

Bunn 155

HARWELL

HARWELL RADIOCARBON DATING CERTIFICATE

Carbon-14/Tritium
Measurements Laboratory

Notes on the method of reporting Radiocarbon results in
the accompanying certificate

1. Age bp (Column 5): is the Conventional Radiocarbon Age calculated using the following Standards and parameters.
 - 1.1 Half-life: The old (W.F. Libby) value 5570 years is used. This is in accordance with the decision of the Fifth Radiocarbon Dating Conference, Cambridge, 1962 and reaffirmed at similar meetings since. It is also a requirement of the publishers of 'Radiocarbon', that this half-life value is used in dates reported therein. 'Age bp' results can be converted to the most recent value of half-life, $5730 \pm 40 \text{ yr}^{(1)}$, by multiplying by 1.029. ~ 221 bc.
 - 1.2 Modern Standard: The oxalic acid standard issued by the National Bureau of Standards (NBS), Washington is used. Following the recommended practice, 'Modern' is taken as 0.95 times the activity of the standard after correction for fractionation during its preparation. Reference standards are routinely checked against freshly prepared samples of the NBS oxalic acid.
 - 1.3 Background Standards: Samples prepared from Marble, Coke or Fuel Oil were used in the initial setting up procedure to determine the best mean value background figure. This is routinely checked against additional samples freshly made and using the full sample preparation process.
 - 1.4 Stable Isotope Correction: This is expressed as DELC13 (Column 4) and represents $\delta^{13}\text{C}$, the deviation per mil, of the ratio of the stable isotopes $^{13}\text{C}/^{12}\text{C}$ of the sample from that of an adopted standard (PDB). The 'Age bp' value quoted (Column 5) is already corrected for the $\delta^{13}\text{C}$ value given in Column 4. If there is no measurement of $\delta^{13}\text{C}$, a value is assumed which causes zero correction to be applied in 'Age bp' calculation, ie -25.0%.
 - 1.5 Bristlecone Pine Correction: No correction is applied to the results given in the certificate table. The laboratory will be pleased to advise on possible appropriate conversions to true Calendar Ages should help be required. Lack of general agreement on which calibration curve to accept induces a reluctance to quote converted dates routinely on this certificate although a corrected value will be given (in the 'Comments' section) if specifically requested.
2. Accuracy of the measurement of 'Age bp' is expressed in the associated error term (+ value) as $\pm 1\sigma$ (standard deviation) inherent to the measurement process. It is not an error which can in any way allow for contamination of the sample or any judgement based on geologic or archaeological grounds. It includes the laboratory's estimate of their own reproducibility ie 68% of all identical replicate samples are expected to give results within the limits of $\pm 1\sigma$; 95% are expected to give results within $\pm 2\sigma$. Inconsistent error terms, eg when similar samples are quoted as having significantly different \pm values, are generally due to the variations in the yield of CO_2 from the samples supplied. Samples giving inordinately high error estimates because the sample size was below that normally required are usually accompanied by a comment identified in Column 7.
3. bp-1950 (Column 6): In accordance with the requirements of the publishers of 'Radiocarbon' this is reported as dates 'ad' or 'bc' after subtracting 1950 from the quoted 'Age bp' although, as stated in 1.5, no further correction to bring

the result nearer to the true calendar date has been applied. To emphasise this point, lower case characters are used in the certificate table when (2) specifying 'ad', 'bc' or 'bp' but it should be noted that this convention is not yet acceptable for Radiocarbon date lists. 'Infinite' dates, ie >35000 y, are reported as 'bp' only.

References

1. Nature, Vol. 195, No. 4845, p. 984, 1962.
2. Antiquity, Vol. 46, p. 265, 1972.

