

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. CO₂ 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 $23 \pm 0.3^\circ\text{C}$. 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 coincidence 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 CO₂. The CO₂ is purified in a manner essentially the same as Rafter's (1955) by scrubbing in (a) 10% KI: 1% I₂; (b) AgNO₃, 0.2N; (c) 1 conc. H₃PO₄; 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 Ra²²⁶ (Pallister and Green, 1964). Repeated tests have shown the CO₂ 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 $\pm 1 \sigma$ based solely on the counting statistics. The Libby half-life, 5568 yr, has been used in the calculation.

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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