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Oruarangi Pa: Past and Present Investigations

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ABSTRACT

Previous theories and analyses arising from the large number of unprovenanced artefacts fossicked from Oruarangi Pa, and used as a type assemblage for the "Classic Phase", are reviewed. A re-analysis of the adzes, together with test excavations, a site survey, and early ethnographic material, have been combined to show more clearly the site's age and status in the area, as it grew from a smaller early stage with Archaic affinities to the two hectare site it became some one hundred years prior to the arrival of Cook.

Keywords ORUARANGI PA, FOSSICKED ARTEFACTS, CLASSIC MAORI TYPE SITE, RE-ANALYSIS, NEW DATA

INTRODUCTION

All archaeologists familiar with prehistoric New Zealand material would agree that the cultural assemblage of the first inhabitants of the land was markedly different from that which Captain Cook observed in 1769. On the other hand, probably no two of these archaeologists would agree as to what changes really occurred, how uniform these changes were from place to place, what the mechanisms of change were, and when they took place.

The early or Archaic Phase, or at least the coastal component of it, is well documented. The lure of "early" sites, coupled with their big birds and spectacular artefacts, the latter with their marked Eastern Polynesian appearance, together with the sites' vulnerability to natural and man-induced erosion, have resulted in a string of such excavations along the coastline of both islands.

Evidence for the late or Classic Phase frequently consists of a mixture of the observations of early European visitors and the numerous well-documented, ethnographic collections scattered throughout the museums of the world, plus a slowly increasing archaeological record. Few late sites productive of diagnostic artefacts have been excavated to any great extent. Golson (1959:29-74) in drawing together the information available at that time to describe the Archaic and Classic Phases, referred to four sites in the South Island and two in the North. Of those in the South Island, Murdering Beach and Tarewai Point, although prolific in artefacts, are at least in part protohistoric (Groube 1964:21, Teviotdale 1939: 108-115). In addition both sites were extensively disturbed. The North Island sites are both swamp *pa*, with similar methods of construction. The first of these was a *pa* known as Mangaroa, in the Horowhenua area. The assemblage from this site has been described as "a mixture of Classic Maori types and types echoing Archaic traditions" (Golson 1959:60). The second site, one which has produced an enormous quantity of unprovenanced artefacts and which has come to be regarded as the Classic's classic, is a site in the Hauraki Plains, Oruarangi Pa.

This paper will describe a small research project that started with a re-analysis of the adzes from this site and from there went on to some wider problems, such as the date of the *pa*, its history of construction, reasons for location, and its social place in the local settlement pattern through time.

THE AREA

The setting is the Hauraki Graben, a downfaulted area bordered to the east by the Coromandel Ranges and by the Hunua Range to the west. The Waihou River, rising

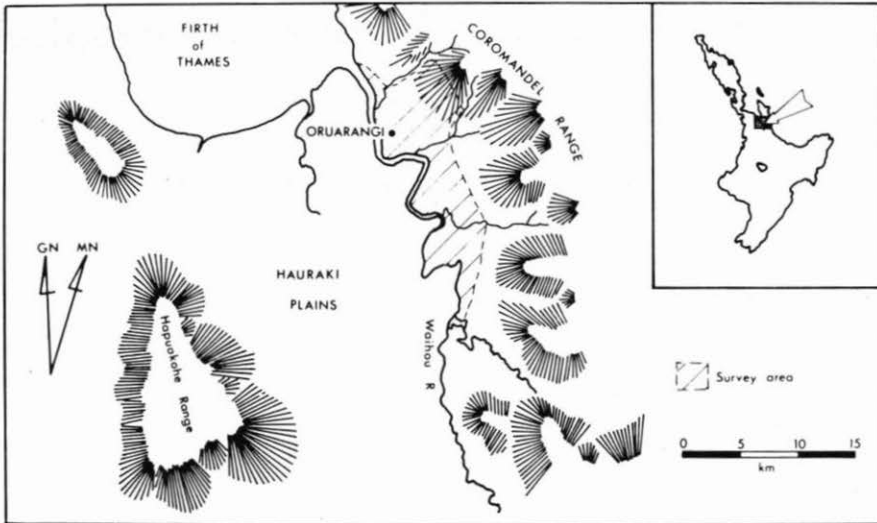


Figure 1: Location of research area and Oruarangi (N49/28).

in the Kaimai Ranges near Matamata, flows down along the eastern edge of the Hauraki Plains under the foothills of the ranges, and empties into the Firth of Thames (Fig.1)

Between the river and the foothills is a narrow, low-lying, flat area, from one and a half to three kilometres wide. Even today, after nearly 70 years of farming and draining operations, it is possible to trace the numerous watercourses that meandered through the area prior to the coming of the European. Large-scale though short-lived flooding still occurs in places once or twice a year.

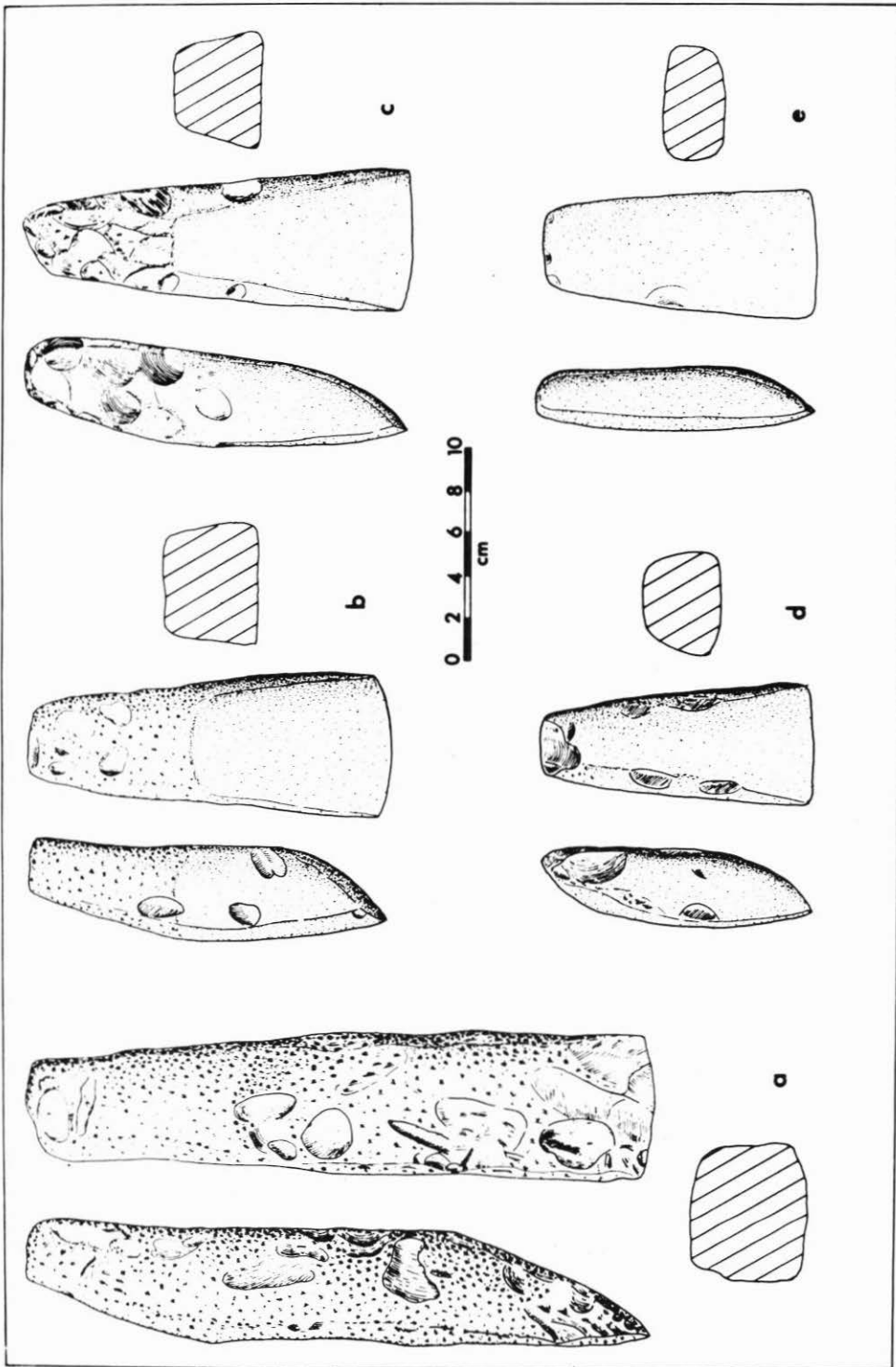
Archaeological sites are scattered throughout this area, formerly almost invariably associated with waterways, even if this often appears not to be the case today. Oruarangi Pa is one of these.

THE SITES

Oruarangi (N49/28) is situated seven kilometres up the Waihou River and one kilometre inland from its present day east bank. The site is visually unimpressive—an oval mound, two hectares in area, from one to two metres higher than the surrounding land, and with none of the features normally associated with important *pa* sites (Fig. 3).

Forty metres to the north, and joined to it by a modern causeway, lies another *pa* (N49/17). A search of old survey plans in the Lands and Survey Department, Hamilton, shows that in 1910 this site was known as Piritahi (Plan 7849) and in 1919 as Paterangi (Plan 11516). By the 1930s Teviotdale was calling it "Grey's", after the name of the farm's owner (Teviotdale and Skinner 1947:341), and since 1966 (Shawcross and Terrell 1966) the name of Paterangi has come back into use. This site is similar to Oruarangi but smaller (under one hectare), and has one complete and one incomplete ditch running across the end of a low spur on which the *pa* is sited.

- Figure 2: Adze types (a) Type 1A blank from Oruarangi: Tahanga basalt.
 (b) Tanged adze with trapezoidal section, from a Group I midden (see Fig. 6): black argillite.
 (c) Tanged adze with trapezoidal section, from find spot: Tahanga basalt.
 (d) Semi-tanged adze with trapezoidal section, from Oruarangi: Tahanga basalt.
 (e) Type 2B adze from Oruarangi: sandstone/greywacke.



TRADITIONS AND HISTORY

Recorded oral traditions state that Oruarangi Pa has a considerable time depth (White 1888: vol.4, 48-54; vol.5, 141-143; Graham 1920: 37-41; Kelly 1949: 175-178; Hammond n.d.). The original inhabitants are variously stated to have been Ngati-Hako, Ngati-Huarere or Ngati-Hei. Of these the Ngati-Hako are considered, in terms of what is known about the area as a whole, to have been the most likely occupants (D. Simmons: pers.comm.). At some time, that Kelly (1949:175-178) puts at about A.D.1650, fighting occurred between this tribe and the Ngati-Marū from the west side of the Firth of Thames. After one incident, Oruarangi Pa is said to have been taken and occupied by the Ngati-Marū, the remaining *pa* being left with their original inhabitants. Eventually the Ngati-Marū overthrew all *pa* in the area and moved into the district.

In November 1769 Captain Cook sailed round the top of the Coromandel Peninsula and down into the Firth of Thames. Anchoring some 15 kilometres from the southern shore he, together with a party that included Banks and Solander, went about 20 kilometres up the Waihou River. He wrote:

About the entrance of the narrow part of the River the land is mostly covered with Mangroves and other Shrubs, but further in are immense woods of as stout lofty timber as is to be found perhaps in any other part of the world . . . (Cook 1955:209)

On his way up Cook stopped at a settlement and was met again by the inhabitants when returning to the *Endeavour*.

His description of the timber resulted in at least four ships calling between 1794 and 1801: the *Fancy*, *Hunter*, *Plumier* and *Royal Admiral* (McNab 1914:88-94). Each of these stayed for some weeks in the area, and considerable European/Maori contact occurred. By 1801 one of the missionaries en route to Tahiti on board the *Royal Admiral* recorded that two Europeans were living in the area, and that white potatoes and turnips were available for the ship's crew (Anonymous Missionary 1801). At that time the inhabitants told the missionaries that they feared attack from the tribes on the west side of the Firth, and from "Weygata" (Waikato).

In July 1820 Samuel Marsden, on his way to Tauranga by means of the Waihou, visited Totara Pa (called by him Te Puke), a headland ditch and bank fortification at the mouth of the Waihou, and was told of recent attacks from both the Bay of Islands and the "west" (Marsden 1932:260-1). According to Kelly (1949:271-277) the Ngapuhi from the north began to raid the area in the late 1780s. It is unlikely, however, that they became a serious threat until towards the end of the first decade in the 19th century.

The inhabitants of Totara Pa feared further attacks and in 1821 these occurred. The site, which by then seemed to have become the strongpoint of the area, was taken by the Ngapuhi and most of the occupants massacred. The survivors are said to have moved to the Waikato, returning in the 1830s after the battle of Taumatawiwi. Whether this was a wholesale exodus, or whether some of the *pa* up the Waihou continued to be occupied, is as yet uncertain. One of the small *pa* about 20 kilometres up the river (Kari or Kiri Island Pa (N53-54/15)) has been fossicked and has produced a disproportionate number of European artefacts (compared to collections from similar sites in the area), including a coin and a trade token both dated to 1854 (Green 1970:36). Just when Oruarangi was finally vacated and left silent among the scrub and swamp remains for the moment unknown.

The next glimpse of Oruarangi comes from the diary of W. G. Hammond, a local identity, who wrote:

About the year 1888 I used to visit the locality This Oruarangi was then practically an island being almost a circular piece of ground about three feet above the surrounding swamp and containing about three acres. . . . It was tapu to the Maoris and on the bare ground could be seen things left by the Maoris years ago, there were pieces of sandstone that had

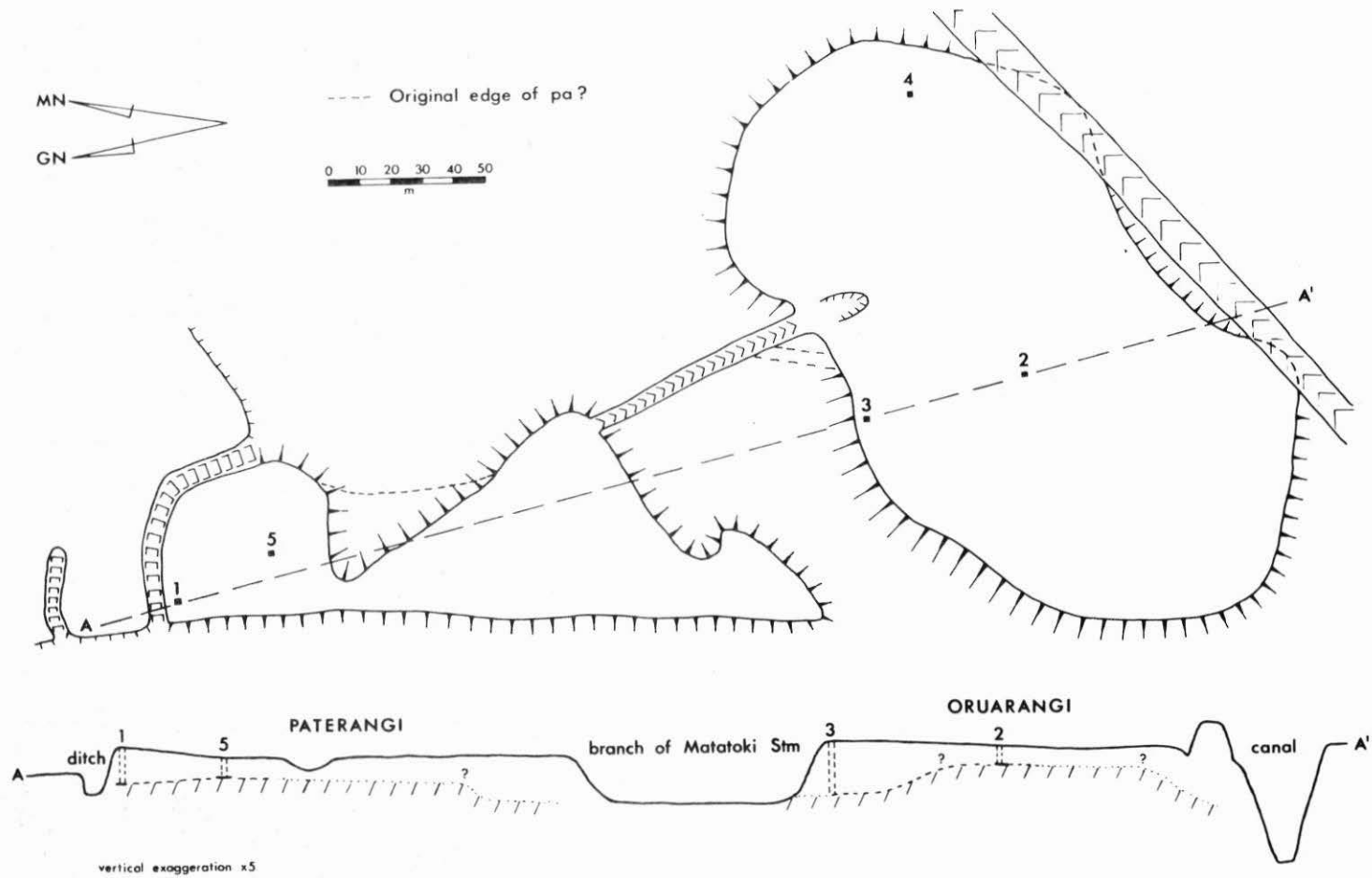


Figure 3: Plans and cross section of Oruarangi (N49/28) and Paterangi (N49/17).

been used in olden days for sharpening their stone adzes, there were pieces of obsidian and in one place lay a stone basin about 18" in diameter and about 6" deep. Underneath a rotting canoe almost surrounded by flax bushes, was a heap of human bones. (Hammond n.d.)

Prior to 1908, European exploitation of the area had been restricted mainly to timber and flax. The feasibility of converting the plains into pasture depended on drainage, the clearing of rivers, and the construction of stopbanks and drainage canals. This work in the lower Waihou was commenced about 1914 and lasted for 20 years.

Unfortunately the banks of those waterways which had made travel through a difficult country possible for the prehistoric Maori were now the very areas that received attention from drainage schemes. Stopbanks along the main river channels and side creeks, and canals often following at least in part old watercourses, have damaged or destroyed many sites.

In 1932, however, a much more specific threat to the old *pa* sites, and particularly to Oruarangi, appeared. The same W.G. Hammond quoted above, now interested in Maori curios, informed a local doctor of the site's potential, and legal permission to dig was granted by the Maori Trustees of the site, providing that a *tapu* burial ground was left undisturbed. This was observed, the party which varied between one and about four people digging at weekends only.

However, another interested party soon hove in sight. Hammond records:

One day when we arrived to dig we found that Selwyn Te Moananui Hovell had arrived [with five helpers] They were there to stay seven days in the week and they made good use of their time Hovell and his party dug wholesale and what he retrieved from the *pa* found a ready market among private collectors and museums. He must have dug up many thousands of articles of interest—shell war trumpets, fish-hooks, tattooing implements, toggles, pumice bowls, stone tops, stone adzes, fernpounders, a black stone reel, bone *meres*, bone needles, pigeon spear barbs, a large thatching needle, green-stone tikis and pendants. Hovell dug up many of the palisading posts and used them as firewood for his camp Hovell . . . invited Skinner of the Dunedin Museum, Teviotdale, Dr. Archey, F. V. Fisher (Auckland Museum), and Trevor Lloyd to visit the diggings and dig (Hammond n.d.)

Apart from lending an air of respectability to the proceedings, the presence of museum representatives, in particular David Teviotdale from the Otago Museum, resulted in some record of the site's stratigraphy being kept and some artefacts being provenanced. It also meant that many of the artefacts quickly found their way into the Auckland and Otago Museums without becoming mixed with other collections and losing their identities.

Teviotdale's diary of the time spent digging contains many valuable observations. In addition he and H. D. Skinner published an article describing the site and some of the artefacts (Teviotdale and Skinner 1947:340-356). A selection of the finds obtained by the Auckland Museum had been described earlier by Fisher (1934:275-286, 1935:287-300, 1936:15-27, 1937:111-118). This assemblage of artefacts recovered from Oruarangi was later analysed by J. Golson, and formed the basis for the definition of the Classic Maori Phase in the area. In 1954 Golson conducted the first scientific excavation on Oruarangi, but few details of this are available, and the material collected has not yet been analysed.

From the 1950s to 1972 a local farmer, C. J. Murdock, dug sporadically on Oruarangi and Paterangi. The artefacts he found are numbered and catalogued and in some cases photographs exist, but only one artefact, fortuitously shown in position by one of these, can be provenanced. The part of his collection obtained prior to 1963 has been described by Green and Green (1963:27-34). In 1965 C. J. Murdock and R. Jolly dug two trenches on Paterangi; the excavations were recorded and the stratigraphy drawn by W. Shawcross and J. Terrell (1966:404-430), who also recorded and described more fully than Green and Green (1963) the total number of artefacts obtained by Murdock from Paterangi itself. In later years visits to the sites have fallen off, with only the occasional artefact dislodged by normal farming activities.

A recent survey in the area (Best 1979) has located and recorded almost 100 archaeological sites on the low lying land. These are now automatically protected by law, and theoretically there should be no repeat performance in the style of the 1930s episode.

PREVIOUS THEORIES

Two main questions arise out of the above. Just how extensive is the damage to Oruarangi, and can the material collected produce more information, in the light of experience gained since the last analyses were made?

The surface of Oruarangi is covered for most of the year in short turf, but wintering of stock on the site tends to remove even this cover at such times. A brief examination of this surface reveals that it varies from flat in some places to extremely uneven in others. Where uneven, fragments of shell can be seen. Testholes in these areas show that crushed shell occurs from the surface down, with no discernible stratigraphy. Where the ground is flat, a layer of black top-soil 10-15 cm thick overlies a flat surface of finely crushed shell. It seems reasonable to suppose that the uneven surface indicates disturbance from prior excavation, while the flat areas are likely to be undisturbed. The preliminary excavations described below confirm this, except in one case (Square 5).

Probing for the shell surface, together with visual estimation of the amount of flat area remaining, suggests that up to half of the site remains untouched. Of the rest it is unlikely that the whole depth of deposit has been dug. One of the collectors at least is recorded as seldom excavating the lower levels because of the fewer artefacts found (Teviotdale and Skinner 1947:342).

The excavated material has been the basis for some analyses and many theories. Fisher was the first to attempt an analysis of the adzes obtained by the Auckland Museum from Oruarangi. He proposed that there were two types of adzes present, types A and B, on the basis of maximum length and thickness, and width at cutting edge. Type A was quadrangular in cross-section, relatively long, narrow, and thick. Type B on the other hand was quadrangular, relatively short, broad, and thin. Bevel and poll taper were also used as diagnostic features. One hundred and nineteen of the adzes fell into Type A and 41 into Type B (Fisher 1936:15-18). He also described two stone reels, one of which is recorded by Teviotdale as having been found on 19th January 1933 (Teviotdale n.d.).

By the time Golson analysed the Oruarangi artefacts with regard to the definition of the Classic or Late Phase, Duff's adze typology had appeared (Duff 1956). Golson classified all except seven of the adzes as Duff Type 2B, ungripped, fully polished, quadrangular sectioned; of the remainder he noted that at least one (Fig. 2a) was Archaic, a typical Type 1A (Golson 1959:55).

Green and Green (1963:27-34) summarised the available information concerning three swamp *pa* in the lower Waihou River area and one on the Piako River, six kilometres to the west. Their comprehensive list of the artefacts included those held in the private collection of C. J. Murdock; from him they also obtained pertinent information concerning the sites. Ten Archaic or "intermediate" adzes are recorded for the sites (or their vicinity), two of which come from Oruarangi.

Shawcross and Terrell (1966:419-424) re-examined Fisher's adze types A and B, and added measurements for six adzes from Murdock's Paterangi collection to the 17 specimens measured by Fisher. The results in their view indicate that the adzes were all from the same statistical population. However, three of the adzes in Fisher's original table (and acknowledged by him not to fall into either type A or B) were included in the Shawcross and Terrell analysis. One of these was the 30 cm long Type 1A adze that Golson had remarked on.

Aspects of the fish hook component of the artefact assemblage were included in

a study of Maori fishing gear by E. Crosby (1966), in which three harpoon heads and two one-piece unbarbed hooks were described, and Skinner (1974:144-5) illustrated and briefly described seven fragments of harpoons and barbed spears from Oruarangi.

Explicit in most of these analyses is the question of the age of Oruarangi. Golson, while recognising the Archaic affinities of at least one of the artefacts, and that the site "on traditional and archaeological grounds does not seem to have had a short or simple history", finds that "the justification for dealing with the Oruarangi material lies in the richness and variety of the finds, their family likeness and the fact that there is no comparable site" (Golson 1959:55).

Green (1970:35), enlarging on the mainly descriptive listing of artefacts mentioned above, states that the occasional find of an Archaic adze probably represents initial exploration and exploitation of the area and that the material from the *pa* sites is a regional variant of the Classic. In the case of Oruarangi Pa and one of the others, occupation continued well past the time of European contact.

Shawcross and Terrell (1966:407) question the validity of using an artefact assemblage from a site with a long traditional time depth to describe the Classic Maori Phase of New Zealand prehistory. Groube on the other hand has suggested that, because of what he describes as the high proportion of European material occurring at Oruarangi, "Many of the artefacts labelled 'Classic Maori' may be post-European in date, and more importantly, the product of protohistoric culture change rather than of prehistoric culture change" (Groube 1964:22).

These conflicting theories show, if nothing else, the lack of any secure data base from which to work. It was to attempt to provide this that the following research was initiated.

RECENT RESEARCH: ADZES AND ROCK SOURCES

Because of some marked typological differences in the adze assemblages from Oruarangi, an analysis was conducted which included functional typology and the material from which the adzes were made. Following this some preliminary test excavations were carried out on Oruarangi and Paterangi. Finally a site survey of the surrounding area was conducted, both as an aid to understanding the relationship of Oruarangi to other sites in the district and to enable the Catchment Board to plan future works with a view to minimising any further site damage.

As has been demonstrated elsewhere (Best 1977:322), width and breadth measurements of 157 Oruarangi and Paterangi adzes held in the Auckland Museum, taken in conjunction with their form, rock type and technology, show that all adzes over 4 cm in length fall into one of two categories.

These are fully ground and polished Duff Type 2Bs in a medium-coarse sandstone or greywacke (Fig. 2e), and flaked partially ground adzes in a fine-grained basalt, some with tangs, incipient tangs or grooved butts and with a wide variety of cross-sections including quadrangular, trapezoidal (Fig. 2d) and subcircular.

The source of the fine-grained basalt is likely to be Tahanga Hill, on the Kuaotunu Peninsula, Coromandel (Best 1977:315-323). Considerable work has now been carried out on this source (Moore 1975:32-36, 1977:77-94) and the identification is well-based. Research has shown that the use of this material was extensive and wide-spread in early times, with a marked fall off in later periods, save perhaps for sites in the shadow of the hill itself (Law:pers.comm.).

The source of the sandstone-greywacke is not known. The two most likely areas have been sampled; the stretch of coast between Wilson Bay and Tapu on the east side of the Firth of Thames, and between Matingarahi and Whakatiwai on the west side. No immediate distinguishing characteristics could be found between even these very large areas, but it may be possible to find different proportions of quartz, feldspar

and lithic fragments for different areas (D. Skinner:pers.comn.). It is also possible, though unlikely, that a single discrete quarry source exists somewhere up in the hills, but it is more likely that the numerous pebble beaches where suitable blanks can easily be found provided raw material for the adzes.

Artefacts which appear stylistically early include the two stone reels, four or five one-piece fish hooks, and a wooden *waha-ika* found by Teviotdale in the lowest occupation layer, and described by himself and Skinner (1947:354) as lacking features of the more recent *waha-ika* of the northern area and resembling those from the southern half of the South Island and the Chathams. On the basis of these artefacts and the adze analysis, it seems extremely unlikely that the bulk of the artefacts could have been a result of European contact, and the site might indeed have a considerable time depth. It was with the hope of recovering dateable materials from undisturbed deposits that some test excavations were carried out on both Oruarangi and Paterangi.

EXCAVATIONS

Five one metre square test pits were excavated, three on Oruarangi and two on Paterangi (Fig. 3). The following are brief summaries of the excavations, and more detailed descriptions of the stratigraphy are included in Appendix I.

Square 1, situated on the north end of Paterangi, revealed that the original ground surface was 1.2 m below the present surface of the *pa*. Into this old soil had been cut a steep-sided feature of unknown area (Fig. 4) and more than one metre deep. This had been filled from the north when spoil from the defensive ditch had been thrown back on to that end of the *pa*. No evidence of occupation prior to this emplacement of spoil was found. At least two breaks occurred during this build-up, when thin layers of shell were laid down and walked over. A pocket of whole pipi shells (*Paphies australe*) underlain by a charcoal lens in one of these layers provided samples for radiocarbon dating. These dates were 250 ± 50 B.P. (N.Z. 4180, NewT $\frac{1}{2}$ 260 ± 50 B.P., shell) and 270 ± 80 B.P. (N.Z. 4181, NewT $\frac{1}{2}$ + secular correction 370 ± 70 B.P., charcoal). Seven small stake or post holes, in an elongated scatter running parallel to the edge of the ditch, occurred in the surface of the clay fill. These almost certainly originated from the surface of the 40 cm of shell which had been dumped on top of the clay to provide a base for occupation. (See Table 2 and associated discussions for terms such as shell, shell fill, etc.)

Square 2 was situated towards the centre of Oruarangi, and encountered the old ground surface at 55 cm depth. A thin layer of compacted wood ash rested directly on the old topsoil, and between this and the surface of the site were two layers of shelly midden containing cultural material such as an adze chip and obsidian and sinter flakes, the two layers being separated by a layer of yellow sand (Fig. 4).

One post hole originated from beneath this sand, while ten penetrated it from higher up, probably close to the surface of the site. That this sand is not merely a local feature is indicated by a colour slide taken by Murdock; although the location on the site is unknown what appears to be a sand layer similar to the above occurs over a distance of some metres. A radiocarbon sample was taken from the lower shelly midden layer, and gave an age of 450 ± 80 B.P. (NZ 4176, New T $\frac{1}{2}$ + secular correction 490 ± 80 , charcoal).

Square 3, on the north edge of Oruarangi, produced the most information regarding the build-up of the site. Shell to a depth of 1.6 m had been placed on waterlogged, blue, silty clay. Charcoal, bracken fern and shell samples taken from the top of the mud gave the following dates:

280 ± 50 B.P. (NZ 4179, New T $\frac{1}{2}$ + secular correction 320 ± 50 B.P., bracken),

310 ± 50 B.P. (NZ 4178, New T $\frac{1}{2}$ 320 ± 50 B.P., shell),

230 ± 60 B.P. (NZ 4177, New T $\frac{1}{2}$ + secular correction 310 ± 70 B.P., charcoal).

Within this body of shell were layers of crushed and whole shell, as well as layers

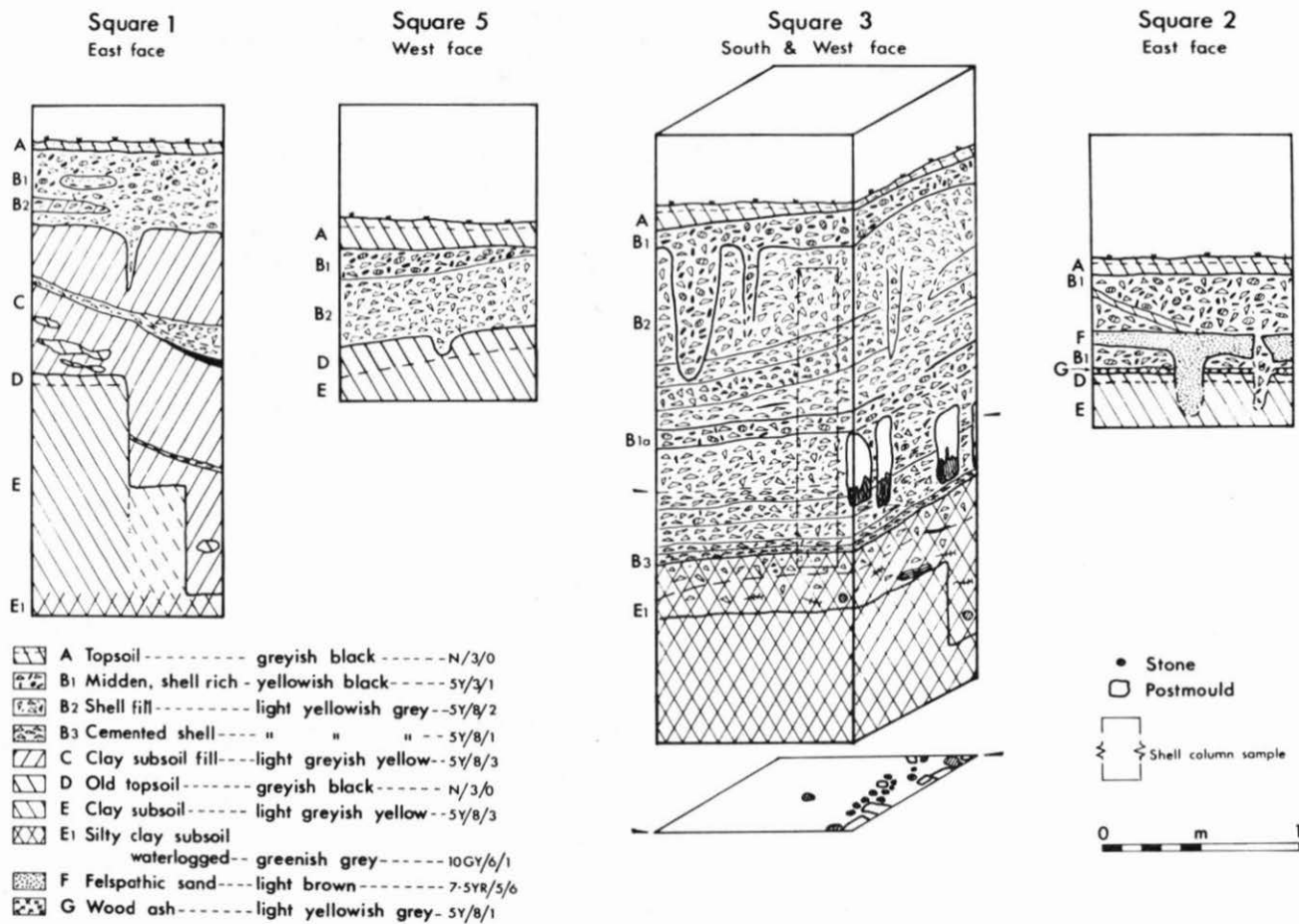


Figure 4: Sections of Squares 1, 2, 3, + 5. (Square 1 and 2—east section. Square 3—west and south, and Square 5—west).

containing charcoal and stone fragments. A set of post moulds, containing squared posts and with a scatter of stones amongst them, occurred near to the base of the square, apparently originating from Layer B1a (Fig.4). Another set of post holes was present near the top of the square, probably associated with the last stage of occupation.

There are strong indications, therefore, that the build-up of shell in this area, unlike that in Square 1, took place over some time and with at least one intermediate stage associated with structures.

Square 4, on the northeast side of Oruarangi, again contained shell, this time to a depth of one metre, resting on a yellow clay "floor". Under this surface a blue-brown silty mud, similar to that in Square 3, contained scattered shells for the first 30 cm. The clay "floor" contained post holes and wood fragments on its surface, and immediately underneath it was a scatter of seeds. It seems likely that the yellow clay was an occupation surface (the same depth below ground surface as B1a, Square 3). No evidence of any intermediate occupation in the ensuing shell deposits was found.

Square 5, on Paterangi, 35 m southeast of Square 1, reached the old ground surface at a depth of 55 cm. The centre of the square was disturbed, and the stratigraphy taken from the baulks. Shell, with no apparent intermediate stage of occupation, continued from the old topsoil to the present surface.

EXCAVATED ARTEFACTS

One adze fragment and 31 flakes and cores were obtained from the excavations and another three flakes from the ground surface. The adze fragment is from the cutting edge and corner of a single bevel adze with a flat face. The material is a grey argillite, with thin black veins and broader yellow ones. The fragment came from just above the sand layer F in Square 2.

The stratigraphic distribution of the rest of the excavated stone material is shown in Table 1, together with the length and weight ranges and means. From this it can be seen that the shell-rich midden layers contain all except one piece, or 97%, of the total tool material. One large core of sinter has been omitted from the above. This was one of the stones used to support the posts in the lower layers of Square 3, and was 12.0 cm long and weighed 368 g. It was omitted because it had not been subjected to the same cultural processes as the remainder.

TABLE 1
STRATIGRAPHIC AND SIZE DISTRIBUTION OF EXCAVATED FLAKES AND CORES

	<i>Squares</i>				
	1	2	3	4	5
Midden (B1)	1	22	2		4
Shell fill (B2)					
Beneath shell					
	<i>Length (mm)</i>		<i>Weight (g)</i>		
<i>Flakes</i>	Range	Mean	Range	Mean	
Obsidian n=21	12-35	19.5	0.24-8.45	1.40	
Sinter/chert n=4	15-45	27.0	2.36-15.01	5.03	
<i>Cores</i>					
Sinter/chert n=5	15-53	24.8	2.32-23.25	7.18	

ECONOMIC MATERIAL

Shell

For a full analysis of the excavated shell material, see R. Nichol (this volume). Based on his findings and taking into account the enormous volume of shell used to build up the sites, Oruarangi in particular, it is obvious that the greater proportion of the

shell material is fill, brought in from some as yet unknown source. Unless one assumes, however, that the process of build-up was practically instantaneous, then shell food remains will occur in lenses and layers throughout most of the shell base. The top 20 cm or so of the site below the present topsoil contains more cultural material and has a darker matrix than the bulk of the underlying shell. Layers of darker shell midden containing cultural material do, however, occur lower in the site, for example B1a and B1b (Fig. 4). There will therefore be a gradient in the site between "pure" shell fill and "pure" shell midden, or food remains.

Because of the subjectivity involved in describing layers as "shell rich midden" or "shell fill", samples from both were analysed. These were separated by fine sieving into three components—shell, soil or sand, and charcoal. The results by weight are shown in Table 2. From this it can be seen that real differences do exist between the two, there being higher proportions of shell and lower of soil and charcoal in what has been described as "shell fill". Of importance, too, is the difference in colour between the soils in both, representing the difference between a clean silty sand and a humus-rich loam. It is also obvious, however, that the "shell-rich midden" includes the upper portion of what was originally shell fill, which through the disturbances of occupation has had incorporated into it humus forming refuse.

TABLE 2
PERCENTAGES BY WEIGHT OF MIDDEN AND SHELL FILL CONSTITUENTS

	Shell	Soil (Colour)	Charcoal
<i>Top Midden (B1)</i>			
Sq. 1	81.8	17.65 5Y/3/1	0.55
Sq. 3	74.36	25.0 5Y/3/1	0.64
Sq. 2	62.09	37.38 5Y/3/1	0.53
<i>Lower Midden</i>			
<i>Layers B1, & B1(b)</i>			
Sq. 2	64.94	34.47 5Y/3/1	0.58
Sq. 3	77.0	22.15 5Y/3/1	0.84
<i>Shell Fill (B2)</i>			
Sq. 1	81.82	18.15 5Y/8/1	0.03
Sq. 3	81.56	18.44 5Y/8/1	0.0

Bone and Seeds

Bone material occurred throughout the excavated layers, but was rare in what is described as "shell-fill" (Table 3). Seeds were recovered only from the lower, more water-logged levels.

Wood identification

Four samples of the best preserved post remains were identified to species level. They represented two, if not three, different types of support: very large, probably squared posts (example from Square 2), slabs of timber (example taken from the waterlogged clay under the shell fill in Square 3), and small posts or stakes (example taken from among the stone group in square 3). (See Appendix 1 for description of posts.)

Square 2.	Large squared? post:	Totara	(<i>Podocarpus totara</i>)
		?Rimu	(<i>Dacrydium cupressinum</i>)
Square 3.	Timber slab:	Kahikatea	(<i>Podocarpus dacrydioides</i>)
	Small post or stake:	Puriri	(<i>Vitex lucens</i>)
Square 4.	Large post:	Kahikatea	(<i>Podocarpus dacrydioides</i>)

Initial examination of midden charcoal samples from the site indicate that wood from softwood species was not generally used for household fires but that hardwood was preferred.

Coprolites

Two were found, one in Square 2 on Oruarangi and one in Square 5 on Paterangi. A preliminary analysis by weight of their major contents is shown below. "Matrix" is the material remaining after the bone and shell has been removed, and consists of a fairly undifferentiated, fine-grained, crumbly substance containing flecks of charcoal.

TABLE 3

DISTRIBUTION OF ECONOMIC REMAINS EXCEPT FOR SHELL. (MINIMUM NUMBERS)

	Fish	Dog	Bird	Human	Seeds
<i>Square 1</i>					
Midden (B1)	1 Snapper (<i>Chrysophrys auratus</i>)				
Shell fill (B2)					
Below shell					
<i>Square 2</i>					
Midden (B1)		1	1	1	
Shell fill (B2)			Grey duck (<i>Anas superciliosa</i>)		
Below shell					
<i>Square 3</i>					
Midden (B1)					
Shell fill (B2)	4				
Below shell	2 Snapper 2 Kahawai (<i>Arripis trutta</i>)		1 Petrel? (medium size)		1 Hinau (<i>Elaeocarpus dentatus</i>) 1 <i>Cyperus ustulatus</i> 1 Titoki? (<i>Alectryon excelsus</i>) 2 <i>Chenopodium</i>
<i>Square 4</i>					
Midden (B1)					
Shell fill (B2)					
Below shell		1			2 Hinau/Pokaka (<i>Elaeocarpus</i> sp.)
<i>Square 5</i>					
Midden (B1)					
Shell fill (B2)					
Below shell	1 Snapper	1			

	Square 2	Square 5
Matrix	96.2%	61.45%
Bone	1.9%	4.05%
Shell	1.9%	34.5 %
No. of fragments of chitinous ?insect exoskeletons	c.10	c.10

The shell material in the Square 5 coprolite contained 10 *Mactra* hinges. The width across the resilifer was measured and compared with the same measurement for the total number of *Mactra* (109) in grab samples from the two midden layers in Square 2.

	Range (mm)	Mean (mm)
Midden	2.1-7.4	3.98
Coprolite	1.6-2.5	2.16

The identifiable bone consisted of 15 fish vertebrae, a spine and one dentary. All were from extremely small fish, about 3 cm in length. The dentary was identified as that of a *Trypterygiid* (R. Choate: pers.comm.).

Although the sample is small, the bone and shell content of the coprolites is comparable with what might be contained in the stomachs of fish or even of one omnivorous fish such as snapper. The lack of any larger fish bone fragments would tend to indicate that only fish stomachs themselves were eaten, while the presence of shell makes it unlikely that this was part of a human's meal. The available evidence seems to suggest that the coprolites are those of dogs and that fish guts were part of their diet.

DISCUSSION

Bearing in mind the very small and preliminary nature of the excavations, some basic interpretations can still be put forward.

The stratigraphy observed in Squares 2 and 3 on Oruarangi, together with the radiocarbon dates, gives some insight into the constructional history of the *pa*. The site has a natural core of raised ground with shell fill added to all sides (Fig. 3). The radiocarbon date of 450 ± 80 B.P. from the lowest midden layer in the centre of the site, although overlapping at two standard deviations with those from under the shell fill at the edge, does indicate that the central raised area was probably occupied for some period prior to the expansion of the site.

There is also some evidence that the addition of the shell and the raising of the *pa*'s surface were not carried out in one stage. The two sets of post remains and post holes in Square 3 are not associated with the same surface. While those in the upper part of the shell fill must belong to the last period of occupation, those exposed at the base of the fill, 1.5 m below the ground surface, belong to an earlier level. These lower post holes, or rather post moulds with their post remains, were leaning 15° from the vertical towards the edge of the *pa*. Those near the present day surface, however, are upright. A possible explanation for this would be that the addition of any shell fill required to raise the level of the *pa* would push against the old posts, tilting them in that direction. It can be seen from Figure 4 that the layers of fill above Layer B1a do slope towards the *pa* edge. Layer B1a itself, recorded as a darker, more earthy fill containing charcoal lenses and stone fragments, may represent this postulated earlier occupation surface at the very edge of the *pa*. It is of interest to note in Square 4, at the same depth below present ground surface of one metre, that the layer of finely crushed, packed shell with a clay capping also contains post holes.

The radiocarbon dates from Paterangi indicate that it was contemporary with the later stages of Oruarangi. The dated material comes from a lens in clay fill which is resting on the old, culturally sterile topsoil, thus predating the main occupation of the site.

Some of the questions regarding the validity of the artefact assemblages from the sites can now be answered, at least in part. Firstly, it is extremely unlikely that European contact played any great part in the total history of either site. That such contact occurred in 1769, with moderate frequency from 1794 to 1801 and increasingly to about 1820, has been mentioned, but there is no reason to suppose that this would have resulted in anything more than a mere archaeological veneer on a well-established and influential site.

On the other hand the total assemblage from the site can hardly be classified as Classic. Some 20% of the adzes are not typical Type 2B, and possess Archaic affinities, as do other items such as the stone reels, one-piece fish hooks and possibly the *waha-ika*. Thus, oral traditions, artefacts, radiocarbon dates and stratigraphy all indicate a site with a long and complex history, hardly the ideal site from which to draw conclusions about the Classic Maori Phase.

SITE SURVEY

Despite the picture emerging concerning Oruarangi Pa itself, the surrounding area was still an archaeological blank, and the status of the site with regard to others in the vicinity was unknown. In addition, current stopbanking works were gathering speed in the area concerned, and the need for a site survey was immediate.

The east side of the first 35 kilometres of the Waihou was surveyed, with special attention to the bank of the river and to any present day or ancient watercourse in the flatland between the Waihou and the foothills to the east. A block of hill country opposite Oruarangi was searched up to the 450 m contour, this being well into the forest, in order to obtain a sample of as many different site types as possible between the two major topographical boundaries of the Waihou and the peaks of the Coromandel Ranges (Fig. 1).

The results can be seen in Figure 5. It is clear that while some sites occur in the foothills, most of the occupation took place close to the banks of the Waihou River itself.

Ten *pa* sites were recorded on the flat low lying land between the east bank of the Waihou and the foothills; one was already known on the west bank, and another to the west was also recorded. All except one of these contained shell fill in varying amounts, becoming less the further upstream the site occurred. The exception was the *pa* some two and a half kilometres up Hikutaia Creek (N53-54/61) and shown as "Kakramare" on William Wilson's map (see below).

Of the 100 sites found on the flat area between the river and the foothills only 10 did not contain shell. By using a probe it was possible to estimate the area of 72 of these. A log distribution (Fig.6) shows five main groups.

I. 20-75 m^2 These sites usually occur singly and at some distance from any other sign of habitation. They possess only a few centimetres depth of deposit and are situated on the banks of old river channels or side creeks. Two artefacts are known from these: the black argillite trapezoidal-section adze with tang (Fig. 2b) and a non-tanged adze of Tahanga basalt similar to those in the same material from Oruarangi.

II. 100-400 m^2 Sites in this category are most commonly found in groups of up to 12, and like the previous category these are again situated on watercourses or old channels. These sites have been located only between Oruarangi and the mouth of the Waihou, and can occur close to *pa* or at some distance from them.

III. 500-600 m^2 These sites are found either as the largest in a group or singly some distance from *pa*. As such this category probably includes sites of very different functions.

IV. 1,000-1,500 m^2 This is a somewhat anomalous group, containing sites that vary from thin irregular scatters of shell on the banks of the Waihou or one of its major sidecreeks to an oval of shell which is the largest among sites otherwise assigned to Group II.

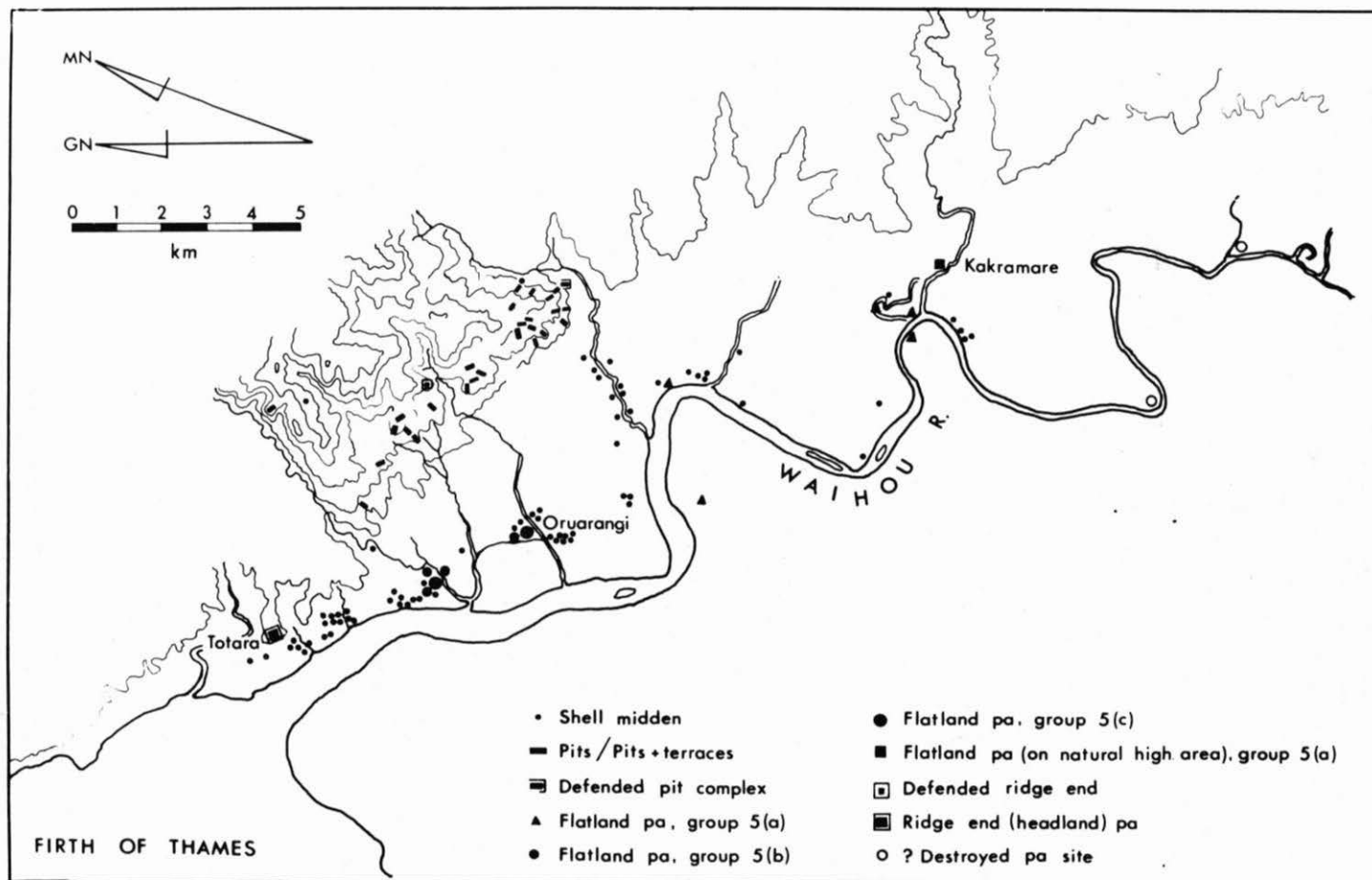


Figure 5: Distribution of site types in survey area.

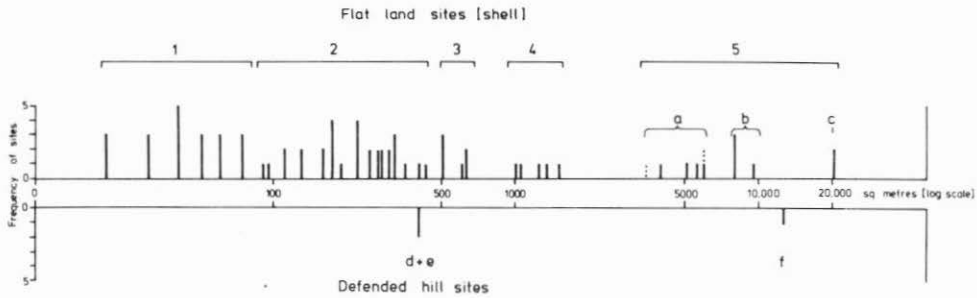


Figure 6: Log distribution of site sizes.

(d) and (e) are two defended hill sites (a pit complex and a small ridge end), while (f) is Totara Pa.

V. 3,400-20,500 m² These sites, because of either their evidence for defence in the form of ditches or palisades or because of their great size when neither of these are known, are referred to as *pa*. They can be divided into three subgroups:

a) 3,400-6,000 m². This subcategory includes the *pa* site up the Hikutaia Creek referred to above that contains no shell fill. All of these sites occur upriver of Oruarangi, at the mouths of old or present day side creeks, and all except one have defensive ditches. These, marked with dotted lines in Figure 6, have no secure evidence for ditches. One is in an area disturbed by extensive drainage contouring, and the other, the downstream site on the west bank, has also been disturbed and, in addition, is complicated by apparent watercourses that border the site.

b) 8,000-9,600 m². These sites have been classified as "satellite *pa*". They occur within 40-150 m of one of the two largest shell *pa*, and only one has a defensive ditch.

c) 20,500 m². Only two sites fall in this subcategory, and are the largest *pa* in the area. They are situated on small side creeks running down from the hills. Oruarangi, with its satellite *pa* Paterangi, is one of these, and the other, (N40/377) just over two kilometres downstream from Oruarangi, has three satellite *pa*.

As a comparison the three defended inland hill sites have also been shown (Fig. 5) and it can be seen that the defended ridge-end (N49/344) and defended pit complex (N49/413) are each equal in area to only one of the larger shell middens on the flatland. Totara Pa (N49/31), while bigger than all except the two largest flatland *pa*, is still not two-thirds the size of these last two sites.

It is of interest to note that two groups of *pa* occur in the surveyed area, four small sites around the mouth and up the Hikutaia Creek, and the six larger *pa* further downstream. The sizes of the latter are remarkably even, with only 17% difference in area between the four satellite *pa* and virtually no measurable difference between Oruarangi and the other large *pa*.

THE SITES AND THEIR LOCATION

Oruarangi and its near neighbour Paterangi together comprise a very large defended area, some 27,500 square metres. The sites are one kilometre from the Waihou River and, although on the bank of the old Matatoki Creek, were nevertheless a long way up what can only have been a very minor waterway.

During the course of surveying the site it was noticed that the southwest side of Paterangi runs in a slightly curved line, the extension of which is tangential to the edge of Oruarangi. A bank 10 cm high continues northwards from Paterangi. A small stream, the Pipi, running parallel and to the west of this bank, here has been confined to a drain about 1.5 m wide. It seemed reasonable to suppose that at some time in

the past a watercourse of some size had flowed close to the edges of the *pa*. Three detailed maps from the late 18th and early 19th century were located (Maling 1969), the relevant parts of which appear in Figure 7.

7a is from Cook's chart of the River Thames and Mercury Bay, made from his 1769 voyage (Maling 1969:36). The map shows that at approximately the correct distance up the Waihou the river divided into two channels, flowing round a large island. Both channels were sounded and two fathoms recorded in each.

7b is from a chart by William Wilson of the River Thames in New Zealand, 1801 (Maling 1969:72). Wilson was the Captain of the *Royal Admiral*, mentioned above as carrying missionaries to Tahiti, and while the ship was anchored in the Firth he, together with a party of officers and men, built a small defended settlement some 20 kilometres up the Waihou River and lived there while collecting the timber. In this chart the two channels are again shown, together with two *pa*, one of which is on a channel and in the correct position for Oruarangi.

7c is from Captain J. Downie's sketch of the River Thames in New Zealand, made during a visit in the *Coromandel* in 1820 (Maling 1969:94). The channels are again recorded on this very detailed map, and this time the name Oruarangi is written across the island between them.

Thus, from three independently executed maps, enough evidence is available to propose that Oruarangi and Paterangi were in fact situated on a channel of the Waihou.

Just when this channel became infilled is not yet certain, but it does not appear on an 1886 map of the river from a survey by S. P. Smith and H. Baker (Smith and Baker 1886). A map drawn in 1855 during the visit of the *Pandora*, held in the Hydrographic Department, England, may provide an answer. Despite the above evidence, no further sign on the ground of this channel could be found. Since it would have taken an enormous amount of alluvium, something in the order of two million cubic metres, to infill it to its present level, further proof of its prior existence was sought. Standard aerial photographs had revealed nothing. Infra-red photography was planned, but before this took place an examination of aerial photographs taken for the Hauraki Catchment Board after every severe flood along the Waihou provided the answer. A photograph (Fig. 8), taken during the August 1976 flooding, shows that although the exit and entry points from the main river have been obscured by modern drainage works, enough of the channel is left to establish without doubt that this configuration of the river, together with the positions of Oruarangi and Paterangi, matches exactly that recorded on the early maps.

A PROPOSED SETTLEMENT MODEL

Based on the results of the above research, a preliminary hypothetical model of settlement for the area can be proposed.

Artefacts with undoubted Archaic affinities do occur in the area. The most striking of these are the large 1A adze blank found at Oruarangi (Fig. 2a) and the stone reels from the same site. However, adzes of both Tahanga basalt and a black argillite, trapezoidal in section and tanged, are also present in collections from the area. Two of these have been provenanced (Fig. 2b and c); one came from a Group I midden and the other from a spot where no shell could be located. In addition the approximate find-spots of two other such adzes, both of Tahanga basalt, were thoroughly examined and no signs of occupation found.

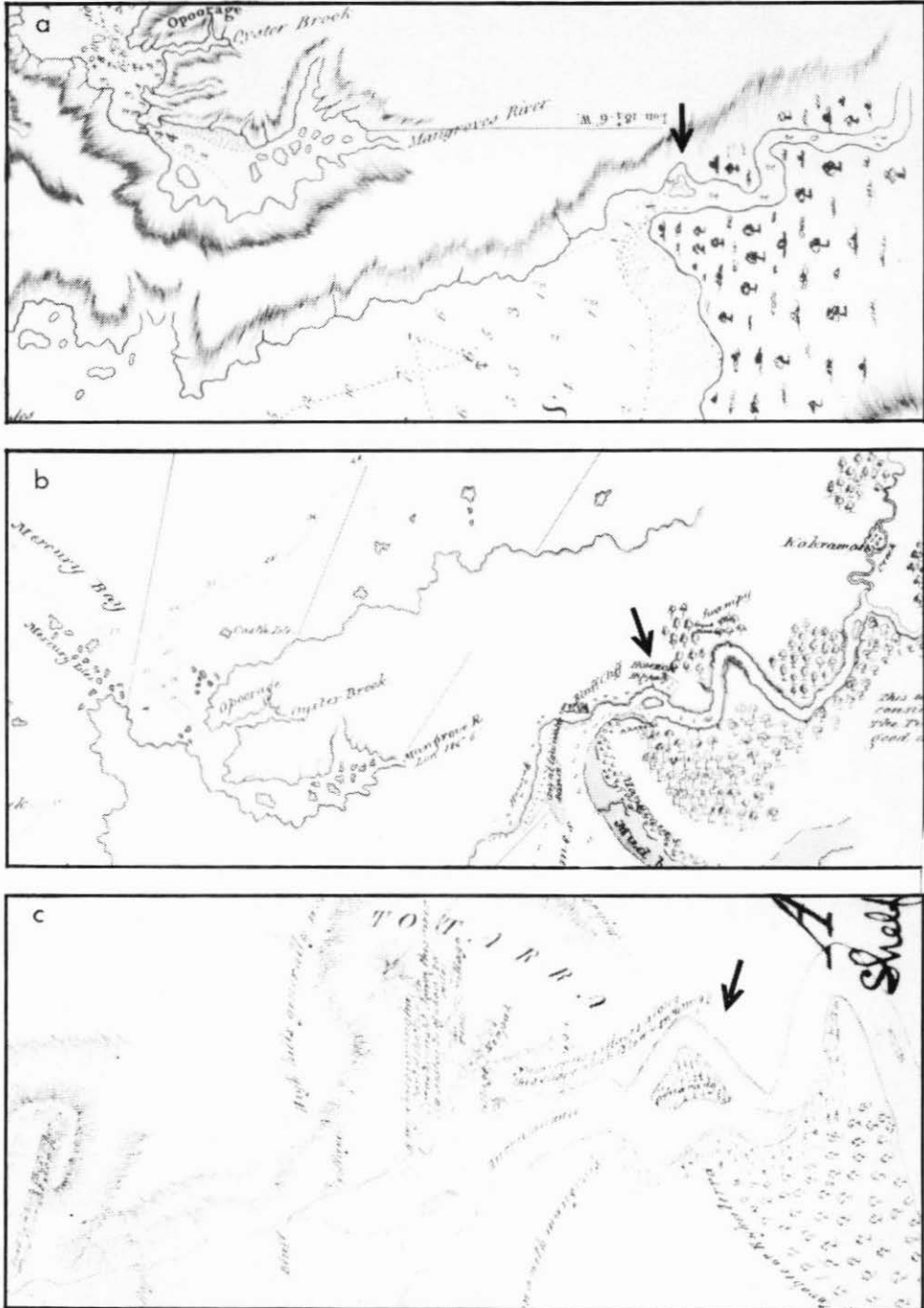


Figure 7: Section of Lower Waihou River region, taken from three maps.
 (a) 1769–1770. From “River Thames and Mercury Bay”, by J. Cook (Maling 1969:36).
 (b) 1801. From “River Thames”, by W. Wilson (Maling 1969:72).
 (c) 1820. From “Sketch of the River Thames, Showing the Coast Explored in the HMS Coromandel”, by J. Downie. (Maling 1969:94).



Figure 8: Lower Waihou River region after flooding, 11/8/76. The arrow marks Oruarangi.
Hauraki Catchment Board Aerial Photograph, MYA3115.

On the basis of this it is proposed that initial occupation or exploitation of the area did not produce the large settlements that were present at later stages. The characteristics of these early sites are not known, but the central area of Oruarangi, the natural island core, may hold the answer. The proposed constructional sequence for Oruarangi should mean that artefacts belonging to this early stage will not only be mixed up with later occupations, especially at the site's centre, but will also occur around the central island, sealed in the mud beneath the first layers of shell fill.

The next hypothetical stage concerns the construction of larger sites, with the aid of shell fill. If the typological assumptions concerning the other adzes of Tahanga basalt are correct then they should belong to this stage. The size of Oruarangi at this time is of interest. The extent of the central island is not yet known and neither are the intermediate stages of enlargement between the island and the site's final size.

An entry in Teviotdale's diary, however, is of interest here.

Up at 5 a.m. and dug till 7 a.m., getting right down on the clay . . . I got a much decayed *waha ika* on the clay about 3 feet 9 inches from the surface . . . there were a large number of posts suggesting a palisade but they are 30 feet or more from the outside fence. (Teviotdale n.d.)

One of the smaller *pa* upstream has also been fossicked, and has produced adzes of Tahanga basalt similar to those from Oruarangi, as well as those of later shape in sandstone—greywacke. If these smaller *pa* were constructed during this earlier period and have not since been enlarged, as seems likely from their small size, then the area of Oruarangi at this time should be an indication of the site's importance.

The final stage is that which existed at contact and any stages consequent to this. Research in this field is only partly completed, and although some success has been had in matching the observations of the first Europeans to the archaeological record as provided by the site survey, some formidable dangers exist in any exercise such as this.

The first observations are those from the journey by Cook and his men up the Waihou on 20 November 1769. Cook himself records:

We saw a number of the natives and landed at one of their Villages the Inhabitants of which received us with open arms; we made but a short stay with them but proceeded up the River untill near Noon . . . we landed on the West side . . . being at this time 12 or 14 Miles within the entrance . . . In our return down the River the inhabitants of the Village where we landed in going, seeing that we return'd by another Channell put off in their Canoes and met us and trafficked with us in the most friendly manner imagineable untill they had disposed of the few trifles they had. The Tide of the Ebb just carried us out of the narrow part of the River into the Sea reach as I may call it . . . (Cook 1955:206-207)

Banks, who accompanied Cook on the trip gives a more detailed description of the settlement.

About a mile up this [the Waihou] was an Indian town built upon a small bank of Dry sand but totally surrounded by Deep mud, so much so that I beleive they meant it as a defence. The people came out in flocks upon the banks inviting us in . . . After this visit we proceeded and soon met with another town with but few inhabitants. (Banks 1963:435)

The total distance travelled up the Waihou was estimated by Banks to be about two leagues.

Parkinson, who was not in the party, wrote:

Near the entrance of this river, which they named the Thames, there was a village, and a Hippa, or place of refuge, erected to defend it, which was surrounded by piquets that reached above water when the tide was up; and, at low water, it was unapproachable on account of a soft deep mud. (Parkinson 1773:106)

Pickersgill, who also did not go up the Waihou, wrote:

... up this river is several townes and the country on each side appears very delightfull and fertile and seemed to be very Popoluse. (Pickersgill 1769)

The exact position of this settlement is not easy to determine. From Cook's account, that they returned by a different channel, it would seem that the site was on one of the channels near Oruarangi. That Cook travelled in both channels is suggested above.

The description of the site given by Banks would fit Oruarangi in all except the "Sand bank" description, but it is possible that what Banks saw was a fresh sand floor (for example, see Square 2, Layer F). Banks also has the site too far downstream, even allowing for his underestimation of distance as shown by comparing his two leagues (six miles) with Cook's 12 or 14 miles for the total distance travelled up the river. The strongest evidence for the approximate placing of the site is that of Cook. Until there is evidence for two channels downstream of those described in this paper, then the settlement visited is most likely to have been in the east channel, one of the two large *pa* there.

The logs or journals from the next three ships in the area have not yet been located, but two of these ships lay for up to three months some miles up the Waihou itself, and if records exist they may hold valuable information.

In 1801 the first secure information that can be used to identify settlements is provided by the personnel of the *Royal Admiral*. The Wilson map (Fig. 7b) provides the key to interpreting the missionaries' journal. "Kakramare", the *pa* up the Hikutaia Creek, is described as the "second in magnitude of the towns, or villages, about the river Thames" (Anon.Missionary 1801), with a population, according to the same source, of about 300.

At the mouth of the Waihou was another settlement.

... we came to a narrow entrance, which is properly the river Thames, on one side there is a low marshy ground covered with shrubs, mangroves etc. On the opposite side we saw several dwelling places, and the appearance of a town. (Anon.Missionary 1801)

This is not marked on Wilson's map, probably for two reasons. Wilson was engaged in collecting timber, and only those places which provided him with some seem to have been marked. In addition, Wilson himself was seldom in that area, being upstream supervising the collecting of timber, as described above.

The other settlement marked on the map, and called Howrok Hippah by Wilson, is not referred to by that name in the Journal. There are, however, frequent references to a site in this vicinity.

As we advanced [up the Waihou from the mouth] saw several towns, and one very large, as we were afterwards informed, was the principal town in this part, and the residence of the greatest chief on this side of the water. (Anon.Missionary 1801)

Just upstream of this town they found the *Plumier* anchored and engaged in getting timber from the immediate vicinity. Although most of the *Royal Admiral's* timber came from further up, they did obtain some from close to the *Plumier*, and it is certain that Wilson and his men had dealings with this settlement. It is referred to in the Missionaries' Journale as "Warreekee's town" (Ariki?), and the chief described as "... the greatest chief in these parts ... and probably ... also an high priest" (Anon. Missionary 1801). It is at this settlement that warriors from the surrounding district gathered and feasted before setting off in the first week of June to go to war against the Waikato (Anon.Missionary 1801).

It seems certain from the Missionaries' description and from Wilson's map that Howrok Hippah was in fact Oruarangi, and that Oruarangi was the most important *pa* in the Lower Thames region in 1801.

That Kakramare was ranked second is interesting. As indicated above, the archaeological evidence shows that there are two clusters of *pa*, one on the Oruarangi channel, the other round the mouth of the Hikutaia Creek. Observations from the Missionaries' Journale are again important here.

In going up the creek [Hikutaia] we saw a great number of huts, several canoes and a multitude of natives. Here we saw also several large tracts of land apparently good and in a state of cultivation, enclosed and divided into many small portions. After rowing 4 or 5 miles came to a large town [Kakramare] containing better houses than any we had seen before . . . (Anon. Missionary 1801)

Although no discrete settlements around the creek mouth are mentioned as such, it is probable that the archaeologically recognized sites at least were occupied. There is one puzzling observation concerning a site nearly opposite the creek, which consisted of "a few huts and an image erected before them in the shape of a man, but no natives seen. We found on enquiry to be a sacred place and where they bury their dead" (Anon. Missionary 1801). Kiri or Kari Island *pa*, the only site located on the opposite bank, is 300 metres downstream. This site is right on the river, with a 90 m water frontage. From the artefact assemblage fossicked from the *pa*, we know that the site was occupied both before and after this time (Green and Green 1963:27-34).

The comment on the different quality of houses might be thought to refer to the differences between seasonal and permanent dwellings, but other observations on houses in the area do not seem to indicate this.

The generality of their huts are about 5 square and 6 feet high, made of reeds and flax leaf . . . saw also several huts larger than the former, which [the latter] seemed to be potato houses. (Anon. Missionary 1801)

and

Their Huts are very Miserable and hardly fit to hold three people; the best of them is employed for keeping their potatoes six foot from the ground standing upon four pillars . . . (Charles Wilson 1801)

While the evidence is not unequivocal, as regards the occupation of the small shell *pa* at this time, the area itself appears to have been a focus for settlement.

The latest reference so far found to any occupation of a fortified *pa* on the Waihou River occurs in 1833, when the Rev. J.A. Wilson, then at the Puriri Mission Station, refers to the "great fortified *pa*" Te Kare, and later travels past it by canoe (Wilson 1889:13-19). Whether this is the same place as Kari or Kiri Island (marked by Percy Smith on his 1873 map as Te Kari Is.), the site referred to above, is not known. The actual abandonment of the traditional sites in the area was in all probability a process that took place unevenly and over some length of time.

CONCLUSIONS

Although the above project was small in scale and preliminary in nature, the combination of several different aspects of research—a site survey, analysis of surface and fossicked artefacts, test excavations, and studies of aerial photographs and ethnographic material—have resulted in a clearer understanding of Oruarangi's place in the archaeological landscape. The initial findings concerning Oruarangi itself: that the site has a long and complex history, was apparently the most important site in the area in 1801, and had reached close to its final size some 150 years before that, taken together with its spatial relations with the other site types in the area, provide a useful reference for any future research in the district.

Of wider interest is the regional information that the area, and Oruarangi in particular, may hold for the tenuous Archaic/Classic "boundary". The occurrence of a multi-stage site, of considerable age and containing early forms of artefacts, in a low-lying

swampy area where organic remains would be preserved provides the possibility of recovering those important and rarely found aspects of material culture.

In 1959 Golson contended that the "... impetus to Classic Maori ... [came from] ... other areas than Hauraki ..." (Golson 1959:70). In the light of this research it seems that the Hauraki Plains area may contain sites which refute this statement. The most promising of these is Oruarangi.

APPENDIX 1

STRATIGRAPHY OF EXCAVATIONS

SQUARE 1

At the base of the square a feature was found cut through the old topsoil and subsoil, Layers D and E respectively (see Fig. 4 for Munsell colours). The base of this feature was not determined, though a spadehole encountered two pieces of wood at 1.8 m below ground surface and topsoil lumps at 2.05 m. Thirty centimetres below this the water table was encountered.

The fill of the feature, Layer C, extending above the old ground surface, was mainly clay subsoil fill containing a few lumps of topsoil. Within the fill were two southward dipping layers of finely crushed shell. Samples for radiocarbon dating were kept from a pocket of whole pipi shells (*Paphies australe*) underlain by a charcoal lens, lying in the south-east corner of the higher of these two layers.

In the surface of the clay fill was an elongated scatter of seven small stake or post holes running parallel to the edge of the defensive ditch, from 4-8 cm in diameter and about 30 cm deep and one larger hole of 14 cm diameter and about 12 cm deep.

Above this clay was a shell fill, Layer B2, the shells at the base being cleaner, more complete, and more loosely packed than those above. This graded into shell-rich midden material with a darker matrix, B1, which contained fragments of stone and charcoal. Very crushed shell formed a flat surface at the top of the layer; and resting on this was Layer A, a black topsoil, containing at its base a piece of obsidian and a cow's tooth.

SQUARE 2

An old topsoil and subsoil were found at the base of the square, with a 2.0 cm thick, compacted ash layer, G, resting directly on top of the old ground surface. Above this was a layer of shell-rich midden containing stone and bone fragments, charcoal, and sinter and obsidian flakes and with a post hole, 17 cm diameter, and about 35 cm deep, originating from the surface of this layer. A charcoal sample for radiocarbon dating was collected from this material.

A layer of sand, F, had been laid at the top of this, in the surface of which were ten post holes. The largest was 70 × 50 cm, contained the remains of a trimmed 50 × 30 cm post (see main text for wood identification), and originated from close to the present-day ground surface, with a minimum depth of 80-90 cm. Eight of the remaining holes were from 10-20 cm in diameter and up to 35 cm deep, and one was 4 cm in diameter and 10 cm deep.

Above this again was shell-rich midden, containing many stone fragments, obsidian flakes, two sinter cores, a fragment of a grey-veined argillite adze, bone pieces, and a dog's tooth. The surface of this layer, from which came a piece of bottle glass, was flat and compacted, consisting of finely crushed shell. Above this was the present day black topsoil.

SQUARE 3

Waterlogged silty clay occurred at the base of the square, containing a slab of timber and other wood fragments, bracken fern, shells, charcoal, stone fragments, and a piece of bird bone. The shells became more numerous towards the top of the layer, and a charcoal lined feature had been cut in from near the surface. Samples for radiocarbon dating were collected from the charcoal, shell, and bracken fern.

Above this was a very hard cemented layer, B3, of clean shell, whole and fragmented, and grey sand. The surface consisted of finely crushed shell with whole mussel shells on it. The next 1.4 m of deposit has been classified as mainly shell fill, B2, but within this are two layers, B1a and B1b, with a darker matrix containing charcoal and charcoal lenses and fragments of stone.

Two sets of post holes or post-moulds occur within this shell fill at different levels. The lowest group, six in number, appear in or just below layer B1a and reach down to the hard cemented layer, B3. Four of these are in line along the south baulk (Fig. 4), and are sharp edged post-moulds of rectangular section,

with post butts in place. Sizes were 14×5, 21×5, 16×8 and 12×10 cm. A fifth mould, 15×8 cm, plus butt occurred 25 cm to the north, towards the edge of the *pa*. Depths were up to 45 cm, and all the features were leaning 15° towards the edge of the *pa*. Amongst and slightly to the north of these post-moulds, and close to their tops at B1a, was a scatter of stones ranging in sizes from 3×4×7 to 12×12×18 cm. One of these was a slab of sinter. A small post hole, 11 cm in diameter and with a core of wood in place, occurred among the stones.

The top set of post holes, a scatter of five in number, appeared to originate from Layer B1 and probably belonged to the last stage of occupation of the *pa*. They ranged in size from 6-21 cm diameter, with depths up to 40 cm. In contrast to the lower set, these post holes were vertical.

Above the shell-fill material was shell-rich midden, containing charcoal, stone fragments, bone, and obsidian flakes. The flat surface of the layer consisted of finely crushed shell, forming a definite interface with the black topsoil, which contained a fragment of glass and a staple.

SQUARE 4

Waterlogged silty clay, containing the occasional shell, formed the bottom 40 cm. Above this for 30 cm the clay became gradually less wet, with a larger proportion of shell and containing an obsidian flake and the radius of a dog. Above this the matrix changed into a darker coloured, more earthy material, still containing shell. At 1.0 m below the present ground surface, and resting on the more earthy material, was a "floor" of clay, about 3 cm thick, containing very thin layers of finely crushed shell and with four post holes and two horizontal pieces of wood on the surface.

The largest post hole was 40×35 cm, containing the remains of a post. Although the wood remains extended 30 cm above this level, the post is considered by the excavator (R. Nichol) to be associated with the clay "floor". The others, 20, 15 and 10 cm in diameter, occur within 50 cm of the first, the smallest with the butt in place.

Immediately below the "floor" were scatters of seeds, a sample of which were retained for identification. Above this the typical shell fill, B2, but with a slightly darker matrix, extended to within 25 cm of the present ground surface. At 48 cm depth two post holes were located, but could not be associated with any level.

Resting on this was 20 cm of shell-rich midden, containing fragments of stone and charcoal. The surface of crushed shell was flat and compacted, above which was the present topsoil.

SQUARE 5

At the base of the square was the old topsoil and subsoil, sloping slightly to the north. Three features appeared in the cleaned down base: a post hole 12 cm in diameter and 13 cm deep, a large hole 30 cm in diameter and 53 cm deep, and an oval depression 50 cm long, 25 cm wide and 18 cm deep. The material above these was disturbed; an iron bolt and a crown bottle top were found at a depth of 35 cm. From the probably disturbed material at the base of this layer were recovered two siliceous flakes, a fishjaw, and a portion of dog skull. The layer above this consisted of shell fill, with occasional stone and charcoal fragments.

Resting on this was a shell-rich midden layer from 5-15 cm deep, containing cultural material. The surface was crushed shell, flat and compacted, with above it a black topsoil flecked with shell and containing an obsidian flake.

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