counted for 1000 min minimum, and after each 100 min interval the accumulated counts from eight monitoring scalers on the outputs of the channels of the coincidence-anticoincidence unit are recorded on a Polaroid camera using a multiple exposure technique. This record is checked to see that the counts are acceptable by having a statistically normal distribution.

Ages are based on 0.95 times the activity of NBS oxalic-acid modern standard, and are given with A.D. 1950 as reference year. The quoted error is $\pm$ 1 σ based solely on the counting statistics. The Libby half-life, 5568 yr, has been used in the calculation.

SAMPLE DESCRIPTIONS

A. Australia and New Guinea

NSW-1. Mootwinje Cave, New South Wales **285 ± 80**
A.D. 1665

Charcoal coll. by F. D. McCarthy, Australian Mus., Sydney, from floor of Site 14, bottom of deposit with maximum depth of 18 in. Seventy-six implements, typical of Tula Regional Sequence, were excavated; included cores, blocks, *Tula* chisels with *Tula* and *Burren* slugs, burins, geometrical microliths, and portions of millstones. The *Tula* and its two slugs and the geometrics occurred from top to bottom of deposit. No *pirri* points present (McCarthy and Macintosh, 1962).

NSW-2. Glen Osmond, South Australia **modern**

Heartwood of "old" red gum tree. Coll. by Highways and Local Govt. Dept.

NSW-3. Konetta, South Australia **35,000**

Shell sample 3, 24 to 30 in. depth, Konetta district SE South Australia, 19 mi ESE of Robe (37° 20′ S Lat, 140° 05′ E Long). Beach shells exposed in new drain. Coll. by G. Blackburn for J. K. Taylor (Ref. Field Book 325, p. 7). C.S.I.R.O. Div. of Soils.

NSW-4. Kabanunt Forest A.N.U. A2., New Guinea **modern**

Wood from outer 2 cm of recently filled Northofagus sp. at Kabanunt Forest, 8400 ft alt (5° 20′ S Lat, 143° 30′ E Long). Coll. by D. and P. M. Walker, Australian Natl. Univ., Canberra.

NSW-5. Kabanunt Forest A.N.U. A3., New Guinea **550 ± 85**
A.D. 1400

Heartwood of felled Nothofagus sp. See NSW-4.

NSW-6. Gymea Bay, New South Wales **1220 ± 55**
A.D. 730

Wood charcoal GY/main baulk layer 6—Gymea Bay (151° 05′ E Lat, 34° 04′ S Long). Found in association with aboriginal skeleton in midden material with large proportion of shell. Probable age 200 to 500 B.P. Coll. by J.V.S. Megaw, Dept. of Archaeol., Sydney. *Comment* (J.V.S.M.): date is first obtained in N.S.W. for pre-white settlement skeletal remains in association with cultural material; skeleton (female aged 18 ± 2 yr) and a scad from the same site are typical of the norms established for N.S.W. coastal aborigines of the 19th Century. The site and scanty finds may be compared with Curracurrang, level M which has a mean date of modern < ca. 200 (GaK-462, 463, Gakushain IV, 1965; Megaw, 1965).

NSW-14. Graystones, New South Wales **30 ± 57**
A.D. 1920

Wood from young gum tree sapling at Greystones, N.S.W. (33° 52′ S Lat, 151° 05′ E Long). Tree was felled between A.D. 1895 and 1900 and used as a roof beam in a shed until recently.

WATER SAMPLES

Studies are being undertaken to examine residence times, renewal rates and recharge within the Great Artesian Basin. The basin extends through four Australian states. The sequence of the Mesozoic strata in New South Wales is not as well established as in Queensland but it seems fairly evident that the N.S.W. aquifer is that of the Lower Cretaceous-Upper Jurassic Blythesdale Group of Q15 (Whitehouse, 1954), so it was therefore chosen for sampling. Although other aquifers exist, their distribution is not so widespread.

The carbon is present mainly as $NaCHO_3$ and is extracted as CO_2 using the method employed at the Physikalisches Inst., Univ. of Heidelberg (oral communication, Munnich). Preliminary investigation indicates $\delta C^{13} > -12.5\%$ for all water samples with respect to our internal marble standard.

Data are too scanty as yet for any conclusions.

A. Great Artesian Basin

NSW-9. Bore No. 434 N.S.W. **2.69 ± 0.39% modern**

Water from Innisfail No. 2 Bore, depth 2729 ft. Structural margin of basin is well-defined 19 mi E of bore and piezometric surface contours are parallel to the margin in indicating an E-W flow. Coll. 1963 by J. D. Curran, Water Conservation and Irrigation Comm. of New South Wales.

NSW-10. Bore No. 434 N.S.W. Duplicate sample **1.48 ± 0.50% modern**

NSW-15. Bore No. 4238 N.S.W. **1.03 ± 0.52**

Water from Gurley Siding Bore, depth 2938 ft (29° 44′ S Lat, 49° 48′ E Long), 27 mi in from structural margin of basin. Coll. 1963 by J. D. Curran, W.C.I.C.

NSW-8. Bore No. 4215 N.S.W. **3.31 ± 0.40% modern**

Water from Glenroy bore, depth 2539 ft, 36 mi from structural margin of basin. Coll. 1963 by J. D. Curran, W.C.I.C.

NSW-16. Groundwater **δC^{14} 168 ± 9‰**

Surface runoff in vicinity N.S.W.-15, stored in excavated tank. Nov. 1963, 8000 cu yd water stored. Chosen for comparison with artesian samples; dissolved salts found to be chemically similar.

NSW-13. Bore RN 14343 Queensland **0.96 ± 0.39% modern**

Bexhill Stock Route (24° 41′ S Lat, 146° 06′ E Long). Coll. by Irrigation and Water Supply Comm., July 1964.

NSW-12. Bore RN 311 Queensland **3.96 ± 0.45% modern**

Augathella Town Bore, (25° 43′ S Lat, 146° 35′ E Long). Coll. July 1964, I.W.S.C.

NSW-11. Bore RN 14588 Queensland **2.66 ± 0.44% modern**

Blackall Town Bore (24° 26′ S Lat, 145° 27′ E Long). Coll. July 1964, I.W.S.C.

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