NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

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ON THE RELIABILITY OF CHARCOAL FOR RADIOCARBON DATING NEW ZEALAND ARCHAEOLOGICAL SITES

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It is well known that the radiocarbon dating of plant remains, particularly wood or charcoal, from an archaeological site indicates not the time of human occupation of the site but the date that the plant died, or in the case of large trees the date of growth of that particular portion of the tree that is being analysed. It has been generally assumed, however, that samples of small diameter, burnt branches or twigs or outer portions of larger diameter specimens, should produce a date approximating the date of site occupation. In many cases I have no doubt that this must be so but my own experience has been that charcoal has given a date at least three centuries earlier than that given by other materials and on this basis I am suspicious of the accuracy of any charcoal date not supported by dates obtained from other materials or methods.

Three dates from moa bone collagen and one from paua shell (A.D. 1447±32, 1447±32, 1407±32 and 1465±32 respectively) indicate a consistent mid-fifteenth century date for the Tai Rua Moa-hunter site in North Otago (Trotter 1967c) yet charcoal from a stake in a post hole was over three centuries older (A.D. 1119±33). It must be concluded, therefore, that the timber from which the stake was made was this old at the time of its use due either to its being the inner portion of a large old tree, which is unlikely, or that by chance or design a piece of relict timber had been obtained. The most likely source of timber for building, artefacts, or firewood at this site is driftwood from the adjacent beach, and it seems quite possible that for one reason or another it could have been of a considerable age before being used.

A similar difference in age was found by Roger Duff from an oven of the flat seaward of Moa-bone Point Cave. Charcoal produced a date of A.D. 1163±82 while moa bone was A.D. 1460±90. In this case, however, no allowance was made for possible atmospheric contamination of the carbonate in the moa bone (Duff 1963: 9).

A fairly definite case of the use of relict timber was at Katiki Point (Trotter 1967a) where the totara slab upright of a building produced an age over six hundred years earlier than adjacent shell midden. There is no indication of totara having grown in

the immediate vicinity for many centuries yet relict logs do occur about two miles away so this result was not unexpected and it gives an insight to cultural industry.

Somewhat harder to explain is the difference between moa bone collagen (A.D. 1457±70) and charcoal (A.D. 1090±32) from an oven at Woolshed Flat, a Moa-hunter site some fifty miles inland from the mouth of the Waitaki River. The charcoal was all from small twigs and one would logically assume that the firewood was obtained from bushes similar to those that can be found in the area today. There is little reason to believe that these bushes would either grow very old or exist very long after death, but again there is a difference of over three centuries. Another charcoal sample was obtained from a different part of the site but the result was the same (A.D. 1140±50). Cultural evidence supports the collagen date.

In a previous publication (Trotter 1967b) I suggested that the A.D. 780±65 charcoal date obtained from the Redcliffs Moa-hunter site by Roger Duff seemed, on the grounds of cultural materials, to be too early. Subsequently I obtained radiocarbon dates for shell (A.D. 1333±34) and moa bone collagen (A.D. 1215±56) from the same level and am thus convinced that the site was occupied about the Thirteenth rather than the Eighth Century. In this case the firewood could have been obtained either from driftwood or the small bushes growing nearby. The difference between the shell and collagen dates is greater than expected but is well within two standard deviations. Alternatively, there may be some other reason for it as most archaeologically reliable shell and collagen samples appear to lie within the range of one standard deviation.

Besides the examples given here, which I have been personally concerned with, several other workers have found large variations in separate charcoal dates from a single layer (i.e. Duff 1963: 9, Groube, pers. com. 1968).

Some charcoal dates obtained for New Zealand archaeological sites may give an accurate indication of the date of occupation; others do not for known or unknown reasons. In view of the uncertainties involved there would appear to be little point in submitting archaeological charcoal for radiocarbon dating except as a last resort when no other materials - such as shell or bone collagen - are available.

If my hypothesis is valid, it will be necessary to reconsider some of the early dates for human settlement in New Zealand which are based on charcoal samples. I would be interested to learn of any reliable early occupational collagen or shell dates that have been obtained.

REFERENCES

Duff, R. S. 1963. The Problem of Moa Extinction. Cawthorn Institute.

Trotter, M. M. 1967a Excavations at Katiki Point, North Otago. Rec. Canterbury Museum 8 (3): 235-249.

1967b Investigations of a Moa-hunter site at Redcliffs, Sumner. Rec. Canterbury Museum 8 (3): 251-254.

1967c Radiocarbon Dates from North Otago. N.Z. Archaeological Assn. Newsletter 10 (4): 137-142.

THE ESK REDOUBT, MIRANDA

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Some three miles west-south-west of the settlement of Miranda, on the Thames Estuary, is situated a well-preserved square earthwork, defended by a deep ditch and low internal bank (map N48 Mangatawhiri 768188). The historian James Cowan (1922) provides the evidence for identifying this as the Esk Redoubt, and it is marked as such on the one-inch map. I quote from Cowan's (1922) section on the Miranda expedition of November 1863, p. 313: 'On the 16th November a force of about nine hundred men, under Lieut.-Colonel Carey (Brevet-Colonel Carey according to G. le M. Gretton "Campaigns and History of the Royal Irish Regiment", London 1911), embarked at Auckland for the Thames Gulf. The object of the expedition was to occupy the principal Maori settlements on the western shore of the gulf, whence men and supplies had been sent to the Waikato, and to establish a line of forts across country from the sea to Queen's Redoubt'.