NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION MONOGRAPH 17:
Douglas Sutton (ed.), ***Saying So Doesn't Make It So: Essays in Honour of B. Foss Leach***

This document is made available by The New Zealand Archaeological Association under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.
To view a copy of this license, visit
http://creativecommons.org/licenses/by-nc-sa/4.0/

SAYING SO DOESN'T MAKE IT SO

PAPERS IN HONOUR OF B. FOSS LEACH

Edited by
Douglas G. Sutton

New Zealand Archaeological Association
Monograph 17

Settlement Chronology, Pā, and Environment of Tolaga Bay, East Coast, North Island, New Zealand

Kevin L. Jones

Directorate of Science and Research, Department of Conservation, Wellington

INTRODUCTION

The object of this paper is to present further evidence relating to *pā* morphology; environmental context of sites; and the age of settlement, including pit storage, adjacent to the main rivers of Tolaga Bay. A few dates have been published (Jones 1986) and one of the aims of the present paper is to provide more detail on the context of these dates.

The results of extensive archaeological survey carried out in 1982–3 and a population interpretation of Tolaga Bay were published in recent papers (Jones 1986; Jones and Law 1987). The abstract modelling of population growth in the latter paper suffered from the lack of a well defined settlement chronology, an inevitable outcome of any survey in which extensive coverage is the primary aim. Excavations carried out in February 1986 were designed to improve understanding of the chronology of settlement and to make further interpretations of the environmental setting of the sites.

As far as possible, available sections were used, concentrating on two sites threatened with further erosion of the river banks on which they lie. Some seven sites were concerned: four in the Mangaheia River valley, one on the main Uawa River, and two at the mouth of Tolaga Bay (Figure 1). One raised rim pit site (N90/290), for which a radiocarbon date had earlier been published (Jones 1986: 9), was also investigated to test the stratigraphic relationship between the relatively early date on the midden and the associated pits. Advantage was taken of slips resulting from a severe rainstorm in the winter of 1985 to record and sample some sections in the Mangaheia Valley.

Sites on the levees of the rivers were reported in some detail in a paper relating their chronology to the age of the river levee surfaces (Jones n.d.). They are not reported in detail in this paper. Appendix 1 presents a full summary of the dates obtained in the course of the 1986 excavations.

Few plans of *pā* on the East Coast have been published. *Pā* on the East Coast represent a significant and unusual part of the range of *pā* morphology in New Zealand, and an addition to the published data base in this area is warranted. The plans of *pā* presented here were produced by plane table mapping in February 1983, the year of an El Niño drought in which the features were especially well exposed.

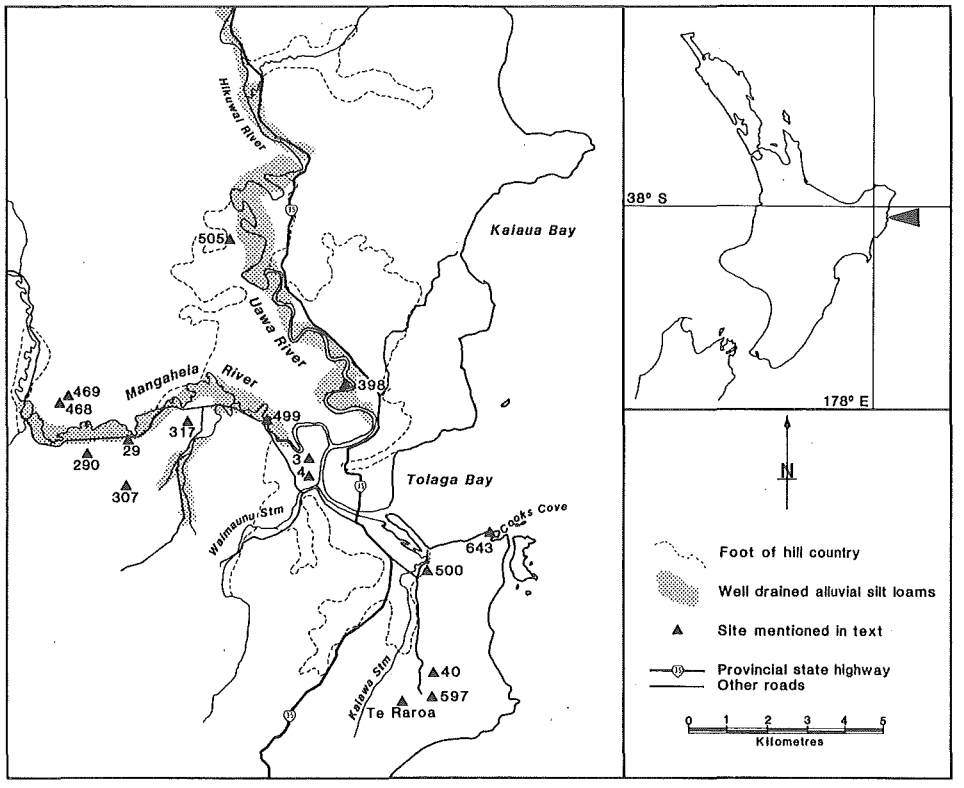

Figure 1: Locality map of Tolaga Bay.

DEFINITION OF PĀ

On the East Coast, judgement as to whether a group of pits and terraces with steep natural defences and little or no apparent artificial defences should truly be regarded as a *pā* is not easy. To restrict the determination of *pā* only to sites with clear artificial defences would mislead readers about the nature of settlements and their distribution. One site which we know from field survey to have had limited artificial defences, Te Kararoa at Cooks Cove, had very full palisaded defences in the 18th century (Jones 1983a). The problem is particularly acute for smaller sites. In this paper, the plans of some larger *pā* (most without surface-visible, artificial defences) are reported locality by locality within Tolaga Bay, along with the occupation history where known. The sites are amongst the largest in the bay and an interpretation of their potential populations appeared in an earlier paper (Jones and Law 1987: 97–99).

Presentation of the evidence of morphology of *pā* and the age of sites is arranged here by geographic locality within the bay, beginning in the south, working towards the north, and finishing with a discussion of sites at the mouth of the bay including Cooks Cove.

PĀ IN THE SOUTHERN HILL COUNTRY

The southern part of the Tolaga Bay catchment is isolated from the main river system yet has very high densities of pits and relatively few *pā* except where the catchment bounds on to the coast (Jones 1986: 12,19). Two of these *pā* are amongst the largest in the catchment (Jones and Law 1987: 97–9). They lie on the southern rim of a basin of easy slope lying at about 100 m above sea level (a.s.l.). The basin itself is dissected by several steep narrow gullies. Along the edges there were scattered clusters of small numbers of pits, now destroyed by giant-discing (Aerial photograph, RN 637/36–38, 1943). The *pā* and the basin form an interesting complex, clearly bounded by very steep hill country, from which an analysis of hill-gardening potentials could be made. No radiocarbon dates are available for the two *pā* to be described. This general locality is close to a topographic feature on the southern rim of the catchment known as Te Raroa. It is a prominent sharp point on the ridge, visible from the main marae in Tolaga Bay, and is understood to be the fighting *pā* of Porourangi, eponymous ancestor of Ngati Porou.

PĀ N90/40 (Figure 2)

The platform of this *pā* lies at about 220 m a.s.l. and is divided into sloping sets of terraces occupying an area of some 140 × 15 m average width. Several very large raised rim pits (up to 10 × 6 m) occupy some of the lower terraces on the platform. The highest terraces are irregular in plan. There are irregular raised features at the highest point composed of the original siltstone substrate, suggesting that the ridge has been cut down hard. To the north, west and south, some 15–25 m below the platform and at the foot of its very steep surrounding slope defences, there are pit complexes on relatively level areas on the ridge or at the heads of the surrounding gullies. One of these pit groups is illustrated elsewhere (Wilson 1987: 90). This *pā* is the largest in Tolaga Bay on the basis of length and apparent volume of storage pits (Jones and Law 1987: 97). The subsidiary pit storage areas have steep natural defences in their own right and were likely to have been outlying defended areas of the main platform.

PĀ N90/597

This *pā* lies on the southern rim of the catchment at the head of the broad dissected basin discussed above. The *pā* lies in a single unit along a narrow ridge. The ridge is defended by two narrow (about 1.5 m wide), transverse ditches some 120 m apart. They occur on this *pā* because there is relatively little slope along the length of the ridge. Several terraces with raised rim pits lie outside the artificial defences. A subsidiary siltstone ridge drops steeply to the south-east from the high point of the *pā*, and provides useful natural defences in its own right. The *pā* is unusual in Tolaga Bay because of lateral defences consisting of narrow terraces set some 4–6 m below the general level of the defended platform. On the platform itself there are several large terraces (up to 20 × 12 m) and large raised rim pits (up to 10 × 7 m) which occupy the full width of the ridge. The general lack of space within the defended area of the *pā* is marked by the presence of several raised rim pits cut into the slope outside the defended area and also pits in close proximity to the transverse ditches. The latter feature is quite common on *pā* on the East Coast and reflects several factors, mainly the advantage of drainage offered by the defensive ditches and the obstacle to an attacker posed by the pits themselves.

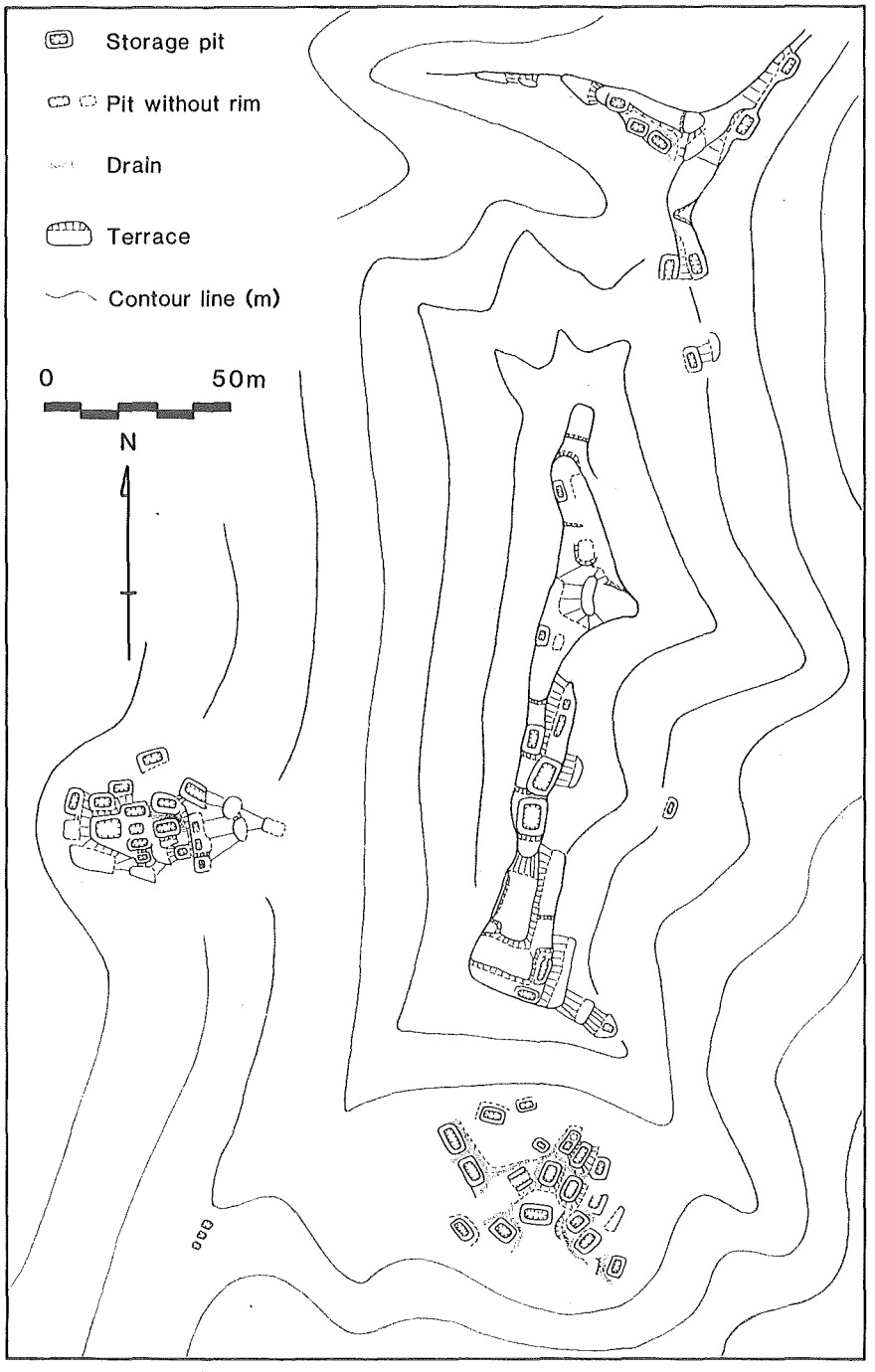

Figure 2: *Pā* N90/40. Form lines in this and subsequent figures are at 10 m intervals unless otherwise shown.

SITES AT CONFLUENCE OF MANGAHEIA AND UAWA RIVERS

The confluence of the Mangaheia and Uawa Rivers lies about 2.5 km from the coast. Here the Mangaheia River runs to the north and east skirting two low hills before it joins the Uawa River. Low ridges adjacent to the Mangaheia have some volume of pit storage on them indicating use of the Mangaheia alluvium for gardening (Jones 1986: 12). The crests of both hills are scarped and terraced with some raised rim pits (N90/3, 4). The northern of the two hills is named Taharangi (ML 4A 1867, a map probably brought before land commissioners at that time). The name is not Haparangi, as noted on N.Z.M.S.260 Z17. This error arose from an earlier incorrect transcription by the present author. The site is known as the *pā* and burial place of Rangiuia, an important chief of Te Aitanga-o-Hauiti in the 1840s. On a lower ridge of the northern hill which runs parallel to the Uawa River, a *pā* is obscured by gorse and not possible to map. Early aerial photographs (RN 635/31,32, 1943) show what appear to be transverse and lateral ditches on the ridge at this point. This *pā* clearly requires much closer inspection and mapping at a future date because of its position at a likely 'central place' and its traditional importance. The earliest historic trading settlements of Tolaga Bay lay on the banks of the river from these hills to the sea (Polack 1838). There is good reason to believe that this is an artificial settlement pattern determined by the availability of ship moorings, as elsewhere in New Zealand in this period. The hills and levees here will nevertheless prove to have much older settlement on them.

SITES ON MANGAHEIA RIVER

ORCHARD *PĀ*, N90/499

This *pā* lies on a narrow loop in the Mangaheia River about 4 km upstream from the point where the river enters the Uawa River and about 7 km from the sea. It is adjacent to a low narrow ridge on which kumara storage pits occur, and reflects an occupation of the Mangaheia River banks in which horticulture on the levee silt loams must have been important. A kilometre or more of poorly drained flats, unsuited to kumara horticulture, separates the site from the Tolaga Bay hill country.

The defended area of the *pā* comprises an elongated 'island' of Waihirere silt loams. The defences consist of an inner bank and flood channel and an outer bank (flood-truncated) and flood channel (Figure 3). The two flood channels are assumed to be the sites of former ditches associated with the banks. The surviving ditches extend only half the distance across the neck.

Stratigraphic sections were observed at the eroded upstream face of the inner ditch and bank and by short trenches through the outer bank and inside the inner bank. The results are described in Jones (n.d.). The charcoal from oven debris used to pack a posthole in the inner bank gives a date of less than 250 years B.P. (N.Z. 7398). This is a maximum age for construction of the defensive ditch and bank. A full list of radiocarbon dates for Tolaga Bay obtained in 1986 is in Appendix 1. A charcoal sample suitable for ^{14}C was also recovered from an *in situ* oven in a yellow-brown silt under the outer bank and lying above a buried topsoil. Again the age is less than 250 years B.P. (N.Z. 7394) (Jones n.d.). This is a maximum age for the outer bank and indicates that the two sets of ditches and banks of this *pā* are near-contemporaneous.

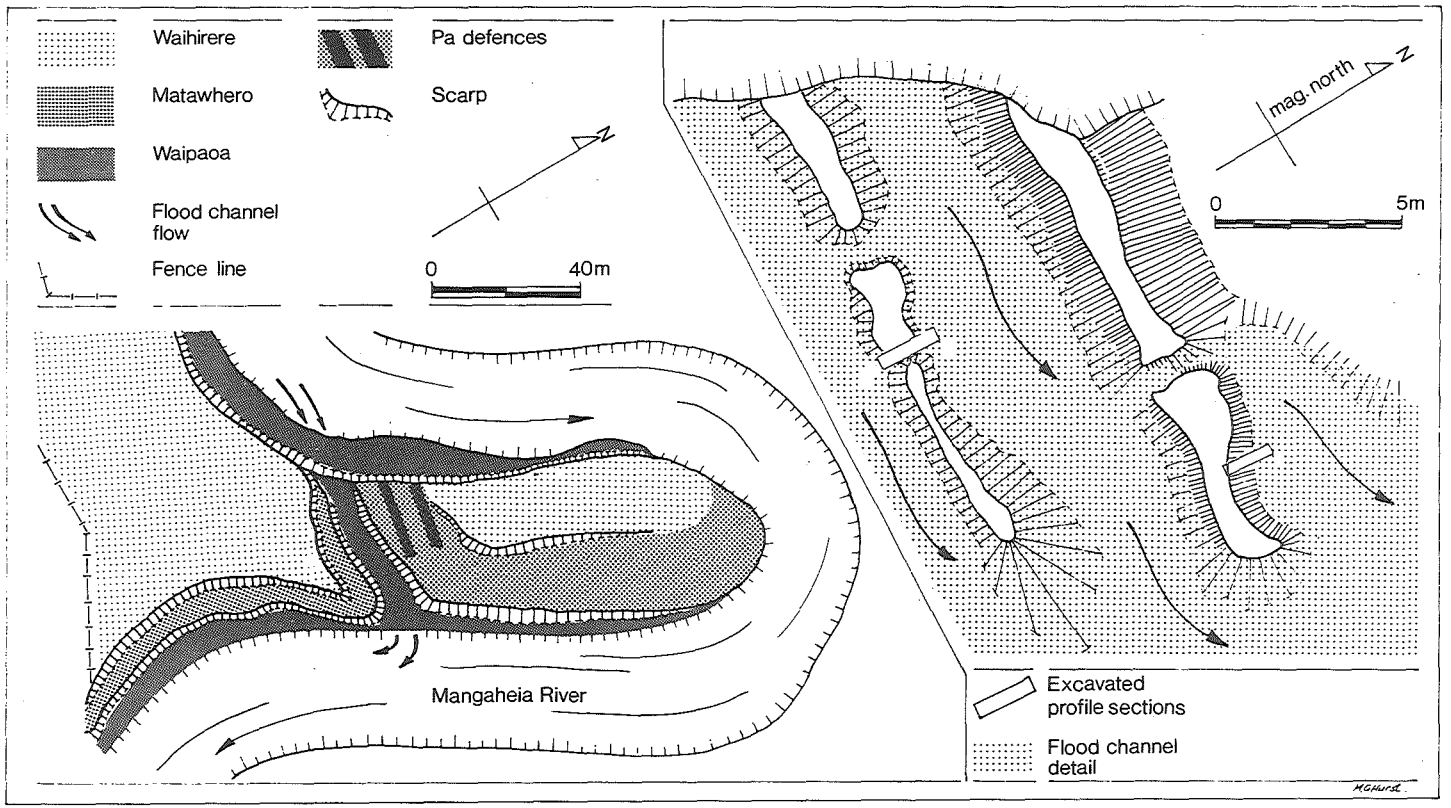

Figure 3: *Pā* N90/499.

PITS AND TERRACES N90/290

This site comprises a group of raised rim pits on a low flat at the end of a ridge (Figure 4) above a seasonal stream running into the middle, enclosed part of the Mangaheia Valley. The flat has an area of about 15 by 15 m with the pits clustered at its distal end above the stream. The proximal end of the flat is featureless.

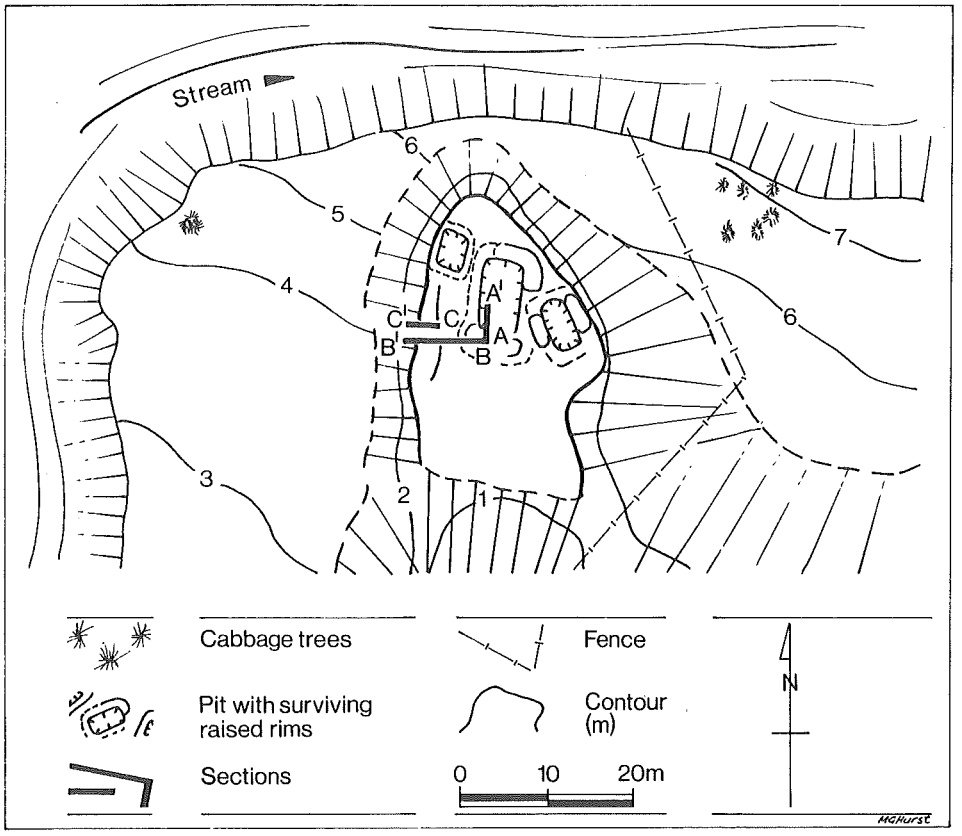

Figure 4: Plan of raised rim pits and terraces, N90/290.

A midden dated to 546 ± 55 years B.P. (N.Z. 6571) lay in the topsoil on a slope adjacent to the pits (Jones 1986). The excavation was designed to test the stratigraphic link if any between the pits and midden, since this relatively early date has occasioned some surprise. Raised rim pits are generally thought to be a later development in pit construction, on the basis of evidence from elsewhere on the eastern coast of New Zealand (Duff 1961; Leach 1981: 14).

Sections were cut from the raised rim of the central pit to the midden lying near the foot of the slope (BB'; Figure 5); from B to a point at the base of the pit (AA'); and a further section (CC') through the terrace (Figure 5). Natural stratigraphy consisted of a substrate of weathered soft sandstone blocks with a brown silty subsoil and about 15 cm of grey silt loam topsoil. At the base of the topsoil there was a distinct layer of Taupo air-fall pumice, a reflection of the lack of slope and sedimentation on this site. Section BB' shows the Taupo

pumice to have been removed in the formation of an indistinct terrace some 2 m wide. On the downslope edge of the terrace was a line of postholes which also show in section CC'. These had been dug into a distinct layer of charcoally topsoil forming the original lip of the terrace. The midden forms a distinct lens lying on this charcoally topsoil but not on the upslope side of the posts. A distinctive layer of sandstone lumps in topsoil and subsoil fill ran from the pit rim down to the terrace, overlying the charcoally soil but stopping short of the shell midden from which it was separated by the line of posts. The fill with sandstone lumps is identical to that of the pit rim, which had eroded downslope on to the terrace. It is therefore unlikely to pre-date the shell and would be either contemporaneous with the forming of the posthole line or slightly later.

Occupation of the site may be summarised as follows:

- Occupation of the ridge end with disturbance introducing charcoal into the original topsoils of the flat area;
- A terrace formed for hearths or ovens at the lower level and a cooking shed or food preparation area erected over the terrace; shell midden thrown over the edge of the terrace;
- At the same time as above or not long after, a raised rim pit grouping was constructed on the upper flat surface of the promontory, with downslope movement of rim fill on to the terrace after abandonment of the site.

A further argument for the contemporaneity of the midden and raised rim pit complex is the integrated nature of the plan of the site. It has a habitation area, which although not excavated is here identified as occupying the featureless area at the base of the promontory. The identified pit storage and cooking areas are separate from the habitation. This is consistent with the form of such settlement known from other archaeological examples or the 19th century.

The midden itself is of interest, since they are rare in most inland East Coast sites. Minimum numbers of individuals are shown in Appendix 2 and terrestrial gastropods are shown in Appendix 3. The high numbers of *Paphies australis* and the significant numbers of rocky shore species indicate that people occupying this site were gaining supplies from the coast some 8 km away along the river course. The *Chione* sp. were taken from the muddy parts of the Uawa estuary, which is only 30 ha in area now and unlikely to have been larger in the past, or on the banks of the river in its tidal reaches. The river is tidal for some 6 km from its mouth. The terrestrial gastropods are a fairly full assemblage and are interpreted by Climo (pers. comm.) to indicate an area of standing forest with some clearance.

PĀ N90/29

This *pā* lies on the end of a steep-sided ridge about 30 m above the level of the valley floor. It is in the enclosed part of the valley where Waihirere silt loams are close to the adjoining hill country, but it is not built on the flood plain. The *pā* consists of a central platform with a narrow ditch at the foot of a slightly steepened scarp to the west (Figure 6). The platform

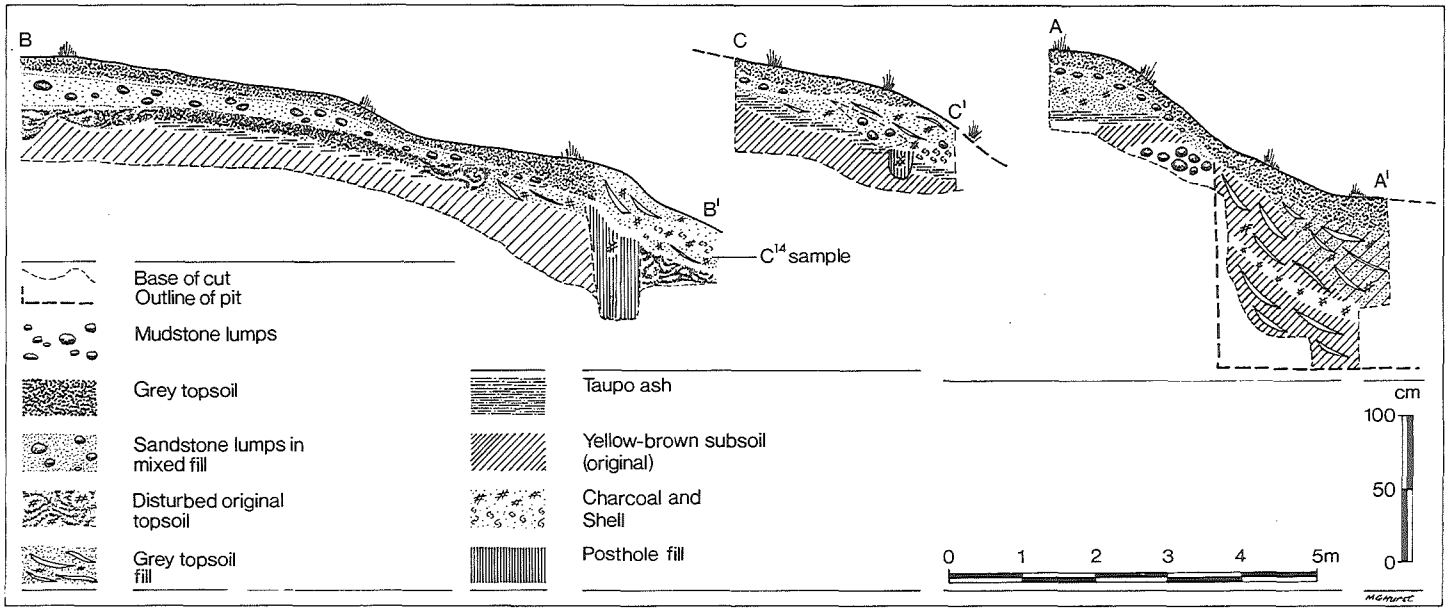

Figure 5: Sections through raised rim pit (AA'), and terrace (BB', CC'), N90/290.

has raised rim pits with drains and possible house floors on it. To the north the platform has a scarp and ditch leading down to a lower platform with further pits and terraces. To the east, a scarp leads down to a narrow eroding terraced ridge. At the foot of one of the terraces in talus deposits or terrace fill, a shell date of 662 ± 56 years B.P. (N.Z. 6570) had been obtained (Jones 1986).

A large section in the side of the principal platform of the *pā* had been exposed (Figure 6) in a severe rainstorm of the winter of 1985. Two shell samples were taken. They were in layers of fill stratified above the initial occupation of the site shown by charcoally topsoil overlying a grey silty ash subsoil typical of Tolaga Bay. The fill represents a period in which there was a substantial levelling and re-working of the surface of the ridge to form the existing platform. This would include the formation of the ditch at the foot of the 6 m scarp. The ditch is smaller than might be expected for the height of the scarp, but this is typical of *pā* on the East Coast. A stratigraphic link between ditch and platform could not be expected because of the separation and natural steepness of the scarp.

The dates for the *pā* are 450 ± 57 (N.Z. 7371) for the fill derived from creation of the existing platform and 460 ± 57 (N.Z. 7380) for a lens of shell in the topsoil of the platform (Appendix 1). These dates are some 200 years later than the earlier date obtained for terrace fill outside the defences of the *pā*. Although this date is not without value as a clear indicator of the minimum age of occupation on this site and in the valley as a whole, the age of the *pā* in its present form is clearly about A.D. 1500.

MANGAHEIA HOMESTEAD *PĀ* N90/317

This *pā* lies at the entrance to the enclosed part of the valley above the intersection of the river and the adjoining Patiki Stream. The stream floor has infilled rapidly in recent times, and there are large areas of Matawhero and Waihirere silt loams in the Mangaheia Valley itself. Both the Patiki flood plain and the Mangaheia Valley were available for horticultural purposes. The *pā* lies on three steep-sided ridges radiating from a central high point. It has no artificial defences except scarps and consists essentially of terraces about the central high point. On the ridge trending down towards the east and north, there were a number of raised rim pits which were giant-disced in February 1985. The discing cleanly exposed the bases of ovens at the foot of this ridge. A radiocarbon sample from one of these ovens gave a date of 358 ± 58 years B.P. (N.Z. 7392). This is a minimum age for occupation of this *pā*.

PĀ N90/307 (Figure 7)

This *pā* occupies one of the highest points on the south side of the valley at 220 m a.s.l. It lies at the head of ridges running up from *pā* N90/29. The main area of the *pā* occupies a steep-sided, very narrow ridge crest some 220 m long and seldom more than 8 m wide. As a result it has been heavily modified by the movement of sheep along the ridge. Pits occur on the ridge running down to the northwest. A photograph of the group of pits about 30 m below the platform (N90/306) is shown in Jones (1986: 20). Elsewhere on the ridge running from N90/29 to this *pā* there are terraces and pits adjacent to colluvium (N90/304, 305).

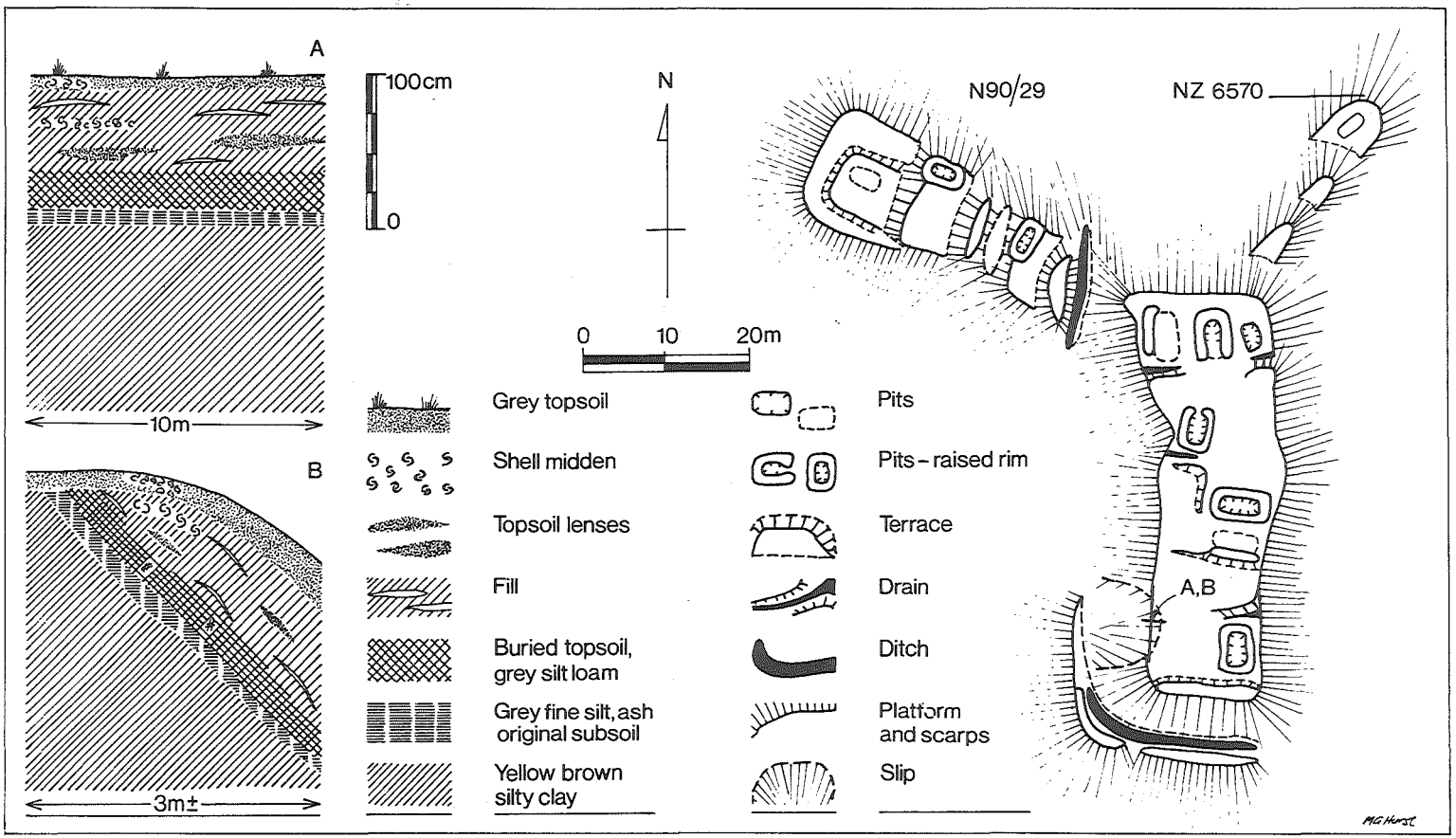

Figure 6: Plan and sections, *Pā* N90/29.

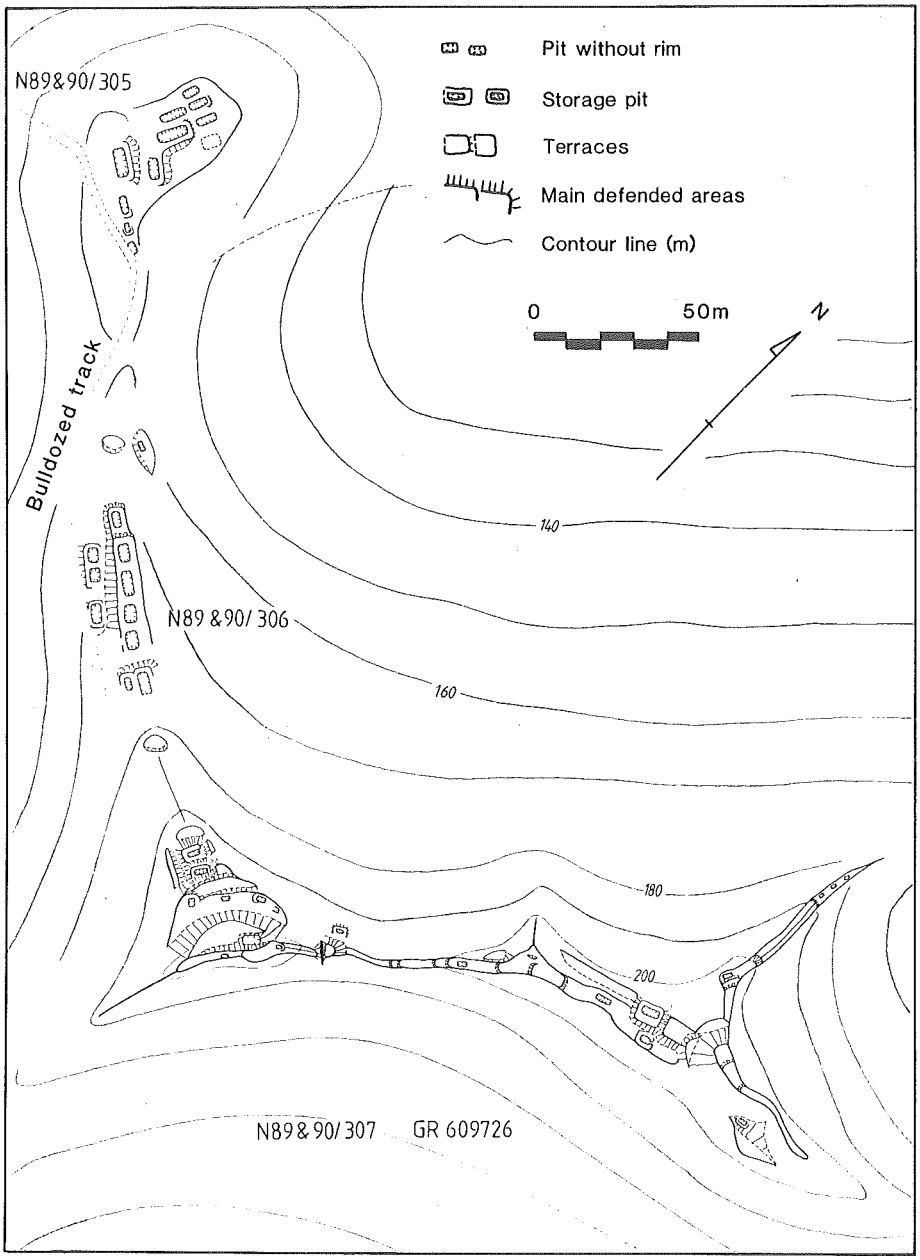

Figure 7: N90/307.

PĀ COMPLEX N90/468 AND 469 (Figure 8)

This site complex lies on the edge of the sandstone plateau forming the northern side of the lower, enclosed part of the Mangaheia Valley. The plateau is cliffed into the valley along much of its length. At the head of a ridge running east from the floor of the valley at about

240 m a.s.l. there is a complex of raised rim pits (Figure 9) with a small terraced area on a steep-sided ridge some 10 m above that. To the north of the pits at the head of a small gully there is an artificial dam, not of recent origin. It is the only such dam or water storage area known to the author throughout the East Coast.

To the east of N90/468, the ridge forms a razorback which rises over some 150 m to a point at about 280 m a.s.l. on the edge of the sandstone plateau. The ridge and the plateau are cliffed on the southern side. The sandstone on which site N90/469 is situated forms a kind of plate lying above the general height of the ridge and sloping down to the north-east. A series of terraces have formed or have been formed down this slope. The terraces are long and narrow, many being about 25 by 3 m in plan. Small pits (1 by 2 m) occur on some of the terraces. Test pits in the rear of some of these terraces showed an undisturbed topsoil with friable ash at the base similar to the natural soils of the area, indicating that they had not been cut into the slope. The terraces are best interpreted as slump features that have been subsequently occupied and perhaps gardened. If they were gardened, the quantity of crop would have been small to judge from the volume of pits on the terraces. The total area of the terraces is also small and the site is best seen as part of a naturally defended complex incorporating N90/468.

SITES ON UAWA RIVER

The Uawa River is the principal river running into Tolaga Bay. It has more extensive alluvial flats than the Mangaheia, but these have been subjected to intensive cropping, so that surface evidence of archaeological sites is very scarce. Two *pā* associated with alluvial flats survive: one on an eroding river bend, the other on low hill country on the edge of the fan of Waihirere soils forming the upper Uawa flats.

MARAMA TAWHAUA *PĀ*, N90/398 (Figure 10)

Marama Tawhaua is said to have been the *pā* of Te Kani a Takirau (Reed 1946) and to have been occupied by European families during the Te Kooti incident at Tolaga Bay in the 1870s (M. Jefferd pers. comm.). The name of the *pā* is derived from the survey map ML4A, 1867 which shows the names of *pā* and *kāinga* written on nearly all the topographic features of the Uawa River.

The *pā* lies on a sharp river bend about 7 km from the sea. Erosion of the bend has been severe and all that remains is a portion of the inner of two banks, a broad flood channel some 7 m across scoured through the line of the original ditch, and an outer ditch and bank in relatively good condition. These ditches defended an enclosed area of the original point estimated to have been some 25 by 100 m (Jones n.d.).

Charcoals stratified under the outer bank on Waihirere topsoil give a maximum age for the defences of 360 ± 125 years B.P. (Wk 1147). A similar section in a stock track though the defences adjacent to the above sample site gave an age of 542 ± 55 years B.P. (N.Z. 7390). These dates provide a maximum age for the outer ditch and bank and because of the possible age of the charcoals in the sample N.Z. 7390, a realistic date for the site is about A.D. 1600. This age is consistent with building of the ditch and bank in the period of Matawhero sedimentation (following the ages in Grant 1985). The general disposition of the ditches and banks indicate that the inner one was constructed first. As the upstream bank eroded, the river broke through the ditch, widening and filling it to the point where it

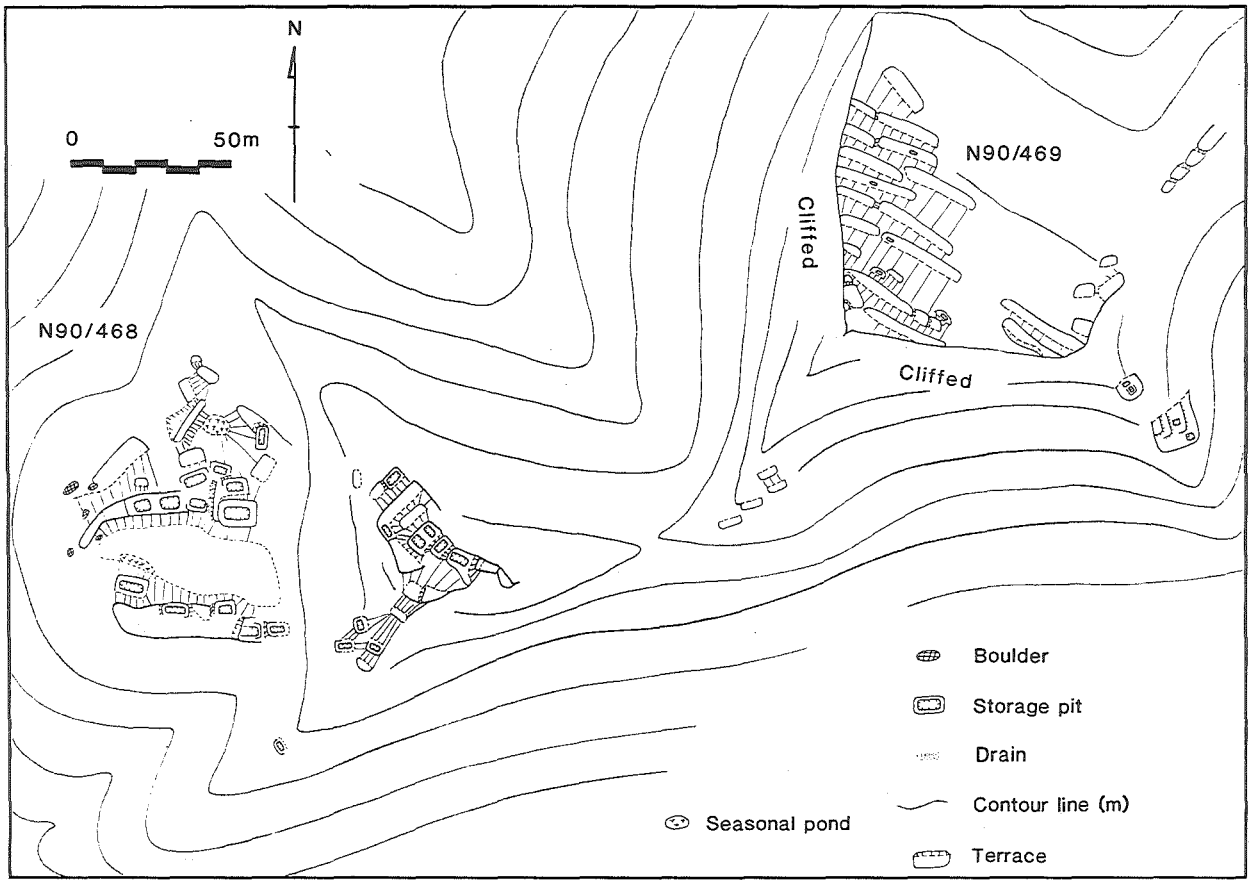

Figure 8: *Pā* N90/468 and 469.

Figure 9: *Pā* N90/468, pits from the west.

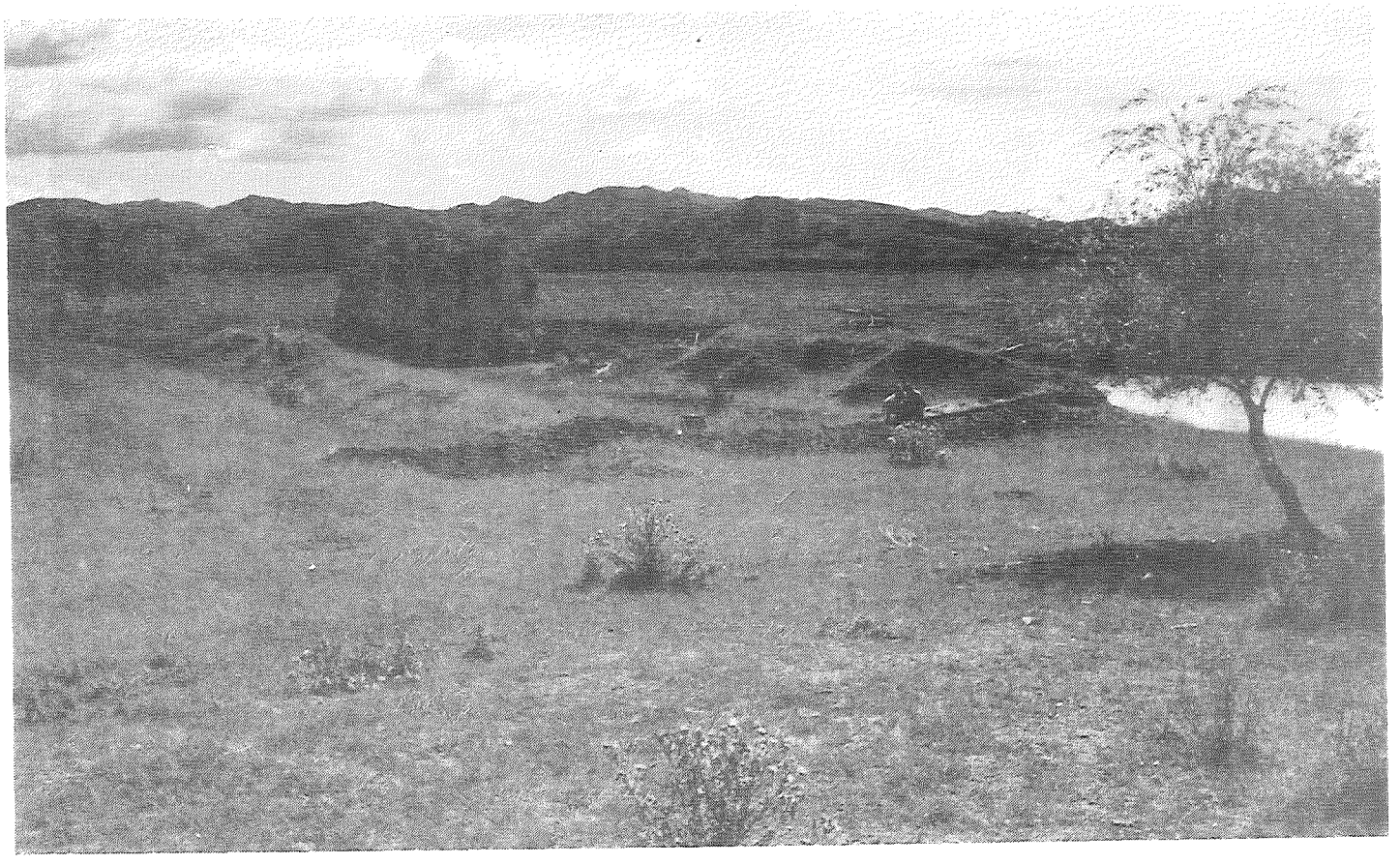

Figure 10: *Pā* N90/398, looking north from the recent terrace towards the surviving double ditch and bank.

was no longer functional. At that point, a second ditch and bank was constructed outside the first. It cannot be a quickly constructed rifle trench of the 1870s, since there is no infilling of the downstream side of the *pā* between the two ditch construction episodes. The outer ditch could well have been usable as a rifle trench in the 1870s, as a local family history indicates (M. Jefferd, pers. comm.), but its relative lack of depth and width is also consistent with prehistoric ditches elsewhere in Tolaga Bay and on the East Coast. Likewise the claim that the *pā* is that of Te Kani a Takirau, who flourished 1820–1850 (Reed 1946), is doubtful. The defences of the *pā* were made a full two centuries before his time although they could have been adapted for use in the 19th century.

PĀ N90/505 (Figure 11)

This *pā* lies on the western side of the upper Uawa flats in an area where the Uawa silt loams form a large fan. It consists of a narrow, steep-sided ridge some 150 m long, with raised rim pits, drains, terraces, and possible transverse defensive ditches (see also Wilson 1987: 103). Space within the defended area is limited. The adjacent ridges which run down to a gully beside the *pā* have single pits or possible house floors at their ends, probably as a response to the lack of space within the *pā*. In a saddle between the *pā* and the adjacent ridges an oven was exposed in the course of bulldozing to make a pond; its location indicates a close relationship with the domestic functions of the *pā*. A radiocarbon date of 380 ± 75 years B.P. for finely divided charcoal in the base of this oven provides a close age for occupation of the vicinity of this *pā*. Given the extreme shortage of space within the *pā*, the date may reasonably be regarded as an age for the occupation of the *pā* itself.

PĀ IN THE VICINITY OF THE BAY

PĀ N90/500

This *pā* lies in the southwest corner of the bay on low hill country some 3–400 m from the estuary of the Uawa River. It occupies a low ridge end and consists of raised rim pits and terraces spread over some 100 m. A farm road running up the ridge exposed midden in terrace fill. A sample of midden from this site has not been given MNI treatment but it contains estuarine and some rocky shore species, and a full assemblage of terrestrial gastropods (Appendix 3). Some fish bone included that of a ray. The terrestrial gastropods have been identified and interpreted as representing a forest environment. Shell from the midden which occurs as a lens in the terrace fill is dated at 476 ± 31 years B.P. (N.Z. 6578).

TE KARAROA *PĀ* (N90/643) (Figure 12)

This *pā*, recorded in the course of site survey in February 1983, was the *pā* described by Banks in 1769 (Jones 1983a). The site lies on the cliffed promontory forming the northern side of Cook's Cove at the entrance to Tolaga Bay. The cliff forms a separate elevated area at this point with three separate terraced ridges running down to the south which are there truncated by a lower cliff above Cooks Cove itself. The westernmost of these ridges was the site of Banks' "fence of poles" (Jones 1983a). At the easternmost point, there is a slightly broader part of the main ridge. A citadel is here formed which has a short length of narrow ditch and bank immediately above the southern cliff. A detailed assessment of the functioning of this complex of settlement and defensive features is not easy. While

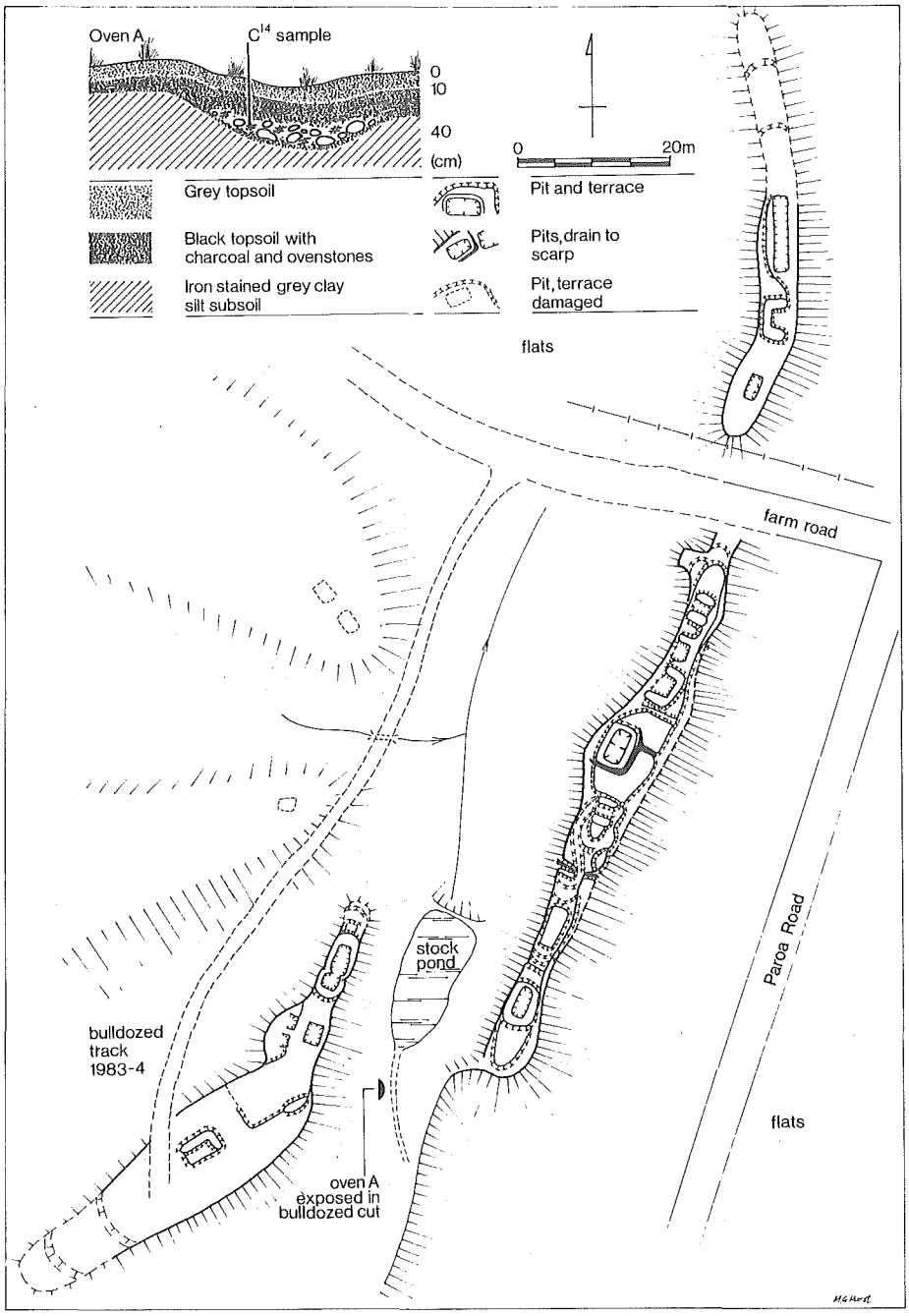

Figure 11: Plan and oven section of *pā* N90/505.

each of the terraced ridges and the 'citadel' may have been a separately fortified unit, the westernmost of them would also have acted to amplify the defences of the easternmost parts of the complex. This easternmost area is reasonably regarded as the principal occupied part of the site.

In the heavy rainfall of winter 1985, slumping occurred below the bottom terrace of the ridge immediately west of the citadel. Shell was exposed in the grey silt loam topsoil which overlay fill from the construction of the terrace. The shell will therefore give a minimum age for occupation of the terrace, and a minimum age for the *pā*, assuming that the strong natural defences of this site were always a prime reason for the occupation within. The date is 445 ± 55 years B.P. The date is later than those obtained for shell and charcoal in the lower layers of the midden on the opposite side of Cooks Cove (McFadgen 1982: 389).

DISCUSSION

SUMMARY OF SITE CHRONOLOGY

Figure 13 summarises the 15 radiocarbon dates available for Tolaga Bay. The earliest date, in the early 13th century A.D. (N.Z. 631), is for midden stratified immediately above Loisel's pumice in the Cooks Cove section (Wellman 1962: 46–7; McFadgen 1982). The early 14th century date for shell on N90/29 should not be regarded as an age for the building of the *pā* on this site, but it does indicate occupation of this age adjacent to the Waihirere silt loams in the Mangaheia valley. This occupation occurred at or soon after the time of deposition of the sediments on which these soils formed, a result that is consistent with the evidence for occupation on Waihirere silt loams elsewhere on the East Coast (Jones 1988). Another early date of 597±54 years B.P. (N.Z. 6562) is for a pit/terrace complex (including some with raised rims) at the head of the Uawa flats. The date is on charcoal at the base of the fill of a pit. It is not clearly of raised rim type because it occupies the full width of a narrow ridge where rims would have been superfluous (Jones 1983b; 1986: 9). The material dated in this sample has been confirmed as tree fern by R. T. Wallace. He is of the opinion that it should be regarded as having little inbuilt age.

The date published (Jones 1986: 9) for raised rim pits as early as A.D.1400 in Tolaga Bay is here confirmed by the stratigraphic association with the dated midden. Elsewhere, they are not known to occur before A.D. 1500 (Davidson 1984: 123–7). This is not surprising since the East Coast is generally recognised as having high concentrations of raised rim pits, and the dates of relatively sparse southern examples are unlikely to supply either measures of the antiquity of the form or any association with Classic Maori migrations, such as that posited by Duff (1961).

The antiquity of the raised rim pit and its functional implications have been the subject of much discussion (summarised in Davidson 1984: 123–127). It is here suggested that its early presence on the East Coast results from the ground conditions. A sand- or siltstone substrate tends to prevent pits being dug deeply and also impedes drainage from the base of the pit. As a result the rim is used to increase the depth of the pit relative to that of the substrate, and also serves to take surface drainage away from the pit. These factors will always have applied and the solution to them in the form of the raised rim was found early. The rim should not be regarded as an innovation in style. The question as to whether this style moves south as part of a general migration southwards of tribal groupings such as Ngati Kahungunu or the related Ngai Tahu as suggested by Duff (1961) therefore does not arise.

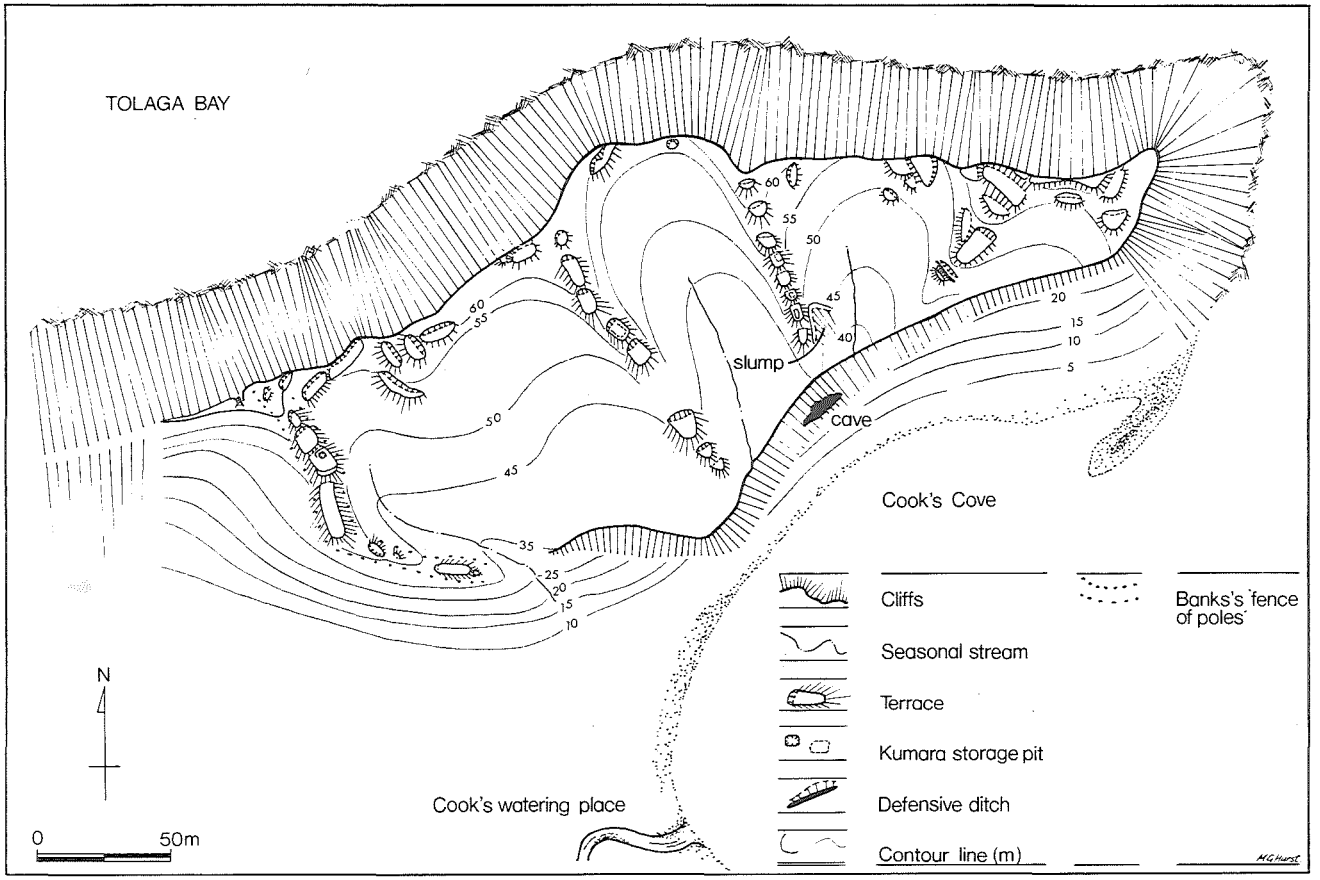

Figure 12: Plan of Te Kararoa *Pā* (N90/643), Cook's Cove.

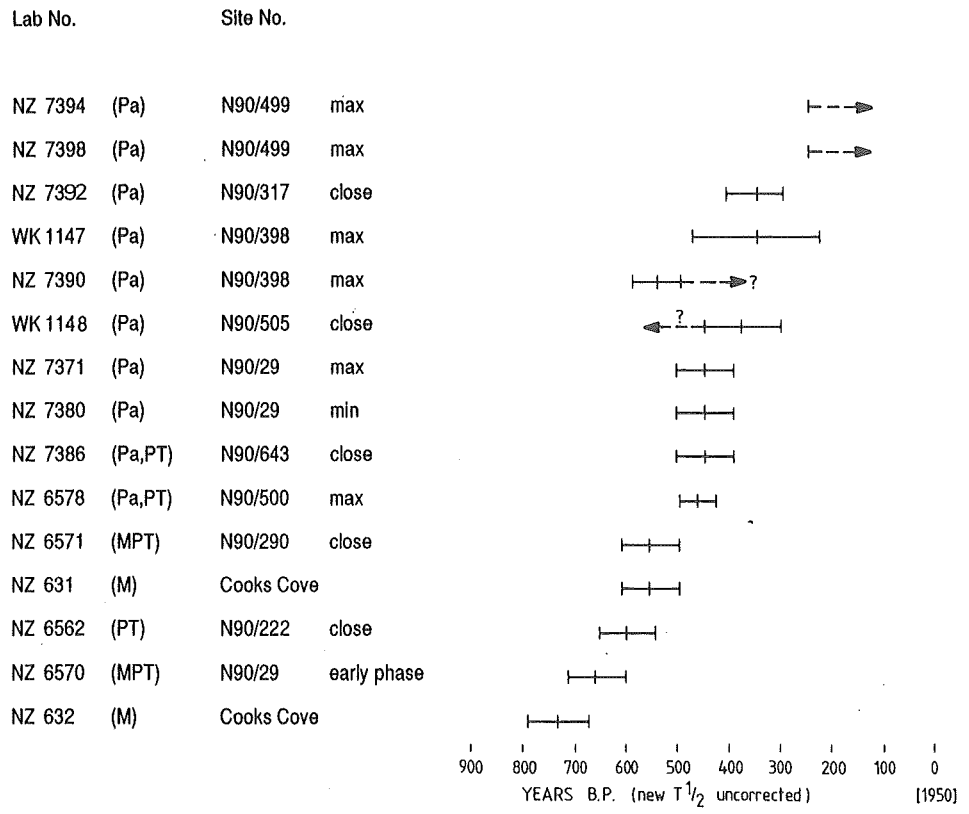

Figure 13: Summary of ^{14}C ages for Tolaga Bay. The ages are given for new $T\frac{1}{2}$, calibrated by the Institute of Nuclear Sciences in the case of charcoal dates. The Waikato laboratory dates are uncalibrated. Data derived from McFadgen (1982), Jones (1986) and Appendix 1.

The dating of features such as *pā* in the course of field surveys using samples from exposed sections has been strongly questioned by Davidson (1987: 17–8). Against her questioning must be noted factors that make such sampling desirable. The field costs of inspecting an available section are low and many such sections can be sighted in the course of an extensive survey. The value of the date in relation to the significance of its stratigraphic position can be ensured by selection from the large number of samples taken. Most of the dates reported here are directly from samples stratified under defensive banks, although some are on features that may be regarded as merely associated with defensive features, especially in the case of N90/500, 317 and 505. They are nevertheless regarded as being reasonable ages for settlement within defended areas and can be interpreted as providing minimum ages for occupation.

The maximum ages for *pā* are consistently at about A.D. 1500. Indeed several different *pā* have ages exactly at this date: they are N90/500, N90/643, N90/29 (two dates). The first two are coastal and the last is in the enclosed part of the Mangaheia valley. Slightly younger *pā* occur in several locations throughout the study area, including three directly associated

with settlement on the Uawa and Mangaheia River alluvium: these are N90/505, N90/398 (Marama Tawhaua), and N90/317. *Pā* are also dated as being later than A.D. 1700 on the Mangaheia River alluvium. These results are similar to the published ages of *pā* elsewhere in New Zealand (Davidson 1987: 17–20). The dates for *pā* and associated pits on alluvium strongly indicate gardening on the river fans and levees during the Matawhero phase of sedimentation, similar to the situation that occurred on the Maraetaha and Waipaoa Rivers in the same range of ages (Jones 1988).

The curve presented in Figure 13 shows the dates for all site types in order of their age, and with some qualifications it is worth comparing this curve with the logistic curve offered by Jones and Law (1987: 102). At the time of writing that earlier paper, only two dates were available for the Mangaheia Valley, whereas the present paper presents a further five for the same valley, extending the coverage of sites, all pits or associated with pits, from two to four. The new dates are all later than those earlier published suggesting that the logistic curve was made to rise too soon, and that too great an area of the multiple of pit volume and duration of use occurred beneath the curve. Rather than alter population numbers it is suggested that the apparent duration of use of pits is set at too high a figure in that paper.

PĀ MORPHOLOGY AND PHYSICAL ENVIRONMENT

Plans of several *pā* without artificial defences have been presented. In all cases the sites have clearly been chosen for a position with the advantages of naturally steep or cliffed approaches. In a few cases, weak points have been further fortified with seemingly small ditches. The ditches themselves are so narrow that they may be trenches designed for the purpose of holding lines of palisade posts rather than physical barriers in their own right. The influence of topography can clearly be seen in the case of the *pā* built on alluvium where the ditches are as much as 6 m across, although this is rather obscured by the effects of flood-scouring after the building of the ditch.

A definition of *pā* taken strictly to include only those sites which have artificial defences would not be sensible given the characteristic, steep hilly country of the East Coast. Although a field judgement as to what constitutes the selection of natural defensive features by the prehistoric inhabitants is open to the objection that it is subjective, the alternative would be a landscape substantially devoid of *pā*. Even although the definition of *pā* and its function in the settlement system remains controversial, a restricted definition would produce apparent differences in settlement pattern between the East Coast and other areas of New Zealand that cannot be justified.

Landsnail assemblages are available from two sites, one in the enclosed part of the Mangaheia Valley (N90/290), the other near the estuary (N90/500) (Appendix 2). Both are on north-facing, small ridge ends at the foot of the main hill slopes and no more than 30 m a.s.l. N90/290 has a mixed scrub and forest assemblage and N90/500 has a forest assemblage. These are results that confirm the picture of limited deforestation derived from the descriptions of Cook (1955).

CONCLUSIONS

Pā in the Tolaga Bay vicinity are no older than 450 years B.P., i.e., they date to the period after A.D. 1500. The age range for *pā* in Tolaga Bay is therefore similar to that encountered elsewhere in New Zealand. The earliest settlement date at about 750 years B.P. is for the

lower layers of midden in Cook's Cove. Sites for which there could only be access from the river as opposed to the coast are also early. These include midden adjacent to the Mangaheia River, on a site later worked into a *pā*, of about 660 years B.P.; and pits on ridges at the head of the Uawa flats at 600 years B.P. Such dates are consistent with those for midden, ovens and general settlement on the Waipaoa River to the south (Jones 1988: 49–50). The oldest *pā* are at Cooks Cove (N90/643) and on low hill country adjacent to the Mangaheia River alluvium (N90/29). The date (N.Z. 6570) for N90/29 published in an earlier paper does not relate to the surface features of the *pā* in the form that it survives today.

Raised rim pits in Tolaga Bay at about 550 years B.P. are the earliest recorded in the country, but the significance of this is doubtful in relation to the supposed 'migration' of pit styles down the East Coast.

The physical setting of sites was in forest or partially cleared forest, situations not dissimilar to those decribed by Cook (1955: 186). Many *pā* were located in positions that were close to the tidal reaches of the river and up to 10 km from the coast. From these positions the coast was still accessible, presumably by canoe, and rocky shore species were taken and transported inland.

ACKNOWLEDGEMENTS

I thank R. Reeves, the proprietors of Mangaheia 2D, and the Hauiti Incorporation for access to their land. The *pā* recorded here were mapped with the assistance of A. Nowakowski and R. Sheppard. Some figures were drawn by M. Hurst and the summary chronology figure entered by M. O'Keeffe. Terry Connor and Leigh Moore also assisted with preparation of figures. J. Bullock kindly typed some of the tables and text. I thank Tony Walton for comments, Rod Wallace for charcoal identifications, and Frank Climo for landsnail identifications.

APPENDIX 1
LIST OF RADIOCARBON DATES

In the following list, information on each radiocarbon date is given according to the following categories. Laboratory Number; Site Number; Material; Age (Old half life, years BP); Age (New half life, years BP)*; Age corrected for secular effect (years BP); Comments.

NZ 7380, N90/29, Shell, 445 ± 55, 460 ± 57, not corrected. In most recent topsoil of platform of *pā*, exposed by slumping. Overlies NZ 7371. Sample post-dates re-working of platform and creation of ditch. Minimum age for platform and the ditch.

NZ 7371, N90/29, Shell, 440 ± 55, 450 ± 57, not corrected. In mixed topsoil and subsoil fill from re-working of a *pā* platform, forming ditch, pit-building, etc.

NZ 7390, N90/398, Charcoal, 525 ± 55, 542 ± 55, 520–630. In Waihirere topsoil under outer bank of *pā*. Sample mainly *Podocarpus spicatus*, "not obviously young wood" (R. Wallace, pers. comm.). Sample gives maximum age for building a ditch and bank following flooding on inner ditch and bank. Allowing for in-built age, bank is less than 400 years old.

NZ 7398, N90/499, Charcoal, <250, <250, not corrected. Charcoal (kanuka, tawa, shrubs) "probably good C14 material" (R. Wallace, pers. comm.). From oven debris packed around palisade post. Sample is a minimum age for the construction of inner defensive ditch and bank.

NZ 7394, N90/499, Charcoal, <250, <250, not corrected. Tawa, shrub twigs: "Ideal for C14 dating" (R. Wallace, pers. comm.). From oven in firm yellow silt underlying outer bank of *pā* and overlying a silt loam topsoil. Sample provides a maximum age for construction of ditch and bank.

NZ 7392, N90/317, Charcoal, 350±55, 358±58, 300–530. Twig charcoal: "Generally excellent C14 material" (R. Wallace pers. comm.). From base of oven exposed in giant discing in ridge leading to *pā*.

NZ 7386, N90/643, Shell, 445 ± 55, 460 ± 57, not corrected. In topsoil overlying terrace-construction fill. Sample gives minimum age for use of a terrace in the principal defended area of the *pā*.

Wk 1147, N90/398, Charcoal, 350 ± 125, 360 ± 125, not corrected. Same general position as NZ 7390 although actually forming a thin layer on top of the Waihirere topsoil. Small sample (benzene 20% of dated material). Charcoals: shrub twigs and fern stems.

Wk 1148, N90/505, Charcoal, 370 ± 70, 380 ± 75, not corrected. Shrub, twigs or fern stem charcoals from oven base adjacent to *pā*. Some rootlets, may be slightly too young.

*Supplied by laboratory and calculated according to Klein *et al.* 1982.

APPENDIX 2
SHELLS FROM MIDDEN EXCAVATION, N90/290

	MNI
Sheltered Estuarine Sands	
Paphies australis	91
Sheltered estuarine muds/riverbanks	
Chione stutchburyi	37
Rocky coast intertidal	
Lunella smaragda	6
Cookia sulcata	2 adult
	2 juvenile
Rocky coast subtidal	
Haliotis iris	1 adult
	1 juvenile

Note: For the bivalves the count shows the greater number of left or right valves.

APPENDIX 3
TERRESTRIAL GASTROPODS FROM MIDDEN SAMPLES

N89 & 90/290		
Bulk Sample	1 *Omphalorissa purchosi*	2 *'Mocella'* aff (northern) *maculata*
20.2.86		4 *'Mocella' accelerata*
		1 *'Mocella' eta*
		1 *'Charopa' goulstonei*
2nd sample	5 *'Laoma' ciliata*	3 *'Mocella'* cf. *manawatawhia*
	1 *'Paralaoma' caputspinulae*	5 *'Mocella'* aff (northern) *maculata*
	3 *Delos coresia*	2 *'Mocella' eta*
		1 *'Charopa' pilsbryi*
		10 *'Mocella' accelerata*
N89 & 90/29		
Shell in topsoil	1 *Potamopyrgus antipodarum*	2 *'Mocella'* 'northern *maculata*'
of section		8 *'Mocella' accelerata*
19.2.86		
Shell from	1 *Potamopyrgus antipodarum*	1 *'Mocella'* 'northern *maculata*'
subsoil fill	1 *Melanopsis trifasciata*	10 *'Charopa' montivaga*
		12 *'Mocella' accelerata*
		1 *'Cavellia' buccinella*

Note: The above assemblages are interpreted as: scrubland, regenerating forests, fairly large bush. The freshwater species move freely and are not significant.

Terrace fill,	1 *Flammulina perdita*	3 *'Paralaoma' caputspinulae*
N90/500	2 punctid *lateumbilicata*	8 *Delos coresia*
	5 *Vallonia excentrica**	17 *Cavellia buccinella*
	6 *Huonoden pseudoleioden*	1 *H. hectori*
	1 *'Charopa' coma*	29 *'Mocella' eta*
	197 *'Mocella' accelerata*	85 *'Mocella'* 'northern *maculata*'

* introduced?

This assemblage is interpreted as occurring under heavy forest.

REFERENCES

Cook, J. 1955. *The Journals of Captain James Cook, Vol. 1: The Endeavour Journal, 1768–1771.* Edited by J. C. Beaglehole. Cambridge, The Hakluyt Society.

Davidson, J. M. 1984. *The Prehistory of New Zealand.* Auckland, Longman Paul.

Davidson, J. M. 1987. The *Paa Maaori* revisited. *Journal of the Polynesian Society* 96 (1): 7–26.

Duff, R. S. 1961. Excavation of house-pits at Pari Whakatau Pa, Claverley, Marlborough. *Records of the Canterbury Museum* 7 (4): 269–302.

Grant, P. J. 1985. Major periods of erosion and alluvial sedimentation in New Zealand during the Late Holocene. *Journal of the Royal Society of New Zealand* 15 (1): 67–121.

Jones, K. L. 1983a. Joseph Banks' "fence of poles" at Cooks Cove, North Island, New Zealand. *Journal of the Polynesian Society* 92 (4): 531–536.

Jones, K. L. 1983b. An archaeologically defined 'hamlet' (N89 & 90/222) in inland Tolaga Bay. *New Zealand Archaeological Association Newsletter* 26 (1): 7–20.

Jones, K. L. 1986. Polynesian settlement and horticulture in two river catchments of the eastern North Island, New Zealand. *New Zealand Journal of Archaeology* 8: 5–32.

Jones, K. L. 1988. Horticulture and settlement chronology in the Waipaoa River catchment, East Coast, North Island, New Zealand. *New Zealand Journal of Archaeology* 10: 19–51.

Jones, K. L. n.d. Determining settlement chronology from river terrace landforms: a New Zealand case study. Typescript copy held at Conservation Sciences Centre, Wellington.

Jones, K. L. and R. G. Law 1987. Prehistoric population estimates for the Tolaga Bay vicinity, East Coast, North Island, New Zealand. *New Zealand Journal of Archaeology* 9: 81–114.

Klein, J., J. C. Lerman, P. E. Damon and E. K. Ralph 1982. Calibration of radiocarbon dates: tables based on the consensus data of the Workshop on Calibrating the Radiocarbon Time Scale. *Radiocarbon* 24 (2): 103–150.

Leach, B. F. 1981. The prehistory of the southern Wairarapa. *Journal of the Royal Society of New Zealand* 11 (1): 11–33.

McFadgen, B. G. 1982. Dating New Zealand archaeology by radiocarbon. *New Zealand Journal of Science* 25: 379–392.

Polack, J. S. 1838. *New Zealand: Being a Narrative of Travels ... Between the Years 1831 and 1837.* Vol. II. London, Richard Bentley.

Reed, A. H. 1946. *Farthest East: Afoot in Maoriland Byways.* Wellington, Reed.

Rijkse, W. C. and W. A. Pullar 1978. Soils of Tolaga Bay flats, East Coast, North Island, New Zealand. *New Zealand Soil Survey Report* 40. New Zealand Soil Bureau.

Wellman, H. W. 1962. Holocene of the North Island of New Zealand: a coastal reconnaissance. *Transactions of the Royal Society of New Zealand* 1 (5): 29–99.

Wilson, J. (ed.) 1987. *From The Beginning: the Archaeology of the Maori.* Auckland, Penguin.