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**NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION NEWSLETTER**



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RADIOCARBON DATES FROM NORTH OTAGO

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Radiocarbon ages for several archaeological sites in North Otago and one in South Canterbury have recently been determined by the Institute of Nuclear Science, D.S.I.R., Lower Hutt, through the courtesy of the Director, Mr T. A. Rafter. Many of these were obtained in the course of research on the reliability of collagen as a dating material.

There is an unfortunate tendency for some archaeological workers to accept radiocarbon ages uncritically. While there is no doubt of the tremendous value of these dates in the interpretation of archaeological evidence, it is essential to understand the known sources of possible error in the method, and also to allow for those of unknown origin. A practical handbook, "Collection of Specimens for Radiocarbon Dating and Interpretation of Results" by Polach and Golson (1966), provides an excellent introduction to the subject.

In the following listed dates those obtained from bone collagen and from shell are acceptable - though this does not mean, for instance, that Waimataitai was necessarily occupied before Tai Rua. The wood, charcoal and bone carbonate results are obviously erroneous for the reasons given. Brief site descriptions have also been included for convenience.

WAIMATAITAI, North Otago. (N.Z. Archaeological Association Site Site Number S.146/2).

A Moa-hunter deposit, overlaid by two other occupational deposits on the southern bank of a coastal lagoon. Remains of four species of moa (Pachyornis elephantopus, Euryapteryx gravis, Emeus crassus, Megalapteryx didinus) and the extinct giant rail (Aptornis) were found (Trotter 1965a). Distinctive artifacts include barbed points of two-piece fish-hooks, one-piece fish-hooks, quadrangular adzes, flaked cutting and scraping implements and drill points (Trotter 1955).

A sample of shells of catseye (Lunella smaragda) and mussel (Mytilus) was selected from the deposit four feet below the surface and sorted by hand into keratin and shell carbonate for purposes of comparison. The carbonate was examined by X-ray diffraction for recrystallisation and

the result of the analysis is believed to be of "good reliability not subject to uncertainties of initial age or isotopic concentration" and is considered more reliable than the keratin (Grant-Taylor 1965-66).

Collected November 1957:

N.Z. 579 - Shell carbonate.  $626 \pm 30$  years (before 1950) =  
A.D.  $1324 \pm 30$ .

N.Z. 580 - Shell keratin.  $701 \pm 47$  years = A.D.  $1249 \pm 47$ .

OTOTARA GLEN, North Otago (S.136/2).

A small, shallow, Moa-hunter deposit adjacent to a limestone shelter, one and a half miles from the coast (Trotter 1965c). Bones of moa (Euryapteryx gravis), extinct flightless goose (Cnemiornis calcitrans) and extinct swan (Chenopsis sumnerensis) were found in the midden (Trotter 1965a). Artifacts included the barbed points of two-piece fish-hooks and broken bird-spear points.

In general, the occupational layer, which was predominantly shells with charcoal, burnt stones and bones in a black earth matrix a few inches thick, lay from four to ten inches below the surface. Because it was easy to remove hair roots and soil from them, the opercula of Lunella smaragda were chosen as a dating material, and the result compares favourably with that of associated moa bone collagen, while the moa bone carbonate has probably been affected by contaminated atmospheric carbon from bomb tests.

Collected December 1963:

N.Z. 560 - Shell.  $528 \pm 32$  years = A.D.  $1422 \pm 32$ .

N.Z. 753 - Moa bone carbonate.  $366 \pm 91$  years = A.D.  $1584 \pm 91$ .

N.Z. 754 - Moa bone collagen.  $467 \pm 70$  years = A.D.  $1483 \pm 70$ .

TAI RUA, North Otago (S.136/1).

A stratified Moa-hunter deposit on the coast which contained bones of moa (Euryapteryx gravis and Pachyornis elephantopus), extinct coot (Palaeolimnas chathamensis), extinct hawk (Circus eylesi) and extinct crow (Palaeocorax moriorum) (Trotter 1965a). The majority of artifacts

found were concerned with fishing and included several varieties of fish-hooks, some of which were barbed (Trotter 1965b).

Large samples of moa bone were obtained from different parts of the site including one from amongst predominantly shell midden in sand and another of heavily mineralized bone from a swampy area. The collagen from part of each sample was analysed separately and both gave the same results (N.Z. 559 and N.Z. 578). Bone carbonate from part of the same samples proved to be highly contaminated by atmospheric carbon dioxide. A sample of paua agreed excellently with moa bone collagen, and the greater age of the charcoal is doubtless due to use of ancient wood.

Collected in 1958 (N.Z. 750 in 1961-62):

- N.Z. 558 - Moa bone carbonate. A.D. post 1954.
- N.Z. 559 - Moa bone collagen.  $503 \pm 32$  years = A.D.  $1447 \pm 32$ .
- N.Z. 578 - Moa bone collagen.  $503 \pm 32$  years = A.D.  $1447 \pm 32$ .
- N.Z. 749 - Paua shell.  $485 \pm 32$  years = A.D.  $1465 \pm 32$ .
- N.Z. 750 - Charcoal.  $831 \pm 33$  years = A.D.  $1119 \pm 33$ .
- N.Z. 751 - Moa bone carbonate. A.D. post 1954.
- N.Z. 752 - Moa bone collagen.  $543 \pm 32$  years = A.D.  $1407 \pm 32$ .

WOOLSHED FLAT, Aviemore (S.117/3).

An inland Moa-hunter camp on the South Canterbury bank of the Waitaki River in the bed of the proposed power project lake at Aviemore. The occupational deposit comprised moa, dog and bird bones, oven stones, charcoal and artifacts, and was overlain by 2ft 6in. of humus and river-deposited silt (Trotter 1966: 122). Moa species were Euryapteryx gravis, Pachyornis elephantopus and Megalapteryx didinus. Both carbonate and collagen were analysed, the former showing the usual contamination.

Collected in October 1965:

- N.Z. 759 - Moa bone carbonate. A.D. post 1954.
- N.Z. 760 - Moa bone collagen.  $493 \pm 70$  years = A.D.  $1457 \pm 70$ .

HAMPDEN BEACH, North Otago (S.146/16).

A shallow unstratified Moa-hunter site at Hampden Beach, North Otago, mostly disturbed or destroyed. A small excavation was made in an undisturbed portion (Trotter 1967b) where the occupational deposit was found to be predominantly burnt stones and moa bones (Euryapteryx gravis) with a few artifacts.

The bone carbonate sample shows the usual atmospheric contamination, but the carbonate from burnt bone is much closer to the collagen results.

Collected in May 1965:

- N.Z. 755 - Moa bone carbonate.  $394 \pm 44$  years = A.D.  $1556 \pm 44$ .  
 N.Z. 756 - Moa bone collagen.  $538 \pm 70$  years = A.D.  $1412 \pm 70$ .  
 N.Z. 757 - Burnt moa bone carbonate.  $472 \pm 70$  years = A.D.  $1478 \pm 70$ .  
 N.Z. 758 - Burnt moa bone collagen.  $554 \pm 53$  years = A.D.  $1396 \pm 53$ .

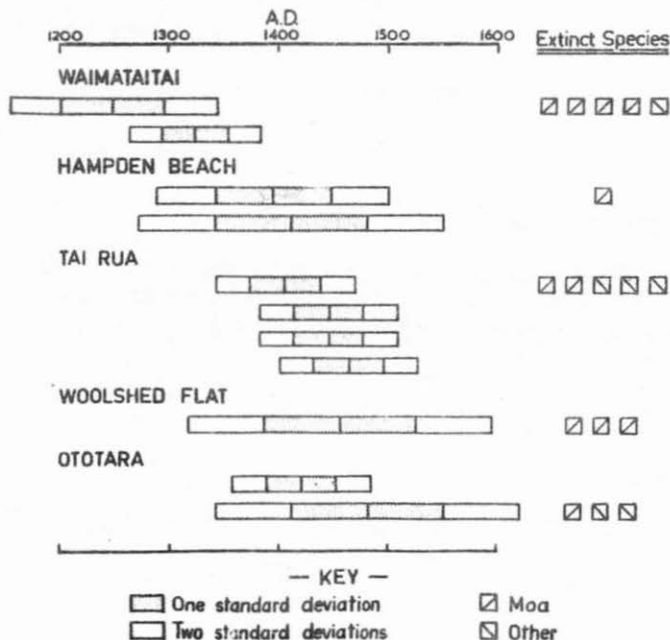


Chart summarizing Moa-hunter site data.

KATIKI POINT, North Otago (S.146/4).

A terraced Ngai-tahu pa site traditionally named Te Raka-a-himetea and occupied in the mid-eighteenth century. All faunal remains obtained are of species still living in the district and artifactual material is of Classic cultural type (Trotter 1967a).

A shell sample was taken from a midden which also contained bone, charcoal, artifacts and other occupational refuse. Separable keratin was not present but, like the Waimataitai shell, the carbonate result is believed to be of good reliability. Another sample of dressed totara wood (Podocarpus totara), from an upright of a nearby and archaeologically contemporary dwelling gave a date of seven centuries earlier indicating that relict logs had been used (Trotter 1967a).

Collected in November 1957:

N.Z. 697 - Shell  $211 \pm 56$  years = A.D.  $1739 \pm 56$ .

N.Z. 696 - Wood  $880 \pm 39$  years = A.D.  $1070 \pm 39$ .

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