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The Chronology of Occupation on Maungarei (Mount Wellington): a Large Volcanic Cone Pa in Auckland

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ABSTRACT

Maungarei is one of a number of very extensive pre-European Maori settlements on the volcanic cones of Auckland. It was the scene of several major rescue excavations between 1960 and 1972. Recently obtained radiocarbon dates suggest that although occupation may have begun earlier, the main phase of terrace construction and pit building on the cone was between the mid-sixteenth and late seventeenth centuries A.D. There was some later occupation of the substantially remodelled crater rim in the eighteenth or early nineteenth centuries, although the site was apparently uninhabited when Europeans first visited the area.

Keywords: AUCKLAND, VOLCANIC CONES, MOUNT WELLINGTON, RADIOCARBON DATES, CHRONOLOGY

INTRODUCTION

Maungarei (Mount Wellington) is one of the four largest volcanic cones on the Auckland mainland. It is one of the better preserved cones and is the most intensively investigated by archaeologists. Although the last significant excavations there took place 20 years ago, ongoing analyses, particularly eight recently obtained radiocarbon dates, have prompted a fresh look at the archaeology of this large and complex site.

Moreover, Maungarei no longer exists largely in an archaeological vacuum as it did when the first excavations took place. The archaeology of the volcanic cones is being intensively reviewed as part of a major project of research and interpretation centred on Te Pane Matao (Mangere Mountain) (Bulmer 1993; n.d.). Analysis of data from Maungarei has been paralleled by an analysis of the 1954–56 excavations at Taylors Hill (Taurere) in the same part of Auckland (Leahy 1991); reports have been published on other investigations of volcanic cone sites (e.g., Shawcross 1962; Fox 1980; Sewell 1986, 1988) and there have been recent investigations of other fortified and open settlement sites in the same general vicinity as Maungarei, (e.g., Foster and Sewell 1993).

Maungarei is a prominent landmark in the eastern part of Auckland. It was surrounded by a large lava field with associated volcanic soils and is adjacent to the Tamaki River and the Wai Mokoia or Panmure Basin (Fig. 1). It was thus well placed for access to garden land and to marine resources.

Published traditional information about Maungarei is minimal. Graham reported that the name means 'watchful mountain' and was given because the vigilance of the inhabitants enabled them to resist attack (Graham 1980: 5; Simmons 1980: 18). The full name is Te

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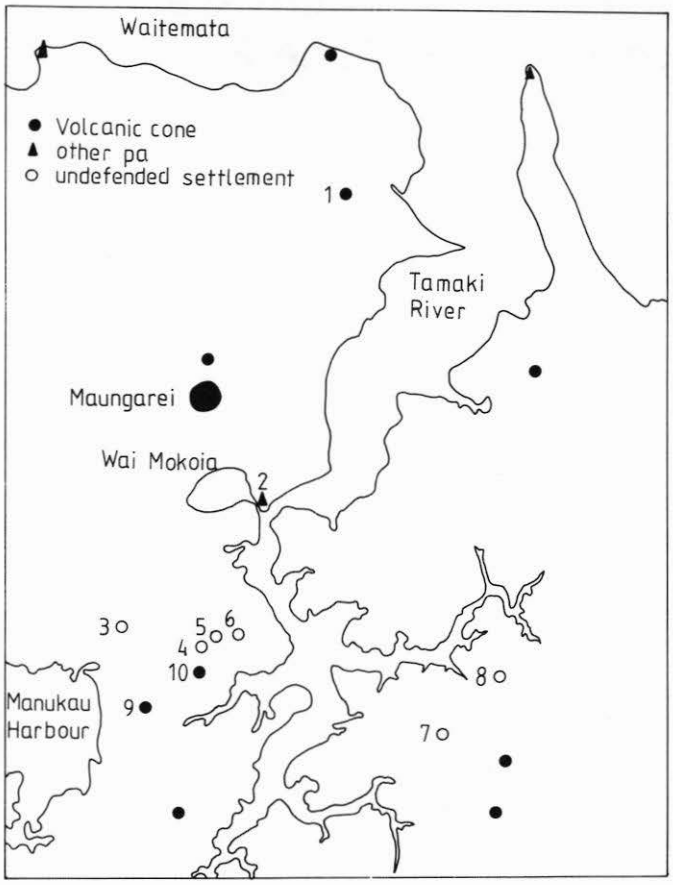

Figure 1: The location of Maungarei and other sites mentioned in the text. 1, Taylors Hill (Taurere); 2, Mokoia; 3, Hamlins Hill; 4, Westfield; 5, Hawkins Hill; 6, Fisher Road; 7, Cryers Road; 8, Harris Road; 9, Otahuhu; 10, Te Apunga o Tainui.

Maungarei a Potaka, after Potaka, a prominent person who lived there and is believed to have been buried there (Te Warena Taua, pers. comm.). The site was apparently unoccupied in the early nineteenth century, when the focus of occupation in this area was on the flats adjacent to the Tamaki River.

HISTORY OF INVESTIGATIONS

Active archaeological interest in Maungarei began in 1960. At that time it was one of the less damaged volcanic cones. An old quarry on the southern side had left a major unsightly scar, there was a small reservoir low down on the western slope, and a track had been bulldozed up the eastern side to the lowest point on the crater rim. However, the triple crater and the entire crater rim were intact, and the Maori earthworks were highly visible and impressive.

Maungarei was therefore selected by L. M. Groube as the setting for a major site survey project, with the aim of trying out the still new site recording scheme on a very large and complex site (Groube 1960). This was the first attempt to map one of these sites in detail and was to be accomplished with a combination of a base map drawn up from an aerial photograph using an epidiascope, and individual feature record cards for every terrace, pit and midden exposure. Although the record cards proved difficult to use, the base map provided the basis for all later maps of the site.

Almost immediately, a major threat to the site emerged with the Auckland City Council decision to build a reservoir in one crater and breach the rim at the lowest point. The University of Auckland Archaeological Society undertook a rescue excavation with financial assistance from the Historic Places Trust (1 on Fig. 2). This excavation lasted from late March to late May 1960 under the overall direction of J. Golson and was terminated by bulldozers (Golson 1960). Construction of the reservoir significantly modified the interior of the crater and adjacent parts of the crater rim.

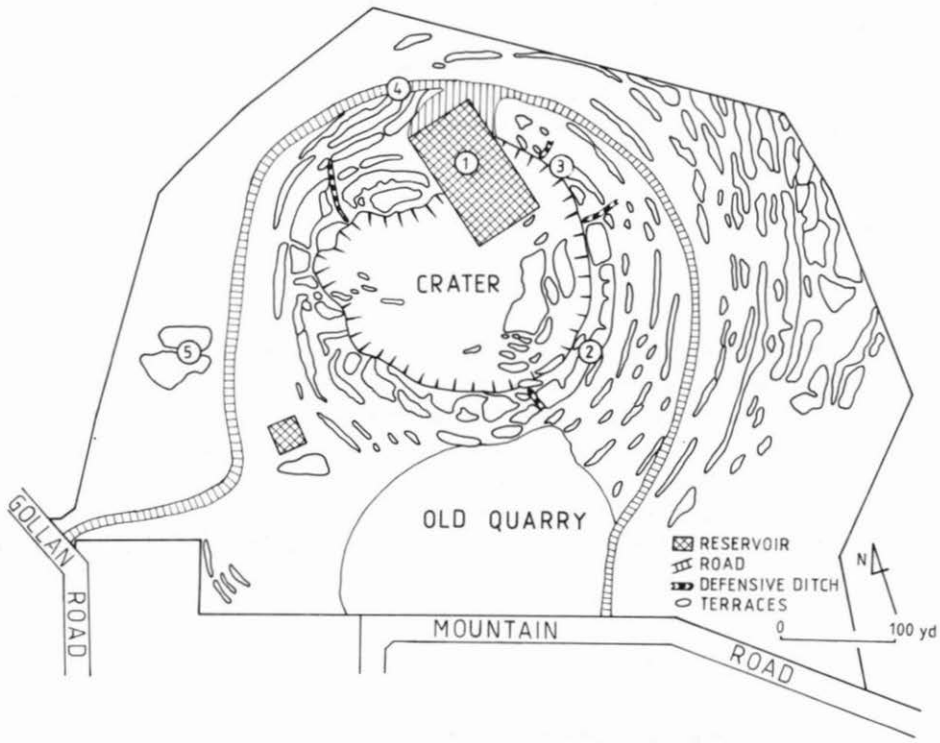

Figure 2: Areas excavated on Maungarei. 1, Crater rim lowest point (1960); 2, Crater rim south-east (1965); 3, Crater rim north-east (1971, 1972); 4, Outer terraces (1971–72); 5, Garden area (1971).

Only a few years later, in the mid 1960s, the next threat arose when the Mount Wellington Borough Council unveiled plans to build a road to the summit, a revolving restaurant, and an artificial ski slope down the side of the mountain. In response to this, W. Shawcross undertook an excavation on the south-east part of the crater rim near the summit (2 on Fig. 2). However, immediately after the excavation the plans were shelved for the time being. The archaeologists were subsequently criticised for not refilling their squares, left open in the expectation that they would soon be bulldozed.

In 1970, the proposal to construct a road to the summit was revived. Between August 1971 and August 1972 three areas threatened by this proposal were investigated: a terrace with a row of pits along its outer edge on the north-east part of the crater rim between the Golson and Shawcross excavations (3 on Fig. 2); the two lowest of the large terraces on the northern slopes below the reservoir (4 on Fig. 2); and a presumed garden area on a raised shoulder at the foot of the western slopes (5 on Fig. 2). The main effort, during the summer of 1971–72, was devoted to the terraces on the northern slope and was jointly directed by J. R. McKinlay and myself. I directed the more limited excavations on the crater rim and in the presumed garden area. Partly as a result of the excavations, the road proposal was modified to do as little damage as possible to archaeological features. The Maungarei Memorial Drive goes only to a parking area on top of the reservoir, leaving the remainder of the crater rim intact for pedestrian use, and avoids the former garden area at the foot of the western slope.

A detailed report on the stratigraphy and structures of the 1960 and 1971–72 excavations is in preparation. The present paper summarises the evidence from the various excavations in order to provide a context for the radiocarbon dates.

SUMMARY OF EXCAVATION RESULTS

CRATER RIM: SOUTH-EAST

This part of the crater rim (2 on Fig. 2) provided a complete contrast with the complexity of the 1960 excavations described below. A number of squares were opened up on this wide flat area. After turfing and removal of topsoil, most squares revealed a natural scoria surface with little or no evidence of occupation. It is obvious from the surface configuration that this is an artificial, not a natural surface. The configuration of the transverse ditch east of the *tihi* (summit) suggests that it was contemporary with this levelled surface. No radiocarbon dates are available for this excavation, but it is argued below that this part of the site, in its present form, is late.

CRATER RIM: NORTH-EAST

The terrace and pit complex investigated in August 1971 and again in August 1972 (3 on Fig. 2) is the first major flat area on the rim after a fairly steep climb from the reservoir (or from the lowest part of the crater rim before the reservoir was constructed). This terrace was partly formed by cutting back into the natural scoria towards the crater edge, but the outer part was composed of fill layers of midden and scoria. Several pits visible as surface depressions along the outer part of the terrace had been dug partly into natural scoria towards the centre of the terrace and partly into the earlier fill layers towards the edge.

Where they were dug in soft material the pit walls were strengthened by neat stone retaining walls. There had been some minor rebuilding and at the downslope end of the terrace a later pit had been cut across an earlier pit. There were traces of a cooking area at the upslope end of the terrace but no definite dwelling was found in the area investigated. Remnants of an earlier pit truncated by the construction of the terrace were found near the crater edge at the downslope end.

No palisades were found in this area, but the excavations were too restricted in area to be sure that palisades were not present.

Two radiocarbon dates were obtained for this excavation (Table 1). NZ7747 was a sample of shells from the base of the earlier of the two intercutting pits on the outer edge of the terrace. It is taken to provide a minimum date for construction of the terrace and the earlier of the two pits and a close date for occupation on the terrace. NZ7748 was a sample of weathered shells from near the base of the fill of the truncated earlier pit-like feature. It provides a maximum date for the terrace construction. Because the shells were weathered, they may have been redeposited in the pit after exposure elsewhere. They should, however, provide a close date for earlier occupation somewhere on the crater rim, since they are most unlikely to have been redeposited in the pit from lower down on the site.

CRATER RIM: LOWEST POINT

The 1960 excavations focused on the lowest part of the crater rim (1 on Fig. 2), a flat area about 30 m long and 7 m wide at its narrowest point, without any surface features. This area was called the 'upper flat'. A line of squares ran down to a terrace (the 'lower terrace') inside the crater about 7 m below the level of the upper flat, and outwards to a larger flat area (the 'lower flat') about 1.5 m below the upper flat on the outer side. Several squares were also opened on another terrace (the 'upper terrace') above and to the west of the lower flat.

The areas most completely excavated and recorded before bulldozers abruptly terminated the investigation were the upper flat and the crater scarp down to the lower terrace. When the turf was removed from the upper flat, a natural looking scoria surface was exposed with a few small ovens and midden patches on it. Beneath this, however, were four large pits. The sides were very eroded, but the floor of the smallest was about 3.3 x 1.8 m and that of the largest about 4.5 x 2.4. These pits were filled with midden and scoria with major lenses of burned material. The pits themselves were part of a complex sequence of modification of this part of the mountain.

The sequence began with activity on the unmodified surface of the crater and crater rim. This activity including midden dumping and probably forest clearance. Soon after this, activity on the high point immediately to the west resulted in the deposition of large amounts of largely natural scoria with only sparse midden scattered through it. This deposit was truncated by the levelling of the rim during construction of the upper flat and the digging of the large pits. Neat stone facing walls were built to retain the edges of the upper flat. The construction of the lower terrace down in the crater and an enormous pit or trench at the back of it may also have taken place at this time. Large amounts of midden and rubble were subsequently deposited in the pits and on the scarp down to the lower terrace. One edge of the largest pit on the upper terrace and the outer retaining wall were apparently truncated by modification and extension of the lower flat. At a late stage in the occupation

sequence, the surface of the upper flat was levelled and capped by the deposit of largely sterile scoria. Only slight signs of occupation were found on this surface.

TABLE 1
RADIOCARBON DATES FROM MAUNGAREI

Lab No.	Material	$\delta^{13}C$	CRA[1]	Calibrated Age A.D.[2]
NZ0404	ch[3]		509±40	1396 to 1476 (95%)
				1413 to 1445 (67%)
NZ7747	sh[4]	+0.8±0.1‰	526±50	1702 to 1950 (95%)
				1721 to 1884 (67%)
				1947 to 1950 (1%)
NZ7748	sh[4]	+0.2±0.1‰	668±50	1521 to 1799 (95%)
				1569 to 1697 (68%)
NZ7749	sh[4]	+1.0±0.1‰	655±50	1530 to 1813 (95%)
				1570 to 1713 (68%)
NZ7750	sh[4]	+0.9±0.1‰	685±50	1501 to 1727 (93%)
				1761 to 1790 (2%)
				1564 to 1681 (68%)
NZ7751	sh[4]	+0.4±0.1‰	674±50	1516 to 1793 (95%)
				1567 to 1691 (68%)
NZ7752	sh[4]	+0.5±0.1‰	732±50	1484 to 1679 (95%)
				1533 to 1644 (67%)
NZ8127	ch[5]	-26.7‰	391±44	1461 to 1644 (95%)
				1486 to 1526 (23%)
				1556 to 1633 (44%)
NZA827[6]	ch[7]	-25.72‰	230±110	1503 to 1955 (95%)
				1638 to 1883 (58%)
				1915 to 1955 (10%)
NZA1618	ch[7]	-26.7‰	403±49	1443 to 1634 (95%)
				1449 to 1520 (45%)
				1582 to 1625 (23%)
NZA1619	ch[7]	-26.4‰	383±54	1447 to 1641 (95%)
				1468 to 1525 (31%)
				1562 to 1631 (37%)

1. Conventional radiocarbon age.
2. Calibrations provided by the laboratory. Southern Hemisphere Terrestrial calibration (charcoal samples) following Stuiver and Reimer (1986), with offset of 30 radiocarbon years as recommended by Stuiver and Pearson. New Zealand Marine calibration (shell samples) following Stuiver, Pearson and Braziunas (1986) with geographic offset Delta-R set to 0 radiocarbon years. These values were reported by the Laboratory. Slightly different values are now used; for example, a value for ΔR of -30 years as suggested by McFadgen and Manning (1990).
3. Unidentified charcoal.
4. All shell samples *Chione stutchburyi*.
5. Mahoe (*Melicytus ramiflorus*). The calibration of this sample provided by the laboratory used values recommended by various authors in *Radiocarbon* 35 (1), 1993.
6. See text for reasons why this result should be disregarded.
7. Three determinations on the same sample of charcoal, all mahoe (*Melicytus ramiflorus*)

The excavations on the lower flat and the upper terrace also revealed complex sequences of pit building and infilling. Unfortunately, these areas could not be fully excavated or recorded before the bulldozers moved in.

No evidence of palisades was recorded anywhere in the 1960 excavations. Postholes were extremely difficult to identify in the loose scoria, but it is unlikely that any large palisade post holes were missed. However, palisading would not necessarily be expected in this area.

A single radiocarbon date was obtained at the time of the 1960 excavations. NZ404 was a sample of charcoal from a layer of shell midden and charcoal just above the old ground surface at the top of the crater scarp, i.e., on the inner edge of the upper flat. The sample is thought to come from the earliest cultural deposit found in these excavations, and is clearly stratigraphically earlier than the formation of the upper flat and the construction of the large pits. Because of the possibility of inbuilt age, this sample provides only a maximum date for the initial occupation of the unmodified crater rim, and the subsequent modification and pit construction. The result has been recalculated by the laboratory to conform to modern reporting conventions. This is why the details in Table 1 differ slightly from those reported by Golson (1961).

A second charcoal sample from an identical stratigraphic context to NZ404 has recently been dated. NZ8127 consisted of pieces of mahoe (*Melicytus ramiflorus*), picked out by R. T. Wallace from a larger sample which included pieces of long lived species. It is thought to provide a close date for initial activity in this part of the site.

OUTER TERRACES

The 1971–72 excavations concentrated on the eastern end of the two lowest terraces on this part of the northern slope (4 on Fig. 2). The next terrace above was found to have been extensively disturbed by the reservoir construction.

The upper terrace had been formed almost entirely by cutting back into the natural scoria and ash, and the relatively firm surface thus obtained had been used for pit construction. The largest pit was similar to those found on the upper flat in 1960. It had a floor area 5.2 x 3.4 m. It was completely filled with layers of midden and scoria and had major lenses of burned material in the fill. The other pits were considerably smaller, between 2 and 3 m in length. All the pits had been completely filled to restore the level surface of the terrace. There were midden deposits on the scarps above and below the upper terrace.

The lower terrace had been cut into the natural slope and used for pit construction at its eastern end. One incompletely filled pit visible on the surface proved to be the last of several pits in this area. Towards the west the terrace became a fill terrace composed of layers of midden and scoria. This part of the terrace was not suitable for pit construction but may have been used for surface buildings or for access. Several successive well trodden surfaces were found along the outer edge.

No definite traces of palisades were found on either of these terraces. The area exposed on the outer edges of both terraces should have been sufficient to reveal palisade post holes if any were present.

Both the lowest part of the crater rim and the terraces on the northern slope were distinguished by large pits, enormous amounts of shell midden, and abundant evidence of earth moving—not only midden dumping, but removal and redeposition of large amounts of scoria as well.

Four radiocarbon dates have been obtained for the terrace excavations. NZ7752 was a sample of shells from the lowest layer of midden just above the original ground surface under the fill layers of the lower terrace. It should represent the earliest activity on this part of the site. NZ7751 is a sample of shells from a higher midden layer in the same square. It represents a later point in the build up of the terrace, although not the most recent. These two samples are taken to provide minimum dates for the start of the formation of this terrace, maximum dates for the cessation of its formation, and close dates for occupation in the vicinity.

NZ7750 was a sample of shells from near the base of the fill of the large pit on the upper terrace and was deposited soon after the abandonment of the pit. NZ7749 was a sample of shells from the midden on the scarp above the large pit on the upper terrace, deposited at a time when all that remained of the pit was a small shallow depression at one end. Both of these samples provide minimum dates for construction of the upper terrace and large pit, close dates for pit infilling and occupation in the vicinity, and maximum dates for final levelling of the terrace surface.

GARDEN AREA

The presumed garden area (5 on Fig. 2) had no surface features other than two low stone walls, running approximately east–west, one across the northern edge and the other across the middle of this natural flat area near the foot of the mountain. The walls proved to have been constructed from small stones piled inside two outer rows of larger boulders. The wall across the middle of the flat was built along the centre of a natural ridge in the ground surface. This probably overlies a lava tube which was once a burial place. Between the two walls, the excavations revealed parts of two large pits, completely infilled with earth and stones, and one earth oven, as well as several smaller depressions containing charcoal. No stratigraphic relationship could be established between any of these features. The pits, oven and depressions were dug into the natural ash deposit and covered by an undifferentiated stony soil which also filled the pits and merged with the stones of the walls. There was not a sign of the shell midden so profuse in the excavations on the terraces and the lower parts of the crater rim.

Only small amounts of charcoal were available for dating from this area. Several samples examined were found to consist largely of long lived species. A small sample of mahoe (*Melicytus ramiflorus*) from one of the depressions was the only one thought suitable for dating (R. T. Wallace, pers. comm.). This was one of several samples from three different sites submitted at the same time for AMS dating and initially reported with unacceptably large standard deviations. They were subsequently rerun with significantly different results. Further investigation led the laboratory to advise that the initial determination on this sample (NZA827) should be disregarded and the other two (NZA1618, NZA1619) taken as a more acceptable indication of the age of the sample (R. Sparks, pers. comm.). This sample provides a close date for unspecified activity in an area with only a few features, all of which probably relate to gardening. It is possible that this date relates to initial clearance of the lower flat.

ESTABLISHING A CHRONOLOGY

It is by no means easy to establish a reliable chronology for such a large and complex site. Ideally, identified charcoal samples from short-lived plant species, obtained from *in situ* features such as ovens or hearths, would be used. In practice, very few such features were found on Maungarei and some of the charcoal samples so far examined have proved to be of long-lived species and likely therefore to have a significant inbuilt age. Both runs on the charcoal sample from the garden area, and the recently dated charcoal sample from the 1960 excavations, produced strongly bi-nodal probability distributions when calibrated.

Although marine shell is highly regarded by New Zealand archaeologists as a dating material, there are considerable contextual difficulties in using shell samples to establish an internal sequence or to correlate different excavated areas on a site like Maungarei. Of the six shell samples dated, three are from the bases of pit fills and three are from scarp or terrace fill deposits. In selecting these samples, it was assumed that those from the bottom of pits would date the dumping of midden soon after the abandonment of the pits and that those from the scarp and terrace fill would date the deposition of midden in these contexts.

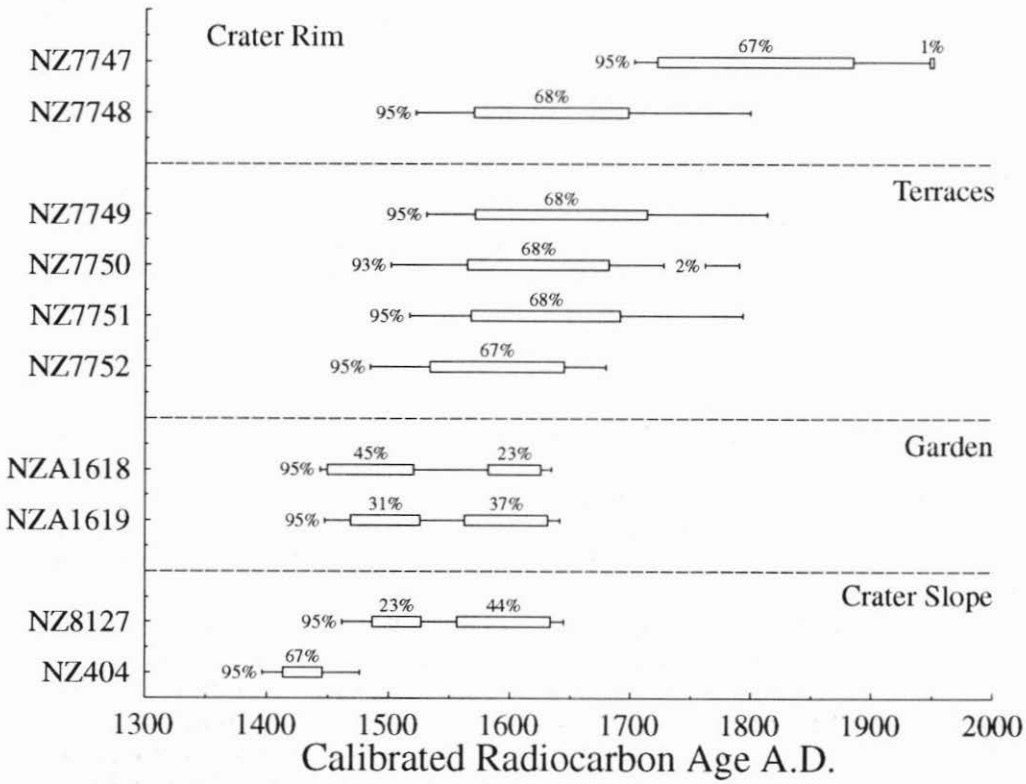

Figure 3: Calibrated radiocarbon dates from Maungarei.

It is recognised that in a site such as this, where earth moving obviously took place repeatedly over some time, it is possible that any or all of these samples are derived from old middens redeposited in secondary positions. This may well be the case with the weathered shells from the fill of the earlier truncated pit on the north-east part of the crater rim. It is argued, however, that those shells date activity on the crater rim earlier than the construction and use of the excavated terrace, and the question of whether or not they are redeposited is immaterial. The other five shell samples appear to be fresh and there is nothing in the radiocarbon dates to suggest that any of them may be significantly older than the context in which they were found. Moreover, although these considerations affect the fine points of the sequence on the site, the shell dates taken as a group provide a strong indication of when the main use of the site took place, as outlined below.

THE OCCUPATION SEQUENCE

The calibrated dates are set out in Table 2 in groups reflecting the occupation sequence proposed here. In Figure 3 they are grouped according to the part of the site from which they come. It is immediately apparent that the majority of dates are very similar, suggesting one major period of occupation of the northern part of the site. In an attempt to refine the occupation sequence, various dates were combined (according to the method described by Davidson and Leach, this volume) to produce probability distributions. Some of these are illustrated here.

The oldest date is that obtained by Golson on charcoal from near the original ground surface on the inner edge of the lowest part of the crater rim (NZ404: 1 σ range A.D. 1413–1445). This sample is likely to have a significant inbuilt age, as the charcoal was not identified. The recently dated sample of selected, identified charcoal (NZ8127) overlaps with NZ404 only slightly at the 95% confidence level. This sample is, however, very similar to the two runs on the sample from the garden area (NZA1618, NZA1619). The bi-nodal nature of the calibrated age ranges of these samples makes interpretation difficult. These dates almost certainly reflect initial activity in two separate parts of the site at approximately the same time, but that time can be only broadly identified as between the mid-fifteenth and mid-seventeenth centuries.

One of the shell samples comes from a similar context to NZ404 and NZ8127. This is the sample from near the original ground surface under the lower terrace (NZ7752: 1 σ range 1533–1644). It may be a better indication of the beginning of major modification and occupation of the central and lower parts of the site.

The four dates from the terraces and the date for the vestigial earlier pit on the north-east part of the crater rim fall close together (Fig. 4) (NZ7752: 1533–1644; NZ7750: 1564–1681; NZ7751: 1567–1691; NZ7748: 1569–1697; NZ7749: 1570–1713). They suggest that the massive amount of earth moving and midden dumping on the terraces was accomplished in a relatively short space of time. Earlier activity on the north-east part of the crater rim and use of the terraces seem to be part of a single major occupation. In view of the similar burned lenses in the large pit on the upper terrace and the pits on the lowest part of the crater rim, the latter area was probably also part of a single large settlement at that period.

It is debatable whether the lower terrace resulted from a gradual accumulation or from a single rapid period of fill dumping. The date from near the base of the fill (NZ7752: 1533–1644) is the earliest of the shell dates but overlaps at one standard deviation with the others. The probability distribution obtained by combining this date and the date from higher

in the same series of fill layers (NZ7751: 1567–1691) supports the impression that these fill layers accumulated quite rapidly (Fig. 5).

TABLE 2
THE SEQUENCE OF ACTIVITY AT MAUNGAREI
BASED ON THE CALIBRATED DATES

Sample	**Context**	**Range (68%)**
NZ7747 shell	Late use of N-E crater rim	1721 to 1884
NZ7749 shell	Midden on scarp above upper terrace	1570 to 1713
NZ7748 shell	Early use of crater rim	1569 to 1697
NZ7751 shell	Upper midden fill on lower terrace	1567 to 1691
NZ7750 shell	Initial fill of large pit on upper terrace	1564 to 1681
NZ7752 shell	First midden on outer slope	1533 to 1644
NZA1618 chc	Clearance/use of garden	1449 to 1520 or 1582 to 1625
NZA1619 chc	Clearance/use of garden	1468 to 1525 or 1562 to 1631
NZ8127 chc	First activity on crater slope	1486 to 1526 or 1556 to 1633
NZ404 chc	First activity on crater slope	1413 to 1445

The north-east part of the crater rim appears to have been remodelled after the main occupation of the terraces, and it was into this remodelled surface that the pits still visible on the surface were dug. Remodelling in this area may have been contemporary with the remodelling of the south-east part of the rim excavated by Shawcross. The point at which the remodelling took place cannot be precisely determined; it is bracketed by the date from the fill of the truncated early pit (NZ7748: 1569–1697) and that from the fill of the later pit (NZ7747: 1721–1884). It may have happened either at the end of the 'main occupation' or immediately before the 'final occupation'.

Since the sample from the later pit on the crater rim overlaps with all the other shell dates at two standard deviations, it could be argued that it represents merely the final stage of a single continuous occupation. However, when the two dates from the north-east part of the crater rim are combined, the result (Fig. 6) suggests that these two samples are not dating closely similar events.

In summary, then, initial human activity on Maungarei may have begun in the fifteenth century as originally suggested by the date obtained by Golson, but is more likely to have

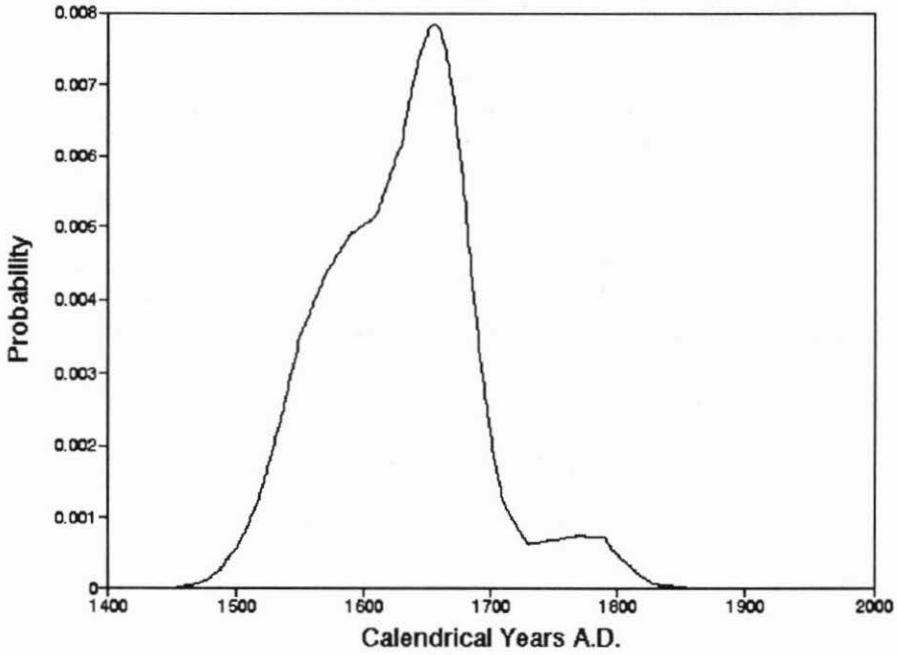

Figure 4: Pooled probability diagram for the main occupation of Maungarei; five shell samples.

begun in the latter half of the sixteenth century. The major occupation, at least of the northern parts of the mountain, appears to have taken place between the mid-sixteenth and mid-seventeenth centuries, and may have been largely accomplished in the space of a few decades in the seventeenth century (Fig. 7). Either at the close of this occupation or later, large areas of the crater rim were remodelled to their present surface configuration. The transverse ditches on the crater rim appear to be an integral part of this configuration and may have been dug either when the remodelling took place or subsequently. Limited occupation took place on the remodelled north-east part of the crater rim, probably in the late eighteenth century, but there are few signs of occupation elsewhere on the northern part of the site at this time.

No evidence of fortification was found anywhere on the lower part of the crater rim or the terraces on the northern slope. This does not mean that the summit areas, which would probably have been occupied at the same time, were not fortified. Unfortunately, the later remodelling of the crater rim is likely to have obliterated evidence of earlier occupation, including fortification, and it may never be possible to be certain whether the high points were fortified before the rim was remodelled.

Extensive though the excavations on Maungarei have been, they have sampled only a tiny part of a very large and complex site. The excavations described here are centred on the northern slopes which, although of favourable aspect and close to good garden land, are not as close to the Tamaki River and its resources as the more extensively terraced eastern slopes. It could be argued that occupation probably began earlier and continued longer on

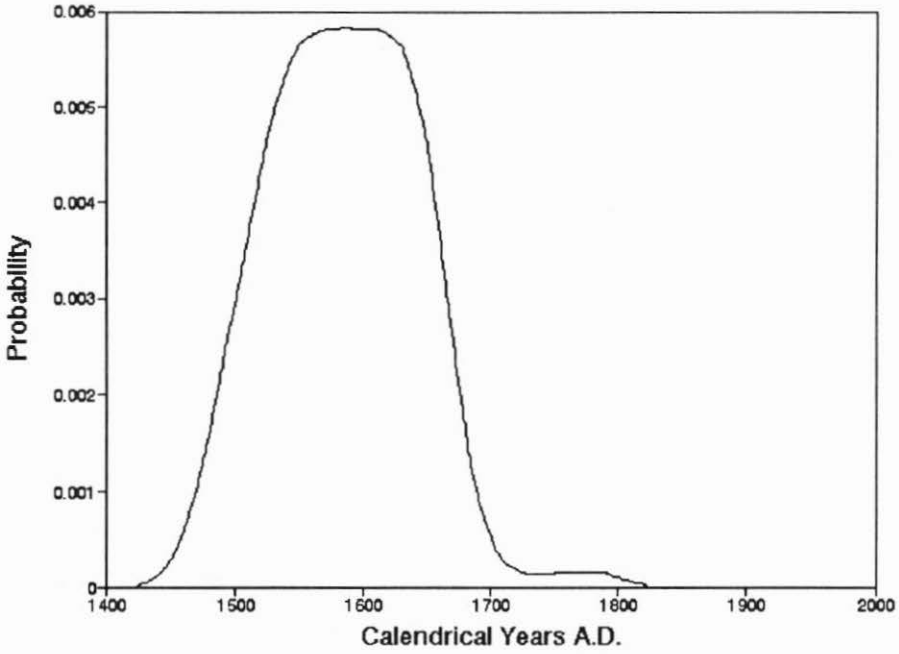

Figure 5: Pooled probability diagram for the formation of the lowest terrace on the northern slope of Maungarei; two shell samples.

the eastern slopes. This could be established only by excavations on the eastern terraces; as noted above, evidence of early occupation on the high parts of the crater rim is likely to have been destroyed by later remodelling. It is none-the-less my belief, based on the results so far, that the main occupation of the entire site will prove to have been contemporary with the main occupation of the northern slopes.

THE WIDER CONTEXT

The occupation of Maungarei can be viewed in a wider regional context. A number of other sites in the same general area have been excavated and dated. Published dates include those from Taylors Hill to the north (Leahy 1991), and Hamlins Hill (Pearce and Walton 1983) and the cluster of undefended settlements known as Westfield, Hawkins Hill and Fisher Road (Foster 1986; Furey 1986; Sewell 1992) to the south. There is a series of dates for a palisaded *pā* on the bank of the Tamaki River south of Maungarei (Foster and Sewell 1993). Single dates from unstratified samples are also available for the volcanic cones of Te Apunga o Tainui and Otahuhu (Sewell 1992). On the other side of the Tamaki River there are dates from Harris Road (Douglas 1987) and a group of sites collectively known as Cryers Road (Fredericksen and Visser 1989). The principal fortified site in the immediate vicinity in the early nineteenth century was Mokoia, at the entrance to the Panmure Basin.

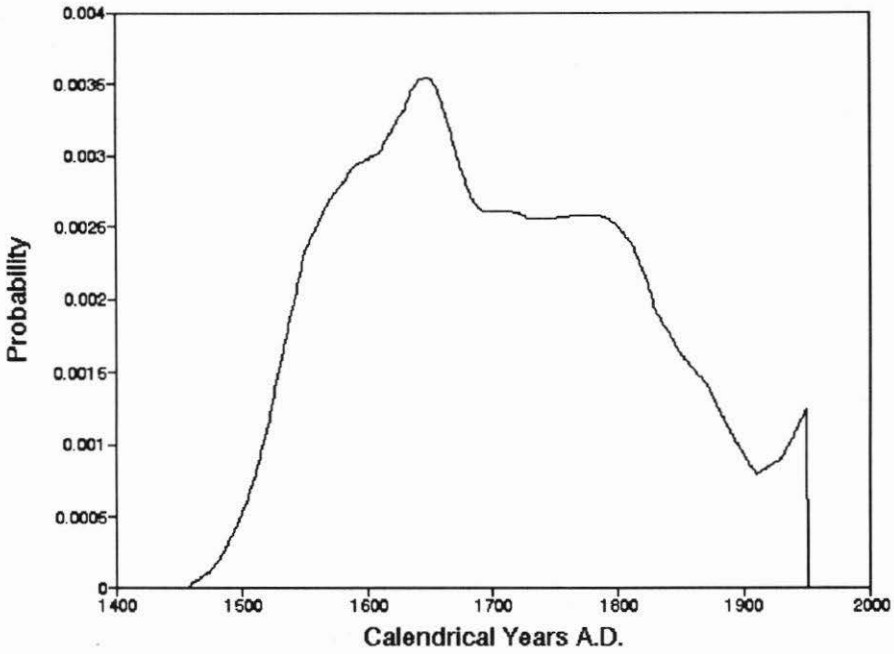

Figure 6: Pooled probability diagram for all occupation on the crater rim of Maungarei; two shell samples.

The calibrated dates suggest an established way of life and a substantial population in the vicinity of the Tamaki by about A.D. 1550. The Fisher Road and Hawkins Hill sites have a consistent series of dates clustering in the sixteenth century, the sole earlier date being on unidentified charcoal. Large pits were found in these sites, one at Fisher Road being even larger than those at Maungarei. There were apparently also pits on Hamlins Hill at this time and some activity at Taylors Hill. These earlier sites appear to be undefended settlements on low hills and ridges.

The initial move on to Maungarei may have taken place at this time or slightly later. It was probably inspired by the need for defence, even though there is as yet no evidence for fortification at this time. The large amounts of redeposited scoria on the lowest part of the crater rim before the upper flat was formed and its pits dug suggest extensive earthworking on the secondary high point immediately to the west, which may well have involved fortification.

The main period of occupation of the northern part of the crater rim and the northern slopes was probably in the early to mid seventeenth century. There is evidence of renewed occupation about this time on both Hamlins Hill and Taylors Hill. The Westfield site and some of the small Cryers Road sites may also have been occupied at this period. There is no direct evidence of fortification at any of these sites at this time, and any fortification at Maungarei or Taylors Hill was presumably confined to the summits.

One of the implications of the dates from Maungarei is the possibility that much of the shaping of a large cone to its present form could have taken place in the space of a few

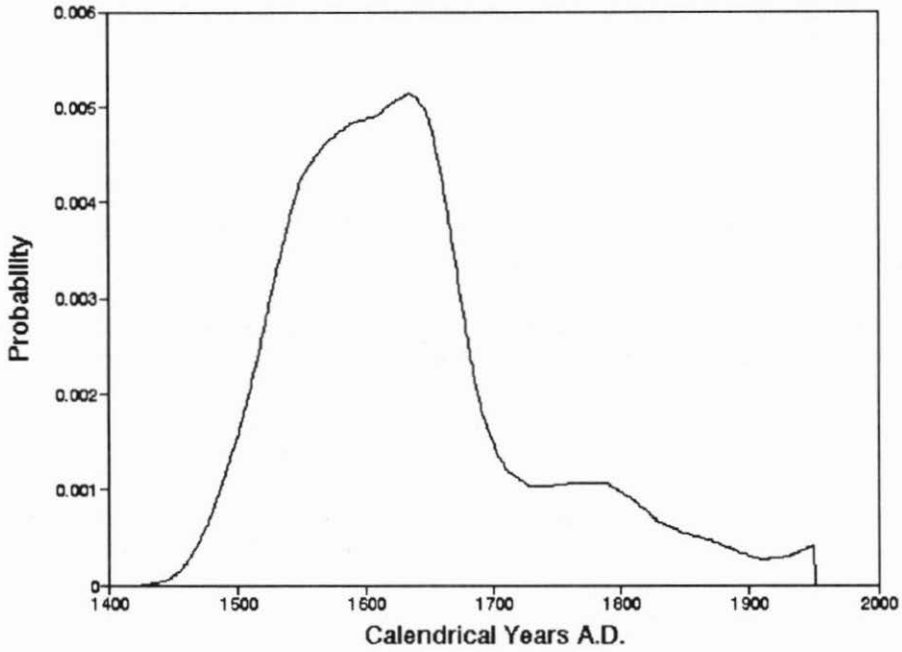

Figure 7: Pooled probability diagram for occupation of Maungarei; six shell samples.

decades. This implies a relatively large population for a relatively short period. It makes it unlikely that all or even most of the cones were occupied simultaneously. However, even if we postulate a highly mobile population moving fairly rapidly from one site to another, it must still have been a substantial population to accomplish so much earthmoving on so many sites. The number of volcanic cones that once existed is known, but it is less easy to estimate how many sites like Fisher Road and Hawkins Hill have been destroyed by modern Auckland.

It is difficult to avoid the conclusion that there must have been people in Auckland for quite a long time before A.D. 1500 to account for such an archaeologically highly visible population in the sixteenth and seventeenth centuries. Populations were becoming archaeologically highly visible in many other parts of the northern half of the North Island at about the same period. These considerations have to be taken into account in broader discussions of the chronology of settlement not only of Auckland, but of New Zealand as a whole.

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REFERENCES

Bulmer, S. E. 1993. Sources for the archaeology of the Maaori settlement of the Taamaki volcanic zones. Te Mana o Te Maunga o Maangere Report 1. In press.

Bulmer, S. E. n.d. Ngaa Whakairo a Tiitahi—The volcanic cone paa of Taamaki Makaurau. A review of the archaeological evidence. Te Mana o Te Maunga o Mangere Report 2.

Douglas, P. 1987. Radiocarbon dates from the Harris Road site N42/1203—East Tamaki, Auckland. *New Zealand Archaeological Association Newsletter* 30 (1): 49–53.

Foster, R. 1986. Radiocarbon dates from the Fisher Road (R11/887, 888, 889) and Hawkins Hill sites (R11/1394). *New Zealand Archaeological Association Newsletter* 29 (4): 248–49.

Foster, R. and Sewell, B. 1993. The Tamaki River Sites: excavations at sites R11/1201 and R11/1506, Tamaki, Auckland, New Zealand. *Auckland Conservancy Historic Resource Series* 6. Department of Conservation, Auckland Conservancy, Auckland.

Fox, A. 1980. The pa on Mount Roskill, Auckland (N42/11): dating evidence from the 1961 excavations. *Records of the Auckland Institute and Museum* 16: 45–61.

Fredericksen, C. F. K. and Visser, E. P. 1989. Archaeological investigations at Site R11/1519, Cryers Road, East Tamaki, Auckland, New Zealand. *Science and Research Series* 21, Science and Research Directorate, Department of Conservation.

Furey, L. 1986. The excavation of Westfield (R11/898), South Auckland. *Records of the Auckland Institute and Museum* 23: 1–24.

Golson, J. 1960. Excavations at Mt. Wellington. *New Zealand Archaeological Association Newsletter* 3 (2): 31–34.

Golson, J. 1961. A radiocarbon date from Mt. Wellington. *New Zealand Archaeological Association Newsletter* 4 (2): 51.

Graham, G. 1980. "Maori Place Names". *Records of the Auckland Institute and Museum* 16: 1–10.

Groube, L. M. 1960. Mt. Wellington site survey. *New Zealand Archaeological Association Newsletter* 3 (2): 24–31.

Leahy, A. 1991. Excavations at Taylor's Hill, R11/96, Auckland. *Records of the Auckland Institute and Museum* 28: 33–68.

McFadgen, B. G. and Manning, M. R. 1990. Calibrating New Zealand radiocarbon dates of marine shells. *Radiocarbon* 32 (2): 229–232.

Pearce, P. and Walton, T. 1983. Radiocarbon dates from Hamlins Hill (N42/137). *New Zealand Archaeological Association Newsletter* 26 (4): 276–78.

Sewell, B. 1986. Excavations at Te Pane o Horoiwi (N42/365), St. Heliers, Auckland. *Records of the Auckland Institute and Museum* 23: 25–44.

Sewell, B. 1988. Excavation on Takarunga (Mount Victoria), R11/109, Auckland. *Archaeology in New Zealand* 31 (3): 182–188.

Sewell, B. 1992. Further excavations at the Westfield Site (R11/898), Tamaki, Auckland. *Auckland Conservancy Historic Resource Series* 1. Department of Conservation, Auckland.

Shawcross, W. 1962. Excavations on Mount Roskill. *New Zealand Archaeological Association Newsletter* 5 (1): 81–3.

Simmons, D. R. 1980. George Graham's Maori place names of Auckland. *Records of the Auckland Institute and Museum* 16: 11–39.

Stuiver, M. and Reimer, P. J. 1986. A computer program for radiocarbon age calibration. *Radiocarbon* 28 (2B): 1022–1030.

Stuiver, M., Pearson, G. W. and Braziunas, T. F. 1986. Radiocarbon age calibration of marine samples back to 9000 Cal Yr BP. Radiocarbon 28 (2B): 980–1021.

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