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An Interpretation of the Settlement and Defences of the Otatara-Hikurangi Pa Complex, Hawke's Bay, New Zealand

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ABSTRACT

Despite the amorphous appearance of Hikurangi, one of New Zealand's largest pā, it is possible to draw conclusions about the defensive character of the place and its neighbour Ōtatara. Detailed study of vertical aerial photographs reveals potential defensive lines, which have to be interpreted in the light of the overall topography of the place. The defence of Ōtatara-Hikurangi relied largely on natural features, on controlling the high ground, and on the speedy interior movement by defenders from one area to another as required. Fixed defences, including scarps, were a small part of the mix. Ōtatara-Hikurangi was an important centre in late prehistory and could probably muster large numbers of defenders.

Keywords: PĀ, DEFENCE, DITCH AND BANK, DISCONTINUOUS SCARP, CHRONOLOGY, NGĀTI KAHUNGŪNU, RUARAHANGA POLITY, LADY FOX.

INTRODUCTION

Ōtatara and Hikurangi together form the largest pā in Hawke's Bay. The two contiguous pā occupy a corner of a block of hill country which was bounded on two sides by the Tūtaekuri River (Fig. 1). Much but not all of the land area of the pā is administered by the Department of Conservation as the Ōtatara Pa Historic Reserve. *Hikurangi* (New Zealand Archaeological Association site number V21/41), the larger pā, occupies the main ridge and some radiating spurs. *Ōtatara* (V21/168) occupied one of the spurs and had its own transverse double ditch-and-bank defences. While Hikurangi remains substantially intact, Ōtatara and a large part of the spur itself have been destroyed by quarrying. In this paper we use Ōtatara-Hikurangi when we mean the two together or the whole site complex; and we use their individual names when referring specifically to one or the other.

The vast size of Hikurangi has discouraged detailed archaeological mapping until recently, while the destruction of Ōtatara means that any plans of it must be based on the pioneering RNZAF vertical aerial photographs from 1936. This situation has resulted in varying best estimates of the size of the site, the number of pits and terraces, and what other features are present. It has also hindered consideration of how the pā was defended. Recently, we mapped Ōtatara from early Royal New Zealand Air Force vertical aerial photographs and Hikurangi from a purpose-flown photography commissioned from New

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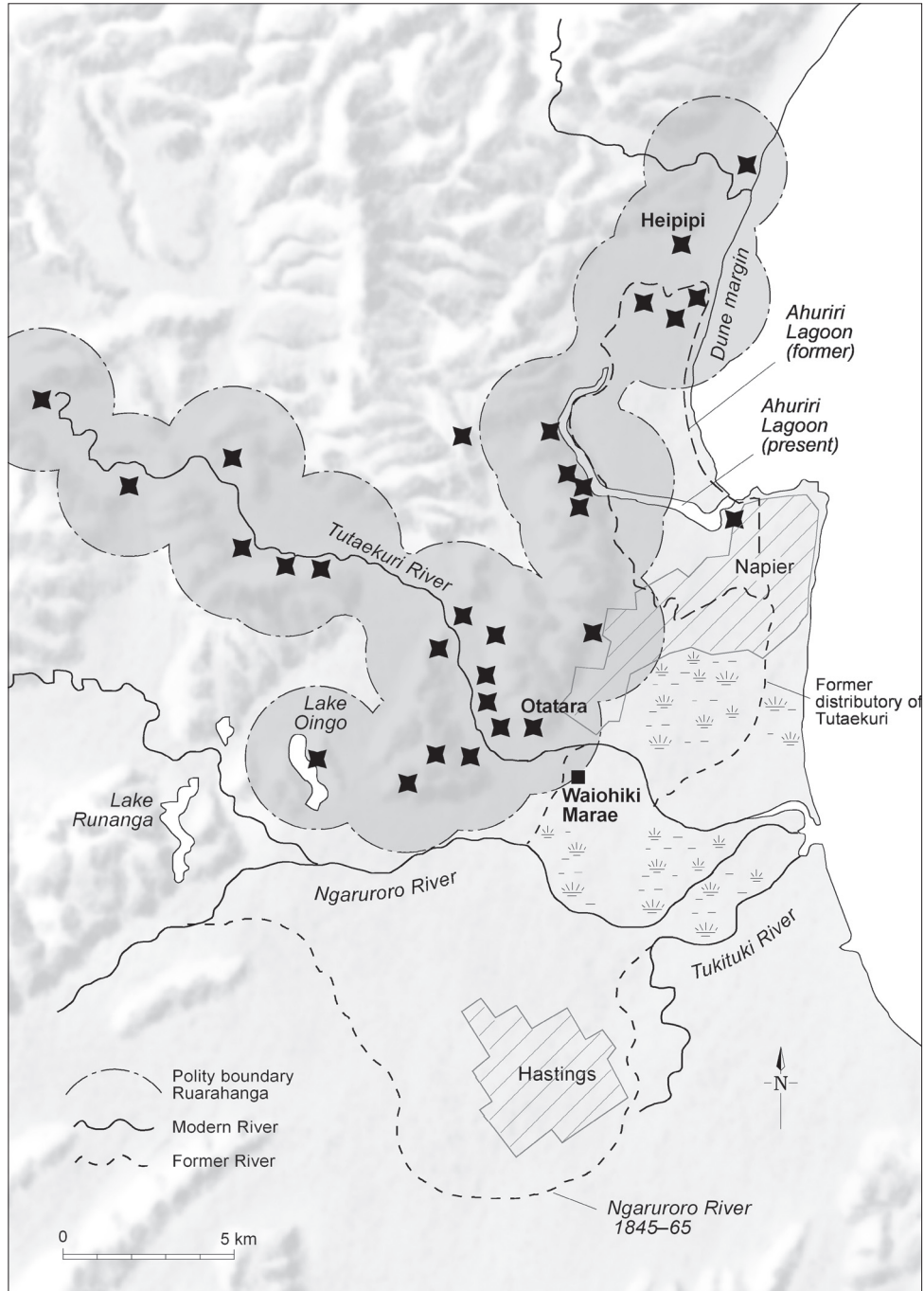


Figure 1: Ōtatara-Hikurangi in its setting. Mapped on an NZMS 260 base overlain by “Heretaunga Plains Hawkes [sic] Bay Period 1845-1865” (Bagnall and Petersen 1948: 237) and “Plan of the Napier Country Districts Hawke’s Bay New Zealand compiled by James Rochfort Esq...” (Alexander Turnbull Library Map Collection 832.3 gbdb / [c. 1876] Acc 9662). Pā distribution and Ruarahanga polity area after Allen (1994: 140).

Zealand Aerial Mapping Ltd. Subsequent more detailed mapping by Geometria for the Department of Conservation has provided plans with improved precision and accuracy, but without significantly changing the known pattern and character of the occupation. This paper presents some of the results of the mapping, describes a small excavation undertaken in 1997, which is relevant to the argument about defence, and attempts to show how the place might have been defended. Comparisons are made with the defences of Pouerua on the volcanic Taiamai plain, inland Bay of Islands.

BACKGROUND

ORAL HISTORY

Oral tradition indicates that Ōtatara-Hikurangi was first occupied by Ngāti Awa, Rangitāne and Whatumamoā, and subsequently by Taraia of Ngāti Kahungūnu. Traditions relate various aspects of the conquest of the place by Taraia and suggest that Ōtatara was hastily provided with its own defences after a part of Hikurangi had fallen to attackers. Genealogical dating puts this event in the mid sixteenth century (McEwen 1986: 40–43; Allen 1994: 127–137; Pishief 1997: 9–40). The tangata whenua of Waiohiki Marae, sited at the foot of Ōtatara-Hikurangi, retain traditional connections with the pā.

NEW ZEALAND ARCHAEOLOGICAL APPROACHES

The sheer size and unusual form of the Ōtatara-Hikurangi (Fig. 3) have long attracted the interest of ethnographers and archaeologists including Hamilton (1974), Best (1975), Groube (1964), Fox (1980, 1982), Jones (1994) and Allen (1994). The sprawling site occupies a main ridge, which rises to 142 m above sea level, and a number of side-ridges. It contains platforms and many small terraces and pits but has limited evidence of defensive earthworks. The site is too large and sprawling to be enclosed by a continuous perimeter and definite evidence of defences is limited to four particular places. However, scarps restrict access along the ridges in some places and may once have played a significant defensive role. Nevertheless, the site appears to be lightly defended compared with many other pā. The absence of large-scale defensive earthworks, commensurate with the extent of the pā and the population that the number of terraces and pits imply, has long puzzled archaeologists (Fox 1980: 235). This has made Ōtatara-Hikurangi a key example in arguments about the development of fortifications, not just in Hawke's Bay, but in New Zealand as a whole.

Fox (1980: 235) estimated the combined areas of Ōtatara-Hikurangi at about 30 ha, a figure accepted by Allen (1994: 144). Because of its amorphous character, however, the extent of the site is not easy to measure. Fox treats the near-continuous occurrence of terraces and pits as defining the site and we have done likewise, but this still requires a judgement about where to draw the lines. The area of Ōtatara-Hikurangi, as calculated from Figure 5, is about 20.5 ha. Of this, Ōtatara makes up about 1.6 ha. These figures still include significant areas of steep slopes within the site boundaries, so the actual occupied area is less. Fox's plan also depicts two detached clusters of pits on lower ridges. These are recorded separately in the Site Recording Scheme as V21/217 and V21/218 but in terms of settlement and defence they, and another group of pits recorded as V21/42, may be an integral part of the Ōtatara-Hikurangi story. These peripheral areas have not been included in our calculation of the area.

Based on the surface evidence Allen (1994: 302) estimated that there were 200 pits on the site. Figure 5 shows 234, with a further 28 within V21/217 and V21/218. The available plans each show different numbers of pits, but 234 is of the right order. Most of the known storage capacity in this part of Hawke's Bay occurs in just six sites, of which Ōtatara-Hikurangi is the largest. Allen's estimate of the population of Ōtatara-Hikurangi based on pit storage was more than 450 people which, whatever its methodological weaknesses, may be a useful guide.

It has long been suspected by archaeologists that much of the form of Ōtatara-Hikurangi may be early, and this has to some extent been supported by oral traditions and whakapapa, with an apparent mid-sixteenth century date for events involving Taraia. In *The Pa Maori*, Best (1975: 295) used Ōtatara-Hikurangi as an example of an early form of pā that were provided with only simple forms of defence. The terraces, he argued, "in no way lend themselves to defence" (Best 1975: 297). If it was a fortified site, Best (1975: 295) argued, then the defences must have consisted of palisades. Both Best (1975: 297) and Golson (1957: 78) recognised that the irregular disposition of many small terraces at sites like Ōtatara-Hikurangi made it very different from other terraced pā with their orderly tier above tier of terraces and integration with complex defensive arrangements. Golson (1957: 78) and Groube (1964: 147) have expressed reservations about hypothetical models of pā development where simple defences are early and complex are late. Yet, like Best, Groube (1964: 264) has suggested the possibility that Ōtatara-Hikurangi was an early form of pā defended by scarps and palisades. The idea of a progression from simple to complex has remained influential as a model of pā development because of the absence of good empirical evidence.

A key issue for interpretation concerns discontinuous terracing and interrupted ridge scarps and how they were used for both habitation and defence. Discontinuous terraces have been described as "short terraces at different levels presenting a series of unconnected scarps" (Groube 1964:191). Interrupted ridge scarps result where short terraces, more or less irregular, rise in a series of steps up a ridge end or similar topographical position (Groube 1964: 191). The scarps were not continuous around the wider hill slope, nor linked to transverse ditches to form a perimeter. Golson (1957: 78) argued that terraces generally "may be more realistically explained as a device to provide flat ground for construction than as necessarily a part of the defensive structure as such". Groube (1964: 187–193) has, however, emphasised that scarps do present an obstacle to an attacker and thus can also be a defensive feature (Fig. 2)

More recently, Ōtatara-Hikurangi has been described and interpreted by Fox (1980) and by Allen (1994). Fox thought the early defences were the scarps on the main central platforms, but she also identified ditch-and-bank defences at three other points. She regarded as plausible the tradition concerning the improvised defence of Ōtatara subsequent to the fall of Hikurangi. On the basis of a detailed consideration of environment, nearest neighbour analysis, and other data, Allen (1994: 144) suggests that Ōtatara-Hikurangi was an important population centre of a large grouping which he terms the Ruarahanga polity (Fig. 1). There is, he argues, "little doubt" that this area was the "locus of the most integrated and populous political entity in prehistoric Hawke's Bay." Ōtatara-Hikurangi is of "a different order of magnitude in comparison with other sites in the region" and is only one of a number of pā in a densely populated area. This has implications for any discussion of defence of Ōtatara-Hikurangi. Up to a point, a large polity would increase security for all its constituent members by providing a measure of deterrence against

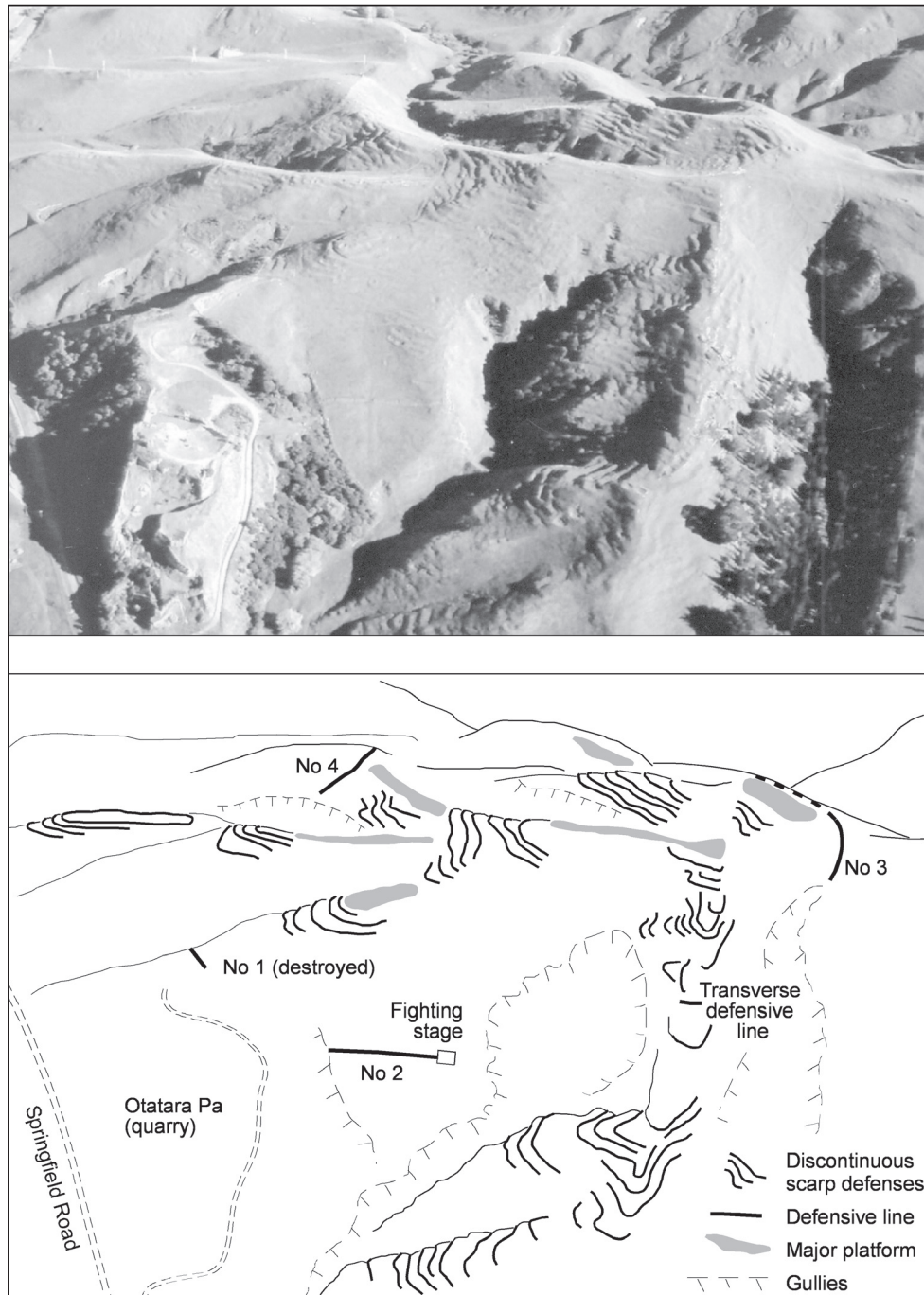


Figure 2: (a) Oblique aerial photograph of Ōtatara-Hikurangi 10 May 1995. (b) Interpretative drawing showing meaning and suggested lines of Groube's (1964) discontinuous scarp defences, ditch and bank defences and configuration of the steep-sided valleys that create part of the perimeter of Ōtatara-Hikurangi.

attack. In the event of an incursion from outside, the inhabitants of individual settlements would have been assured of the support of their neighbours. This would have reduced the need for fixed defences.

Ōtatara-Hikurangi as seen today is a palimpsest with evidence that may reflect many changes over time. In principle, the surface evidence now visible need bear little relationship to the layout in earlier periods and the defences may have changed over time. Yet most observers do make the assumption that the present evidence does reflect early configurations and that the overall pattern has not changed dramatically over time. The reason for this is that the form of the pā is strongly constrained by topography and the nature of the substrate. First and foremost, the overall configuration is determined by the form of the main and side ridges. The ridges rise by way of a natural series of steep changes of slope to level areas. The latter are the most suitable places for cutting platforms and terraces. The size, form, and overall layout of the terraces are largely a response to the geomorphology and the substrate. The terrace treads are generally long and narrow, reflecting the axis of the ridge and the steepness of the slopes. The steep discontinuous scarps produced are useful for defensive purposes.

Such stratigraphy as is exposed in sections across the site suggests only minor phases of rebuilding. There is very little evidence of substantial re-building of terraces or defences, and over much of the site the substrate is not particularly amenable to this. Unlike pā in other areas, there has been no massive levelling and re-modelling of the ridges; rather the occupation has been fitted around the existing form of the ridges in apparently ad hoc fashion. Terraces have been spread out over the site, creating the unusually large area of occupation. Our argument is that, in spite of apparent lack of an overall defensive design, the scarps do form barriers to movement and this could have been exploited to provide an effective defence, especially if the scarps were supplemented by palisades. Fixed defences are important but more significant are the actions of the defenders.

It is often asserted that Ōtatara-Hikurangi would require a considerable number of men to defend it because of the lengthy perimeter. How do you defend a sprawling site spread over hundreds of metres of ridgeline? It requires an active defence by its inhabitants, directed, in particular, at retaining control of the high ground and strongly resisting any attempts by attackers to establish a foothold on the ridgelines. Given an ability to move men quickly to the point of attack, one way of handling the defence is to use a thin screen to watch for enemy movements and keep a group in reserve in a central position to respond to the point of attack. Attackers have the difficulty of fighting uphill and so would need to achieve a local preponderance of force to overcome this disadvantage. If the attackers do establish a foothold on the lower part of a ridge then the defenders can retreat up the ridge, establish an improvised defensive line at an easily defended point, and continue to deny the enemy the high ground. Not everything is of equal importance, so not everything has to be defended. The platforms are usually on sections of the ridge that are naturally more difficult of access and so would make good places to rally the defence. Any scarp or structure that obstructs, diverts, or slows down the attackers as they move up the ridge is an advantage to the defence. The topography tends to present significant barriers, which channel attackers on to the sides of the ridges where their flanks are exposed to attack. Forced to fight at a disadvantage, they have little chance of making enough progress to turn defensive lines. Attackers are forced to make disadvantageous frontal assaults to gain the higher ground and so run the risk of heavy losses. Prepared defensive lines are thus only one element in the defensive mix.

If the position becomes too difficult, then the defenders may have the option of abandoning Hikurangi and retreating to a citadel, in this case Ōtatara. This is what is

reported in oral tradition to have occurred when defences were first constructed there in the mid sixteenth century—thereby retaining control of the adjoining ridge for as long as was needed to evacuate Hikurangi. Perhaps one of the reasons for the defensive line (Fox defensive line 2) in the valley is to deny easy access up the Hamilton slope between Ōtatara and Hikurangi.

No defence is foolproof. This approach requires good communication among the defenders and a quick response to threats as they develop. This could, of course, never be guaranteed in any crisis.

Ōtatara has been the subject of two previous small excavations on surviving terraces. In 1990, Mary Jeal (n.d.) excavated on two terraces low on the side of the spur and obtained a radiocarbon date (NZA1351). More recently, we (Jones and Walton 1997) excavated an outer terrace below the original platform area and revealed a substantial fence or palisade on the outer edge, to be described in more detail below. A radiocarbon date (Wk5467) was obtained. There have been no excavations on Hikurangi, although a water pipe installed in 1991 revealed partial traces of features. Two shell samples, obtained by Pam Bain, have been radiocarbon dated (Wk2273, Wk2274) (Pishief 1997: 71). The four radiocarbon dates obtained to date provide valuable, but limited, evidence on the age of different parts of the site.

LANDSCAPE SETTING (Fig. 1)

Ōtatara-Hikurangi lies on a commanding position above the Heretaunga Plains and is half encircled by the Tūtaekuri River. The Heretaunga Plains are over 34,500 ha in area and were formed by the deposition of alluvium by the Tūtaekuri, Ngaruroro, and Tukituki Rivers. The Tūtaekuri River formerly turned towards the north just east of Ōtatara-Hikurangi and followed the base of the foothills, eventually flowing into the Ahuriri Lagoon. Large-scale drainage works undertaken since the nineteenth century and the uplift associated with the 1931 earthquake have transformed the Heretaunga Plains and Ahuriri Lagoon. Today, the Tūtaekuri flows directly south from the Ōtatara-Hikurangi vicinity to join the Ngaruroro, following the dendritic course of small streams, which for most of the duration of human settlement, drained the Tūtaekuri fan in a southerly and easterly direction. The Waiohiki marae is located on this fan. Cropping, fruit growing, vineyards, and residential subdivisions now occupy areas that were once predominantly lagoon floor, river flats, or wetland.

DESCRIPTION OF THE ŌTATARA-HIKURANGI COMPLEX

The following description is based on aerial photographs and mapping by Vanessa Tanner on a Wild mirror stereoscope. The mapping method is described in Jones and Tanner (2002: 12–13). We have also checked the results against the recent archaeological plans produced by Geometria using a total station. These plans are highly precise and accurate, but the detail of the contours and features do not significantly alter our interpretation.

The different parts of the site are named in the site outline in Figure 3. This follows Fox's (1980) names where they exist and in part the nomenclature in Pishief (1997: 57). Figure 3 should be considered in conjunction with the detailed archaeological plans of Ōtatara (Fig. 4) and Hikurangi (Fig. 5).

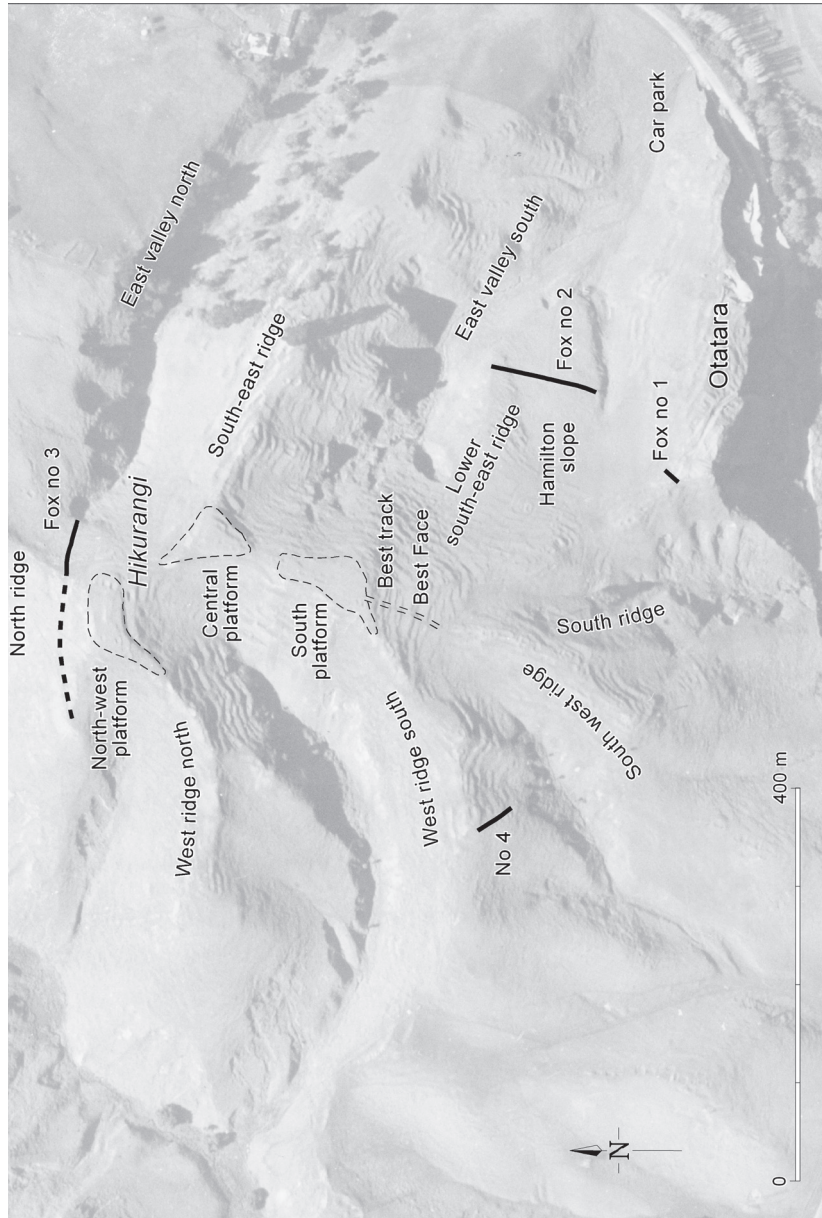


Figure 3: Names of parts of Ōtatara-Hikurangi, in part following Pishief (1997: 57).

ŌTATARA (Fig. 4)

Ōtatara is the smaller pā now largely destroyed by quarrying, on the south-east corner of the reserve. This appears to be the pā referred to as the 'lower pā' (as distinct from Hikurangi) in traditional accounts (McEwen 1986: 42). The following description is based on the plan (Fig. 4a) drawn using an overlay and stereoscope at a scale of approximately 1:6 000 of a stereo pair of prints of R.N.Z.A.F aerial photographs (S.N. 18/ J10, J11, 3 February 1936) (Fig. 4b). Relief showed poorly in all stereo pairs formed from the RNZAF photographs.

From the north, the pā was approached by a shallow saddle via 70 m of ridge to a transverse double bank with interior ditch (Fox's defensive line 1), 18 m wide and 9 m from outer scarp to the top of the inner bank. The general rise in the slope shows that the defences were against attack from this northern saddle. The ridge from the saddle was featureless on its south-western side but there are several pits on its crest. On the north-east face towards the saddle was a terrace, wedge-shaped in plan, opening out into a broad saddle. Below that again was a long, lateral scarp and terrace (about 3 m wide) apparently of defensive intent, which continued through a rise, and a similar second scarp and terrace, slightly wider, terminating at the north-eastern end of the double ditch and bank.

Within the defences the ridge rose abruptly about 5 m in height to the central platform, which was about 33 m long and 22 m wide. The platform had a house terrace to the north-east and descended to the south-west to a large scooped terrace (possible an enhanced slump) above a steep slope. Any features which may have been on this slope had been destroyed by the earthquake-induced slump of 1931. There were also pits or house floors on the eastern end of the platform. The northern side of the platform was a shallow terrace and further north again, the platform dropped away by a steep, high scarp to a lateral terrace about 4.5 m wide which ran the full length of the platform.

Below the tihi (top platform), the ridge trended down slightly north of east for some 60 m and then curved around, on the level, to the head of a steep slope, which led down to what was the river-cut face on the south-east. This ridge line fell to the south into an open basin with a few pits and terraces. On its crest were a few pits and on the north a series of terraces 3–4 m wide and up to 30 m long spread out along the northern slope following the contour.

The east or north-east face of the natural return in the ridge stepped down about 15 m through a series of four defensive transverse scarps and terraces, each about 25 m long, some of which carried around to the northern face. The lowest of these terraces was 15 m x 20 m and triangular in plan. This was evidently on the main defensive line to the east. Below it the ridge narrowed, falling gently over a horizontal distance of some 120 m to the level of the alluvial plain. A few terraces commenced on the upper part, carried around to the north, and were the site of our 1997 excavation (JW on Fig. 4a).

These ridge features are separated by the moderately steep slope, which descends some 40 m (measured vertically) to a group of terraces above the narrow gully which commences on the south side of the Hamilton slope and carries down to the intersection with east valley south. Some of these terraces survived the quarrying; they cover an area of 110 m x 20 m at the very foot of the slope. One was the site of the excavation by Jeal (n.d.) (JT on Fig. 4a). By the time of the RNZAF photograph in 1936, they appear to have suffered a slump towards the eastern end, which cut through three tiers of terraces. There were large pits on the eastern most group of terraces. To the west, the terraces are bounded by Fox's defensive line 2, which is still extant north of the southern gully feeding into east valley south. The southern extension runs for some 24 m of the gully

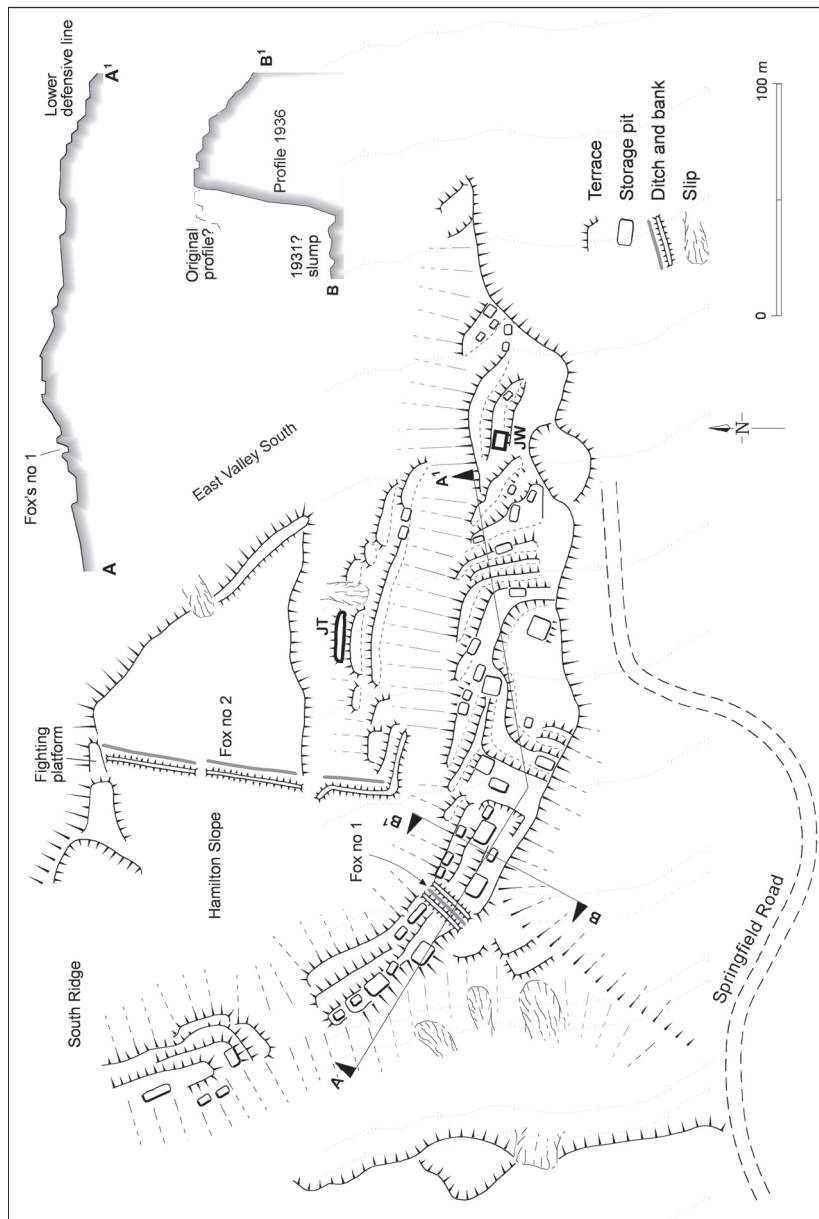


Figure 4a: Plan and cross sections by Jones of Ōtatarā (V21/168) from RNZAF SN 18/J10, 11, 1936. Terrace excavated by Mary Jeal noted as JT; Jones and Walton excavation noted as JW.

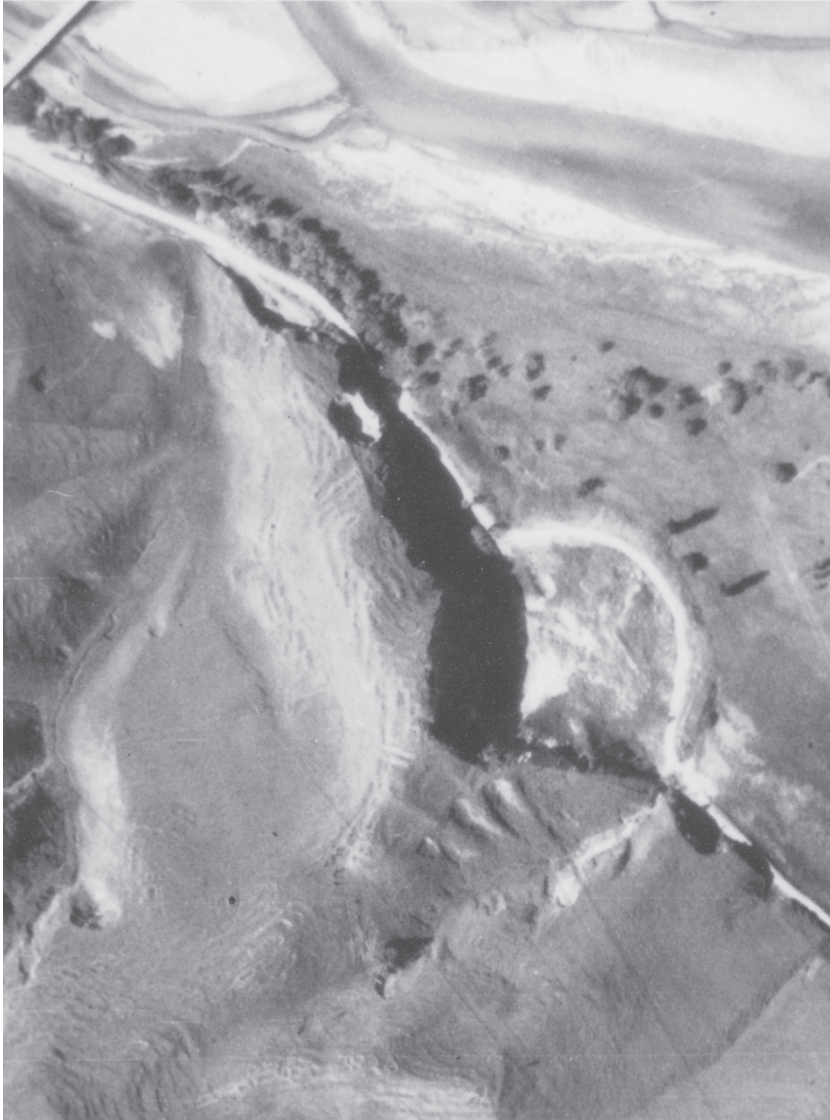


Figure 4b: Detail of vertical aerial photograph of Ōtatara-Hikurangi in 1936 (RNZAF S.N. 18/J11, 1936).

to the toe of the hill rising up to the eastern end of the tihi of Ōtatara (the quarried pā) where it makes a return to the east along the toe for a distance of about 15 m. The nature of this return could be read to suggest that the ditch and bank does not have a defensive purpose. However, even although it lies at the foot of a moderately steep slope, it must arguably have had a defensive purpose, which integrated the defence of Hikurangi with that of the stronghold of Ōtatara.

HIKURANGI (Fig. 5)

The immediate vicinity of the platforms on Hikurangi has no apparent ditch-and-bank defences, but these platforms all have pronounced discontinuous scarping on the easiest lines of approach. The platforms are spaced along the central ridge line over 220 m, at altitudes between 125 m and 140 m above sea level. The terraced ridges and faces radiate out to the west, south-east and south of the platforms. Figure 3 illustrates the names of each part.

The terraces on the lower eastern slopes of both Ōtatara and Hikurangi, including those on the south-facing slope of the west ridge south (see also Figs 2, 3), are a neglected but interesting part of the discontinuous layout of features across the ridges and slopes of the complex. In many places they are contiguous, at their lower edge, with the uphill relief break of the steep-sided gullies, which have been working their way back into the loess of the hill slopes. The lower terraces were sheltered and sunny, with water readily available from springs, and were protected by the pā on the slopes above.

The following description is based on aerial photograph stereo pairs RN 1702/30, 31, 16 May 1949 (see Jones 1994: 158) and on purpose-flown aerial photographs SN 9654/A1-3 29 April 1997. Where terraces are described they are probably for habitation unless the context makes it clear that they are narrow and lie at the foot of defensive scarps. The plan should be viewed as an interpretation and refinement of a very complex set of ground features. A comparison of the features depicted in Figure 4a with the corresponding features in Figure 5 (both drawn from the same 1936 photographs) is instructive on this point.

North-west platform

At about 140 m above sea level, this is the highest of the platforms and has a plan area of 65 m x 33 m. There is a slight scarp falling to the south and east (regarded as part of the platform) and then a steep, high scarp, probably defensive, to a long lower terrace 50 m long and 5 m wide. To the east is a line of two or three raised-rim pits on a lower terrace and a descent through a few poorly defined terraces to the head of the gully south of the north ridge. There is a possible defensive scarp on the west of the platform and a mild slope along most of the platform's northern edge, with no obvious scarping or terracing. A distinct rectangular-plan terrace on the northern side of the platform may be a house floor. The platform descends to the south-east by a narrow ridge flanked by well-defined terraces on the west to a narrow featureless saddle which rises again to the south-east to the central or main platform.

North ridge

The north ridge is narrow, with levelling of its crest. It joins, through a large natural more-or-less level area, on to the area owned by the Eastern Institute of Technology. The near-level area extends around the head of east valley north where it is cut by the

Fox defensive line 3. There are a few isolated rectangular storage pits at the head of the north ridge. Further down the north ridge towards the reserve boundary are large natural terraces, possibly enhanced by human hands.

Across the north ridge, commencing 20 m from the northern side of the north-west platform is the Fox defensive line 3. It runs due east for about 50 m to the advancing erosion face (of long standing) at the head of the gully south of the Institute ridge. It is less clear and well defined at its crest. The ditch is on the north side. The width from bank to outer side of ditch is about 3.2 m and the total height from the base of the ditch to the top of the bank is about 2 m, decreasing as one approaches the steeper slope leading to the crest of the ridge. On the aerial photograph taken in late summer (April 1997), there is a line of surface grass parch marks just below the north-west edge of the north-west platform, which is in line with, and appears to connect to, the Fox defensive line 3. This makes a logical and long defensive barrier (some 100 m long) on the vulnerable northern approaches to the main area of Hikurangi. On closer ground inspection, it can be determined that the western extension, down slope from the crest of the ridge and along the line of the ditch and bank, is in the form of a narrow terrace, more or less on an even contour, with an uphill scarp, followed by a section of steep slope with no distinguishable features and then a final scarp and terrace just below the western extremity of the north-west platform (EX on Fig. 5).

West ridge north

West ridge north runs south-west from the platform and has a flight of closely spaced terraces on its south side, covering an area of 80 m x 50 m in plan and stepping down to the advancing erosion face at the head of the gully. There are further terraces at the lower end of the ridge, worked into the northern end 200 m up from the platform. There is some possible defensive scarping at this western end.

Central platform

This platform is triangular in plan, presenting high defensive scarps to the north-east (30 m long), the west (45 m long), and the south-east (45 m long). To the south-east the terrace below the defensive scarp falls steeply to the head of the gully south of south-east ridge. There are indistinct pits on the west side of the platform. The defensive scarp on the west falls some 8–10 m to a long terrace 65 m x 5 m in plan, which extends along to the south-west to form the western defensive scarp of the south platform. (This platform is just above the line of the informal road.)

South-east ridge

The south-east ridge adjoins the central platform through two defensive scarps descending from the platform to the head of the ridge by some 25 m. The ridge is 340 m long, falling to about 70 m above sea level at its eastern extremity, where it directly overlooks the Tūtaekuri flats. Outside the reserve boundary, further terraces were probably cultivated and destroyed some time before the 1949 aerial photographic record, since the change to bare ground seems abrupt. The ridge is extensively terraced on the south side and to a lesser extent on the north. On the north the terraces take the form of irregular, but more or less level, long terraces (up to 80 m long), 3–5 m wide, running up to 50 m (horizontal distance) down the slope towards, but not into, east valley north. These form a wedge

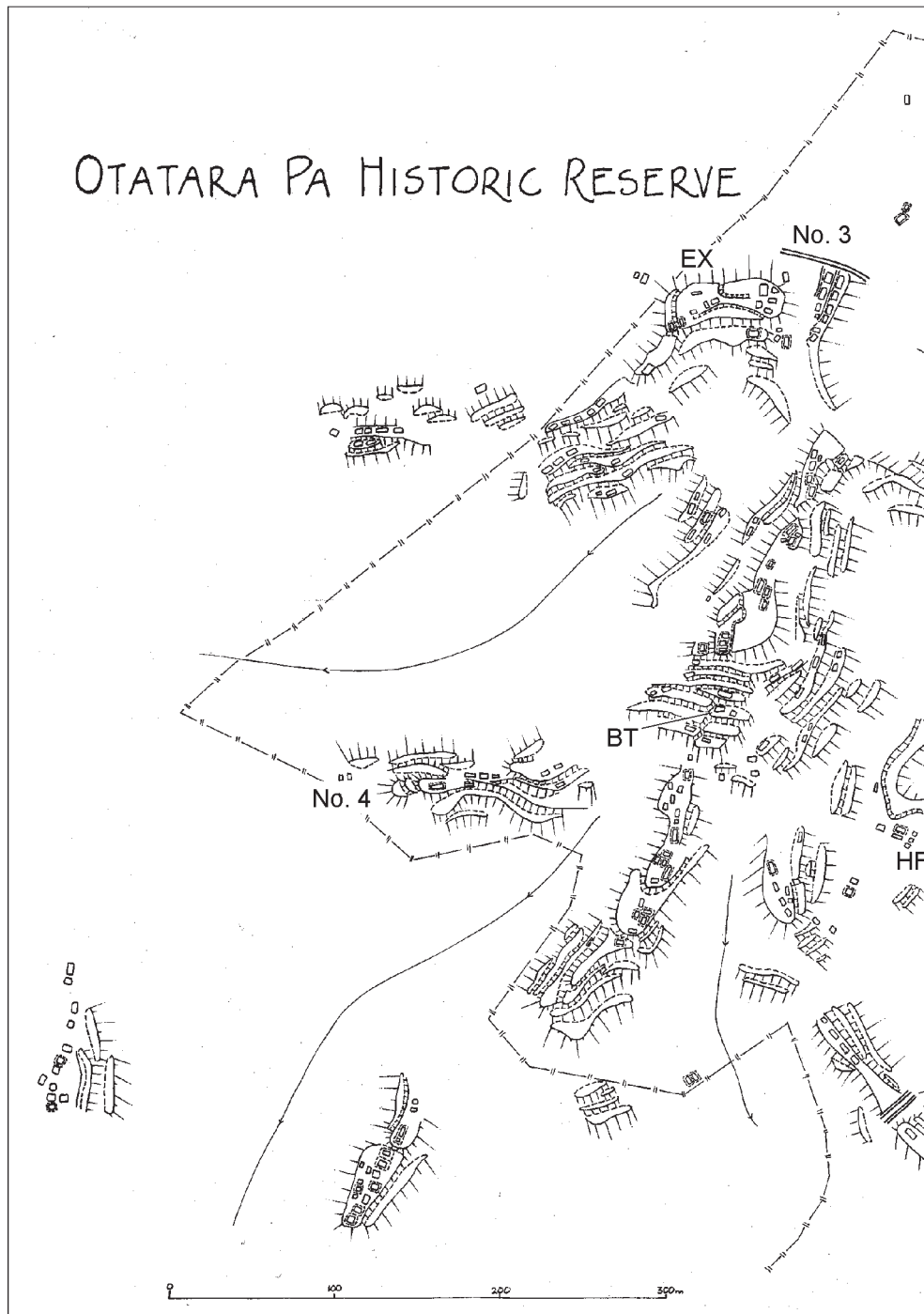
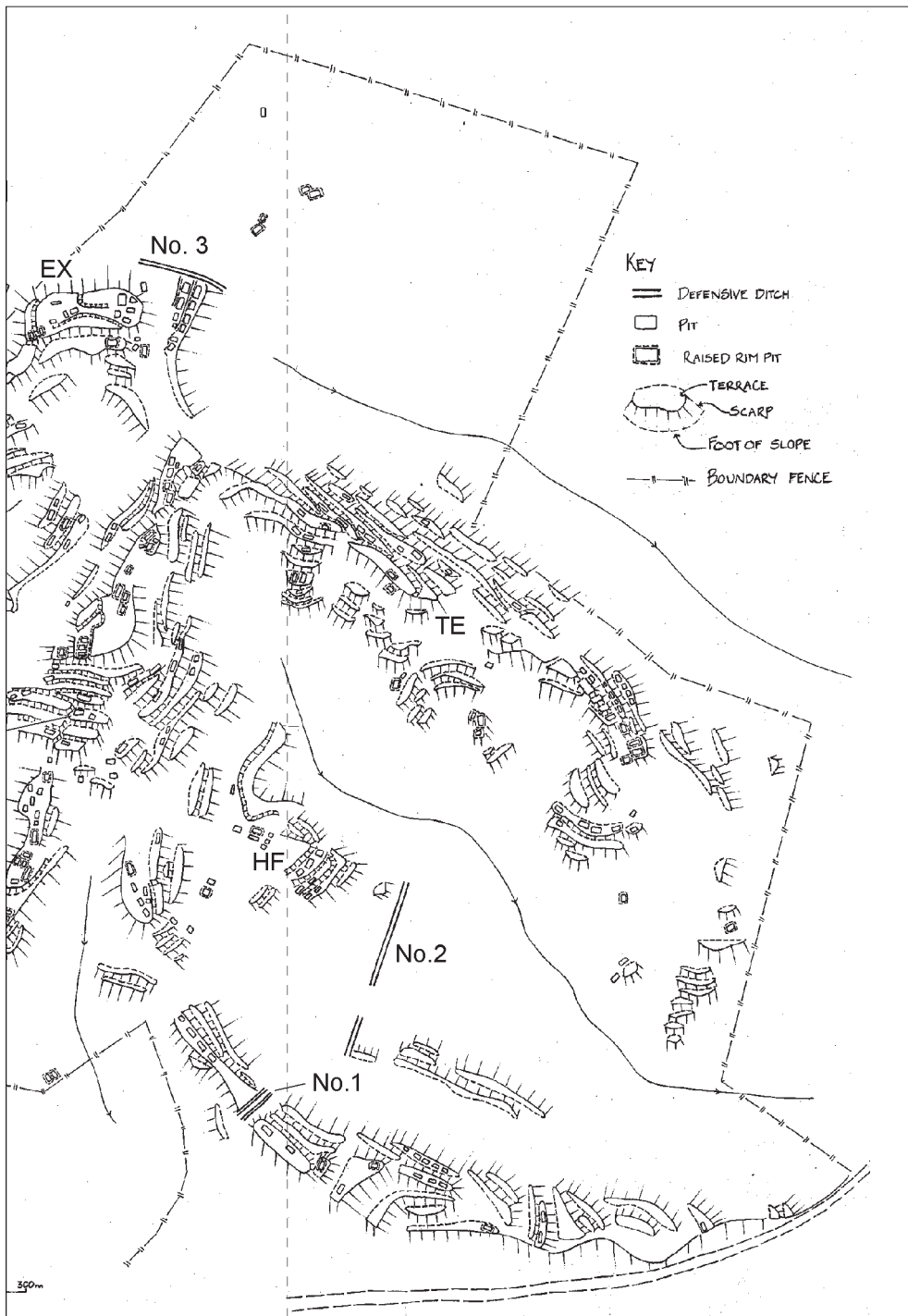


Figure 5: Plan of Hikurangi by Tanner from custom-flown aerial photographs S.N. 9654 R.N. A/1-4, 29.4.1991. Otatara is based on RNZAF SN 18/J10, 11, 1936. The suggested track on the Best face (BT), the house floors at the head of the Hamilton slope (HF), the transverse defence position on east ridge (TE), the no. 3 ditch and bank extension (EX) and the no. 4 ditch and bank are noted.



appearance in the plan view as they trend out to the north and west from the descending ridge crest. A few pits, rectangular and up to 8 m x 4 m in plan, lie on the terraces. A similar pattern applies on the south side but more especially within 15–20 m horizontal distance of the crest. A number of small blunt ridge ends form the lower slopes of the ridge above the actively eroding gully on the south side. They are extensively and deeply scarped and terraced, the scarps possibly being defensive; one may have a ditch at its base (TE on Fig. 5).

South platform and Best face

This platform is a large unit about 80 m long and 50 m wide above its southern or Best face. The low-relief central ridge line has a few indistinct pits. There is probable defensive scarping to the south above the steep Best face, continuing around the head of west ridge south and on to the north-west facing side, joining in an irregular fashion with the terrace and scarp described above on the west of the central platform.

To the south, on the Best face and the eastern face, is an extensive area (110 m x 60 m) with many terraces. These are generally small, especially on the steep eastern face, but are up to 14 m x 10 m in plan on the Best face. A notable feature is the discontinuity across the slope in the plan of the terraces on either side of the edge of the south platform down the centre of the Best face to where the heads of the west ridge south and south-west ridge begin. This suggests that this line may be an access way or track (BT on Fig. 5) of some antiquity through the pā. If it is a track, it is a highly significant element, since it demonstrates the integration of settlement between the lower ridges/platforms with discontinuous scarp defences (e.g. south-west and west ridge south) and the south and central platforms. It suggests that ridge lines (usually the easiest route for a track) may have been relatively difficult to negotiate because they were packed with tiers of defences and other obstructions such as pits. Although it was no doubt in everyday use, such a track would also have formed part of the quickest and most direct route from the south and central platforms of Hikurangi down through the south ridge and on to Ōtatara—a point of some significance for defence or retreat from these platforms.

West ridge south

The west ridge south descends to the south-west from the south-western corner of the south platform. It has a central flat area about 20 m x 50 m in plan at about the level of the corresponding level area of the south ridge, which is about 70 m to the east. Below this to the north and south are several tiers of more or less continuous terracing, with especially steep high scarps to the south. A further 80 m down the ridge there is an area of strong, possibly defensive scarping. The ridge crest here is marked by lines of rectangular pits, the largest of which is 8 m x 4 m and others about 6 m x 2 m in plan.

A possible defensive scarp or bank (which we have labelled ‘defensive line 4’) about 15 m long lies at a diagonal to the contour and extends south-west down the slope from the western extremity of the defended area (see Jones 1994: 159, bottom left). There are other examples on the south-west ridge (Jones 1994: 159, bottom right). Line 4 appears to have assisted in preventing an outflanking approach up that side of the valley between west ridge south and the south-west ridge.

South-west ridge

The south-west ridge is in two more or less level segments. The upper one is about 100 m x 13 m in plan and has a large concentration of raised-rim pits on its crest and on small terraces on its southern flank above a broad terrace about 30 m x 8 m in plan. There are about 14 distinct pits, some raised-rim, the largest of which are about 8 m long. The side faces of this upper segment are lacking terraces, although a few return on the level around the south side. The lower unit is about 60 m long with a featureless central ridge line flanked to the north-west and the south-west by tiered terraces which extend about 25 m to the north-west, less to the south. The bottom terraces are wider and have higher scarps than the rest while the lowest north-western terrace runs more or less level and continuously around to the gully which cuts off the lowest terraces on the south side of west ridge south. There are further pits to the south-east of the southern part of the lower unit.

South ridge

The south ridge extends south from the base of the Best (south) face with a level plan area of about 50 m x 12 m. Pits lie on the level area and on terraces on the crest of the ridge which turns again to run across the east-facing slope above the Hamilton slope and the lower south-east ridge.

Lower south-east ridge

The lower south-east ridge forms the northern side of the Hamilton slope. On the north is a steep slope to the east valley south (south of the south-east ridge). The lower eastern end is relatively featureless until the junction with the north end of Fox defensive line 2, where the ridge end has been formed into a terrace about 8 m square in plan with the back scarp more or less in line with the ditch and bank (Fox 1980: 236). It is terraced on its upper south-east facing slopes. Above this is a broad naturally level area with some large pits. This area then rises to the terraces of the east face of the south platform and the south ridge.

Hamilton slope

The Hamilton slope provides one broad approach to the south and west of Hikurangi and for this reason the earthworks there (Fox defensive line 2) are regarded as defensive. On the Hamilton slope proper (between east valley south and the gully north of Ōtatara) the ditch and bank is 83 m long and 4 m from counter scarp to the top of the bank. It is pierced more or less at the centre by what may be an original entranceway. The area of the slope is featureless, except at its uphill (western) head, described further below.

The finishing of the northern end of Fox defensive line 2 above east valley south requires detailed description. The ditch and bank at this end is simply a steep scarp about 2 m tall backed by a narrow terrace. There may be a ditch on the downhill side, but if so, it has been infilled, probably by natural processes. As the ditch and bank approaches the fall to east valley south, the scarp is absorbed into a rise in the ground in the form of a terrace about 8 m square in plan with a steep scarp 2–3 m high on the east side. It falls to the north into the steep-sided east valley south (for details see Fig. 4a). Fox (1980: 236) sees this as the base of a fighting platform. We also believe, based on its form and placement, that it served such a function. It could have served the same functions by being palisaded to

form a strong enclosure on the elevated earthwork base rather than the base simply being there to hold the uprights of a wooden platform.

Overall, the detailed function of this ditch and bank and the probable fighting platform requires archaeological investigation to show whether there was palisading and whether there was a ditch on both sides of the bank. Its defensive function is unambiguous, but what exactly did it defend? The defensive plan here is clearly to defend lines of approach—in this case up the flat floor of the valley to the south of east valley south. The problem is that advancing here is not a good idea because it would have been flanked on one side by Ōtatara and on the other by the south-east ridge and the steep-sided east valley south. Attackers would have been heading into a dead end—which is of course the point, defensively speaking.

At the uphill (upper, western) end of the Hamilton slope, there are several large house terraces with rear drains and large raised-rim pits (see HF on Fig. 5). The size suggests residences of higher status people or communal structures. The Fox defensive line 2 may, therefore, have been not only a defence but also a ceremonial entranceway to a complex of important houses at the head of the slope. However, its position on the slope, well away from these house floors, also suggests that in some way its defensive intent was linked to the overall defences of Ōtatara-Hikurangi. For example, in the event of attack, occupants of the large house terraces could have moved easily across the slope to Ōtatara while attackers were held up at the defensive line 2. It is commonly thought that prestige houses such as these should be located on high points rather than at the head of a slope overlooked by the heights above. As we have already observed, it is certain that Ōtatara-Hikurangi was occupied in many different configurations at different times. These house floors may have been built at a time of peace or lesser population, or when the heights were under a restriction (*tapu*) for settlement, or a combination of these.

EXCAVATION OF TERRACE EDGES ON ŌTATARA PĀ

Ōtatara was substantially quarried away long ago. A surviving terrace on the lower north-east flank of the pā was investigated in 1990 by Jeal (n.d.) (JT on Fig. 4a). The quarrying left a number of steep dangerous faces up to 12 m high. The 1997 excavation (Jones and Walton 1997) was designed to investigate part of a remnant terrace and midden exposed in section at the head of one of these faces (JW on Fig. 4a). The face was collapsing and needed to be shaped back to a more stable angle of repose, necessitating the removal of the head of the slope. Midden from the slumping face was scattered over its foot.

The area excavated was at the base of a long lateral terrace on the northern flanks some distance below the main central platform of the pā. The terraces are narrow with steep scarps below them, potentially forming part of the defensive line. No ditches were apparent on this eastern end of the pā.

Two squares each 1 m x 1 m were laid out (Fig. 6). The squares were later extended lengthways (one to 1.25 m and the other to 1.5 m), but the baulk between was retained. The total area excavated was 2.75 square metres.

Stratigraphy

Beneath the topsoil, layer 1 was composed of blackened topsoil with many oven stones and much charcoal and shell, the last usually in lenses. Layer 2, the ‘basal’ yellow, consisted of lenses of re-deposited yellow subsoil, occasionally with large lumps of hard subsoil, and with patches of blackened soil in places. The interface between the two layers was

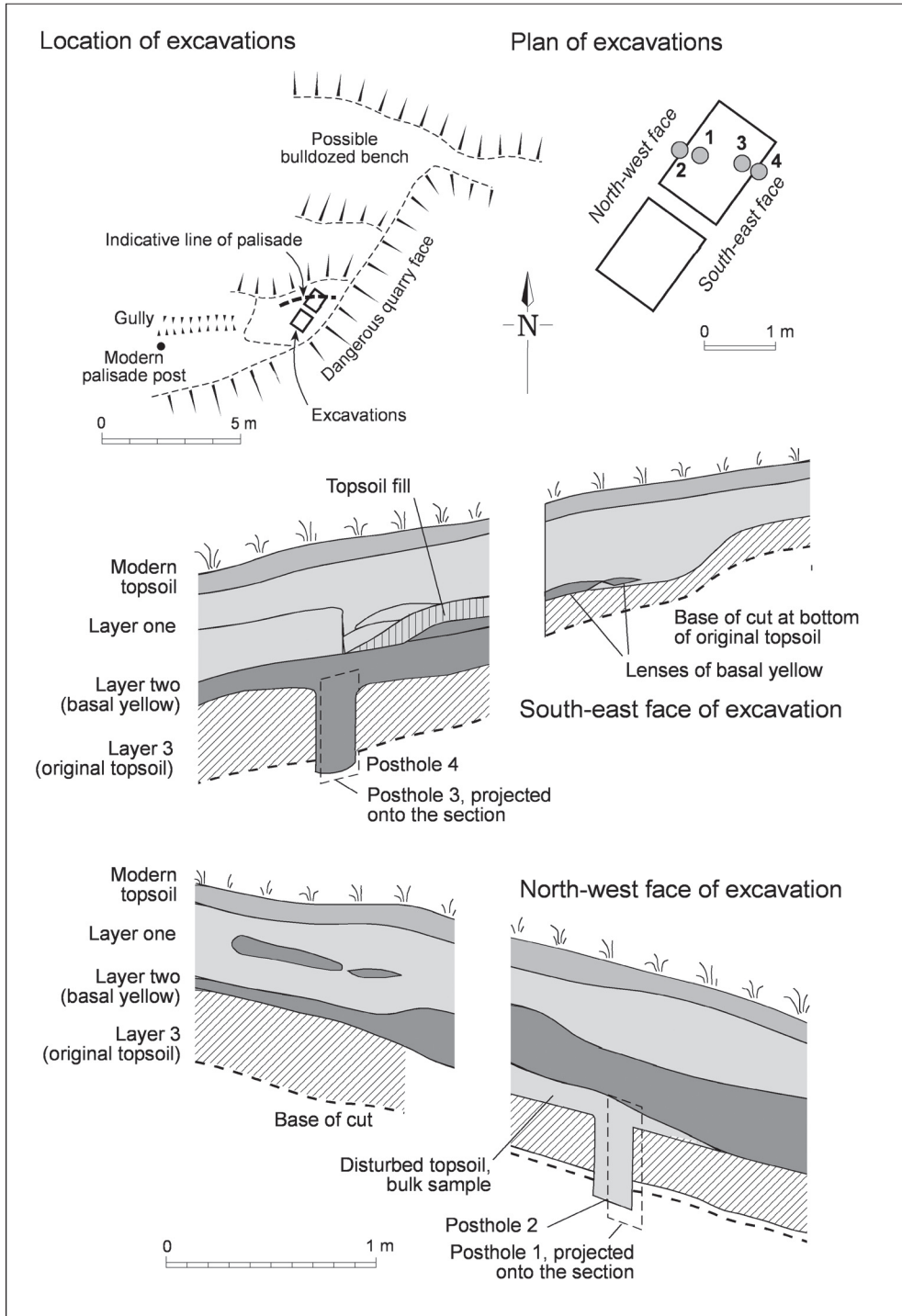


Figure 6: Plan and sections of the 1997 excavation squares on Ōtatara. For location see Figure 4a.

not sharp in either square, and the two may be regarded as the outcome of one event involving re-deposition of materials from nearby, presumably upslope, as the fill became thinner towards the east. Beneath layer 2 was layer 3, the modified original topsoil. There was a sharp interface between layer 2 and 3 in most places. Layer 3 contained rare or sparse charcoal and shell and quickly graded down to undisturbed topsoil. The subsoil is a yellow silt loam with a lower horizon ashy grey in colour.

The stratigraphy indicates two sets of events. The earlier event is associated with cut-and-fill terracing. The quarry scarp, 1 m to the south-east of the squares, shows the scale of this event better than the excavated squares. The change in the natural slope must have been relatively minor at this stage as the original topsoil survives in the excavated area. Postholes dug from the surface of layer 3 are associated with this earlier occupation. The later event is associated with the deposition in quick succession of layers 1 and 2. As the two layers together represent a 60 cm-thick deposit it is likely that this was a deliberate effort to re-shape the terrace.

Plan features

In the excavation sections, the layer 3 surface has an apparent slope of 15–18°. The survival of the original topsoil, albeit modified, suggests that the original slope was not much steeper than this and that the terrace was formed on a relatively gentle slope. There were noticeable changes in the level of the layer 3 modified topsoil surface in both recorded sections (Fig. 6). In the south-east face this change is obscured by the baulk. The uneven surface is best interpreted as due to cutting and scooping of fill from the original slope in the course of forming a terrace.

A void was discovered while cleaning down the layer 3 surface in the north-eastern of the two squares. On excavation this proved to be a posthole (no. 1), descending 21 cm below the layer 3 surface and 25 cm in diameter. Its bottom was filled with the rotted post butt and some charcoal. Posthole 2 was found in the section. It was 10 cm deep and 20 cm in diameter. On extension of the baulk area, 2 further paired postholes were recovered to the south-east. Posthole 3 was 15 cm deep and 20 cm in diameter, filled with packed topsoil. Posthole 4 was 5 cm deep (into the subsoil) and 20 cm in diameter. It also was a void with a rotted post butt at the bottom. It is assumed that all postholes (as was made plain by postholes 1 and 2) had been dug from the level of the top of the layer 3. They therefore had no more than 50 cm depth of the original soil of the terrace to support a fairly large post. Because of this relatively limited depth, the posts were closely spaced. The pairing of the posts and the packed fill of posthole 3 indicate a phase of rebuilding. No features were found in the small area excavated behind the palisades.

Layers 1 and 2 are different material deposited in quick succession. The source of this material is likely to be close at hand: either the same terrace or the terrace above. Subsoil was deposited first, followed by materials containing midden and rake-out. Layer 2 sloped down from north-east to south-west but the layer 1 surface has an apparent slope about 10°. By the time this material was deposited only the butts of the palisades were present. If they had existed to a greater height then the postholes should have been evident within layer 2. Instead, the tops of the voids were sealed by layer 2 material. Two explanations are possible: the layers represent a deliberate attempt to re-shape the terrace or they are an accidental by-product of work close by. No features had been found on the layer 1 surface.

Midden

Both layers 1 and 2 contained items of shell and bone, which were hand picked during excavation. The layer 3 disturbed original topsoil was rich in charcoal but had limited shell. The talus deposit which lay at the foot of the bulldozed cliff was surface collected and also analysed. All midden collected was sorted by species and counted and analysed for MNI (minimum number of individuals). Table 1 shows the results by square and by layer. A bulk sample of about 2 kg, taken from the baulk of layer 2 basal yellow in the western corner of square 2, is merged with that layer for the purpose of analysis. Charcoal and an unidentified landsnail were recovered by flotation from the same bulk sample. The charcoal in larger fragments is entirely mataī (*Prumnopitys taxifolia*) (Wallace 1997, pers. comm.).

TABLE 1
MINIMUM NUMBER OF INDIVIDUALS (MNI) FROM MIDDEN
EXCAVATED IN 1997

Species/layer	Square 1	Square 2	Square 1	Square 2	Talus deposit	Totals MNI
	Layer 1	Layer 1	Layer 2	Layer 2		
Mollusca						
<i>Bivalves</i>						
Cockle	86	286	41	60	83	556
Pipi	40	69	1	7	14	131
Tuatua	1			1		2
Mussel		1	1	2		4
<i>Ruditapes lagillerti</i>	3	18	4	4	8	37
Freshwater mussel				2	2	4
<i>Gastropods</i>						
Mudsnail	23	101	1		47	172
Cat's eye	1	19		6		26
Pāua	1			1	1	3
<i>Cominella sp.</i>		9	1		5	15
Fish						
Barracouta			1			1
Other (unidentified)			1			1
Mammals						
Dog						1
Human						1

Cockle: *Austrovenus stutchburyi*; pipi: *Paphies australis*; tuatua: *Paphies subtriangulata*; mussel: not determined; freshwater mussel (kākahi): *Hyridella sp.*; mudsnail: *Amphibola crenata*; cat's eye: *Turbo smaragdus*; pāua: *Haliotis sp.*; Barracouta: *Thyrstites atun*; dog: *Canis familiaris*.

For bivalves, MNI was obtained by counting the valves and dividing by 2. The samples are mostly from fill which was redeposited from somewhere upslope, raising questions of representativeness. A few tentative conclusions can, however, be drawn from the midden samples. The bulk of the midden is cockle (*Austrovenus stutchburyi*) with some pipi (*Paphies australis*). Cockle would have been available in much greater volume than pipi (which is localised to intertidal bars at the mouth of estuaries), so greater effort has been put into pipi gathering. The habitat of *Ruditapes largillierti*, the other numerically important species, includes estuarine and oceanic settings in silts or muds, but the midden shells are likely to have been gathered from the estuary. The sparse presence of freshwater mussel suggests that this was not a highly desired species, since it would have been readily available in local lakes and the river. Recourse to the ocean beaches was likewise limited. Tuatua (*P. subtriangulata*) is rare in the assemblage, as one might expect, since the gravel and cobble ocean beaches of the generally exposed Hawke Bay beaches are not tuatua habitat. Mussel may have been taken from rocks in the harbour channels or in the ocean. The fishbone also is sparse. The other bone from the midden samples is mainly fragmentary human remains with some dog (Matisoo-Smith 1997, pers. comm.).

RADIOCARBON AGE OF ŌTATARA-HIKURANGI

The four radiocarbon results available for the complex are shown in Table 2. They are discussed further below. A newspaper article in the *Herald Tribune* 13 July 1971 reports that Groube had obtained a date of AD 1360 on a sample of unidentified charcoal collected in December 1970. No laboratory record of this has been located.

Ōtatara

In the course of the 1997 excavation (reported above), cockle shells from the bulk sample from the baulk on the western face were submitted for dating (Wk-5467, Table 2). Dating the sequence of occupation is not straightforward as there were no suitable samples to provide a close date for events such as the building of the palisade or the use of the layer 3 surface. Layers 1 and 2 consisted of lenses of material dug from a place further upslope which may, therefore, have incorporated midden which had originally been deposited there many years before. Although the sample may come from rake-out of an oven in the rear of, and contemporaneous with, the palisades this cannot be proven. WK-5467 therefore provides a maximum age for the deposition of Layer 2 and has no particular bearing on the age of fortification. A radiocarbon date on charcoal obtained by Mary Jeal (n.d.) (NZA-1351, Table 2) is from beneath the fill of one of the pits on the terrace marked as JT in Figure 4a. The two dates now available suggest occupation at Ōtatara by the early sixteenth century AD.

Hikurangi

In 1991, Bain obtained samples of shell from two of three occupation areas uncovered when a trench was dug for a water pipe in the vicinity of the south ridge. The dates, Wk-2273 and Wk-2274 (Table 2), suggest settlement on Hikurangi by the sixteenth century, or a little earlier. Neither of these dates is associated stratigraphically with defensive structures and they may therefore reflect an earlier, undefended, phase of occupation at the site.

TABLE 2
RADIOCARBON AGES FOR ŌTATARA-HIKURANGI

Lab no.	CRA*	$\delta^{13}\text{C}$	95% Calibrated Range (AD)	Material	Context
NZA-1351†	414 ± 63	-27.20	1428 to 1649	Charcoal: <i>Myrsine australis</i> , <i>Hebe</i> sp., <i>Alectryon excelsa</i>	From base of stone-rimmed pit beneath plug layer of silt, sand, pumice.
Wk-2273	810 ± 45	0.20	1423 to 1540	Shells (unidentified)	Exposed in pipe trench
Wk-2274	750 ± 45	-0.10	1453 to 1644	Shells (unidentified)	Exposed in pipe trench
Wk-5467†	850 ± 50	-0.10	1397 to 1520	Shells (<i>Austrovenus stutchburyi</i>)	Sq. 2. Layer 2. Basal yellow layer with charcoal and landsnails.

†NZA-1351 and Wk-5467 are from the 1990 and 1997 excavations at Ōtatara respectively.

*Conventional Radiocarbon Age (Stuiver and Polach 1977).

Charcoal date calibrated using New Zealand radiocarbon calibration curve (Hogg *et al.* 2003) smoothed by least squares using the method of Knox and McFadgen (2001).

Shell dates calibrated using marine calibration curve (Stuiver and Braziunas 1993) with $\Delta R = -31 \pm 15$ (McFadgen and Manning 1990).

All four dates are early for pā sites and may reflect use of the area of Ōtatara-Hikurangi prior to the building of fortifications. Schmidt (1996: 449) and McFadgen *et al.* (1994: 235), in their comprehensive analyses of New Zealand radiocarbon data, say pā building began *c.* AD 1500. On the face of it, the radiocarbon dates for Ōtatara-Hikurangi tend to support the various strands of the Best, Groube, and Fox arguments that the site is early. Of course, we must now see the site in the context of a generally accepted shorter chronology for New Zealand.

DISCUSSION

Table 3 and Figure 7 summarise our views on the chronology and settlement pattern of Ōtatara-Hikurangi and their relationship to the defensive features that are visible on the ground surface.

The site of Ōtatara-Hikurangi as a whole has a number of features which makes the complex defensible (Fig. 7, see also Fig. 2). Considering its general location, it is not easy to attack. There is a narrow level approach along the main ridge from one direction (from the north) but all other approaches involve physical obstacles such as the steep-sided gullies before ascending the steep ridges to get on to the platforms. This favours the

TABLE 3
SUGGESTED CHRONOLOGY OF OPEN SETTLEMENT AND DEFENCE OF
ŌTATARA-HIKURANGI (See also Figure 7)

Chronology	Traditional evidence (after Allen 1994)	Defences	Settlement pattern
1400–1550	Large settlement develops at Ōtatara-Hikurangi. Politically, period relatively stable.	Ōtatara: Defended by scarp and palisade by early-mid 16th century. Some settlement on Hikurangi but it remains undefended.	Settlement on Ōtatara, and on nearby parts of Hikurangi, both on ridge and on upper valley slopes.
1550–1625	Ngati Kahungūnu establish themselves in area mid 16th century and this, and later, instability persists into early 17th century.	Ōtatara provided with strong defences and becomes citadel; Fox 1 in use; scarp and palisade defences on Hikurangi.	Settlement expands on Hikurangi, but limited by defensive requirements. Terraces on lower parts of Ōtatara in use.
After 1625	A larger regional grouping (Ruarahanga) emerges centred on Ōtatara-Hikurangi and Heipipi. Politically, a relatively stable period.	Further scarp defences added to Hikurangi as settlement extends along ridges and ‘marae’ building on Hamilton slope? Fox 2 and 3 in use.	Peak population with Hikurangi reaching largest extent. Ridge top sites fully utilised; extensive terracing of upper ridge slopes.

defenders, who can watch and muster using ‘interior lines’ to meet the attackers as they ascend the slopes. An approach up the valleys would make the attackers vulnerable to missiles thrown from above or to an attack on their flank, always an effective tactic. The only other option is to ascend the end of a ridge, but progress could be blocked further along the ridge by a small force of defenders making good use of the natural slope of the ridge top and artificial defences probably installed along its length, as we have suggested for the south-east ridge. If an attacking party decided to retreat from a strong point and attack another weaker area they would generally have had a long sprint down into and out of gullies in shifting around the perimeter. The defenders, on the other hand, had rapid access from one interior part of the pā to any other: along the central and south platforms, up or down the Best (south) face, up or down the south ridge and into or out of Ōtatara itself.

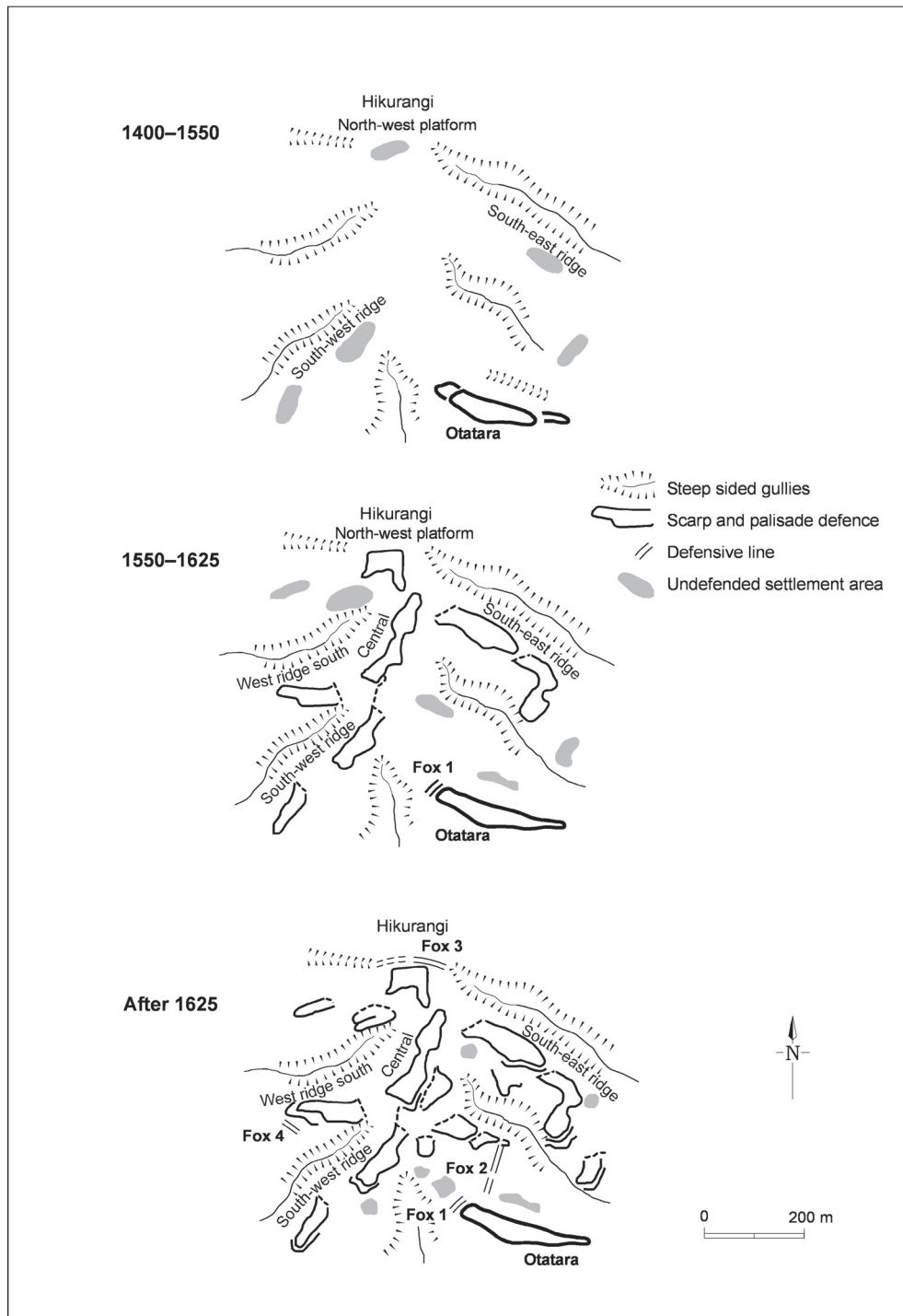


Figure 7: Suggested defensive configurations of Ōtatara-Hikurangi at various phases. See also Table 3.

In summary, four types of standing defence are evident at Ōtatara-Hikurangi:

- Discontinuous scarps and terraces on the sides and ends of ridges would have been an obstacle to attackers, especially when cluttered not only with palisades but also with houses, pits, fences, cooking houses, and other structures. These could have been used to delay the attackers and dissipate the force of their assault, thus giving inhabitants time to get away or mount a defence.
- The topography meant that attackers would on occasion have been forced into the heads of gullies, where they would be more vulnerable to the defenders' weapons, or forced to traverse into and out of the very steep sides of the gullies if they attempted to re-group and attack at less vulnerable points.
- Some sections of the ridges of Hikurangi may have been independently defensible strong points: the north-west platform, the central platform, the south platform, the south-west ridge, the south-east ridge—all of which have prominent discontinuous scarps.
- There are ditch and bank defences obstructing the easiest lines of approach between gullies, principally the Fox defensive lines 2 and 3, and there were palisaded scarp defences on the outer ends of some of the ridge units (e.g., defensive line 4).

Discontinuous scarps may be an early defensive form, typical of an early period of New Zealand prehistory. An alternative interpretation of discontinuous scarps is that they were only one element in the defensive arrangements and not necessarily early. On Pouerua, a pā on a volcano in the inland Bay of Islands, defensive scarps did precede the building of ditch/bank/palisade defences (Sutton *et al.* 2003: 184, 208–210). The chronology established by excavation and radiocarbon dating there suggests occupation began in the late 1400s with high, steep defensive scarps constructed *c.* AD 1550 but followed soon after by ditches/banks/palisades (Sutton *et al.* 2003: 196). This indicates that scarps are an early defensive form, as Groube long ago postulated in relation to both Pouerua and Ōtatara-Hikurangi. Groube, however, viewed these developments in the context of what we would now term a 'long chronology' that pushed events back and stretched out processes.

At both Pouerua and Ōtatara-Hikurangi the defensive scarps form discontinuous lines. Sutton *et al.* (2003) state that the scarps on Pouerua became longer and more continuous over time but for most of the history of the site they did not link up in any coherent defensive pattern; i.e., for much of the time there was no continuous trace or perimeter encompassing the whole site. The scarps instead produced several tiers of defensive lines below the various high points or tihi. The tiers of scarps around three sides of ridge-ends at Ōtatara-Hikurangi are not dissimilar. Ōtatara-Hikurangi, occupying a series of connected ridgelines, is topographically a less compact site than Pouerua but the same defensive principles apply, i.e. the use of a series of steep scarps to form a series of defensive barriers. Critically, on Hikurangi there is little information on the extent of the use of palisades and fighting stages as part of the defences. It cannot be assumed that the tops of the scarps were augmented by palisades, notwithstanding our excavated example on Ōtatara. Certainly the defensive scarps at Pouerua were generally not fitted with palisades.

We agree with Fox that there is a form of earthwork on the north end of her defensive line 2 that is suggestive of a fighting platform. This platform assisted in control not only of the north end of that ditch and bank but also of access up and down the adjacent valley (east valley south). The whole of the Fox defensive line 2 may relate to a settlement integrated between Ōtatara as a citadel and the large house floors ('marae') at the head of the Hamilton slope.

The Pouerua investigation (Sutton *et al.* 2003) has again confirmed that it cannot be assumed that all defensive elements visible at the ground surface were in place at any one time. If Ōtatara-Hikurangi was occupied over any length of time, and we assume that it was, then there were probably changes over time in where people were living and in the defensive arrangements that were in place. On Hikurangi, as elsewhere on the East Coast (e.g., on the eastern approaches to Hanganui a Tara, Y18/5, near Gisborne), the ditch and bank defences are generally low and loosely thrown across broad ridge approaches, often some distance from occupied areas. They do not tightly enclose particular tihi or platforms, as does the Fox defensive line 1 on the approach to Ōtatara.

Finally, the use of a strongly defended citadel next to a large, but more lightly-defended area is a well-attested tactic which is also evident at nearby Heipipi and is common in other pā which were the centres of large populations, such as Maungakiekie/One Tree Hill.

On the basis of the Pouerua experience, Sutton *et al.* (2003: 228) have argued convincingly that the detailed history of a pā site can only be understood by combining detailed surface mapping with large-scale, strategically placed excavation. Such excavation results are not yet available for Ōtatara-Hikurangi.

A conservation management plan for the Ōtatara Pā Historic Reserve was issued in 1991. Under this plan, the primary purpose of the Reserve is to protect the historic and archaeological features it contains. As a matter of policy, excavation is to be avoided except where there is no other way of protecting and conserving the information. This is in accordance with the wishes of Waiohiki Marae that "archaeological investigation should not be carried out unless there is unavoidable damage occurring" (Department of Conservation n.d.: 15). It should be noted that in this paper we have concentrated on the overall nature of the surface defensive features, focusing on particular elements of the field evidence where necessary. We would observe that our interpretative hypotheses could be tested by archaeological excavation. Some areas could be the subject of excavation with particular objectives as follows:

- Determine the absolute age of initial settlement on the tihi (central platforms) of Hikurangi;
- Examine the house floors on the tihi of Hikurangi and upper Hamilton slope and determine their age;
- Investigate the defences and determine the age of a sample of the discontinuous scarp terraces of Hikurangi and the lower eastern scarps of Ōtatara;
- Investigate the defensive elements of the no. 2 ditch, including the postulated fighting stage, and determine their absolute age or relative age compared with settlement on the Hamilton slope;
- Check the defensive elements of Fox defensive line 3 along its full alignment out to the north platform and determine its absolute age or relative age compared with settlement on that platform;

- Conduct excavations on a sample of the terrace complexes south of the west ridge north and the south-east ridge, to determine the function of the terraces and how they may have related to the overall settlement and defensive pattern;
- Examine the defensive character of postulated defensive alignments on the middle sections of the south-east ridge.

Such an excavation programme would go some way to testing the interpretations made in this paper, particularly the chronology of first settlement and the complex relationship between the discontinuous scarp defences, the area of widest or largest settlement habitation, the Fox defensive lines 2 and 3 and the use of Ōtatara as a citadel.

CONCLUSIONS

Ōtatara has been occupied since at least about AD 1520. Our 1997 excavation has shown that terrace edges at the head of steep slopes had palisades even where there was no ditch. It is therefore clear that steep scarps had a defensive function within the wider Ōtatara/Hikurangi complex, as has previously been inferred.

The Ōtatara/Hikurangi complex is the product of a long sequence of occupation with varying population numbers at different times and with varying defensive strategies. Smaller populations may initially have built the Ōtatara and Hikurangi summit defences. The discontinuous scarp defences of outlying ridges probably contributed to defence of the central high points. At a peak in the population, the site was occupied up to its full perimeter as we understand it today. All the known ditch-and-bank defences were in use at that time, and lesser defensive lines on the eastern ridges may also have been in use. There is little evidence on when the different areas of the site were in use. They could all be contemporary but this would still leave open the possibility that some remodelling or expansion occurred. It was usual for sub-groups to occupy adjacent but physically separate and defensively self-contained places also known as *pā* within the larger site. So not only is the layout a result of the physical character of the area, it may also reflect social organisation.

Ōtatara-Hikurangi lacks a continuous artificial defensive perimeter. An effective defence can be achieved in the absence of this. The surface evidence of terraces and pits is well spread over the ridges and on their upper side-slopes. Even if it is assumed that only some places were occupied at one time, there is a sizeable population present. The effort required to enclose the sinuous and dendritic ridge pattern within a continuous perimeter would have been enormous. There is some evidence, in the form of the Best slope track and the precise positioning of Fox's defensive lines 1 and 2, that the defence of Hikurangi and Ōtatara were linked.

Attack would also be pointless if it was obvious that the defenders generally had the numbers to mount an effective defence, particularly given that they held the high ground and the tactical advantage. They also had the advantage of easy movement within the wider defended area of the complex, while the attackers had to negotiate a series of gullies to get around the exterior of the defences. However, from the sixteenth century until the early nineteenth century, Ōtatara-Hikurangi was probably never a small community. A good defence is to have as many defenders as there are attackers, or more. Effective defence is not just about fortifications, but about chiefs, alliances, and regional balances

of power. Allen's (1994) analysis suggests that Ōtatara-Hikurangi was part of a large and powerful grouping of hapū in the Ruarahanga polity. In considering the adequacy of the defences, one must also take into account the level of threat being faced by the inhabitants of Ōtatara-Hikurangi.

Ōtatara-Hikurangi occupies the main ridge and a series of subsidiary ridges between Tūtaekuri River and Ahuriri Estuary. Ōtatara itself occupies a subsidiary ridge in one corner of complex. It has a naturally defensible position along with good access to the river and the estuary. Although traditions are not a focus of this paper, it might be noted that this identification of Ōtatara as the place of refuge for the whole pā finds support in oral traditions. It was the most heavily defended area with transverse ditch-and-bank defences at each end, linked to a gully and lateral palisaded scarps on the third side (towards the Hamilton slope). These were in turn linked to the defensive line 2, which cuts across the Hamilton slope. There are steep river-cut slopes on the fourth side. Ōtatara is a strong candidate to be the citadel of the whole complex, because of its location by the river, its easy accessibility downhill from Hikurangi, its steep sides, and its documented strong defences.

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