NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION NEWSLETTER

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A MAORI OVEN SITE IN THE TARARUA RANGE, NEW ZEALAND

A Paleoclimatological Evaluation

G. N. Park,
Botany Department,
Victoria University of Wellington

ABSTRACT

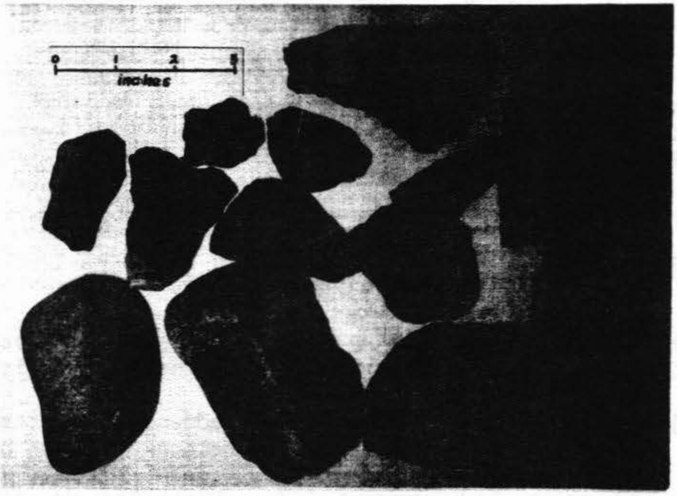
Two oven pits are described. Charcoal fragments dated 1227 A.D. (± 40) from these are discussed in the light of current ideas on climatic change in the last 800 years.

INTRODUCTION

An evaluation of a Maori oven site was made as part of an analysis of time control of the genesis of the landscape vegetation and soil pattern in late Neo-glacial time (Porter and Denton 1967). The analysis was made in conjunction with soil stratigraphic, pollen analysis, radial annual growth rate in Halls totara, and age structure and current regeneration of silver beech. The area of study was at 2,600 ft on Maymorn Ridge, southern Tararua Range (Grid Ref. 710545, N.161).

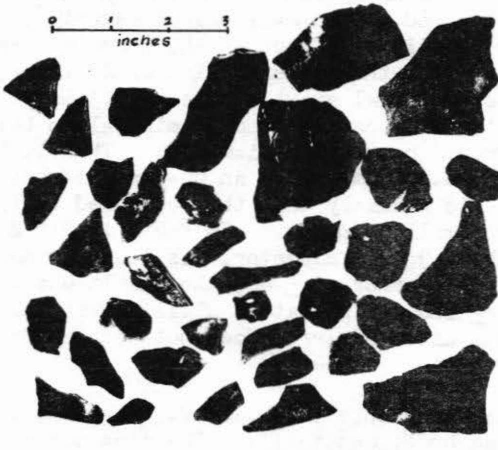
THE MAORI OVEN SITE

In April 1968, charcoal fragments were accidentally found whilst in the process of excavating a soil pit on a flat ridge site. Further excavating revealed charcoal concentrated towards the base of the pit along with greywacke stones and obsidian flakes. During a dry period in January 1969, the site was re-excavated and a second concentration of the above materials was found, 10 ft from the pit site of the April excavation. During both periods of examination, a standard archaeological procedure of excavation was made quite impossible by both the structureless nature of the loessial soil and by the high water



Heat-reddened greywacke stones from base of Pit 1.

x = river gravel erratic



Obsidian flakes from base of Pit 2.

PLATE 1

table at the site. Notes were made on position and nature of any material in the pit. Charcoal was removed from the first pit for radiocarbon dating. This analysis, by T. Grant-Taylor (pers. comm.) gave a date to the charcoals of 1227 A.D. $\pm$ 40. Greywacke stones and obsidian flakes were removed to be photographed (see Plate 1). The obsidian was identified as Mayor Island type by Mr I. Keyes, Geological Survey, D.S.I.R. Charred and preserved wood samples from the base of the pit were removed for identification. No bone or shell material was found; a likely consequence of low pH (4.2 - 4.4).

DESCRIPTIONS

Pit 1

The structureless loess-derived soil (12" deep) was removed from an area 8 ft by 5 ft to establish the extent of the umu material.

The major features were a group of heat-reddened flat stones, of the arkosic greywacke facies outcropping in the area. These had approximate mean dimensions of 4" x 3" by 1.5" deep, and were resting on the massive greywacke bedrock surface (see Plate 1). A single, blackened specimen of rounded river-gravel (also arkosic greywacke) transported to the site by whoever constructed the umu, was also in position with the flattened greywacke stones. Infrequent flakes of obsidian, about 1" square, and charcoal fragments, all less than 0.5" diameter were found amongst the stones. The charcoal was used immediately for radiocarbon analysis. From the appearance of growth-rings, the charcoal appeared to be small branch material. This in all likelihood would have had little effect on the standard error $\pm$ 40 given to the 1227 A.D. date, other than an extension of 20 years, giving $\pm$ 60. Assuming that the present radial growth rates of 0.5 mm/yr for Podocarpus hallii in the area can be used as minimal in this context, a 20 year old branch would be 2 cm in diameter. This is larger than the charcoal samples used. Similarly, an 80-year-old branch would be 8 cm in diameter. It is unlikely that the wood used in firing an umu would be restricted to small branches. In fact, in Pit 2 a piece of Halls totara, 8 cm (about 3 in.) diameter, was found. Adding 80 years to the analytical standard error of $\pm$ 40, the result was a more valid estimate of 1227 A.D. $\pm$ 120. In that it still covers the period 1100 to 1350 A.D., this extended error does not detract from the paleoclimatic interpretation of the umu.

Old root material was identified by Dr R. Patel (pers. comm.) as either Nothofagus fusca or N. menziesii. The area occupied by the "pavement" of flattened stones was approximately 15" x 20". All umu material was concentrated in the lowermost 3" of soil.

Pit 2

The overall nature of this pit was identical to the former except that the flat stone "pavement" occupied a greater area, approximately

32" x 20", and obsidian flakes were far more numerous (Plate 1). Very fine obsidian fragments were concentrated in one corner of the pit. A large piece of charred wood (3" diameter, 8" long) was identified by Dr R. Patel (pers. comm.) as either Podocarpus hallii or P. totara. The former is almost certainly the most likely species.

INTERPRETATION

The presence of two distinct ovens was established. The distribution of the burnt greywacke oven stones in a group at the base of the loess, resting on the greywacke basement is consistent with the methods of Maori umu (hangi or firepit) cooking (I. Keyes, pers. comm.). This appears as good evidence that the umu was dug down through the loess to the greywacke. Maori umus were always built in an excavated pit. Firstly, the stones were heated in the pit, then cleared out except for the bottom layer. The food was piled in, then the other stones were replaced. The opening of the umu would cause the upper stones to be scattered, but once the food had been removed, the stones in the bottom of the pit would remain in their original position as a "pavement". This is the nature of the two pits excavated. Subsequent filling in of an umu by slumping of the loessial soil would be very rapid. In fact, the pit excavated in April 1968 was half-filled by January 1969.

This type of site can probably be regarded as a temporary camping site, related to seasonal birding activities. Its position may also coincide with an established Maori route, across the Tararua foothills between the southern Horowhenua and the Wairarapa. Topographically, this is not an unlikely explanation. B. McFadgean (pers. comm.) describes two occupation layers at a site near Foxton in the Horowhenua, the lower of which contains charcoal dated at 1222 A.D. (± 40) and 1297 A.D. (± 58). Siliceous flint, of a type outcropping in coastal Wairarapa and N. Marlborough is present in this lower layer. A Wairarapa source is considered most likely.

There is evidence (P. Barton, pers. comm.) of Maori routes across the Tararua Range, following lines of least resistance, and several instances of flint, obsidian and adze material being located. The Tararua Pa formed a tribal boundary, for example, between the Ngati-Kahungura of Hawkes Bay-Palliser Bay and the Muapoko, who until their 1843 defeat by Te Rauparaha occupied the coast south of the Manawatu River.

The umu site could also be related to a refuge position; though this can be regarded as less likely. The Wellington peninsula was well occupied about 1200 A.D. (B. McFadgean, pers. comm.).

PALEOCLIMATIC EVALUATION OF OVEN

The interpretative value of the umu is seen mainly from a paleo-microclimatic point of view. The umu, of necessity, occupied a site that at the time of its formation was above the summer water-table. It would be difficult to imagine an umu being constructed in soil much above field capacity.

With this in mind, a check was made of water-table levels at the umu site throughout the summer of 1968-69 and infrequently in the summer of 1969-70.

The data of the N.Z. Meteorological Service (Finkelstein, pers. comm.) demonstrated that for the months of December 1968, January, February and March 1969, December and January were close to their monthly temperature and precipitation averages. February was very low in precipitation and March was much warmer and drier than average. The 1969-70 summer was markedly warmer and drier throughout.

Despite the warm, dry periods outlined above, the water-table at the umu site was above the level of the umu itself, whenever examined. The umu site was on a flat, but slight, saddle on the main ridge of the area. The site tends to accumulate water for longer periods than adjacent ridge-sites. A very close canopy of 12 ft tall silver beech forest minimises any direct loss of soil water through evaporation.

Clearly, at the time of formation of the umu (about 1200-1300 A.D.) climatic factors influencing the amount and distribution of soil water must have been considerably divergent from those pertaining at present. Apparently, the effect of the divergence was to render negligible (for umu construction purposes) the variation in soil water between the umu site and the shallower, considerably better-drained soils of adjacent ridge crest sites.

This divergence and the relationship between the effectiveness of rainfall and seasonal climatic variation is clearly demonstrated in the data of Lamb (1966) for England and Wales. This shows that the summer months of the period 1150-1300 A.D. were markedly drier and warmer than any subsequent period including the present. However, the mean annual data for 1150-1300 A.D. was in fact indicative of a warmer and wetter climate than experienced in any subsequent period. A change in soil water does not necessarily mean a change in the total input of water by precipitation (Lamb, 1966). Rather it means a change in the effectiveness of that precipitation in terms of transpiration-efficiency of the vegetation, rapidity of lateral soil drainage, frequency of showers, etc. The present annual precipitation is a well-distributed 120".

Even a 15% reduction of this total will not preclude the presence of partial soil saturation for much of the year. However, as is repeatedly seen in the field, drying of the soil down to soil field capacity is attained in periods of:

(a) high temperature
(b) drying wind
(c) nil rainfall

In summer months, such as March 1969 and much of the 1969-70 summer, these factors were operating in combination. The forest canopy has not been subjected to the canopy damage of other sites (Park, thesis MS) and is unlikely to have influenced soil water levels.

On these grounds, it is suggested that the <u>umu</u> was constructed in a period of warmer, drier summers (the warm Mediaeval epoch of Lamb (1966)) than prevail at present. The <u>umu</u> immediately pre-dates the period of decreasing mean temperature and increasing soil water, generalisingly referred to as a period of "increased dessication" by Holloway (1954), Raeside (1948) and others.

ACKNOWLEDGMENTS

For critical discussion, I am grateful to, without implying their agreement, Drs D. R. McQueen, J. R. Bray, and Messrs B. McFadgean, A. P. Druce, B. Mitcalfe, P. Barton, C. G. Vucetich and P. A. Williams. Mr T. Grant-Taylor provided the C^{14} dates and Mr R. Patel, the wood identification.

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