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Aileen Fox, *Tiromoana pa, Te Awanga, Hawke's Bay, Excavations*  
1974–5**

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**Tiromoana pa, Te Awanga, Hawke's Bay,  
Excavations 1974-5**

**Aileen Fox**



Volume 11 University of Otago studies in prehistoric  
anthropology. Monograph 8 of the New Zealand  
Archaeological Association

TIROMOANA PA, TE AV'ANGA, HAWKE'S BAY

EXCAVATIONS 1974 - 5

by

Aileen Fox

Volume 11 Otago University Studies  
in Prehistoric Anthropology

Monograph No. 8  
of the New Zealand Archaeological Association



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FOREWORD

Aileen Fox's report of her excavations at Tiromoana Pa, Hawke's Bay is an interesting addition to the literature of New Zealand archaeology in several respects. Firstly, it adds valuable information on the development of earthwork fortifications here. This problem has been the focus of considerable attention in recent years. Tiromoana can now be added to the all too short list of pa sites for which there is available a dated internal sequence of structures. Secondly, the report makes available the first large body of stratigraphically excavated data from a site on the East Coast of the North Island. This vast area is geographically remote from the centres of archaeological research although it is well known for its remarkable archaic artefacts. Further, early visitors recorded a rich and distinctive cultural tradition on the East Coast, an example of which appears on the cover of this volume. This is a reproduction of the canoe prow drawn at Pourewa Island, Tolaga Bay in 1769 by Herman Spöring, assistant naturalist on Cook's first voyage. The carving style of the prow separates the East Coast tradition quite decisively from that of the Bay of Plenty, Northland or Taranaki regions.

The present work may be regarded as drawing archaeological attention to this distinctive region and Aileen Fox is to be congratulated for taking this initiative.

This is the first major excavation report from New Zealand to appear in monograph form and I would like to thank Professor Charles Higham of the Anthropology Department, University of Otago, for helping to make this joint publication possible.

D.G. Sutton  
President, N.Z.A.A.  
1976-1978

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## INTRODUCTION

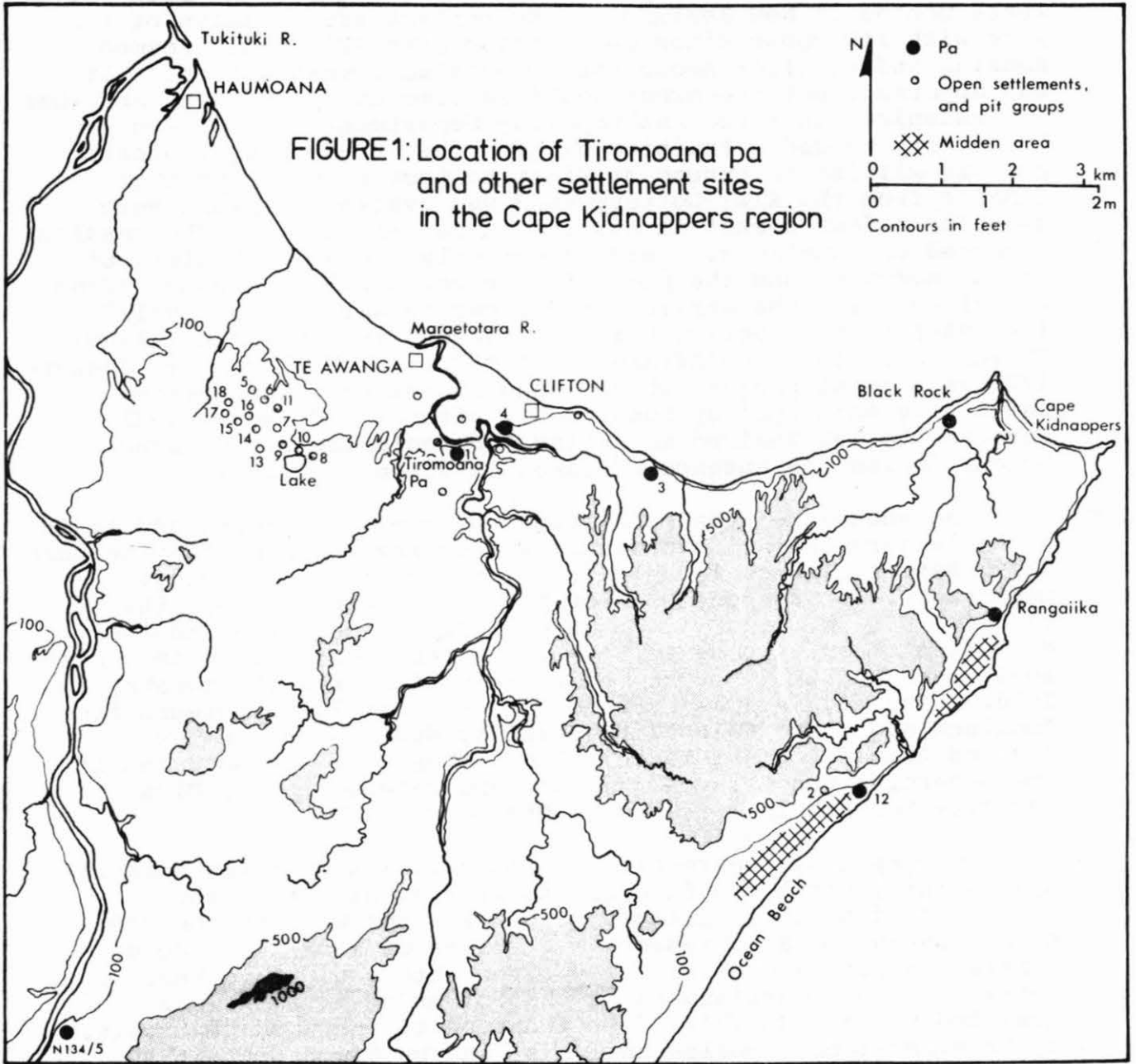
Excavations are not supposed to happen by chance: ideally the site is chosen from a wide knowledge of others in the locality and is selected to answer questions and to solve problems in archaeology that are current at the time, but initially this was not the case at Te Awanga. Mr W. (Bill) Shaw took me to see the pa on his property, 'Tiromoana', on my first visit to Hawkes Bay at Easter 1973 after I had been only three months in New Zealand. The perfect preservation of the site with its house sites and storage pits (Pl. I-II) seemed amazing and to offer scope for scientific investigation. It was apparent that the owner would welcome an excavation, and when it transpired that the Anthropology Department at Auckland University needed a training dig for the archaeology students and was willing to extend my Visiting Lectureship, and that finance from the Kiwi Lottery Fund was available, plans were made for a four weeks' excavation in January 1974. The results exceeded expectations, yielding not only a complex history of the pa defences and the plan of an exceptional long house (Figs. 16-17) but also the earliest radio-carbon date of AD 940±120 (NZ 1914) from an agricultural settlement in the North Island. It was possible to undertake further work at Tiromoana in January 1975 as a joint project of Auckland Museum and the Auckland University Anthropology Department, after I had unexpectedly returned to New Zealand as Acting Archaeologist at Auckland Museum during the absence of Janet Davidson overseas.

The success of the excavation was due to teamwork and it is with pleasure that I acknowledge the achievements of many helpers. Karel Peters, Senior Technical Officer in the Anthropology Department, was responsible for the preliminary survey, the planning and for organizing the equipment; he shared in the direction of the two seasons' work. John Coster came as a site supervisor and Bill Bourke undertook most of the photography in 1974. The digging was carried out by up to 20 volunteers from Auckland and Otago Universities and by members of the New Zealand Archaeological Association; they were accommodated in the shearers' quarters on the farm and catered for by Miss Caroline McGrath in 1974 and by Mrs Mary Jeal in 1975.

In compiling the report I am much indebted to the work of specialists, first and foremost to Dr T.A. Rafter of the Institute of Nuclear Sciences, D.S.I.R., for without the radio carbon dating of a representative series of stratified wood samples, a detailed chronology of the site would have been lacking. An understanding of the former environment was assisted by Paul Smith's identification of the wood charcoals, by Mr M. McGlone's pollen analysis, and by Elwyn Griffiths' account of the soils. Information concerning the economy of the Maori inhabitants was obtained from the identification of fish bones by Foss Leach, bird and animal bones by Ron Scarlett, from Dr R.F. Hemming's sourcing of the obsidian, and from Michael Morwood's analysis of the lithic material. The final plans were redrawn by Caroline Phillips from Karl Peters' originals with the exception of Figures 1-3.

Finally, I would like to express my gratitude to Bill Shaw of Tiromoana for his many kindnesses and for his interest in the site and to Professor Roger Green for his help and

FIGURE 1: Location of Tiromoana pa and other settlement sites in the Cape Kidnappers region



encouragement throughout and to Janet Davidson for editing the text of this report.

### The setting (Figure 1)

Tiromoana pa (Site N135/1 in the New Zealand Archaeological Association's site record file) is situated near the mouth of the Maraetotara River which flows into the southern part of Hawke's Bay at Te Awanga. East of the river a much dissected 500 ft (152 m) high plateau forms the base of the Cape Kidnappers peninsula, whilst on the west a belt of low hilly country forms the watershed between streams flowing to the Tukituki River. The coasts are varied: the north coast has a pebble beach and a rocky shore, whilst on the east coast there are the extensive sand dunes of Ocean Beach. Between the mouth of the Tukituki and the Maraetotara Rivers there is a low-lying belt of land fringing the hills, much of which was probably salt marsh and mangrove swamp in early times: east of Clifton the line of sheer cliffs begins extending to the Cape and continuing southwards to Rangaiika and Ocean Beach.

The geological formations in the area are sedimentary rocks of the Castlecliffian series, superimposed on the Waitotaran (Kingma, 1971:144). The pa is situated on a high river terrace of middle Pleistocene age but as Mr E. Griffiths' report on the soils shows (Appendix 7) the gravels are mantled by substantial quaternary deposits of loess, and by some volcanic ash, belonging to the Aokautere and Waimihia falls. These produce a fertile soil of the Matapiro series, although the presence of a hard pan in the loess at a depth of 60 - 100 cm makes for parching in the summer. Since the middle of the 19th century the land between the Maraetotara and the Tukituki Rivers has been cleared for pasture, whilst eastwards towards Cape Kidnappers much of the high ground is covered by manuka scrub. Cook who visited the coast in October 1769 noted that it was well wooded and the evidence from the excavation shows that timber from large totaras was obtainable in the 15th and 16th centuries near Te Awanga

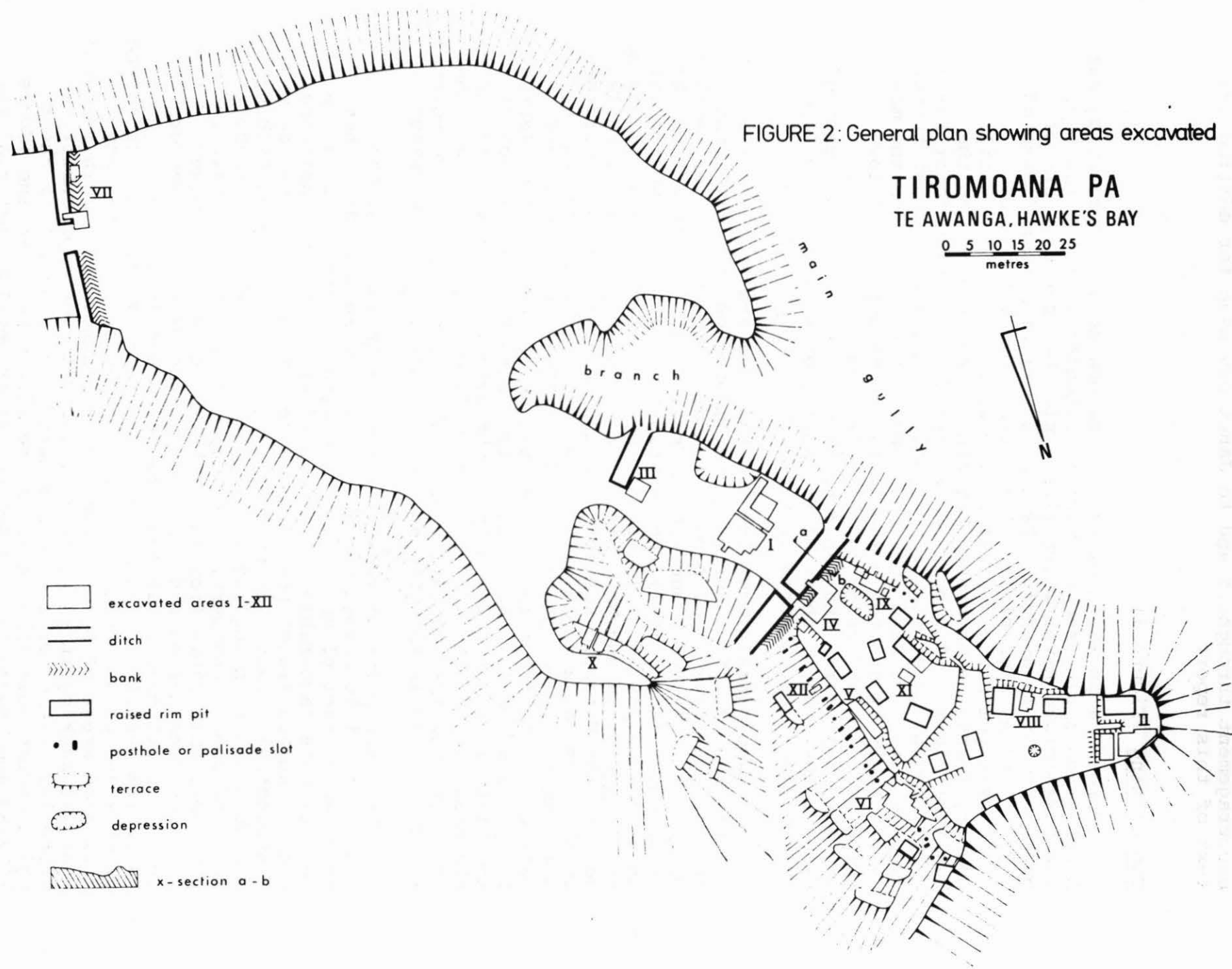
From the point of view of the Maori inhabitants, the hinterland of Te Awanga was attractive for settlement, since it provided a tract of undulating land with a fertile soil and a good climate favourable for the cultivating of their principal crop of kumara (sweet potato). Access to and from the sea was easy, whether directly or by canoe on the rivers: good fishing was obtainable in the bay and in the deep waters near inshore south of Cape Kidnappers; shellfish, principally mussels and paua were obtainable from the rocky shores and many other bivalves from the more distant sandy beaches as the numerous and extensive middens in the dunes of Ocean Beach and Rangaiika testify. The Maraetotara River is still a rich source of eels and birds would have been obtainable from the many uncleared areas of bush on the higher ground. The main resource that was lacking in the immediate locality was high quality stone for cutting or for adze manufacture; apart from chert which occurs near Kahuranaki in the Elsthorpe antecline (Moore 1977:83 and Figure 2) as beach and river pebbles, material for implements would have to be imported from a distance.









The Maori settlements known to me are marked on Figure 1.

FIGURE 2: General plan showing areas excavated

**TIROMOANA PA**  
TE AWANGA, HAWKE'S BAY

0 5 10 15 20 25  
metres



-  excavated areas I-XII
-  ditch
-  bank
-  raised rim pit
-  posthole or palisade slot
-  terrace
-  depression
-  x-section a-b

The information has been obtained from air photographs, from land owners and from rapid site surveys which have been carried out with Mrs Mary Jeal; the map does not claim to be complete. It will be noticed that all the pa sites are on land below 500 ft (150 m), and near the coast in areas where cultivation was practical; a high proportion of the interiors of most of them was taken up by raised-rim storage pits (Plate I-II). According to Buchanan (1973:71) the two pa at Rangaiika and Black Reef were related to a transpeninsular route across the base of Cape Kidnappers, a route used by Colenso on his way south from Hawke's Bay in the 1850's; both pa are heavily eroded.

The sites chosen were on end-spur or headland sites, and were defended by one or more transverse ditches and banks (Groube 1970:142 Type 2). At Tiromoana (Figure 2) these are spaced out forming successive enclosures on the ridge. At Razor Edge pa, Clifton (N135/3) the banks and ditches are close together, making a formidable double defence. The need for an additional lateral defence was developing in the area, shown by the palisades at Tiromoana (Plate II), by a pronounced scarp at Ocean Beach (N135/12) and by a low bank along the crest at the seaward side at Clifton Court (N135/4). This is probably true of southern Hawkes Bay in general, for farther south, at Te Hauke school pa (N141/13) which is defended by two separate transverse ditches and banks across the ridge, several posts of a lateral palisade are preserved, whilst to the north at Kaimata above the Esk (N124/3) a palisade slot can be seen along a terrace on the west side of the pa, despite the cruel damage to the site for a recent sub-division.

The other type of settlement in the area lacks earthwork defences and consists of groups of rectangular storage pits ranging from 4 to 12 in number, often arranged in rows, and some still retaining a raised rim: these are associated with lightly scarped levelled areas, probably for houses, rather than with true terraces. A number of these open settlements or hamlets on the Haddington Estate (N135/5-7, 11, 13-18, Figure 1) are to be found on the crest of the low ridges about 3 km from the coast, in places where the construction of defences would be practical but no surface indications of a palisade are visible. Others in this group are situated near a spring or on the rim of a small nameless lake (N135/8, 9, 10), an obvious source of fish, eels and water-fowl to augment the food supply. There are also some isolated single pits or small groups of two or three in the vicinity of the settlement and of the pa; these are likely to have been dug near the garden plots where the kumara were grown. It is certain that intensive and systematic fieldwork would reveal many more of these open settlements in the area, wherever there was suitable soil for cultivation. Modern farming must have obliterated many others.

The third type of site shown on the distribution map (Figure 1) are the middens, numerous in the dunes near Flat Rock, Rangaiika and at Ocean Beach. These are places where meals of seafood were prepared and cooked and which now show up in the sand as white patches of shells mixed with charcoal and burnt stones. Some of these were also industrial sites, where bone and stone implements were made as shown by the waste flakes, and many complete and broken examples of adzes and fish hooks recovered by casual digging (fossicking) in the past.

Some of these are preserved in the Hawke's Bay Museum at Napier, some remain in private collections. They include imported adzes of archaic type made from metasomatised argillites originating in the Nelson - D'Urville Island area. The broken blade of such an adze was found recently on the Tiromoana estate, when a track was made behind the homestead. A review of the material is much to be desired.

The settlement pattern, whilst admittedly incompletely known, does not indicate a dense population, in comparison with that evident for example in the Bay of Plenty or in North Taranaki. The pa are well spaced out, with the exception of Tiromoana and Clifton Court on either side of the lower Maraetotara River, where the river could have been the agreed boundary. The cluster of open settlements west of the lake is likely to be within the tribal territory of Tiromoana pa, which could have been a refuge for their inhabitants in times of war.

The region of Cape Kidnappers (Te Matauamaui) was occupied by the Ngati Kahungunu, an invading group from the north-east who according to tradition established themselves in Hawkes Bay in the early 16th century, after a struggle with the previous inhabitants, the Ngai Tara, of Kurahaupo descent (Buchanan, 1973:3). The district appears in historical times during the first voyage of Captain Cook and Joseph Banks in the *Endeavour* in 1769 (Beaglehole, 1955:176). On October 14, after having traversed Hawkes Bay from the direction of Portland and coming within 2 or 3 miles of the bluff on which Napier now stands, so that they could see the Ahuriri lagoon behind it, the *Endeavour* 'stood over for the southernmost land or south point of the bay', though not reaching it before dark; at that time she must have passed very close to the Te Awanga shore, but owing to the darkness neither Cook nor Banks observed the series of river mouths. At 8am on the 15 October when the ship was 'abreast of the S.W. point of the Bay' the famous incident of the attempted kidnapping of the Tahitian boy, Tiata, took place, from which the cape was named (Beaglehole, 1955:177). The war canoe manned by 22 men must have put out from a settlement on the north coast, because the *Endeavour* would not have been visible from farther south until she had rounded the cape. The nearest place is the heavily eroded pa on the cliff top west of Black Reef, but those at Clifton or Tiromoana cannot be ruled out.

### Recent History

The Tiromoana property was originally part of the large Kidnappers block purchased by W.B. Rhodes, in 1839 but the land to the north and west of the Maraetotara River was separated in 1851 to form the Clive Grange estate and farmed by a younger brother Joseph Rhodes (MacGregor, 1970:39). In 1856, 5100 acres (2054 ha) between the Tukituki and Maraetotara Rivers were leased to Mr Ashton St Hill; the holding was increased to 11000 acres (4451 ha) by 1876 and known as the Tukituki Station (*idem*:242). After passing through several hands, the station was divided into smaller blocks and the remainder sold for market gardens and for residential purposes.

The present house named Tiromoana, subsequently attached



to the pa, was built in 1910 by Mr Sam Charlton who was the first person to farm this block after the Tukituki Station was split up. None of the subsequent owners, of whom little is known, occupied the property for any length of time, until it was acquired by the Shaw family. The late Mr Basil Shaw purchased the estate of 1536 acres (622 ha) in 1938 from John Gatenby, and it is now farmed by his son, W. (Bill) Shaw, who kindly supplied the above information.

#### Site Description (Figure 2 and Plate I-IV)

The remains of the pa at Tiromoana occupy the end of a spur on the left bank of the Maraetotara just after the river has emerged from the hills and made a loop at Clifton, so that it flows past the site more or less parallel to the coast and about 1.5 km inland (Figure 1). The pa site was naturally well defended; on the north, flanking the river, by 30 m high sheer slopes mainly of compacted gravel, and on the west by a steep sided gully and its branch, now partly bush-covered. On the north-east the slopes are gentler, inclined to a shallow lateral 'dry valley' which has been truncated in the past by erosion, a process that was seen in action in the 1974 floods when the Maraetotara rose 30 ft (9 m) overnight and washed away the farm road at this spot. The only easy line of approach was from the south-east down from the 60 m crest of the ridge, where consequently three lines of man-made defences were constructed (Figure 2), each tactically well placed.

The outermost line was aligned from close to the head of the gully on the west to the river valley cliffs on the east: it consists of a transverse ditch and bank, 30 m long, with a 5 m wide gap in the centre. The middle line consists of a short length of ditch extending from the steep side of the branch gully for 15 m across the ridge towards the head of the 'dry valley'. The inner line, consisting of a low rampart and ditch 25 m long, crossed the ridge 44 m farther north in a position that not only commanded the level approach but also the head of the 'dry valley'. There was a narrow entrance gap towards the east end, and the rampart had also been breached in the vicinity of an oval depression inside the pa; since formerly it held water, this was probably an attempt by a European farmer to make a pond, and trampling by stock would have lowered the rampart. On the eastern side, there was a series of slits and depressions aligned along the contour (Plate II), with a gap indicating a possible entrance; they end on the eroded cliffs to the river. Similarly on the west side there are surface indications that some defences had been designed to protect a vulnerable flank; these consisted of three small conical heaps of soil and five circular depressions extending for some 20 m north-westwards from the end of the main rampart to end on the steeper slopes.

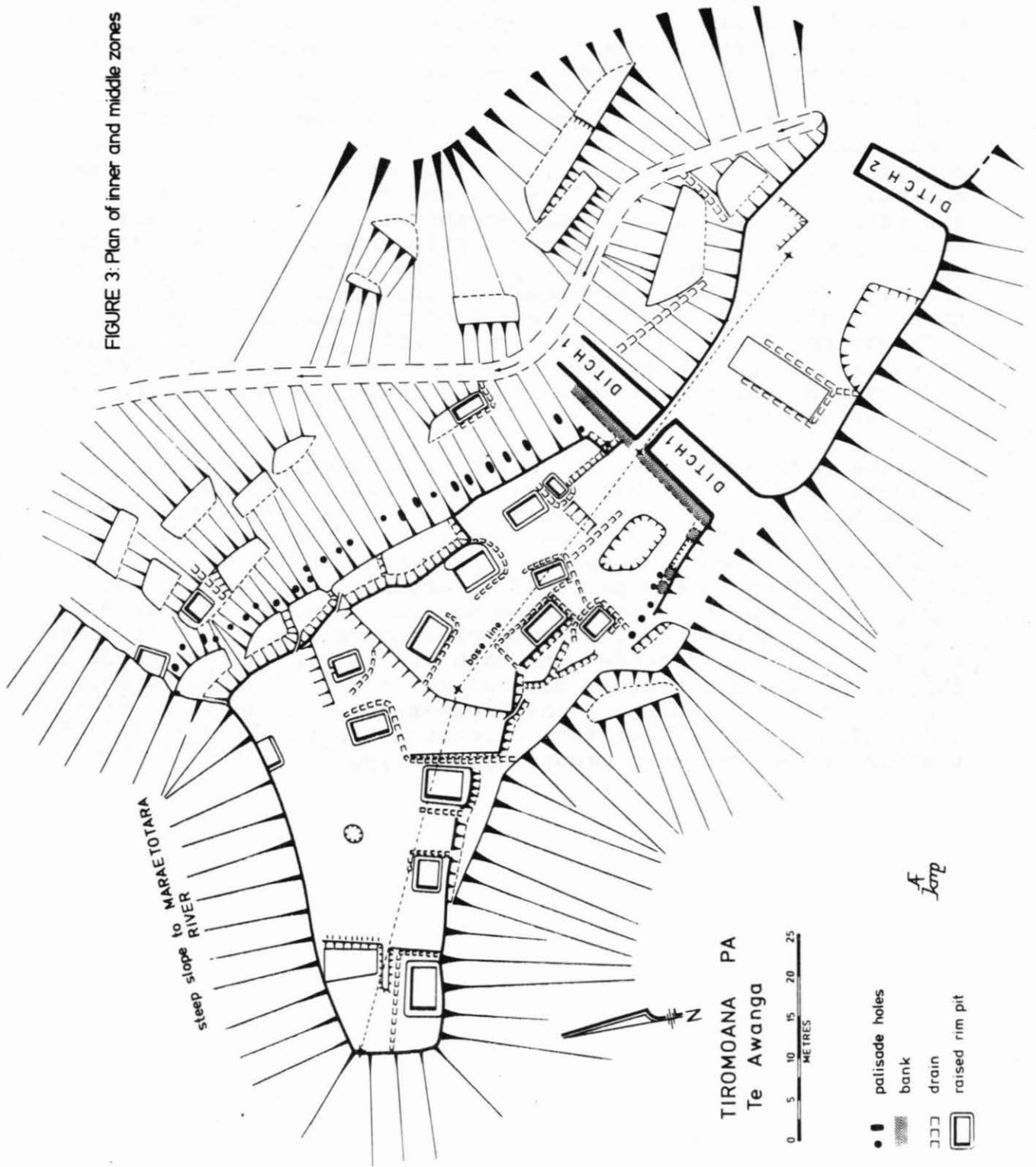
The pa, therefore, in its final form consisted of three enclosures; the outermost, which was by far the largest, is devoid of any surface signs of occupation. In the second enclosure, the embanked outline of a long building was visible extending across the ridge (Site I, Plate XV), and the position of another indicated by a levelled flat (Plate III). Around the head of the dry valley several terraces and a pit had been made on the slopes, showing that the settlement at some time

had extended outside the defended zone (Plate II and IV).

The inner enclosure formed the kernel of the pa and in contrast to the other two was fully occupied (Figure 3). Immediately inside the entrance gap there was a raised area extending for some 8 m behind the rampart, clear of all structures except for the European pond. Beyond this, the pa was tight packed with nine rectangular storage pits irregularly disposed, each surrounded by a prominent raised rim (Plate I) and by a complex drainage system: levelled spaces between the pits indicate some probable house sites. The far end of the enclosure is on a slightly lower level and makes a dog-leg turn, narrowing as it reaches the tip of the spur. On the west side there are three raised-rim pits with levelled spaces between them, and on the northern tip of the spur there is another levelled flat and a raised-rim pit (Site II, p. 17) separated from the rest by a low bank and scarp. The remainder is an open space presumably for assembly, with a small circular depression in the middle, probably a filled-in pit. Finally there is evidence of over-spill in the six terraces and two raised-rim pits grouped on the east-facing slopes of the dry valley; there is also one terrace below the major scarp on the west side. This completes the description of the pa as it appears today, which is based on observations by myself and Karel Peters during several visits; like a slowly developing photo-negative, not all the details were apparent at the outset and the final plans (Figures 2 and 3) have been redrawn more than once.

The pa site is a commanding one. From the interior the wide expanse of Hawke's Bay can be seen, giving early warning of the approach of visiting canoes. Across the river to the north-east another well populated pa above Clifton Court is overlooked and its activities could be monitored. Southwards, movement along the adjacent ridges in the direction of the pa would be visible on the skyline. This route traverses the area of cultivation; in a favourable light the low banks and ditches dividing the kumara gardens can be seen running up and down the north-facing slopes of the opposite ridge; these are also visible on the air photographs.

FIGURE 3: Plan of inner and middle zones



## THE EXCAVATIONS

Objectives and Procedure

The main objective of the excavations was to discover the history of the site and of the people who lived there. Since this was the first scientific excavation in southern Hawke's Bay, it was hoped to produce some guidelines for the prehistoric Maori occupation of the region, which could be tested by further archaeological work on other sites, and by reference to the traditional accounts. For this reason much of the work was concentrated on the defences, to find out how and when the pa was built and modified. A second objective was to study the different structures indicated on the surface, particularly the house types, which in 1973 were little known apart from Bellwood's work at the Mangakaware swamp pa in the Waikato (Bellwood, 1971). The discovery of artefacts would be incidental to these aims, though highly valuable as a source of cultural and economic information; as it happened, very little was found and nothing dateable, and in consequence the chronology was based solely on radiocarbon analysis of wood and charcoals from stratified contexts (Appendix 6).

The places selected for excavation numbered twelve, I - V in 1974, VI - XII in 1975 (Figure 2); sites III, IV, VI, VII, IX and XII, were concerned with the defences, sites I, II, V, VIII, X and XI with the occupation areas. In each case the area was uncovered in a series of rectangular cuttings, laid out in relation to the presumed structures indicated on the surface, and not to a pre-determined base line or to a grid of 'squares'. Sections or narrow reference balks were left where required and then recorded and each area was totally cleared to the top of the undisturbed natural soil; all post-holes were cleaned out. In this way the inexperienced diggers in the team had a clear idea of what they were investigating and could see the plan of a structure gradually emerging.

## THE DEFENCES

Site VII, Outer Line (Figure 4 and Plate V)

The outer defence consisted of a shallow ditch 2.5 m wide with an internal bank standing 1 m high at most, aligned across the ridge where it narrowed to 35 m (Figure 2). On the west the defences rested on the steep side of the head of a lateral valley, on the east on the cliffs above the flood plain of the Maraetotara; the bank ended 1.25 m short of the cliff, suggesting an entrance was intended on this side. It was noticeable that the bank and ditch were best preserved for a distance of 10 m at either end, reducing gradually to half size and then fading out altogether for 5 m in the centre.

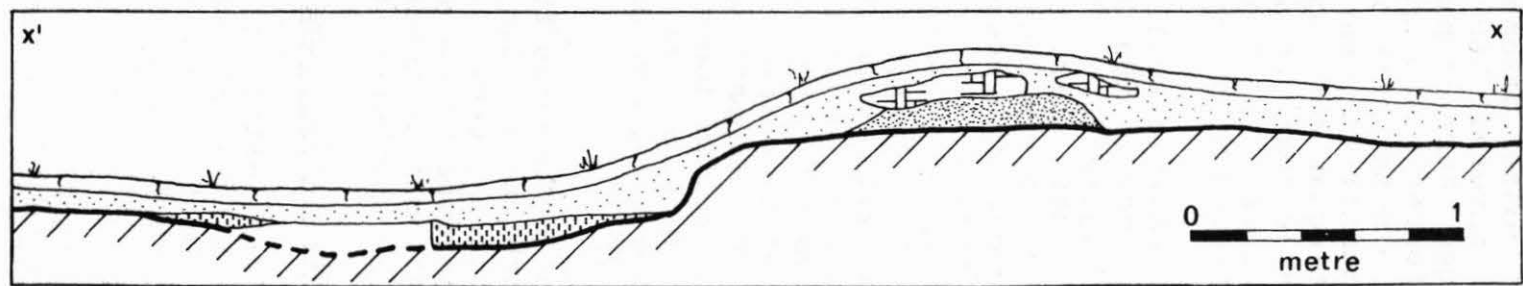
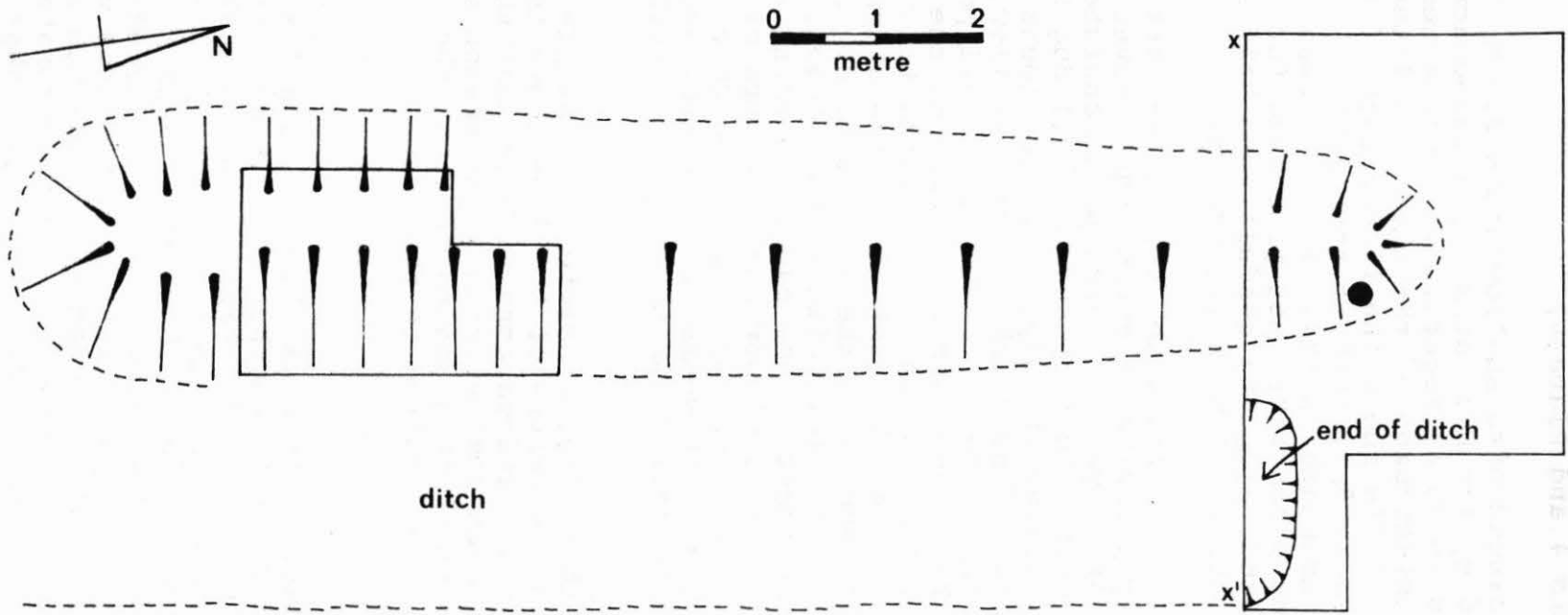
A 3 m wide section was cut through the reduced rampart at the west end of the central gap, with an extension to cover the ditch (Figure 4). The lowest layer in the rampart consisted of dark humic soil, representing the turf and top soil dug from the ditch, covered by a thin layer of lumps of yellow loess clay beneath the present turf. The ditch was very shallow, and both bank and ditch ended within the cutting. One small post-hole 25 cm in diameter and 20 cm deep was found towards the front of the bank; it was too insubstantial to belong to a palisade and perhaps held a marker post set up for the alignment. A second 2 x 3 m cutting was made along the outer face of the higher part of the rampart to look for palisade post-holes, either on the crest or at the front of the bank. Nothing was found; the rampart was constructed of horizontal layers of 20 cm of yellow loess, tamped firm on top, resting on 20 cm of grey surface soil intermixed with seams of white ash, and overlying a base of dark humic soil as in the previous section (Plate V).

The defence as built, therefore, consisted of a simple bank and ditch but the 5 m gap in the centre of the line shows that it was unfinished. The surface indications suggest that the work was done by two gangs, each completing a 10 m section at different ends and making a start on a second section (the reduced bank) before the work was halted in the centre.

Site III, Middle Line

Investigation of the middle ditch was limited to a 4 x 3 m cutting at its northern end to check whether the ditch continued further east towards the head of the dry valley, and to look for post-holes belonging to a palisade on its inner lip. The natural soil, which was a loess mixed with white ash and speckled with brown worm holes, was found to be undisturbed at a depth of 20 to 30 cm below the modern turf. Since this was deeper than on the nearby Site I, it suggests that the top soil from the ditch had been spread, instead of being incorporated in a rampart. No post-holes were found. It appears that the function of the 12 m long ditch was to restrict the easy line of approach down the spur to a 5 m wide gap and to check any attackers within missile range of a force on the inner rampart with its fighting stage approximately 45 m away (Site IV, p.12)

FIGURE 4  
 SITE VII, OUTER DEFENCES - PLAN & SECTION



turf



clay clods



grey-yellow speckled soil



grey soil



dark soil



natural

### Site I, Early Palisade (Figure 16 and Plates VI - VII)

The area between the inner and middle ditches contained the embanked outline of a long house which was selected for excavation (p. 24). It was soon apparent that a series of post-holes lay beneath the low bank on the south side of the structure (Plate VI and Figure 16, section ) and a line of 14 holes were traced across the ridge, extending beyond the house and diverging from it (Figure 16, plan ). The holes ranged in diameter from 30 to 60 cm at the top and from 20 to 36 cm at the bottom and had been dug from 18 to 39 cm deep in the subsoil. The spacing between the holes varied from 0.50 to 1.25 m. The characteristic shape resembled a flower-pot; when first excavated, radial grooves were apparent in the sides of many holes, which cracked open on exposure (Plate VII). These marks were probably caused by digging with a *ko*, the Maori digging stick, in a circular fashion, pressing the side of the blade against the hole in the relatively soft subsoil of ash and loess. The filling was homogeneous, a dark crumbly humic soil, easily distinguishable in the pale subsoil; the exceptions were the five holes at the west end of the line which had a blue-black peaty fill, due to seepage of surface water from the house drain down the slope. It was apparent that the butts of the posts had decayed in the holes, and in the absence of packing material, the size of the timbers corresponded with the bottom of the hole, that is from 20 to 35 cm in diameter. The end hole had two separate post impressions, the larger 42 x 30 cm and the smaller 24 cm diameter. The deduction is that a strong fence of close-set timbers had been erected across the ridge. The variation in the size of timbers suggests that, numbering from the left, 3, 6, 9, 11 and 14 were the main uprights, with two smaller posts in between, except between 9 and 11 where there was only one. The infilling was likely to be of supplejack, woven to make a very solid obstacle. The extra small post in the end hole suggests a strut to brace the larger post on the slope.

What part this fence played in the defences of the pa is uncertain, as no timber was found in the holes for radiocarbon dating and analysis of the soil in two of the holes was unsatisfactory (Appendix 6). On general grounds it is unlikely to be contemporary with the earth-work defences; it is difficult to see why an additional obstacle was needed between the two ditches and the construction differs from the wide spaced and deeper post-holes with ramps and packing, characteristic of the other palisades on Sites IV, VI and IX. If it belonged to an earlier period as seems likely, it should ante-date the 15th century defences by a considerable time, sufficient for the posts to decay and the holes to fill up naturally. Certainly the line of holes had disappeared completely when the long house was constructed on Site I in the 18th century.

### Site IV, Inner Line (Figure 5 and Plate VIII - IX)

The innermost defence consisted of a shallow transverse ditch 25 m long and 4-5 m wide in front of a 1 m high rampart. There was a narrow entrance gap with weathered sloping sides 7.5 m from the north-east end: up to this point there is a ditch-like hollow behind the rampart, probably a soil scoop.

The site selected for excavation was where the rampart had been lowered and the ditch partly filled, in the vicinity of the European 'pond', this is now only an irregular rushy hollow, 6.75 x 5 m and 20 - 40 cm deep. A 3 m wide section was cut through the rampart and later extended to an L-shaped cutting at the back of the rampart, with a second extension into the entrance passage (Figure 5, Plan and Plate VIII).

The rampart (Figure 5, section) was found to be of similar construction to the outer line (Site VII, p.8). At the base there was a 10 - 20 cm uneven layer of dark humic soil, containing some scattered charcoal but no artefacts. This presumably was the original turf layer; pollen analysis by Mr McGlone (Appendix 5) showed that bracken was dominant, with minor amounts of scrub species, as well as grass, moss and herbs. Three tree species were recorded, *Podocarpus spicatus* (matai), *Nothofagus* sp (beech) and *Dacrydium cupressinum* (rimu). *Podocarpus spicatus* was the most abundant tree type. He comments that the vegetation pattern would fit fairly well with the late clearance phase evident from his work at Lake Poukawa, near Hastings, with the original forest very much reduced in extent and a dense bracken/scrub mosaic covering the landscape. These findings are consistent with the archaeological evidence from Site II for early agriculture antedating the defences.

The old turf layer was covered by 40 cm of mixed soil, mainly fine dark but with some lumps of loess clay, representing surface soil obtained from the digging of the ditch. The front of the rampart had been built up to a height of 0.5 m with bands of the yellow clay and turf which were clearly visible in section (Figure 5). Above this, the rampart consisted of loess clay clods dug from the lower levels of the ditch and tamped solidly so that it retained a near vertical face, beneath the eroded surface deposit. The inner lip of the ditch was established in the section beneath some slip and accumulated surface soil but otherwise was not excavated.

Behind the rampart, there were three heaps of stones below the turf, mostly broken and burnt (Figure 5); the largest consisted of 143 fist-sized pieces, weighing 30 kg; the other two of 67 and 51 stones, weighing 11.5 and 10.5 kg respectively. There was no charcoal with them or a hollow in which they could have been used for a *haangi*; it is likely they had been collected from a cooking place elsewhere as missiles by the defenders. Cook and Banks record that the Maoris in the pa at Mercury Bay had a stack of darts and missiles on the fighting stage (Beaglehole, 1955:199) and that stones were thrown at the *Endeavour* off Whale Island, (Motuhora) and Cape Colville on November 2 and 18, 1769 (Beaglehole, 1955:190, 205).

The section (Figure 5) showed that there was a slip covering a sinkage at the back of the rampart; when investigated a complete glass bottle was found behind the section face lying horizontally beneath 10 cm of loose surface soil.. It was of thick amber glass, hand-made with a two-ring moulded neck and basal 'kick' and of early or mid-19th century date according to Trevor Bayliss of the Auckland Museum. Beneath it, the soil was soft, dark and greasy with some charcoal and seamed with small animal burrows which extended into the back of the rampart: in the other direction, the soil was firm but still discoloured. These two deposits of different consistency



continued well down into the natural soil (post-hole A, Figure 5); the firm soil filled an elongated hole 1.40 m long x 0.65 m wide and 40 cm deep, with a ramp sloping inwards; the loose dark soil, some 50 cm square, carried down to a depth of 1.40 m where it measured 32 cms square, and was of a blue-black colour and crumbly consistency, showing where the post had stood. These deposits did not show in the section, which missed the centre of the hole; the position of the post has been projected in Figure 5.

Further excavation revealed a similar hole (post-hole K) 2 m away and partly covered by a stone heap: it measured 1.50 x 0.60 m at ground level and was 1.25 m deep; at the bottom up against the vertical back of the hole, the decayed butt of a post was preserved, 31 cm in diameter, from which a radiocarbon date of 430 BP (AD 1520)  $\pm$  60 (NZ1911) was obtained. The wood was totara and hard enough for a cross-section to be cut at the Institute of Nuclear Sciences Laboratory, which has been sent for a tree ring count to Dr C.W. Ferguson at the Laboratory of Tree-Ring Research, University of Arizona, U.S.A.

A third post-hole (L) on the same alignment, 40 cm in diameter and 1.10 m deep but lacking a ramp extension, also contained a totara post butt. This was much more decayed and shrunk, measuring about 25 cm in diameter, and gave a radiocarbon date of 570 BP (AD1380)  $\pm$  60 (NZ1911). It is interesting to see that the differences in the appearance of the two timbers are reflected in their radiocarbon ages.

Four other smaller post-holes with ramps B, C, D and G 1 to 2 m apart, were found about 2.5 m behind the rampart (Plate VIII) and more or less parallel with the A-L-K alignment. Post-holes B and C were visible as surface depressions, G was partly beneath a stone heap, whilst D was at a lower level in the end of the ditch-like hollow; it was detected from the flight of bumble bees who had made a nest in the soft filling. Post-hole G contained traces of a small post, 18 cm in diameter, centred in a hole 37 cm in diameter. Post-holes B and C were dug with ramps on the north side (Plate IX) and were 53 - 73 cm deep: each contained the blue-black crumbly deposit characteristic of decayed timber, indicating posts of 33 x 22, 35 x 26 and 67 x 26 cm in D. Hole C had a water-worn stone wedged against the post, the only packing stone found on the site. The large oblong timber in D had been set diagonally in the hole and overlay another post-hole 53 cm in diameter and 27 cm deeper, which had been firmly repacked. Similar evidence of re-used post-holes was found in the entrance on Site VI (p. 15)

Finally, four post-holes E, F, H and J were located in the outer face of the rampart. As time was getting short, E, H, and J were found by prodding the top of the rampart clay which was impenetrable except in these soft spots, where a ranging pole could be pushed down for nearly a metre: as a check, post-hole E was partly uncovered to show the discoloured outline. Post-hole F was found beneath the edge of the rampart on the east side of the entrance gap and was cleared; unlike the other holes there was no soft dark soil in the filling, which consisted of dirty clay to a depth of 37 cm. On the assumption it had held a gate post, a search was made for another beneath the opposite end of the rampart, but without success.

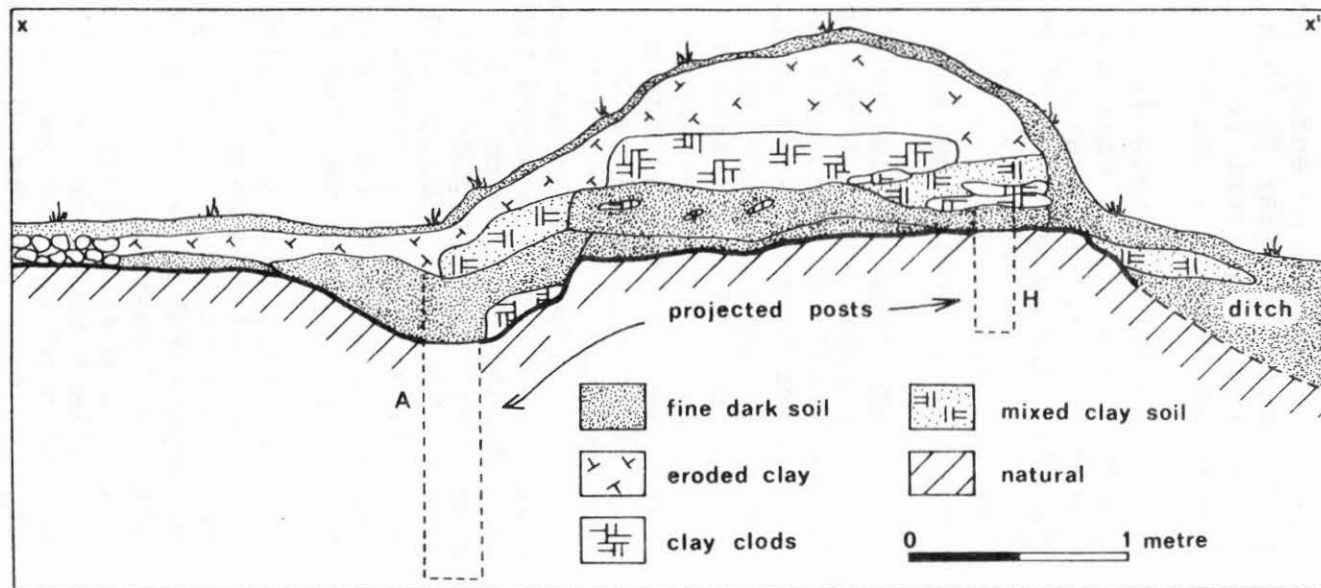
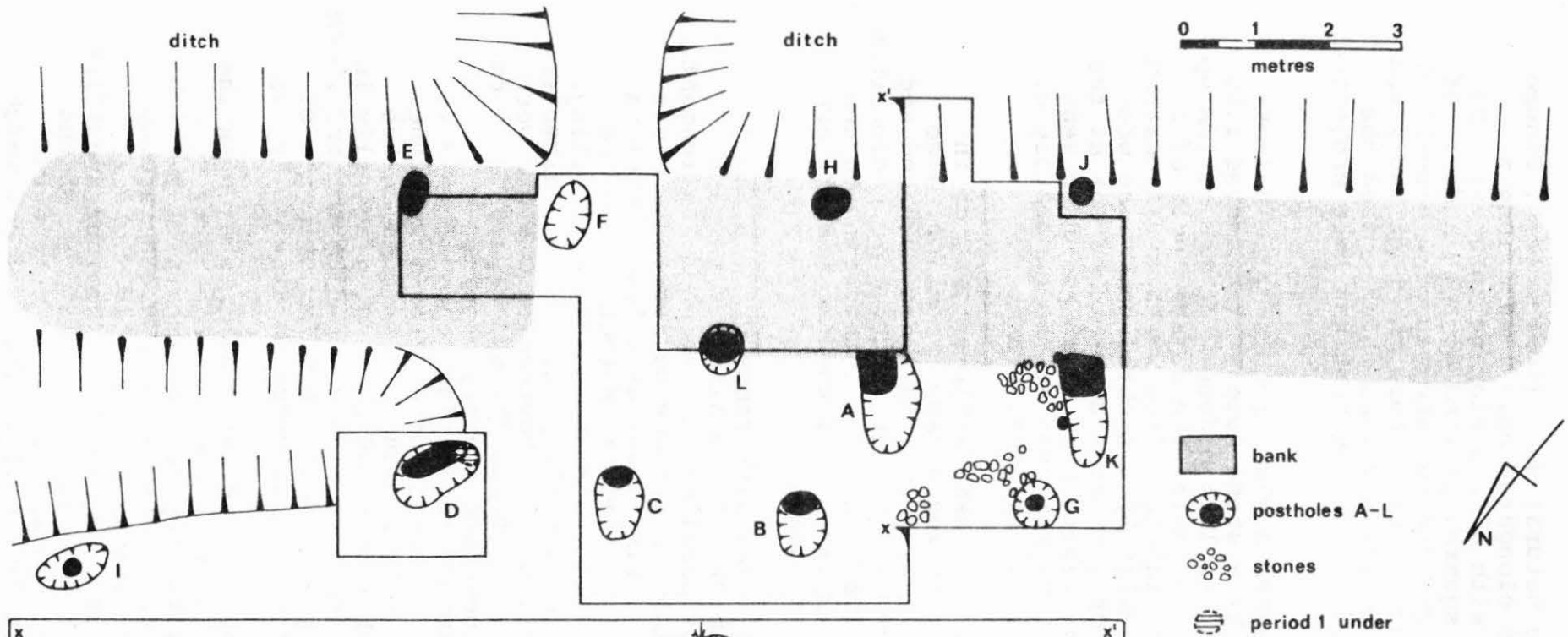


FIGURE 5  
SITE IV, PLAN & SECTION

## Interpretation

The meaning of these various settings of posts must now be considered. By analogy with other pa which have been excavated like Otakanini and Kauri Point, the row of posts E, F, H, J in front of the rampart held the main uprights of a palisade. It was a different construction to the close-set uprights of the palisade excavated on Site I (p. 9). The posts were 2 to 3 m apart and the intervening spaces will have been filled with light timbers which were not bedded, but lashed together with supplejack and strengthened by a horizontal attached to the uprights. This composite type of palisade is frequently illustrated by 19th century artists; a good example is G.F. Angas' picture of one defending Waitahanui pa at Lake Taupo (Angas, 1847:plate 18). The main uprights would need to be high enough to carry a breastwork above the rampart, and after allowing for 1 m below ground level, must have been at least 4 m long.

The middle row K, A, L held the largest posts, 50-60 cm in diameter and set 1.10 to 1.40 m deep below ground level, and therefore of considerable height. It is likely these were the supports for a fighting stage, a lofty timber platform erected above or immediately behind a rampart on which the warriors, armed with long wooden spears, stood and hurled stones and darts. The additional height enabled them to outrange the attackers. Fighting stages were described by Cook and Banks at Wharetaewa pa in Mercury Bay on November 12, 1769 (Beaglehole, 1955:199) and by Crozet at Paeroa in the Bay of Islands in 1772 (Crozet, 1891:32) where they were said to be 20 - 30 ft high (6-9 m), 6 ft wide (1.8 m) and up to 40 ft (12 m) long. They are attested archaeologically by Bellwood's excavations of similar deep post-holes at Otakanini, South Kaipara where the period II stage measured 9 m x 2 m, and the two smaller ones of period III, 5 x 1.5 and 4 x 2 m respectively (Bellwood, 1971:68).

At Te Awanga it seems that the stage was erected over the rampart and secured to the front posts of the palisade. Post-hole J is square with post-hole K, but H lies between A and L; a third front post was probably missed in the body of the rampart. The great depth of the rear posts would have anchored the whole structure, but the diagonal timber in post-hole D suggests that a strut may have been necessary on the east side. The size of the platform would be 5.50 m long and 2.35 m wide, providing standing room for some 15 to 20 men. The stage could have extended 2 m farther west, into the area not excavated, but the three anchor posts are central to the rampart and on the highest point of the ridge; beyond this the ground begins to slope downhill.

The rear post-row G, B, C, D, is more difficult to interpret. Traces of decayed wood were found in B, C and D, and this and their ramp construction indicates that these posts are likely to be contemporary with the stage, though not correctly aligned with it. One possibility is that G, B, C supported a platform at a lower level, used to mount to the upper stage. This would be easier than a ladder made out of notched timber, and could be used by a number of warriors in quick succession. A stage of two tiers is not unknown as Elsdon Best noted

(Best, 1927:81-82) and one was drawn by Charles Heaphy in the Chatham Islands in 1839. The drawing in the Hocken Library at Dunedin shows the famous confrontation of wooden siege towers at Waitangi, but in the background, at the opposite end of the pa which was being assaulted, there is a two-tier stage with warriors standing on it at two levels. (This is not shown in Best's reproduction, 1927:Figure 34.)

The alternative suggestion is that this third row of posts belongs to an earlier palisade across the ridge, which, as will be demonstrated on Sites VI and IX was present on the other two sides of the pa. This interpretation gains support from post-hole D where an earlier round post-hole was repacked and another timber inserted in the enlarged hole above (Figure 5).

The narrow entrance through the rampart is unlikely to be primary as it would be a serious weakness during a frontal assault, but it is too weathered to be a recent gap. It seems likely to have been made when the pa was inhabited but no longer defended. This explains the absence of any traces of a palisade post in post-hole F; the post would have been removed and the hole repacked when the entrance was cut. Another example of a post removal occurred on the west side of the pa similarly associated with a new entrance (Site IX, post 6, p.14).

#### Site IX, Western Palisades (Figure 6)

Surface indications on the west side of the pa suggested that the defences had turned and continued for some 20 m along the edge of the wooded gully to protect a vulnerable flank; these consisted of a row of five depressions and three low mounds above a 1 m high artificial scarp (Figure 3). Excavation showed that the depressions were post-holes (Nos 3, 5, Figure 6) measuring 66 cm in diameter and 30 and 60 cm deep, with a soft core of dark soil 20 cm across. A sliver of wood found lying loose in post-hole 3 gave a radiocarbon date of 1520 BP (AD430)  $\pm 100$  (NZ2713), suggesting that the wood was ancient driftwood. Another post-hole (No. 2) was found on the same line, firmly packed with mixed soil and without a soft core, indicating that the post had been removed. A section (Figure 6) was cut through one of the mounds and showed it was a featureless heap of lumpy yellow loess clay and mixed soil. In front of it the scarp had been built up to a near vertical face with grey soil, probably the remains of turf. A line of pebbles resting on a deposit of fine dark soil indicated the previous ground surface, which had been cut through to make the scarp. The edge of a large post-hole showed in section beneath the soil heap (No. 1, Figure 6). When cleared, it measured 75 cm in diameter and contained the butt of a palisade post 41 cm high. A second post-hole (No. 4, Figure 6) was uncovered 2 m farther north, similarly sited at the top of the scarp by a second mound and in alignment with the three remaining depressions visible on the surface to the west (Figure 3). This post-hole also contained the butt of a totara post standing 90 cm high in a 1.15 m deep hole. A radiocarbon date of 330 BP (AD1620)  $\pm 70$  (NZ2712) was obtained from this timber.

On the south east, a 5 m gap separated these structures from the third mound close to the end of the main rampart. The scarp

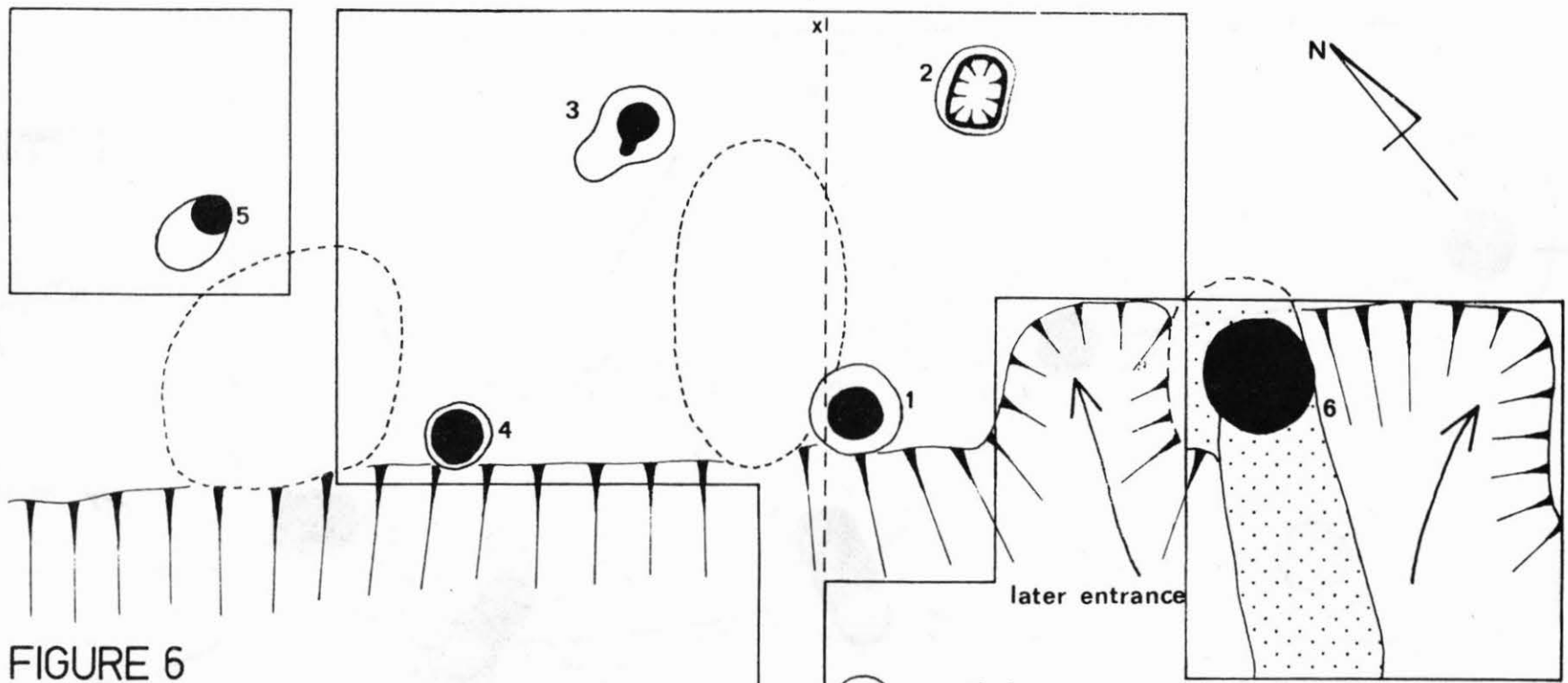
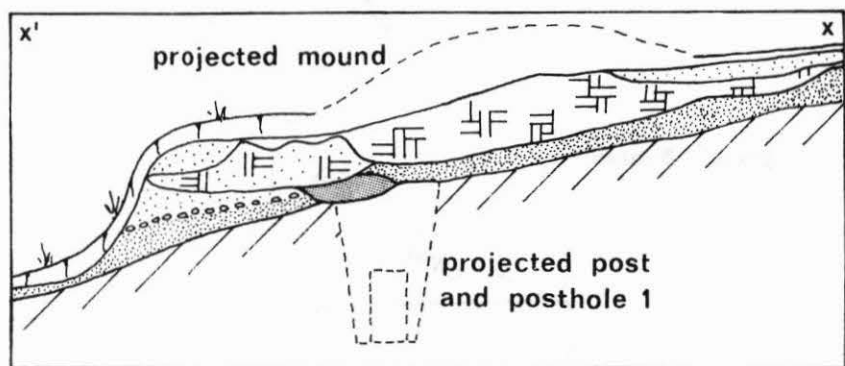


FIGURE 6  
SITE IX, PLAN AND SECTION













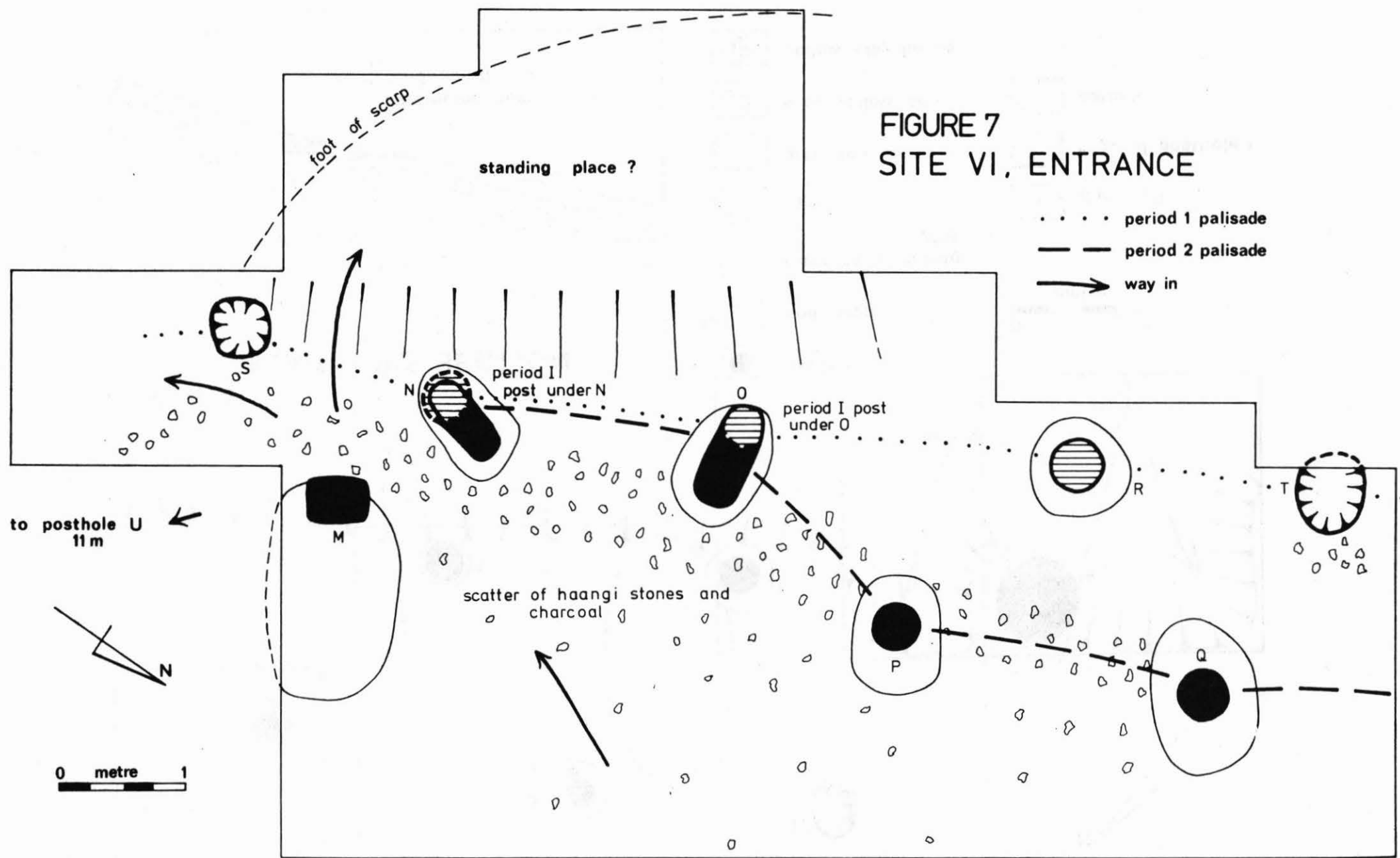
-  posthole
-  soil heap
-  ramp for removing post
-  turf
-  grey soil
-  grey-yellow soil
-  yellow clay lumps
-  dark soil
-  edge of posthole 1
-  natural

FIGURE 7  
SITE VI, ENTRANCE



- ..... period 1 palisade
- - - - - period 2 palisade
- way in

to posthole U  
11 m

scatter of haangi stones and  
charcoal

0 metre 1

in between had been reduced in height and inturned to form a 3 m wide rectangular recess (Figures 3 and 6). A 2 m square cutting on the lower level of the recess revealed the dark mark of a very large palisade post up against the rear scarp (No. 6, Figure 6), in line with Nos. 1 and 4. The front of the post-hole had been cut away, leaving a sloping ramp in line with the post impression. It was apparent that the post had been removed by undercutting at its base and then pulled out down the ramp. The post socket and part of the original hole as well as the ramp had been filled in with dirty soil, mostly loess clay, packed hard and carefully levelled (spotted on Figure 6).

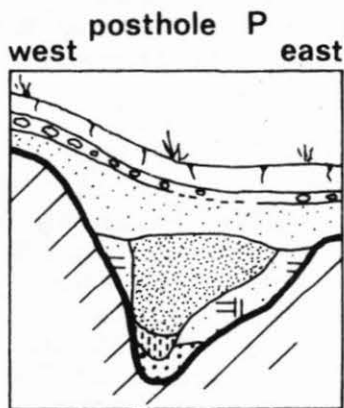
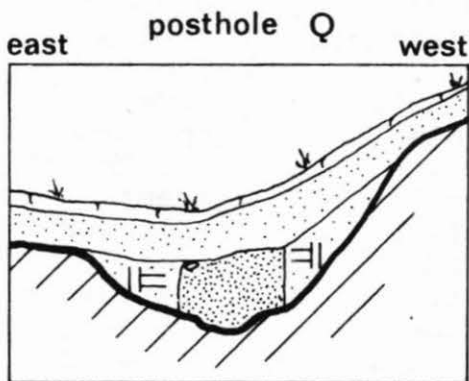
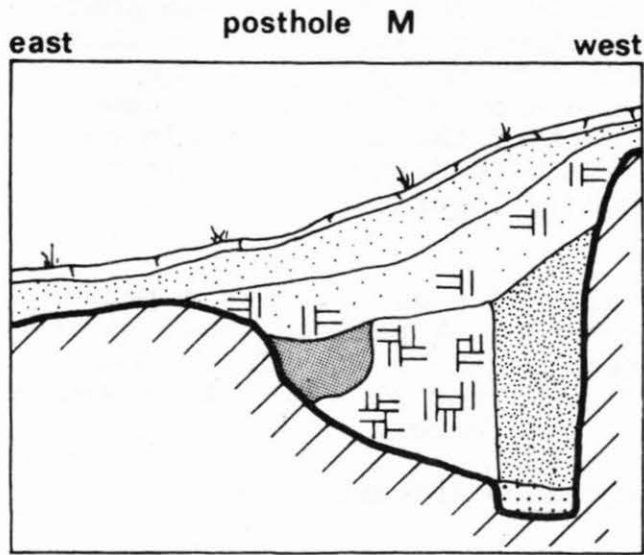
The cutting back of the artificial scarp to make a recess, together with the removal of a substantial palisade post shows that an entrance to the pa was required here at a later date. There were surface indications of a narrow path on either side of the recess, as shown by arrows on Figure 6.










#### Site VI, Eastern Palisades and Entrance (Figures 7-8)

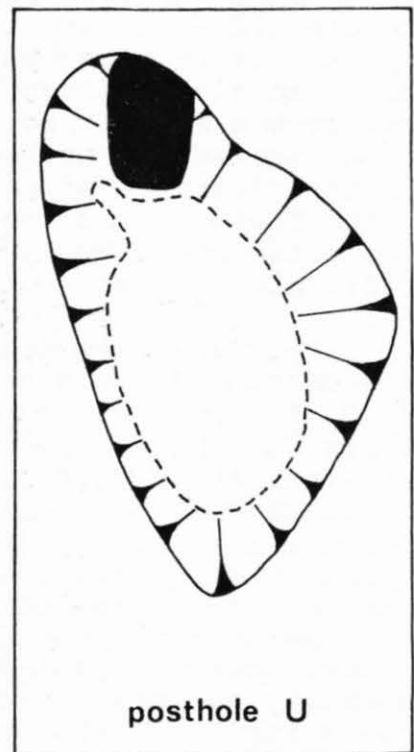
On the east side of the pa which faces the relatively easy slopes of the 'dry valley' there were surface indications of a palisade extending from the end of the rampart along the contour to the edge of the cliffs (Figure 3 and Plate II). Some of the depressions were circular, some were trench-like slots about 3.5 m long. The spacing between them varied from 2 to 3 m but there was a significant 6 m gap about 35 m away from the end of the rampart, suggesting that the entrance was here. Three more possible post-holes were visible in this gap higher up the hillside, and there was access to the interior of the pa by two narrow paths which ascended diagonally the adjacent terraced slopes (Figure 3). All these features were planned before the excavation began and determined the area to be investigated. Further work on the eastern palisade was limited to the clearance of one circular depression (post-hole U, Figure 8 and Plate X) and one slot-trench (Site XII, post-holes W and X, sections, Figure 9). Post-hole I on Site IV (Figure 5) could also belong to this palisade, as it was in alignment.


The main excavation (Figure 7) confirmed the existence of the entrance; on the northern side of the gap, three post-holes, N, O, P, were set back from the line to form a shallow recess, whilst on the southern side, there were indications of a substantial post in M positioned at the back of a 2 m long slot, leaving only a 1 m space between it and the timber in N. There was a scatter of broken *haangi* stones, ash and charcoal lying on the compact grey surface soil in the recess, thinning out down the slope below the line of post-holes. It continued *only* between the two post-holes M and N, thus identifying the actual entrance passage through the palisade. The material probably had been deliberately scattered to give a foothold on the slippery slopes outside and through the gate. Immediately behind the palisade posts, there was a semi-circular platform at the foot of the main scarp (Standing place on Figure 7). Although the site was suitable for a fighting stage, no post-holes were found; clearance of half the area showed only firm yellow subsoil beneath the turf, except at the back where there was 15 cm of loose black soil which had washed down the slope. such a platform would have provided a level stance for warriors

**FIGURE 8**  
**SITE VI, POSTHOLES - SECTIONS & PLAN**



-  topsoil
-  grey wash
-  yellow-grey
-  packing lumps
-  fine black soil
-  black
-  grey with charcoal
-  fine gritty ash
-  natural



-  haangi stones and charcoal



near the gate, sufficiently raised to enable missiles to be thrown over the palisade, and thus to dominate the approach.

There were some interesting differences in the post-hole construction at the entrance. Post-hole M held the terminal post in the palisade, which also acted as a gate post. It had been dug with a vertical back and sloping front (Figure 8, section) resembling the ramps of the stage posts A and K on Site IV (p. 11). The position of the timber was shown by a patch of fine dark soil 46 x 30 cm and 85 cm deep against the back of the hole, which was packed in front with lumps of loess (plate XI); a second pocket of dark soil containing timber fragments 25 cm in diameter and 20 cm deep on the lower side of the hole indicated that a second post had been inserted into the packing, perhaps as a brace for the larger upright. Post-hole Q (Figure 8) was oval, 1.25 x 0.75 m and 60 cm deep; it had sloping sides with a core of soft dark soil indicating that the post had been placed in the middle of the hole and packed round with mixed soil. Post-hole P was similar to M, with a ramp on the lower side. Post-holes O and N contained the marks of oblong timbers or planks measuring 55 x 30 and 50 x 25 cm respectively, 50-60 cm deep and placed diagonally to the slope. When the soft soil of the post marks had been removed, it was found that the loess packing at the upper ends of the holes continued down for another 22 cm into the natural soil, defining a previous smaller post-hole (Figure 7).

The small post-holes in O and N were in alignment with post-hole R which had been detected on the surface and found to be filled with loose ashy soil to a depth of 55 cm, beneath which there was the impression of a 40 cm post packed in loess to 85 cm deep. The line was continued along the contour by post-holes S and T; both were squarish holes, 40-45 cm across, filled with ashy soil, fine charcoal and burnt stones without a trace of a post. It can be deduced that the five holes are the remains of an earlier palisade from which the posts had been removed, and the holes either filled with kitchen rubbish (R, S, T), or re-used (N, O) when a later palisade was constructed lower down the hillside. This interpretation was confirmed by the excavation of one of the slot-trenches (Site XII) nearer the main rampart, in which the post-holes of the two palisades were found at either end of the 3 m long slot (Figure 9). At the upper end, post-hole W was filled with similar rubbish to S and T; the lower side of the hole had been cut away and the surface levelled for a hearth, on which some material had been burnt. Post-hole X, at the lower end of the slot, was of a similar character to M, with the soft dark soil of the post impression up against the vertical back of the hole, and with a ramp on the lower side. Since W and X were not in alignment in the section trench, the outline of X has been dotted in on Figure 9 from the opposite side of the 1.5 m wide trench.

The ramps on the lower side of some of the post-holes in the palisade raise a structural problem; were these dug to slide the timber down into the hole, as they undoubtedly were on the level ground behind the main rampart (Site IV, A, B, C and K) or were they dug later to enable the post to be pulled out, as was the case on Site IX, post 6. On a hillside, a ramp on the lower side of the hole is a source of weakness, however firmly

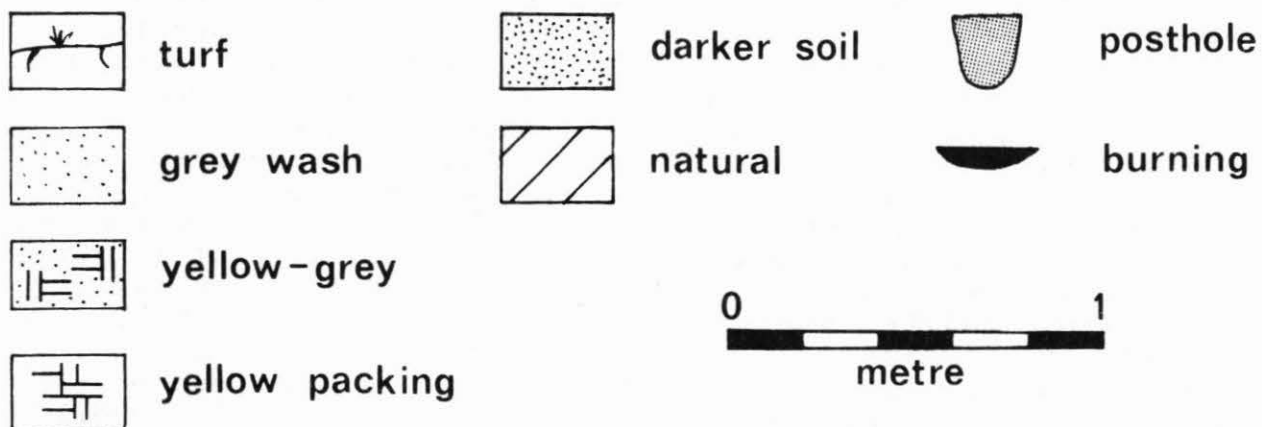
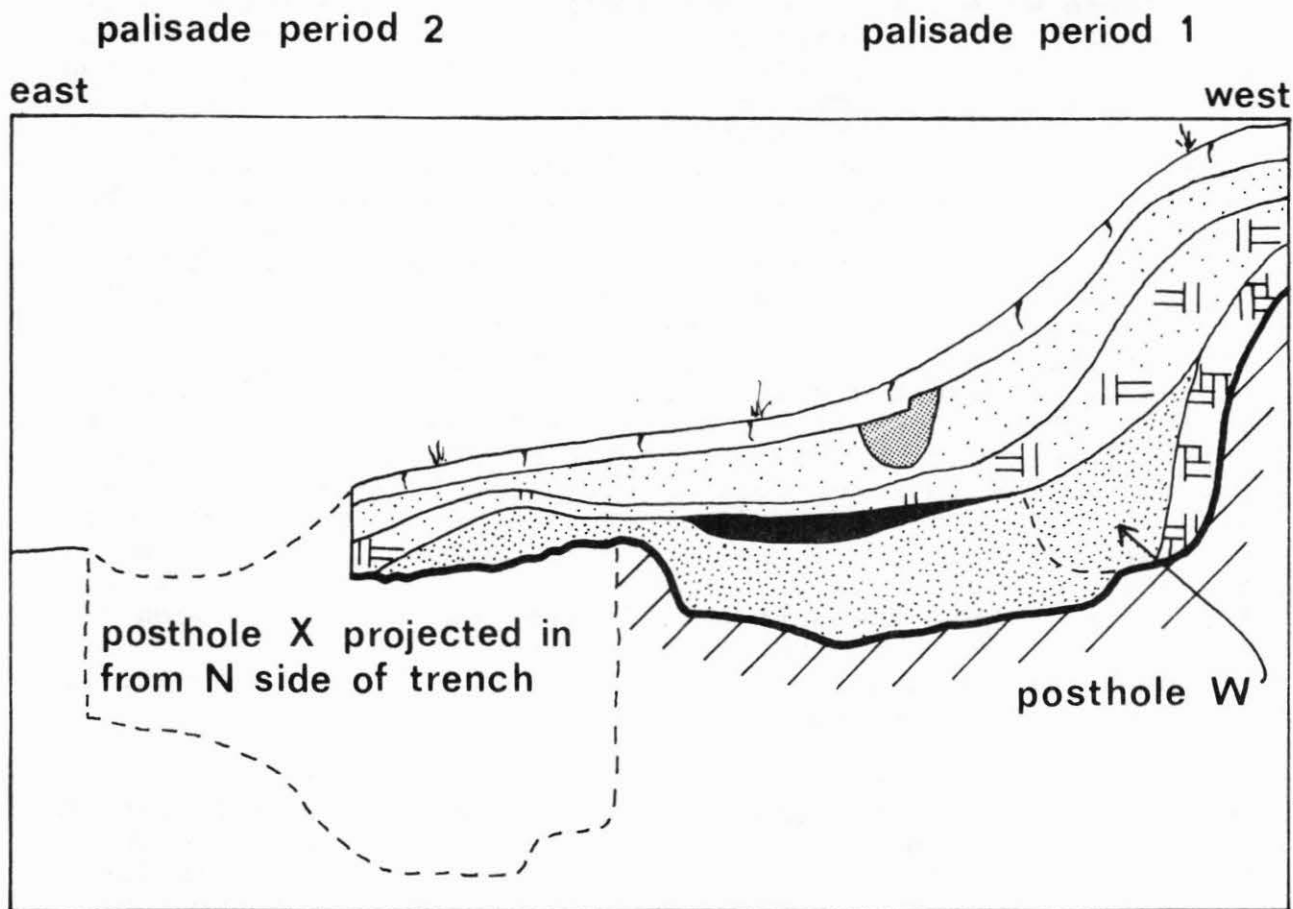
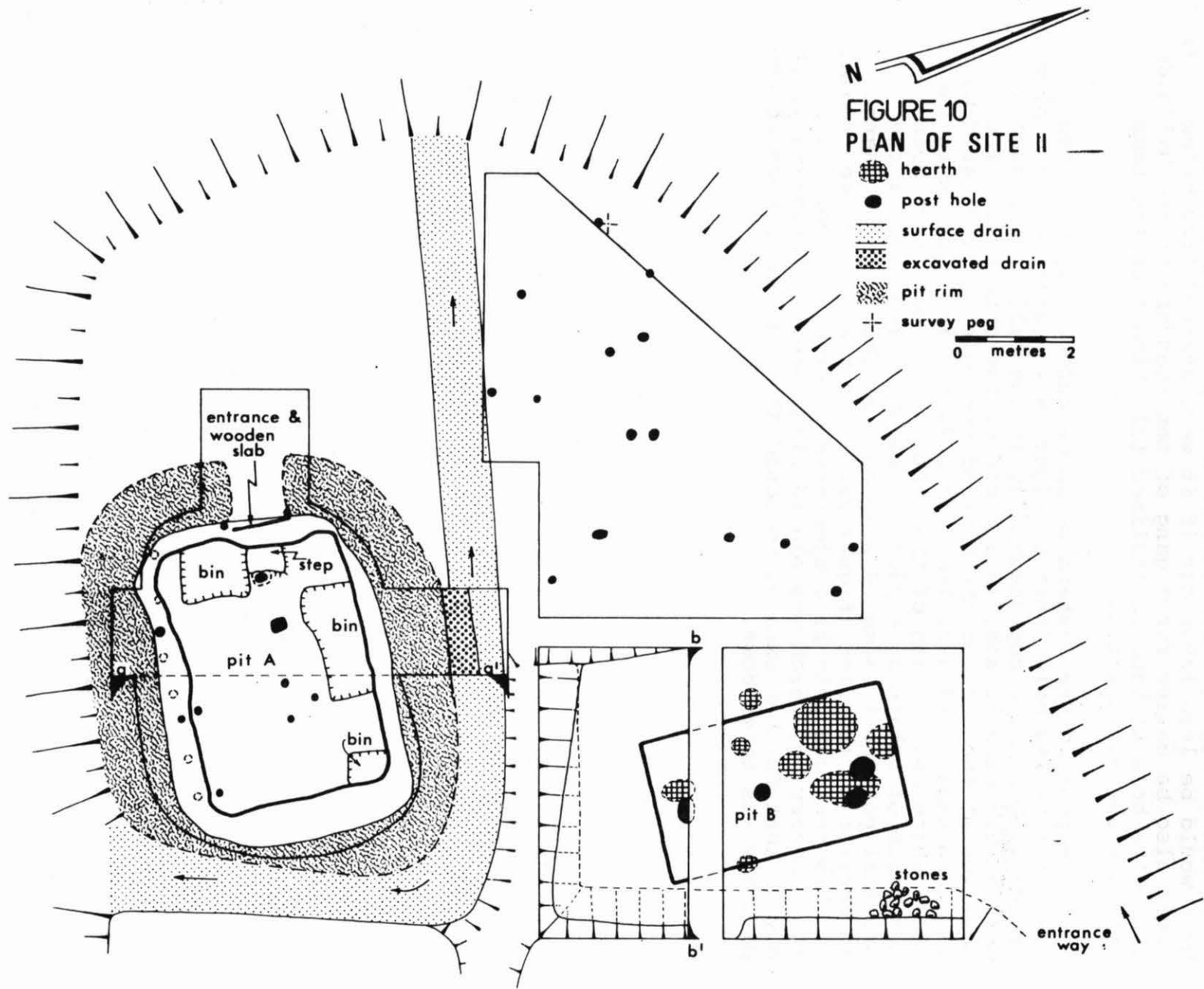


FIGURE 9  
SITE XII POSTHOLES - SECTIONS

the hole is repacked. On the other hand the excavation with a long wooden digging stick (*ko*) of a deep hole with a vertical back would be less laborious if it were started from below. It would also be easier for a gang of men standing on the hillside above the hole to haul an inclined tall timber on the ramp into the upright position.

One post in the eastern palisade undoubtedly had been removed from its hole (Post U, Figure 8). This was in a slot trench 1.50 m x 1 m dug diagonally in the hillside through a stratum of volcanic ash, 11 m south of the entrance. The position of the post at the back of the hole was indicated by a firm brownish packing of loess 40 x 24 cm, in contrast to the loose white ash filling of the slot, which would have been incapable of retaining a post (Plate X). The size of the original post-hole, some 50 x 70 cm, was shown by the change in outline of the slot (Figure 8). The reason for the removal of this post can only be conjectured: perhaps it carried a notable carving, which was placed elsewhere; alternatively, it may be that further excavation would show that much more of the palisade was taken down.



## OCCUPATION WITHIN THE PA

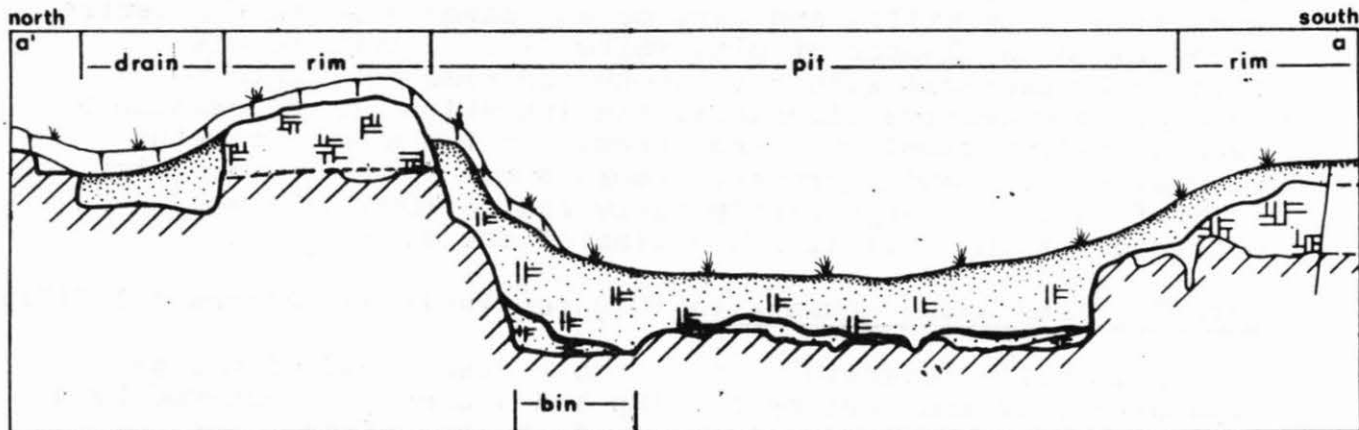
The four sites selected for area excavation within the pa (Figure 2) were a raised-rim pit with two apparent house sites at the tip of the spur (Site II), a terrace on the east side above the palisade (Site V), a levelled area between two pits on the west side (Site VIII), and part of an uneven area in the centre among the main cluster of pits (Site XI). Since it was clearly impractical with the labour and time available to attempt an extensive clearance, the intention was to examine a representative sample of structures. In the event, cooking places, a shed, and a probable store house (*pataka*) were also identified and a surprisingly early radiocarbon date was obtained for the initial occupation of the site.




Site II, Pits and ? house site (Figures 10-12 and Plates XII-XIII)




This was a domestic unit at the northern end of the pa separated from the rest by a scarp and a bank, and entered by a gap on the northern edge of the cliff to the river. It consisted of a large raised-rim pit with an external drain on two sides (Pit A), and two levelled areas, one at the foot of the scarp (Pit B) and the other built up on the triangular tip of the spur and now steadily eroding away.

Excavation showed that the unit had undergone several changes. The earliest structure was Pit B, 4 m x 2.5 m, dug 1 m deep into the crumbling loess (Plate XII). Its alignment was transverse to the spur but unrelated to the adjoining scarp (Figure 10). There was a row of three post-holes in the centre, 33, 40 and 60 cm in diameter and from 30 to 50 cm deep; these would have supported the ridge-pole for a gable roof (Fox, 1974:141 and Figure 1). A fourth post-hole, 35 cm diameter, at the northern end of the row, was clearly a replacement, for the filling of the nearby larger hole had been consolidated and it probably had been enlarged when the original post was taken out. The filling of the other holes was of fine black soil characteristic of a decomposed post; small pieces of wood were found in the southern end-post (section, Figure 11) from which a radiocarbon date of 1020 BP (AD930)  $\pm$ 120 (NZ1914) was obtained. Its significance is discussed below on p. 28. There were no indications that the pit had a 'raised rim' or external drains, but these features could have been removed by the subsequent alterations.

The floor of the pit was covered evenly with 30 cm of fine grey soil, an accumulation of slow silt, indicating that the covered pit had been in use for a considerable time. Above this, there were slips of loess from the pit walls creating an uneven surface on which a series of six or seven scoop hearths had been made, with associated heaps of ash and charcoal rake-outs, together with refuse and food debris. One hearth (Figure 11, section) had stakes on either side, probably supports for spits for roasting birds or smoking fish; these were bedded at different depths, suggesting the structure had been renewed. Two of the hearths were superimposed. The charcoals examined by Paul Smith (Appendix 8) were twiggy material mainly from shrubby growth of manuka, kanuka, cottonwood, koromiko, rewarewa, as well as bracken. The



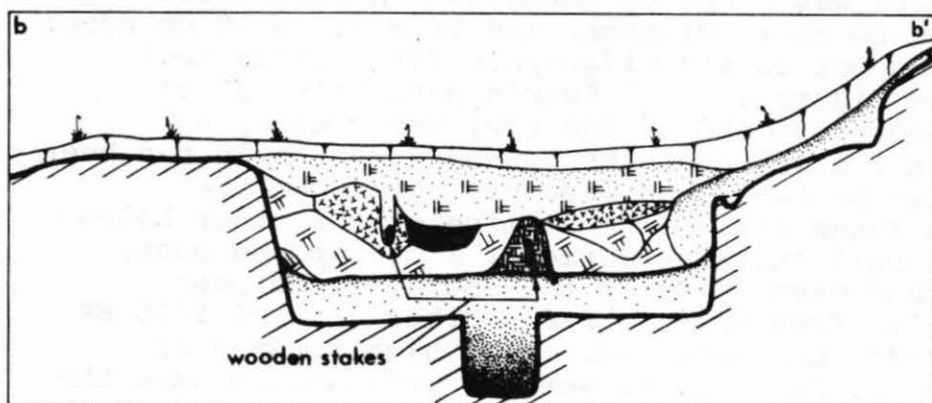
-  topsoil
-  grey soil mixed with clay lumps
-  loess clay




-  black soil
-  natural
-  charcoal seam

-  fine gritty


0 1  
metre

FIGURE 12  
SECTION PIT A, SITE II



-  topsoil
-  grey soil mixed with clay lumps
-  dark soil

-  rake out
-  hearth
-  hard yellow clay

-  loose yellow clay

0 1  
metre

FIGURE 11 SECTION PIT B, SITE II

deposits of ashy soil were from 20 to 30 cm deep and contained 15 small pieces of chert and 2 of obsidian as well as a quantity (26.5 kg) of burnt water worn stones, used for *haangi* cooking. Examination of these stone artefacts by Michael Morwood (Appendix 3) showed that there was use of some acute angled cherts for food preparation and the striations on one piece of obsidian indicated use for butchering or cutting up fish. Other pieces of chert and a greywacke flake bore evidence of wood working. There was also some red ochre (*kokowai*). The fish bones from the same deposit identified by Foss Leach (Appendix 2) were from red cod, school shark, ray and snapper. The fragmentary bird and animal bones identified by R.J. Scarlett (Appendix 1) consisted of kaka, harrier-hawk, and extinct swan, with dog and rat bones: there were also dog coprolites. There was much mussel epidermis and shell, some paua and cook's turban, and one large gastropod (*Charonia* sp, probably *C. capax*), all obtainable on the rocky shores towards Cape Kidnappers. It was clear from the finds that the sheltered hollow created by the collapsing storage pit had been re-used as a cooking place. Charcoal from a hearth gave a radiocarbon date of 450 BP (AD1500)  $\pm$ 70 (NZ1915), indicating an occupation contemporary with the defences.

The cooking place had eventually been levelled up with 20 cm of mixed soil on top of the slips from the pit sides (section, Figure 11). There was a heap of beach pebbles at the foot of the scarp near the entrance way (Figure 10); all were of a size suitable for missiles; there was also one large paua shell.

#### The Raised-rim Pit, Pit A

This large rectangular pit, measuring 7 by 6 m overall, and 5.5 by 4 m internally, was dug with its long axis down the spur, more or less in alignment with the short axis of Pit B: it was 1 m deep (Figure 10). The conspicuous raised rim had a 1 m wide entrance gap at the north-west end. On the north and east sides it was surrounded by a grass-grown drainage channel 1 m wide which diverted rain water from the pit to the edges of the spur. A 1.5 m wide section trench (Figure 12) was cut from east to west through the drain, rim and centre of the pit: the whole of the pit filling was then removed and the entrance gap investigated (Plate XIII).

The drain was filled with dark peaty soil and was 30 cm deep; a ledge on the north side suggested it had been recut and deepened at some time (Figure 12). The only finds were pieces of twig charcoal. On the north side the raised rim was built of clean pale grey loess, baked by exposure to a cement-like consistency; it was 1 m thick and 50 cm high. On the south side, the rim had slumped forward into the pit as well as slipping outwards down the slope; consequently although 40 cm of re-deposited loess was in position, the surviving top of the rim was 50 cm lower than that on the east. No stake holes were found in the 3 m length of the rim which was cleared.

Beneath the top soil, the filling of the pit was mainly clean slumped material, making the detection of the original pit sides very difficult. At a depth of 30-35 cm there was a thin layer of fine sandy soil containing a seam of charcoal and small pebbles (Figure 12), representing the silt which had

accumulated on the floor whilst the pit was in use, and showing that some burning had taken place. In the centre of the pit floor there was a row of four post-holes, which had held the supports for a gable roof; two were small stake holes 10 cm in diameter, and the others were holes for timbers of rimu and totara 20 and 28 cm in diameter respectively and 45 cm deep. Wood from the largest post had a radiocarbon date of 750 BP (AD1200)  $\pm$ 80 (NZ1917). Three more stake holes were found on the edge of the pit floor as well as a row of eight holes in the south wall: these were probably only fissures in the loess into which dark soil or roots had penetrated, but if genuine, suggest that the pit wall was lined.

The pit floor was uneven; three rectangular sunk areas were detected on the margins where a stained grey filling extended for 10-15 cm into the natural, beneath the 2 cm seam of charcoal (Figure 12). These can be interpreted as the emplacements for wooden bins or basket containers for selected kumara or other supplies. The twig charcoals identified from the lowest levels in the pit included manuka, tea tree, hebe as well as larger pieces of totara and rimu (Appendix 8). Although no hearths were found, the spread of charcoal is presumably the result of burning brushwood in an attempt to fumigate the pit and to prevent moulds infecting the crop (Fox, 1975:204).

Excavation at the west end of the pit confirmed the existence of an entrance through the worn gap in the rim (Plate XIII). A slab of totara wood, 90 cm long and 10 thick was found lying across the gap at the edge of the pit between two small post-holes: these indicated the position of a door frame, and a timber sill to reinforce the edge of the pit. Radiocarbon analysis showed that the slab was a fossil wood with a date of 3910 BP (1960BC)  $\pm$ 90 (NZ1913), probably a piece of ancient driftwood from the seashore or brought down and buried by a river flood.

Below the timber sill, there was a ledge and then a step down on to a block of natural soil 60 by 40 cm (a 'buttress') which was 10 cm above the floor of the pit. Since the end-post of the centre ridge pole supports was in a line with the entrance, anyone descending would need to make a half turn at this point to get into the pit. The position of the bins suggests that there was a central gangway across the floor of the pit.

### Commentary

Raised-rim storage pits are characteristic of Hawke's Bay where they are found in pa and open settlements alike. The general distribution in New Zealand has not been mapped in detail, but the type is known to occur from East Cape southwards to the Wairarapa and across Cook Strait in the Marlborough Sounds. Others have been recorded in the eastern Bay of Plenty (D. White), whilst sporadic examples are known in the Coromandel and South Kaipara (NZAA Auckland file), but the rims are not nearly as massive as those in Hawkes Bay.

The Te Awanga excavations have shown that such pits were roofed in the same manner as the majority of flat rectangular pits, with a ridge pole supported on a central row of posts set



in the pit floor (Fox, 1974:Figure 1) and entered at the gable end. The clear evidence for a timber-framed door with a reinforced sill opening on to an earth step or 'buttress' in Pit A has confirmed the association of 'buttrresses' with entrances to pits. A very similar construction was excavated by Agnes Sullivan on Motutapu Island (Sullivan, 1972:39 and Fox, 1974:Figure 3a).

There was unfortunately no archaeological evidence to show how the roof structure was related to the raised rim; common sense suggests that the ends of the rafters and the eaves rested on the rim top so that surface water would run off into the external drain. The principal difference between the raised-rim and the more usual rimless pits is the method of dealing with rain water, which threatened the kumara crop if allowed to seep into the pit. Rimless pits are usually provided with an internal drain at the edges of the pit floor leading to a sump outside, as at Bald Hill, South Auckland (Fox, 1974: Figure 3b), whereas raised-rim pits have a drain outside the rim to carry the water away. Furthermore the massive rim would act as a barrier against flooding in the exceptional rainstorms characteristic of Hawkes Bay, such as Colenso experienced in the 1850's and that flooded Te Awanga in 1973. In normal times, the rim would act as a sponge to prevent water seeping into the pit, or being driven under the eaves by the wind.

#### ?House Site

The remaining triangle of flat ground north of the Pit A drain was fully excavated. There was a general build up of dark soil between 20 and 50 cm deep in which a series of small post-holes were found, 12-15 cm in diameter. Three of them had penetrated the loess subsoil to a depth of 17 to 25 cm; the rest were shallow, 12-18 cm deep in the made ground; probably others were missed at this level. Their alignment did not form a coherent plan nor correspond with the orientation of either of the pits. Nevertheless it was apparent that they belonged to rectilinear structures, of more than one period. A compact thin layer of grey soil was found below the turf covering a 2 m square in the centre of the area; this was perhaps the latest floor level. At the east end of this, there was some burning and *haangi* stones, probably from the surrounds of the nearby cooking place in Pit B. Two pieces of obsidian, some chert flakes and a core were found at 5-10 cm depth, as well as five broken river pebbles and one that had been used for rubbing red ochre (*kokowai*). The larger piece of obsidian had been used probably for scraping a thin shaft, according to M. Morwood (Appendix 3).

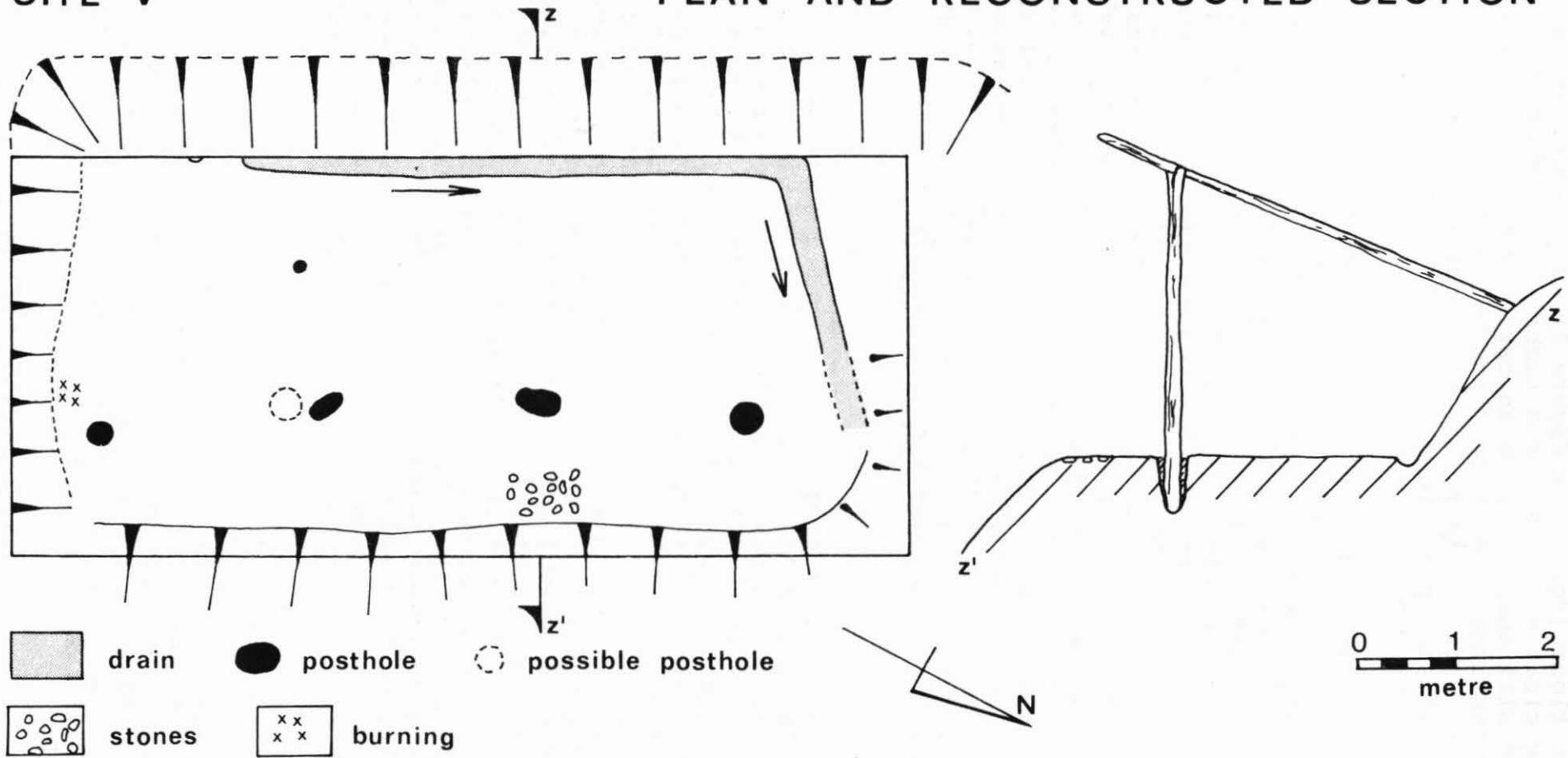
#### Site V, ?shed (Figure 13 and Plate XIV)

This was one in an irregular row of five terraces constructed along the contour on the eastern side of the pa, above the line of the palisade post-holes and below the area of the raised-rim pits. It measured 9 m long and 5 m wide, with scarps 1.5 to 2 m long at the back and south end, and was separated at the north end from the next terrace by a low scarp 0.5-0.75 m long (Figures 2, 3).

Clearance showed that there was 20-30 cm of loose dark soil

FIGURE 13  
SITE V

PLAN AND RECONSTRUCTED SECTION



overlying the natural yellow loess which contained many broken *haangi* stones, and some charcoal with a concentration at the south end (Figure 13). No obsidian was found but there were pieces of used chert and a small half pebble tool usable for scraping or burnishing. Morwood comments that the lithic assemblage reflects the use of this area for 'light maintenance activities' only, and that there was no evidence of chert being worked here as it was on Site I (Appendix 3).

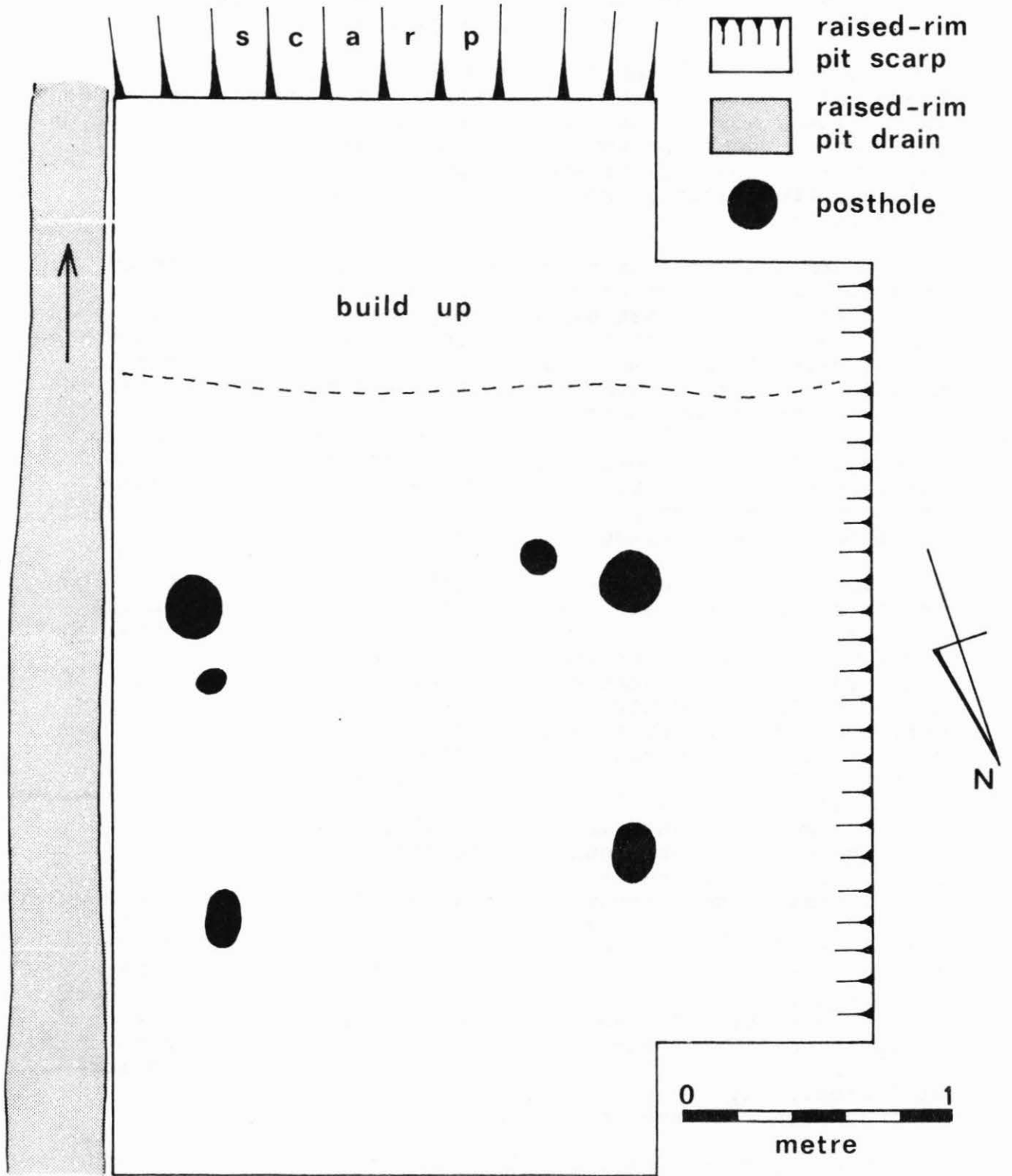
At the foot of the rear scarp, 1.5 m from the south end, there was a shallow drainage gutter which deepened and widened as it flowed north; it then turned eastwards and faded out on the edge of the slope towards the palisade (Figure 13). There was a good deal of small twig charcoal in the dark filling, from material commonly found in scrub formation (Appendix 8).

There was a row of three or four post-holes, 30-50 cm in diameter, 13-24 cm deep, on the long axis of the terrace (Plate XIV). One post had probably been replaced, and the remaining post-hole at the south end is out of alignment and may not be part of the same structure. In that case, a single stake hole, found towards the back of the terrace and near the commencement of the gutter, may indicate the south end of the building, which would then measure 5-6 m long and 2.5 m wide. In contrast to the loose dark soil behind the post row, the outer edge of the terrace was built up of well consolidated soil, smooth and worn probably by treading; there was a patch of river pebbles embedded in it at one point (Figure 13).

The remains are not easy to interpret but the post-holes indicate that there was a structure on the terrace with its long axis parallel to the hillside and with a pathway beside it. The limits of the floor are shown by the drainage gutter, designed to prevent surface water accumulating at the foot of the scarp, and probably by the stake hole; similar features were found on another terrace, Site X (p.27). The floor deposits containing charcoal and some chert artefacts show that the structure was occupied, though the absence of hearths and *haangi* shows that it was not a cooking place. Since the row of timber uprights is not central to the terrace and no other post-holes were found at the presumed edges of the floor, it is difficult to reconstruct the remains as a symmetrical rectangular house structure with a roof carried on a ridge pole. Instead it was probably a long open-fronted structure with a lean-to roof with wide eaves, which rested on the three or four timber uprights in front, and on the scarp at the back (Figure 13, reconstructed section). The front and the south end could be filled with woven panels of raupo between the uprights, utilising the stake hole. An annex or lean-to construction to a chief's house was drawn by Richard Taylor at Taiamai, Bay of Islands in 1842 (Fox, 1976:Figure 32) so this method of roofing was practised in New Zealand.

The function of the building is debatable but since the site is only 20 m away from the recessed entrance through the palisade on Site VI, such a shed would be conveniently placed for an arms store, housing, for instance, a stack of the long spears used in defence. A communal arms store was described and planned by Crozet and Le Roux in the centre of Paeroa pa on Moturua, Bay of Islands, in 1772 (Fox, 1976:Figure 40).

FIGURE 14  
SITE VIII, PLAN



Alternatively, the shed could have been used by women for plaiting baskets or for weaving under cover, or for storing fishing gear conveniently close to the entrance and the way down to the river.

#### Site VIII, Raised Storage Unit (Figure 14)

This was a levelled area on the western edge of the pa, near its northern end and situated between two raised-rim pits (Figure 2). It measured 3 m wide and 6 m long and was completely cleared (Figure 14). The western edge had been built up with clods of loess 'clay' for a distance of 1.5 m from the edge of the scarp; elsewhere the soil consisted of 10 cm of fine, clean grey, in which only some flakes of red ochre and chips of obsidian were found at the east end of the cutting. In the centre there was a rectangular setting 1.6 x 1 m of four post-holes; these measured 15-25 cm in diameter and 12-16 cm deep in the natural loess soil. There were also two small post-holes 10 cm in diameter which were probably for struts.

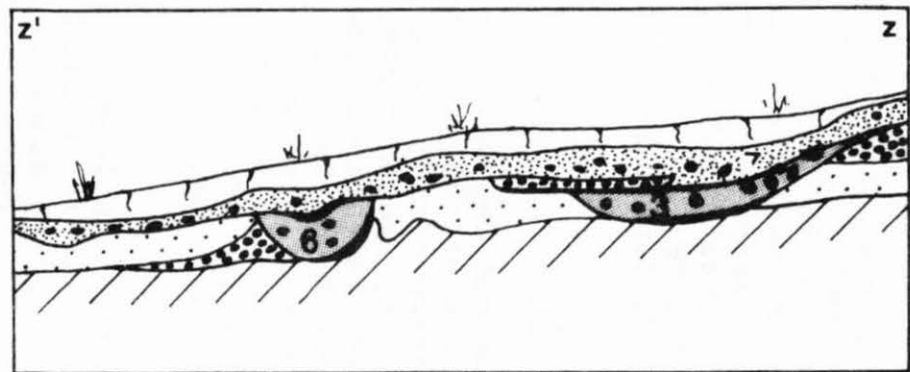
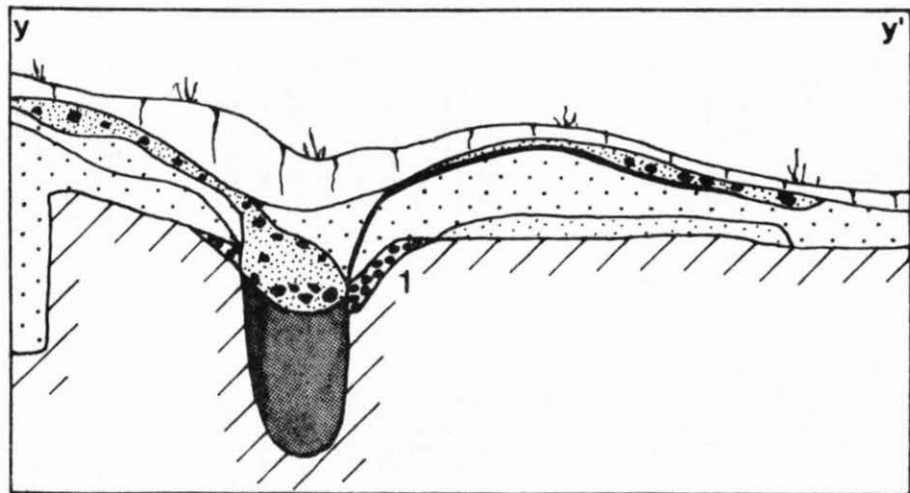
The small rectangular timber structure which the post-holes imply was clearly not a house. Two interpretations are possible. The first is that the four posts supported a timber platform or rack, such as shown in de Sainson's drawing of Kahuwera pa, Bay of Islands, some 3 to 4 m above the ground, and used for storing fern-root and other commodities (Fox, 1976: Figure 1). The second is that the remains are those of a solid wooden store-house or *pataka*, raised only 1 m above the ground on the four posts, and with an overhanging ledge or 'verandah' surrounding the central structure. Such storehouses were drawn and described by Augustus Earle on the Hokianga in the early 19th century (Murray-Oliver, 1968: Plate 49) whilst others which were elaborately carved, are preserved in museums today. The fact that the post-holes were not very deep favours the *pataka*, which with its low centre of gravity would remain firm under its own weight, whereas a rack would be subject to wind pressures and would require deeper holes for the angle posts. Such storehouses were usually situated on the perimeter of the pa, according to the drawings of 19th century artists, (Geelen de Kabath, 1974), as was this example at Te Awanga.









#### Site XI, Cooking Place (Figure 15)

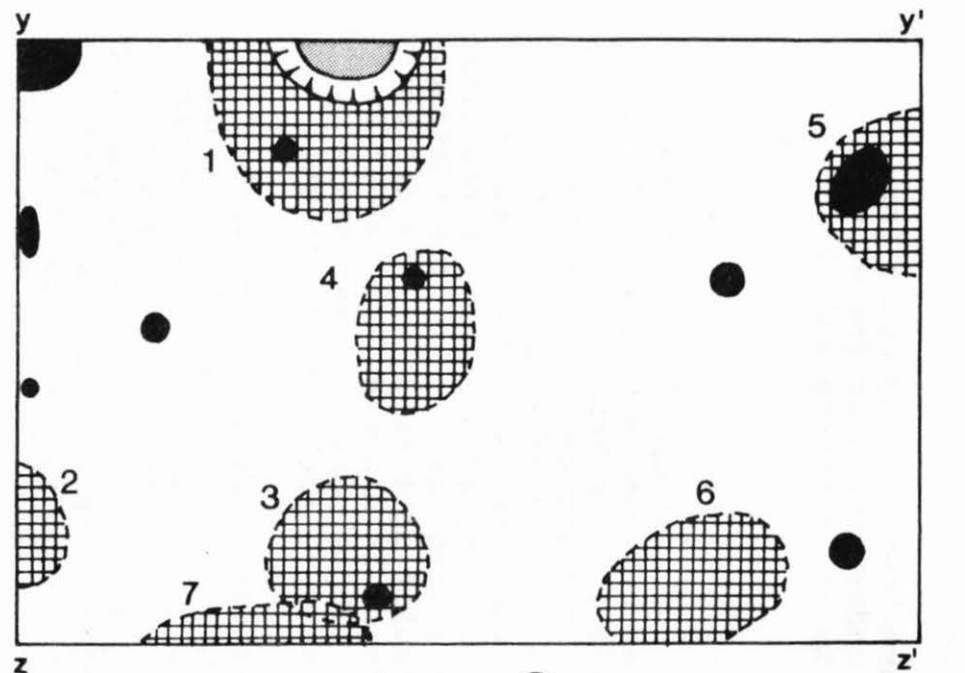
This 3 x 2 m cutting was opened to test the occupation levels in the centre of the pa, among the principal concentration of raised-rim storage pits (Figure 2). It was selected because it had a very uneven surface which contrasted with the nearby flat places, tentatively identified as house sites. It proved to have been a cooking place, dating from the main occupation of the pa in the 15th and 16th century, which had undergone a series of alterations. Unfortunately, time did not permit an extension of the area to complete the investigation. Three main periods were detected.





##### Period 1:

The first occupation layer consisted of an uneven deposit of brown loamy soil, 10-18 cm thick, containing a little charcoal and a few *haangi* stones, probably intrusive from deposits of period 2. There were two large post-holes and



- |   |                               |   |                      |
|---|-------------------------------|---|----------------------|
|  | topsoil                       |  | brown loam           |
|  | dark soil with red clay lumps |  | old topsoil          |
|  | dark soil with burnt stones   |  | dark soil (posthole) |
|  | charcoal                      |  | stone filled haangi  |



-  postholes, period 1
-  haangi, period 2 (1-7)
-  stakes, period 2
-  posthole, period 3

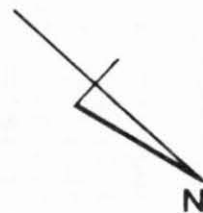


FIGURE 15  
SITE XI, PLAN AND SECTIONS

six stake holes in the natural loess soil, but no structural alignments could be discerned in the small area cleared. The stake holes suggest that temporary shelters or screens were constructed. Burnt wood from a stake hole produced a radiocarbon date of 460BP (AD1490)  $\pm$ 70 (NZ2711), it is possible that this was mixed with charcoal from a nearby later *haangi* (H3), and so is not wholly reliable.

#### Period 2:

In the second period the area was intensively used for cooking with heated stones in the *haangi* or earth ovens. The seven *haangi* consisted of shallow scoops, up to 1 m in diameter dug into the previous occupation layer and in two cases penetrating into the natural soil below (H3 and H5: see H3 in section, Figure 15). In some, the burnt stones had been left *in situ* (H1, 3 and 7, Figure 15), others were filled with ash and charcoal only: in most, the base and sides were reddened by heat. Weights of broken stones associated with individual *haangi* varied from 1 kg to 9 kg, whilst a total of 60 kg were recorded from small heaps found over the whole area in a matrix of dark soil, well consolidated and blackened by treading and burning. Stake holes were found in two of the *haangi* (H1 and H4, plan, Figure 15), which may have held supports for spits for roasting or smoking, as in the cooking place on Site II. Much mussel epidermis and a piece of a univalve shell were the only surviving food remains. There was also a lump of clay with the impressions of plant stems on it; these were identified by Miss J. Goulding of the Botany Department, Auckland Museum, as bracken and a grass. Stratigraphically the *haangi* were clearly later than the post and stake holes, H5 being superimposed on a post-hole, and H3 covering and sealing off the dated stake hole. In one case one stone-filled *haangi* (H7) partly overlay another (H3) as shown in section (Figure 15), indicating that the cooking activities were prolonged. A radiocarbon date of 430 BP (AD1520)  $\pm$ 50 (NZ2714) from the upper *haangi* (H7) indicates that this phase was contemporary with the defences.

#### Period 3:

The *haangi* were covered by a loose layer of dark soil 5-10 cm thick, full of broken stones and debris, which was probably the result of human movement across the area coupled with natural erosion (section, Figure 15). It was broken only in one place where the stony layer had sunk into the upper part of a large post-hole, 30 cm in diameter, which had been dug through the remains of a *haangi* of period 2 and the brown loam of period 1 into the natural soil to a total depth of 75 cm (section, Figure 15). Since the post-hole was at the edge of the cutting, it was not possible to know whether it was part of a structure or whether it had stood alone. Solitary supports for small raised storehouses, often elaborately carved, are well authenticated in drawings of Maori settlements in the early 19th century, as for example by Earle at Chief Shulitea's residence at Kororareka, Russell (Murray-Oliver, 1968:Plates 19 and 48) and it could be that such a *pataka* was erected amongst the storage pits at Tiromoana. Other single posts were commonly used to suspend gourds and baskets (*idem*:Plate 49).

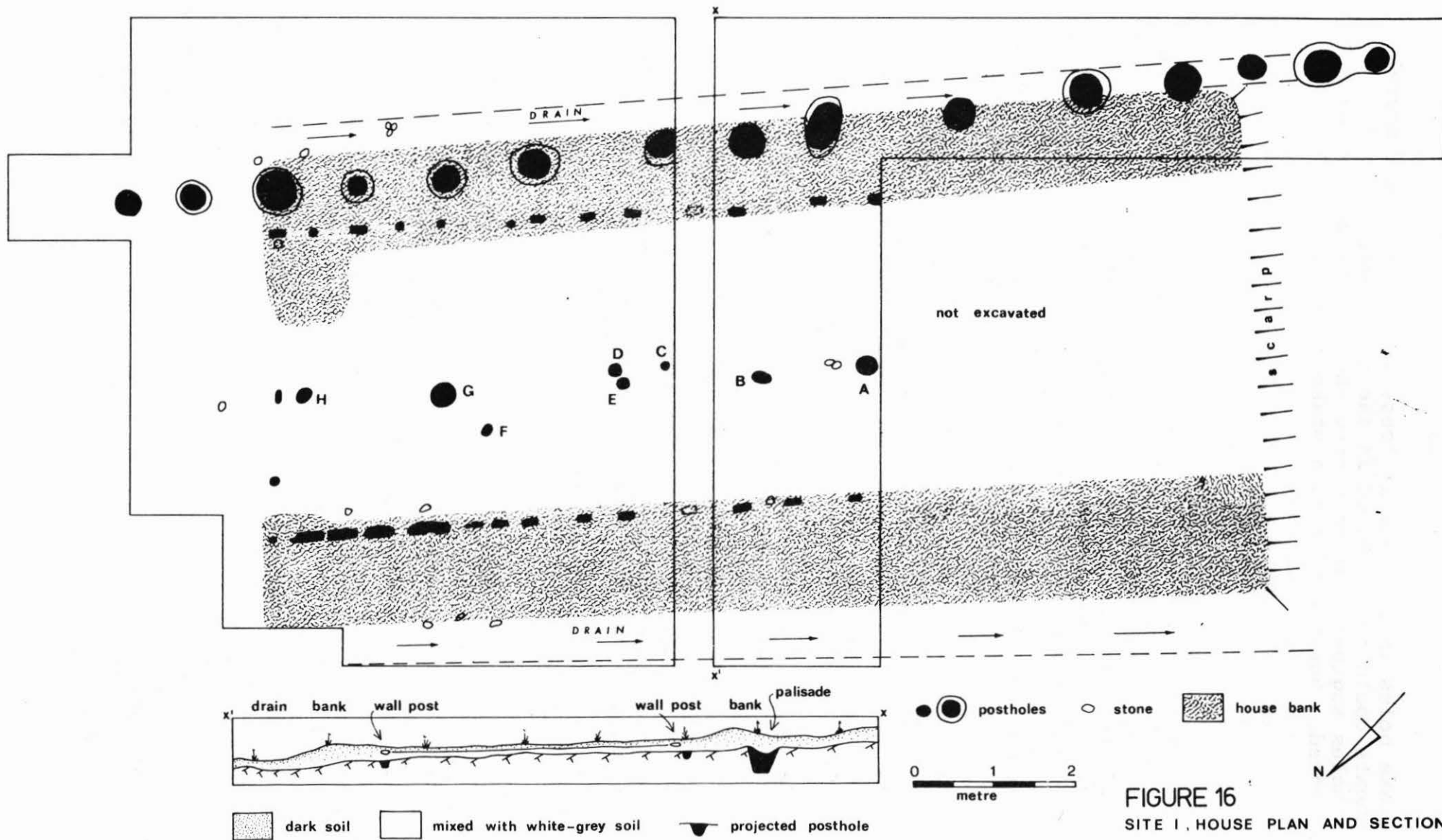


FIGURE 16  
SITE I, HOUSE PLAN AND SECTION



## OCCUPATION OUTSIDE THE PA

Two sites were excavated, Site I, an embanked long house on the ridge crest 15 m south of the main rampart, and Site X, the higher of two terraces overlooking the head of the dry valley (Figure 2). Both sites were considered likely to belong to a late phase in the occupation, when the main defences of the pa were out of use.

Site I, The Long House (Figures 16-17 and Plate XV-XVI)

Before excavation, the house site was revealed by two low banks and associated drains across the narrow top of the ridge, here only about 16 m wide. The banks were 11 m long, 1.5 m wide, and were of very low relief. The space between them, 3.5 to 4 m, was level, having been built up at the south-west end to form a small scarp. The north-east end was ill defined; the banks faded into the level ground surface about 4 m short of the edge of the ridge. Nevertheless the outline of a long rectangular structure was apparent from the first. The method of excavation was to cut and record a central section across the drains, banks and house floor (Figure 16); in this the first post-hole of an earlier palisade was found as described on p 9. Two-thirds of the house floor was then completely cleared by trowelling off in 5 cm layers in units of 2 m squares, by which means the central post-holes were located (Plate XV). Finally, the banks were cut back to uncover the rows of side posts (Plate XVI) and the area extended farther to the north-east to look for a possible porch. The full extent of the early palisade was also uncovered. The south-eastern third of the house was deliberately not excavated; this comprised the built-up portion in which the detection of small post-holes would be difficult in the made ground. It was also thought desirable to leave some surface indication of the structure for future investigation.

The banks consisted of fine dark top soil, probably mostly decayed turf; the maximum height was 25 cm above the level of the natural soil, a pale sandy loess, with a surface speckled by brown worm casts. It was clear that the banks had spread in both directions, inwards on to the house floor and outwards across the shallow water-worn depression of the drain (Figure 16): they probably were about 50 cm high when first built. Two layers were present on the house floor; the upper, 5 cm thick, consisted of the same dark soil which was barely distinguished from the modern turf; the lower was of similar consistency but harder and paler, being mixed with the whitey-grey loess by worm action. A few small stones were found which seemed to indicate an original surface (Figure 16, section and plan). No hearth was found, though bits of charcoal were encountered throughout the deposits, with several small concentrations on the edge of the floor, beside the banks. Paul Smith identified the wood as *Leptospermum* species, including manuka and kanuka, *Pseudopanax* species including five finger, and *Hebe* species. Charcoals from the bank and drain were more varied, and included *Discaria toumatou* (wild-irishman), tawa, and totara. Bracken occurred in both deposits. A radiocarbon

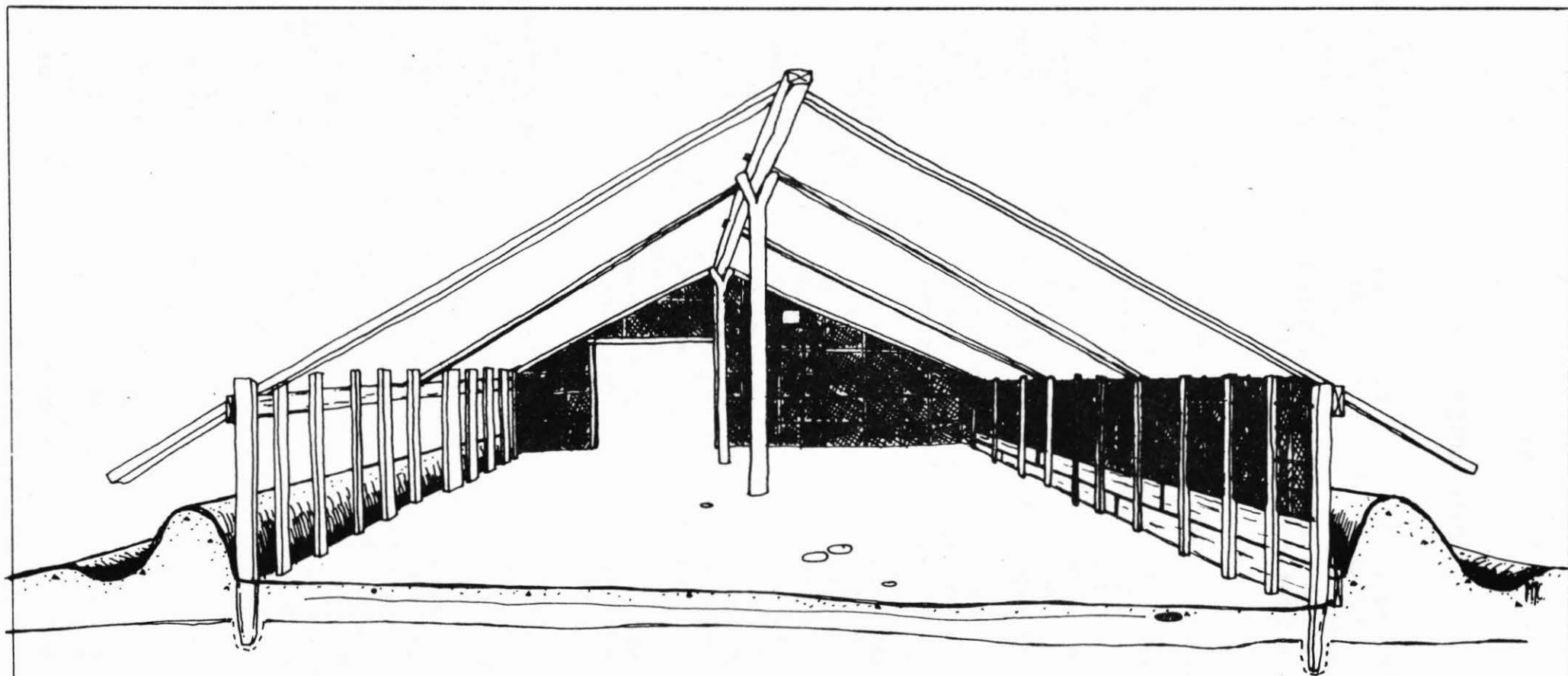


FIGURE 17  
TE AWANGA - House Reconstruction

Sectional Scale



date of 520 BP (AD1430)  $\pm$ 70 (NZ1916) from a small concentration in the lowest level indicates that there may have been occupation on this part of the spur before the defences were constructed.

Other finds were 140 pieces of chert, mostly flakes, and 4 chips of obsidian. Morwood (Appendix 3) deduced that some small tools were being manufactured and others trimmed or sharpened: none of the pieces were suitable for wood carving, incising or cutting fibre. Many river pebbles were also flaked for cutting or scraping and a half pebble had probably been used for burnishing. There were some small pebbles of white quartz and of jasper which probably had been brought into the house as play things. There were flakes of red ochre (*kokowai*) and small lumps of a resinous gum, which could also have been burnt to make colouring matter, or used as an adhesive.

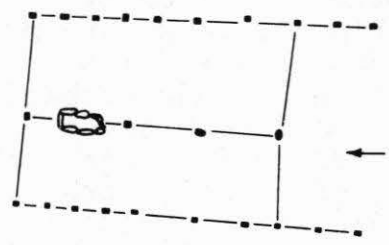
A row of small post and stake holes, 10-20 cm in diameter was found in the centre of the house floor, 1.5 to 2 m apart and 12 to 25 cm deep in the loess (Plate XV). The more substantial of these (A, B, G, H) together with a smaller one (E) on the same alignment will have held posts carrying a ridge pole; the remaining holes (C, D and F, Figure 16) may have held props for weak places in the roof or struts for the centre posts. The pointed butt of one stake, 11 cm thick, was preserved in hole F and from this a radiocarbon date of 140 BP (ad1820)  $\pm$ 90 (NZ1912) was obtained. The wood was identified by Dr B.P. Molloy as belonging to the *Pseudopanax* species, which includes five finger. This post clearly was an addition to the main framework of the house and therefore related to a late phase of the occupation. The building itself can be confidently ascribed to the 18th century, in the absence of any European material.

The holes for the timbers of the side walls were found only after the banks had been cut back for 30 cm (Plate XVI), when they showed up as small light brown stains in the pale loess; it was easy to see how these had been missed in the initial section cut. The filling was crumbly and extended only 6 to 12 cm into the natural. A few of the holes were for round stakes, 10 cm in diameter, but most were sub-rectangular slots varying in size from 15 x 9 cm to 34 x 16 cm. Two of the slots were of V section, the remainder were flat based indicating the use of plank-like timbers. The spacing was irregular; some of the planks were close together, but most were 25 to 50 cm apart (Figure 16).

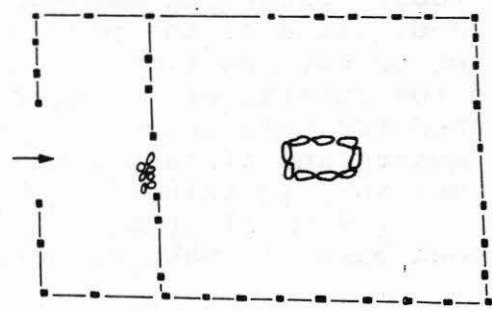
The north-east end wall of the house was identified from three similar small holes in a line that coincided with the spread ends of the banks. The holes were 50 and 75 cm apart and despite much effort, no more were found to continue the line south of the centre point; nor could any be found to indicate a porch or verandah at this end of the structure, where the entrance almost certainly was situated.

#### The House type - summary and reconstruction (Figure 17)

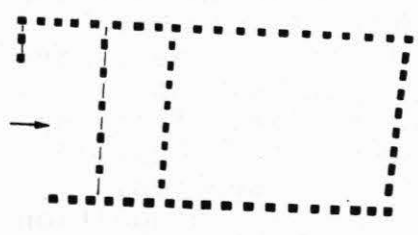
The house on Site I was a rectangular timber-framed building, on a larger scale than the normal Maori sleeping house (*whare*) as described by European travellers and missionaries at the



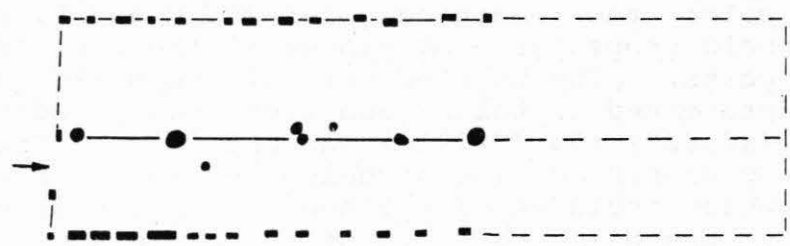
Palliser Bay



Moikau

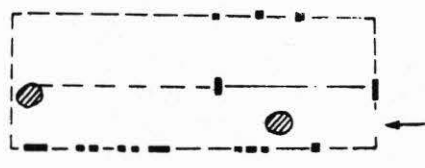


Tarata



Te Awanga

FIGURE 18: Comparative plans of Maori houses excavated in North Island

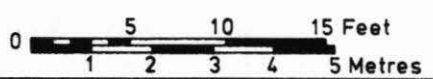


Mangakaware



Poor Hill

-  HEARTH
-  POSTS



period of contact (Groube, 1965:64). The proportions of length to breadth (12 x 3.75 m) are in excess of 3 to 1, justifying its description as a 'long house'. Despite its size the building was of light construction. The row of slender centre posts implies a gable roof carried on a ridge pole, with the rafters resting on, or more likely lashed to a wall plate. The roof material would have been a light thatch on a woven foundation, by analogy with recent examples. The side walls consisted of a mixture of plank-like timbers and small round posts lightly bedded and with spaces between showing that, unlike the house excavated by Bellwood at Mangakaware (Bellwood, 1971:83, Figure 7), the walls were not solid. The most likely infilling would be woven panels of raupo (*Typha muelleri*) as shown in Figure 17, renewed from time to time. The sides of the house were embanked; this unusual feature presumably was designed to screen the wall base from the weather. The construction is analagous to that of the raised rims round the storage pit, and presumably the function was similar (p. 20). A drip-gutter outside and parallel to the banks carried away the surface water and the run-off from the eaves, discharging down the west slope below the house. In the reconstruction, it has been suggested that a sill timber might have been used to reinforce the wall base; this would prevent soil from the banks washing on to the house floor. Evidence of similar banks and sills have been found at the Moikau settlement in the Wairarapa (Prickett, pers. comm.).

The entry was certainly at the eastern gable end where there was space to approach the building on the flat, although there was no evidence of a porch or verandah. Since only two post-holes were found, 1.8 m apart, it has been assumed in Figure 17 that these belong to the door frame and that the remainder of the front wall left of the centre post was a panel of solid raupo secured to the angle wall post. It is well known that the doors of Maori houses were small and low, for early European visitors often commented on this and had to crawl to enter; nevertheless there is evidence in a careful drawing by de Sainson in 1827 of a wide high door in the gable end of a house near Cook's watering place at Tolaga Bay (D'Urville, 1833:Plate 45 and Fox, 1976:Figure 27). The type, therefore, was known elsewhere on the south-east coast in the early 19th century.

The Te Awanga long house can also be compared with the few other large houses excavated in New Zealand. These comprise two in the Wairarapa, one in the Waikato, one in south Taranaki and one in the Bay of Islands (Figure 18 and Fox, 1976:32). It will be seen that these are not uniform in size or proportions. Three out of the six have a porch or verandah at the gable end, with indications of a central doorway; three have a row of centre posts to support the ridge pole; the position of the hearth is variable. The dates determined from radiocarbon analysis range from ad1180 ±54 at Moikau, Site N165/9 (Prickett and Anderson, 1972:164) to the late 16th century at Palliser Bay (Leach and Leach, 1972:163) and Mangakaware in the Waikato (Bellwood, 1973:173). The very large house at Poor Hill, Waimate North, was only partly excavated by Ken Gorbey and is undated; it is one of a large group of terraced structures extending down the hillside below a small pa (pers. comm.). There is obviously insufficient evidence on which to

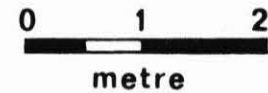
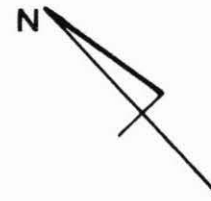
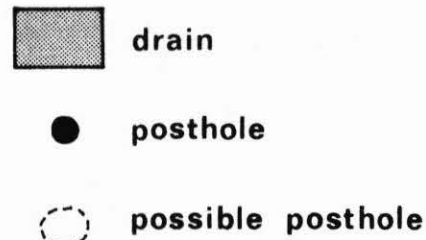
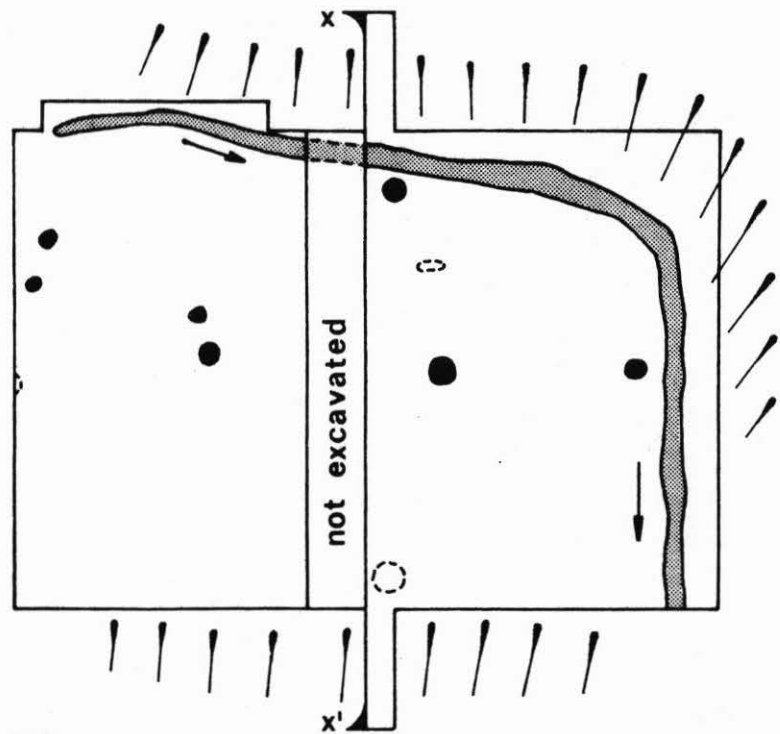
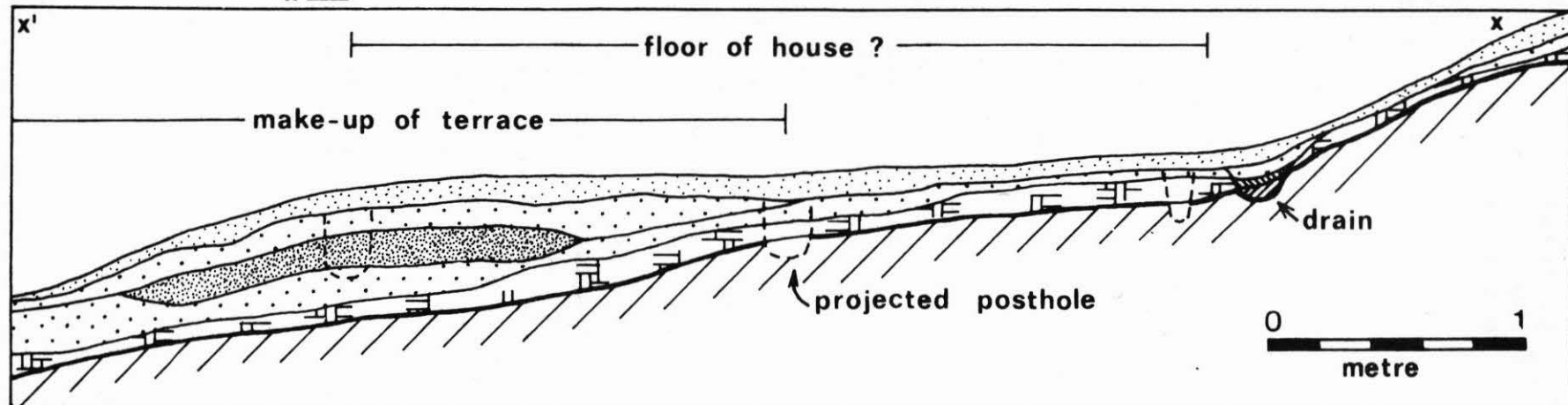


FIGURE 19  
SITE X, PLAN AND SECTION



base a chronological sequence or to distinguish any regional house types in these widely scattered examples.

Site X, House Site (Figure 19)

This was the largest in a group of five terraces situated on the eastern side of the head of the 'dry valley' (Figure 2 and Plate IV). It measured 17 m long and 3.5 - 4 m wide and was defined by scarps 1 - 1.5 m long and 0.60 m high. The flat was unequally divided by a low transverse scarp; investigation was limited to the southern portion which was 6 m long, since time did not permit total clearance. The yellow loess soil was shallow and very dry in January 1975 and excavation was difficult and unrewarding.

A cross-section (Figure 19) showed that there was over 40 cm of make-up on the lower side of the terrace, comprising alternate layers of stained loess and dark humic soil resting on the former weathered ground surface. The whole site was covered by 10-15 cm of fine grey soil, a mixture of hill wash and decayed turf. At the foot of the scarp on the upper side, there was a shallow drainage gutter, 20 cm wide, filled with fine crumbly soil that was slightly darker than the surrounding floor layer. The course of the drain was traced curving southwards and then turning west across the end of the terrace, until it disappeared on the scarp: it deepened all the way from 10 cm to 30 cm below the floor level, indicating that the flow was to the south-west. North of the section, it narrowed, became shallower and then faded out, presumably at the end of the structure on the terrace.

The floor was of well compacted clean loess, in which 4 small pieces of obsidian and 10 of chert were found. Post-holes were only found with difficulty, due to the parching of the soil. A central row of three, 18-20 cm deep, indicated the position of supports for a ridge pole and the remainder which were few and indistinct should relate to the perimeter walls. The evidence is therefore incomplete but it would seem to indicate a free standing structure 5 m long by 3.25 wide with a gable roof and its long axis the same as that of the terrace. The drain would be exterior to the house, carrying surface water from the terrace slopes as well as catching the eaves' drip. The absence of the drain at the north end indicates that the door was probably there. A test hole on the lower slopes, 7 m below the terrace, produced much black soil and ash as well as broken *haangi* stones, suggesting that cooking for the group living on the terraces was carried on in the shelter provided by the narrow head of the valley.

?open settlement

fortified pa

extra-mural settlement

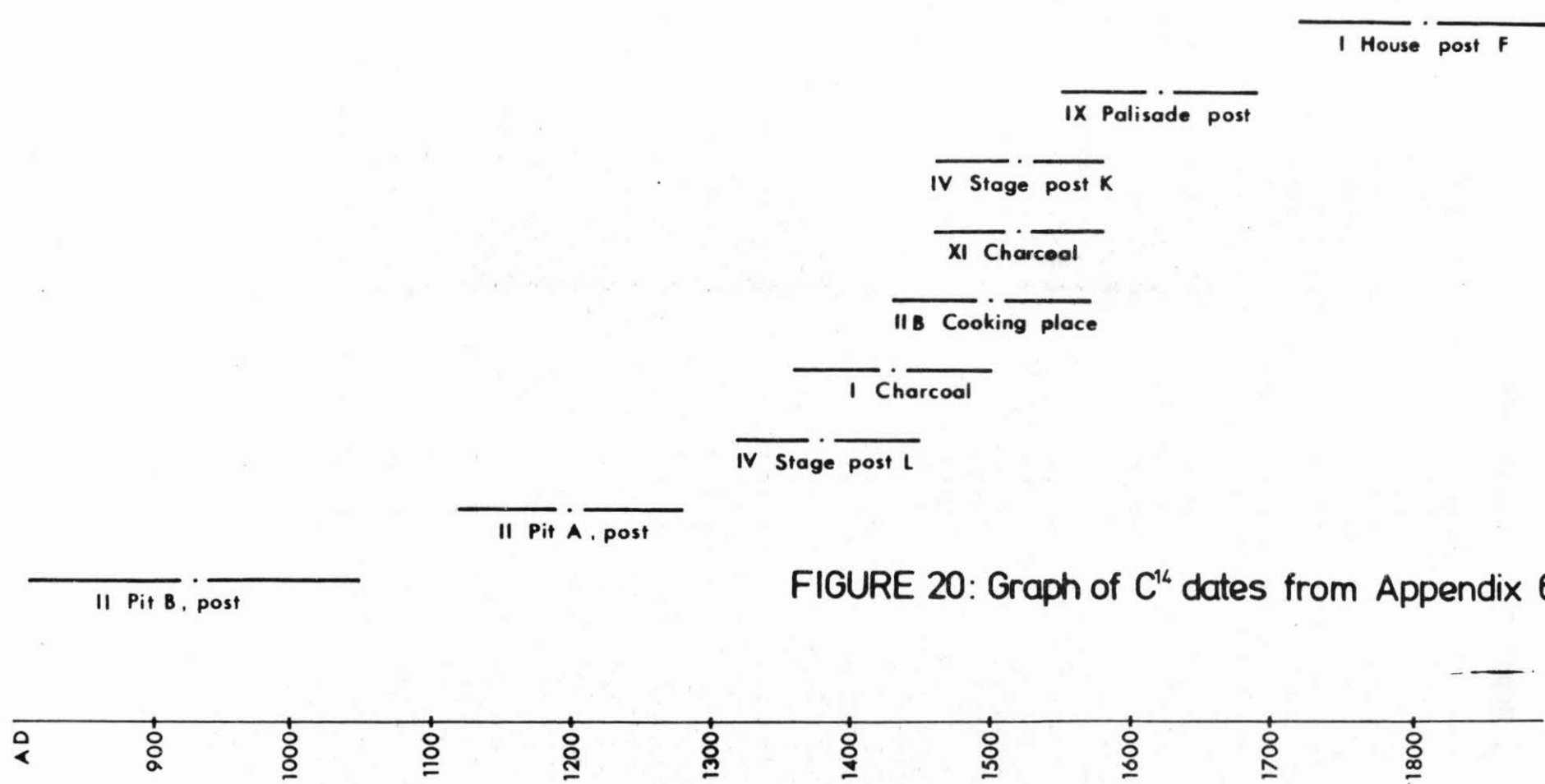


FIGURE 20: Graph of C<sup>14</sup> dates from Appendix 6



## CHRONOLOGY

The excavations have demonstrated that the Tiromoana ridge was occupied over a considerable period of time. In the absence of diagnostic or dateable artefacts, the time scale has inevitably to be based on the stratigraphical sequences and on the results of radiocarbon analyses, with all the uncertainties inherent when working within a relatively short period.

The radiocarbon dates supplied by Dr Rafter, D.S.I.R. are tabulated in Appendix 6; those used in this report are the figures based on the revised Half Life of carbon 14, which have been corrected for secular effect, and converted to the BC/AD calendar. The dates are shown graphically on Figure 20; a dot represents the central date, with the horizontal lines on either side indicating the plus or minus range in years to one standard deviation. It must never be forgotten that the central date is only a probability within the  $\pm$  bracket and it is just as likely that the central date is too early as that it is too late. With two exceptions, the dates are in order and conform closely with the sequence established by archaeological means. The exceptions are first from the door slab of Pit A, Site II which produced a date of 1960 BC  $\pm$ 90, which is clearly incompatible with the date of AD 1200  $\pm$ 80 for the pit's centre post; and secondly from a piece of timber of the first palisade on Site IX dated AD430  $\pm$ 100, which is out of keeping with the 15th - 16th century dates from other timbers belonging to the defences on Sites IV and IX. Both these examples have been omitted from the graph; such antique timbers presumably were derived from driftwood on the seashore or from the river, and can be disregarded.

The graph (Figure 20) indicates three periods of occupation. There is a significant cluster of dates relating to the fortification and occupation of the inner zone of the pa, commencing about AD1450-1500 and ending with the second palisade on Site IX about AD1620 or later. Before that, there are the two dates from timbers in the successive pits on Site II of AD930  $\pm$ 120 from Pit B, and AD1200  $\pm$ 80 from Pit A. Their importance and reliability has been argued elsewhere (Fox, 1975:200-2) and since they reinforce each other, neither can be dismissed as improbable. In estimating the initial date of this occupation, which was apparently limited to the tip of the Tiromoana spur, the age of the tree may be taken into account. The samples were from fragments of totara posts, with a basal diameter of some 25 cm (Figure 11). Paul Smith has examined some modern examples and found that the width of the annual growth rings varied from 1 to 3 mm. He commented, "If we assume a uniform ring width of 1 mm throughout the life of the Te Awanga posts, then the age would be 125 years; alternatively a uniform width of 3 mm would give an age of 75 years. This simple calculation provides the age limits and I do not feel that any more definite estimate can be given". It is therefore possible to bring forward the construction date for Pit B to *circa* AD1000 - 1050, though this is still within the original time span indicated by the one standard deviation of  $\pm$ 120 years.

It can therefore be concluded that there was occupation of the site during the 11th century, and an earlier date cannot be excluded. It may well be that discoveries from future excavations will reinforce the evidence for this early date from Te Awanga. It is now generally accepted that agricultural settlements were well established in different parts of the North Island by the end of the 12th century; as for example at Skippers Ridge, Coromandel, with a date of AD1170  $\pm$ 60-50 (Davidson, 1975:36), in the Wairarapa with dates of ad 1180  $\pm$ 50 (Prickett and Anderson, 1972:164), and at Wiri, Auckland, with dates of AD1240  $\pm$ 70 (Sullivan, 1975:206). There would not appear to be any inherent difficulties in pushing back the origins of Maori agricultural settlement in Hawkes Bay for another 100 or 150 years.

The first period of occupation lasted into the 13th century according to the radiocarbon date of AD1200  $\pm$ 80 from the upright in Pit A, Site II, though the use of this large storage pit may have continued for longer. The graph (Figure 20) then indicates a break in the series, before the cluster of overlapping dates from the fortifications in the late 15th and 16th century.

The remaining date from a small secondary timber from the long house on Site I, shows that there was occupation on the ridge outside the main pa defences in the 18th and early 19th century. Unfortunately no other reliable carbon samples were obtained from late deposits in the interior of the pa to prove or disprove another cultural break.

## GENERAL SUMMARY

Three phases of occupation have been identified from the series of radiocarbon dates; it now remains to summarise their character and content, and to attempt to pull together the threads from the evidence of the excavations.

The Open Settlement

The earliest settlement on the Tiromoana ridge was at the tip of the spur overlooking the steep fall to the river (Site II, Figure 10 and Plate I). The first structure was a rectangular storage pit, 4 x 2.5 x 1 m with a central row of three timber uprights to support the roof; one end post yielded the radiocarbon date of AD930 just discussed. The pit presumably had been used for kumara storage and implies cultivation of garden plots in the vicinity. It was used for a considerable time because the other end post had been replaced by a smaller timber and the original hole repacked, and 30 cm of fine silt had accumulated on the floor before the sides began to collapse (Figure 11).

A series of small post-holes on the adjoining triangular levelled flat indicate the possible site of a sleeping house. It was unfortunate that no coherent plan was obtained in the 0.5 m of loose black soil which covered the site; undoubtedly there had been a succession of rectilinear structures with post-holes of varying depths. The present rate of erosion of the river slopes suggests that the inhabited area was originally more extensive.

The first pit was eventually abandoned, probably due to moulds contaminating the tubers (Fox, 1975:203) or to the inhabitants moving away temporarily, since the radiocarbon dates show a possible break. The next structure was a large pit with a raised rim, 7 x 6 m and 1 m deep, with a similar central row of roof supports (Pit A, Figure 10); one upright had a radiocarbon date of AD1200  $\pm$ 80. The pit had an external drain, and a doorway with a timber sill made of a piece of drift-wood and an internal step down at its northern end (Plate XIII); at the sides there were rectangular divisions sunk in the floor, interpreted as bins for storing the kumara (Fox, 1974:146). A thin seam of charcoal 8 cm above the floor suggests that the pits had been disinfected periodically by burning to overcome the danger of contamination and to extend the period of use (Fox, 1975:203). The increased capacity of this second pit suggests that the area of cultivation had been extended. This is supported by the evidence of pollen analysis from buried soils on Site IV, which indicates that forest clearance had preceded the building of the defences in the 16th century (Appendix 5).

It is uncertain whether this early settlement spread farther up the ridge or whether it was defended: there is an open space immediately to the south of Site II (Figure 3) which has surface irregularities that could be the remains of filled-in pits; these need to be tested by further excavation.

There were no traces of previous occupation beneath the defences on Sites IV and IX. The only other possible early structure is the timber palisade across the ridge, sealed beneath the bank of the 18th century long house on Site I. The close set timber uprights had been placed in small and relatively shallow holes, 20-40 cm deep, dug with sloping sides to fit the post with minimal packing. The construction differs significantly from the wide spaced uprights in the palisading associated with the later pa, but is undated.

### The Fortified Pa

The area enclosed by the initial fortifications was some 450-400 square metres, extending for 75 m from the tip of the spur southwards.

The first defence was of timber only, consisting of a lateral palisade along the whole of the eastern side of the hill (Site VI and Plate II0 and for 20 m along the western side (Site IX). In all probability the two were connected by a transverse line about 3 m behind the later rampart, but only one post (Site IV, D, Figure 5) was positively identified beneath the later work. The timbers were placed in small holes 2-3 m apart, some squarish 40-60 cm in diameter, and up to 85 cm deep. The posts were presumably lowered into the centre of the holes and packed in the upright position. All the posts had been removed and the holes filled up with cooking rubbish or repacked with soil; in four examples, the post-holes had been re-used (Site VI, O, N and W. Site IV, D). No entrance was located. Although no satisfactory material for radiocarbon dating was recovered, the archaeological evidence is sufficient to show that this palisade was primary.

### The Earthwork Defence

The final form of the defences consisted of a transverse rampart and ditch across the ridge, fronted with a palisade and with a central fighting stage over the rampart at the highest point of the ridge (Site IV). This was a platform 5.50 m long by 2.35 m wide, anchored to three very substantial timbers at the back of the rampart, and probably with a lower tier for rapid mounting at the rear. The construction was dated to the late 15th or early 16th century by averaging the radiocarbon dates of AD1380  $\pm$ 60 and 1520  $\pm$ 60 from the stage posts. Such a stage would provide standing for 15 to 20 warriors, probably at a height of some 4-5 m above ground level. There was a short length of a second ditch 45 m in front of the first at the narrowest point on the ridge (Site III); this was designed as an obstacle for the attackers when they came within missile range of the defenders on the fighting stage. Three piles of broken *haangi* stones on the ground behind the stage show the type of projectiles used.

The first palisade on the eastern side of the hill was replaced by another with more substantial posts 2 to 3 m lower down the slope (Site VI, second palisade). The holes had been dug with a vertical back and a shallower sloping front which acted as a ramp down which the post was slid; it could then be hauled into an upright position against the back wall of the hole, and packed with solid loess clay (Figure 8 and Plate XI).

The same method of construction had been used for the erection of the stage (Plate IX), suggesting that the two were contemporary. On the western side of the pa (Site IX) there was evidence of a similar replacement of the short length of the previous palisade. Three heaps of clay soil had been dumped along the line suggesting that an extension of the rampart was intended to reinforce a vulnerable flank, but that it was not completed. A radiocarbon date of AD1620  $\pm$ 70 from one of the palisade posts shows that this reconstruction of the western defences took place at a rather later date.

The entrance to the pa was on the eastern side facing the slopes to the dry valley and the river. Here one end of the palisade was inturned to form a shallow recess and the way in between two posts 1 m apart was shown by a scatter of broken *haangi* stones and occupation dirt (Site VI). The placing of the entrance on this side of the pa would compel attackers either to make a direct advance from the river up the slopes of the 'dry valley', or if they came along the ridge from the south, it would be necessary to descend the slope at the end of the rampart and to enfilade below the palisade. Here they could be assailed by missiles from the defenders higher up the slope on the terrace within the pa. For the inhabitants, the entrance was conveniently placed for a descent to the river, for water, fishing or to their canoes.

Structures excavated within the pa were limited. One was an open-fronted building 5-6 m long on a terrace, south of the entrance (Site V). This was a lean-to construction with an internal drainage gutter at the foot of the back scarp; it could have been used as a weaving shed or for netting, or possibly as an arms-store, since it was conveniently close to the entrance through the palisade (Site VI). A trodden path along the outer edge of the terrace gave access to this building.

Another structure was a rectangular wooden building 1.6 m x 1 m supported on four small angle posts; it was situated at the western edge of the pa, between two raised-rim pits (Site VIII). The remains have been interpreted as those of a raised store-house, a *pataka*, rather than a food rack.

Two open-air cooking places were investigated, one in the centre of the pa (Site XI), and the other at the northern end (Site II), in the sheltered hollow provided by the filling of the preceding Pit B, and adjoining the possible house site which will have continued in use. In both places cooking was in earth ovens (*haangi*) on heated stones in a shallow depression, which was usually burnt red at the bottom. Stakes probably for spit roasting over the fire hollows were also found (Figure 11). Some bones of dogs and rats with a variety of bird and fish bones attested to the foods cooked; shellfish, other than mussel and the occasional paua, were conspicuous by their absence; much waste material, however, could have been thrown away down the slopes. Radiocarbon dates of AD1520  $\pm$ 50 and AD1500  $\pm$ 70 from the cooking hearths on each site show that these activities were contemporary with the defences. The shed and the *pataka* were undated. It is uncertain how many of the principal cluster of raised-rim pits, and the levelled spaces amongst them which are probably house sites (Figure 3), should

be assigned to the same period rather than to a later date.

### The Extra-mural Settlement

Terracing and associated storage pits around the head of the dry valley and on the eastern slopes below the palisade, showed that occupation had spread outside the defences (Figure 3). The beginnings of a transverse bank and ditch 246 m higher up the ridge to the south, where it narrows significantly, may have been an attempt to defend the expanding settlement, but the two lengths were not linked up, and the work remained unfinished (Site VII). It was probably over-ambitious, since there are no signs of habitation in the intervening space on the crest of the ridge (Figure 2). Two structures were investigated in the extra-mural settlement; the first was probably a sleeping house of slight construction on a terrace at the head of the dry valley (Site X). It had an internal drain at the rear, and a ridge pole supported on slender posts. The second was an embanked long house 11 x 3.75 m on the crest of the ridge only 15 m away from the inner rampart (Site I). It was an interesting construction, with a roof carried on a ridge pole resting on a row of central uprights, and with an entry at the eastern gable end. Its reconstruction (Figure 17) and the house type have already been discussed (p.26). The function remains uncertain. The few finds show that the building was inhabited and that trimming and sharpening of stone artefacts was carried on inside. No hearth was found but scattered charcoal indicated that small warming fires had been lit in various places. The size and prominent position of the house on the ridge top, where it completely blocked the main defences of the pa (Site IV) demonstrates that the building was important to the community at a time when the idea of defence had been given up. A radiocarbon date of  $ad1820 \pm 90$  from a subsidiary post or strut indicates that this was in the late 18th or early 19th century, since no European objects were found.

There are two possible interpretations of the building, first that it was the chief's house at a time when the centre of occupation had moved outside the defences. There are surface indications of a similar embanked structure at the large pa at Rotokare (N134/36) near Hastings, situated on the summit platform (*tihi*) an area customarily associated with the chief. The second suggestion, which is not incompatible with the first, is that the building was a place of assembly, the prototype of the Maori meeting house, of which many examples survive from the mid and late 19th century. This would account for the paucity of domestic debris on the floor, but such a suggestion is incapable of proof.

It was presumably about this time that the strong defensive circuit of the 16-17 century was weakened by the cutting of two entrances through the earthworks. On the crest of the ridge a narrow cut with sloping sides had been made through the rampart, a palisade post removed (F on Figure 5), and the ditch filled in to make a causeway. On the west side of the ridge (Site IX) a large palisade post had been dug out from below, leaving a 3 m long recess with indications of a path up the scarp on either side (Figure 6). These make-shift entrances provided an easy way through the earthworks and were presumably made to enable people in the extra-mural settlement

to reach the cluster of raised-rim pits at the upper end of the pa, which now functioned mainly as a food store. Finally the line of the eastern palisade was breached, when some of the uprights (U and X, Figure 9) were dug out by means of a slit trench from below; the surface indications of a row of other similar excavations suggests that most of the palisade was dismantled in this way.

### Correlations with Traditional Evidence

The three phases at Tiromoana expressed in human and political terms represent a period of peaceful agricultural settlement, followed by a period of insecurity when warfare was expected and defence needed, and finally a period of peace when defences could be dispensed with. It is worth considering whether this sequence in broad outline can be correlated with what is known from Maori traditional stories and from genealogies of the history of the region. As J.B.W. Robertson stated "Archaeology is essentially impersonal and (Maori) tradition is essentially personal. It is only very broad conclusions that can be applied from tradition to archaeology and vice versa" (Robertson, 1964:4). Any attempt to do so is fraught with difficulty, particularly for archaeologists like myself, untrained in Maori language and scholarship. Recent work on traditional evidence by D. Simmons has shown that there is no generally accepted 'myth' concerning Maori tribal origins; instead there is a variety of local traditions which relate to specific areas (Simmons, 1976:315). In this area it is believed that Hawke's Bay was populated by descendants of men who arrived from 'Hawaiki' in the Kurahaupo canoe commanded by Chief Whatonga. The Rangitane of the Hastings district and the Ngai Tara of Cape Kidnappers are said to have developed from these origins. Tara, the chief personage in the Te Awanga region, was a son of Whatonga (Buchanan, 1973:3; Simmons, 1976: 86-9 and 317). They were subsequently joined by others who landed from the Takitimu canoe, whose commander was Tamatea-ariki-nui. One tradition indicates that the previous landing of the canoe was in the far north near Kaitaia, followed by a voyage south and east to the Bay of Plenty, and then round East Cape to other landings in Poverty Bay, the Mahia, Wairoa, Waimarama and the Wairarapa (Mitchell, 1944:40) which geographically is an acceptable coastal settlement pattern. Another tradition states that the canoe came by way of Rarotonga in the Cook Islands, and landed first at Nukutaura on the Mahia Peninsula and there are other variants (Simmons, 1976:114-124). It seems permissible to ascribe the first agricultural settlement at Tiromoana to the Ngai Tara, probably incorporating some of the later group as time went on.

The Ngati Kahungunu tradition also tells of a later movement from the Bay of Plenty which brought Chief Kahungunu, great-grandson of Tamatea-ariki-nui, to the Mahia Peninsula. Kahu achieved his position by marriage with the Mahia chief's widow, Rongomaiwahine, after he had drowned her husband at sea by a ruse (Mitchell, 1944:78). Three generations later there are stories of aggressive attacks by his people, the Ngati Kahungunu, under the leadership of Taraia in central Hawke's Bay, including the capture of Heipipi pa from the Maruiwi, a branch of the Ngati Awa and an attack on Otatara in the territory of the Rangitane (Buchanan, 1973:9).

Their dominance over southern Hawke's Bay quickly followed. It is obvious that this expansion of the Ngati Kahungunu provides a suitable context for the fortifications at Tiromoana, provided that the traditional dates are compatible with the radiocarbon evidence.

Calculations of Maori chronology are based on genealogies (*whakapapa*) committed to memory and recited ceremonially by the living person who claims kinship by virtue of his descent. "The records were kept in the heads of men specially selected and trained for the work and the essence of the system was word-perfect repetition" (Robertson, 1956:46). By this means, as many as 20 generations are known, ancestral to a person born in the late 19th century. Reckoning on four or five generations to a century, and utilising the cross references provided by different genealogies of the Ngati Kahungunu and related Tuhoe and Waikato tribes, Robertson (1964:9, 45-6, 53) has shown that in all probability, Chief Kahungunu lived in the 15th century and Taraia in the mid 16th century. This is as close an approximation as could be hoped for with the radiocarbon dates from the fortifications at Tiromoana.

It remains uncertain whether the defences were constructed by the Ngati Kahungunu themselves, or by the Ngai Tara in order to defend the site against the intruders. There are two pa near Napier that traditionally were attacked by the Kahungunu under Taraia in the early 16th century and which therefore should indicate the indigenous type; these are Otatara on the Tutaekuri River near Taradale, and Heipipi above Bay View. Both are much larger but less coherent structures than Tiromoana, with terraces and pits spread out over a kilometre or more of the ridge system. Their inhabitants appear to have relied primarily on natural steep slopes for their defence and the use of transverse ditches appears ineffectual. At Otatara (Buchanan, 1973:Plate 4) there is a small-scale ditch and bank across the lower slopes facing towards Redcliff in a position that provided little protection for the main inhabited area on the crest. At Heipipi (Buchanan, 1973:plate 3) the two transverse ditches on the lower end of the spur south of the Glenvale vinery, which were seen by Elsdon Best (1927:212) have been obliterated by a pine plantation. A short length of ditch survives about a kilometre inland just beyond a high point on the ridge, which bars the way to the pa from the southwest. Without excavation it is impossible to say whether any of the earthworks at these two sites are original features, or whether, as seems probable, they are later additions to expanding open or palisaded settlements. The technique, in that event, may have been introduced by and copied from the Kahungunu.

It is clear that more detailed study of pa types and their distribution followed by excavation of select examples is needed in Hawke's Bay to solve such problems, and to create a firm foundation for the prehistory and early history of the region. The excavations at Tiromoana pa, Te Awanga, are merely a beginning.



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APPENDIX 1

## Bird and Animal Bones

R.J. Scarlett  
 Canterbury Museum  
 Christchurch

*Nestor meridionalis septentrionalis* (North Island Kaka)

Shaft fragment of R. humerus, fragment of mandible

Site II, Pit B, 10-20 cm

Proximal fragment of L. coracoid, shaft of L. humerus

Site II, Pit B, cooking place, 40-50 cm

*Cygnus sumnerensis* (Extinct Swan)

Distal end of R. radius, small specimen

Site II, Pit B, 10-20 cm

*Circus approximans* (Harrier Hawk)

Shaft fragment of R. tarso-metatarsus, fragment of ulna

Site II, Pit B, cooking place, 40-50 cm

*Canis familiaris* subsp. (Polynesian Dog)

Posterior end of L. ramus, badly fragmented

Site II, Pit B, post-hole 4

Proximal end of R. ulna

Site II, Pit B, cooking place, 45 cm

*Rattus exulans* (Polynesian Rat)

L. ramus of mandible

Site, II, Pit B, cooking place, 40-50 cm

APPENDIX 2

## Fish Bones

B.F. Leach  
 Anthropology Department  
 University of Otago

*Galeorhinus ? australis* (School Shark)

6 vertebrae, one individual

5 vertebrae. ? one individual

*Physiculus bachus* (Red Cod)

1 R. articular, one individual

3 L. premaxillae, 1 R. premaxilla, 4 L. maxillae, 1 R. maxilla,  
 1 L. articular, 1 L. quadrate, minimum 4 individuals: in  
 addition some unidentified fragments, probably *R. bachus*.

*Physiculus* sp., not *P. bachus*

1 R. quadrate

*Chrysophrys auratus* (Snapper)

1 R. quadrate

*Dasyatis thetidis*      *D. brevicaudatus*      *Myliobatis tenuicaudatus*  
 (Ray)

1 spine

All from Site II, Pit B, layer 2, cooking paace.

The fish were all rather small specimens, except the sharks which were of medium size. There is nothing relating to seasonality in their remains. They are typical for a 'soft shore' environment and the fish were probably caught by fish-hook and line rather than by nets, trolling lines or traps.

APPENDIX 3

## Lithic Material

M.J. Morwood

A very restricted range of artefactual material was recovered from the site. This consisted mainly of locally available cherts and river stones, although thirteen pieces of a brown translucent obsidian were also recovered. Artefactual as well as structural evidence was obtained from Sites I, II, IV and V, and has been detailed in Table 1.

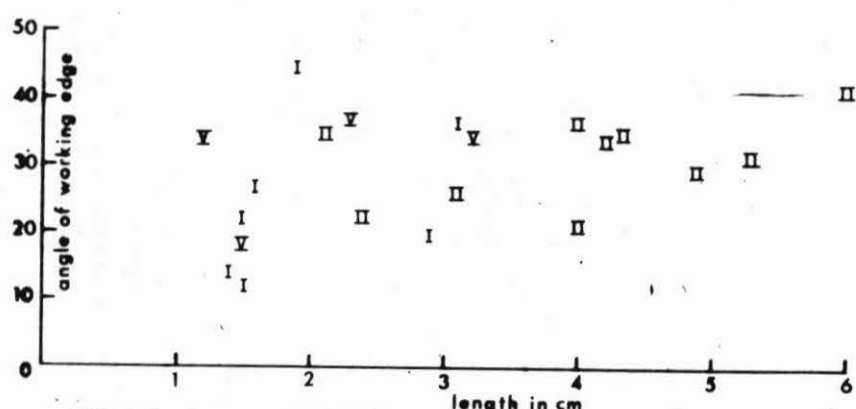
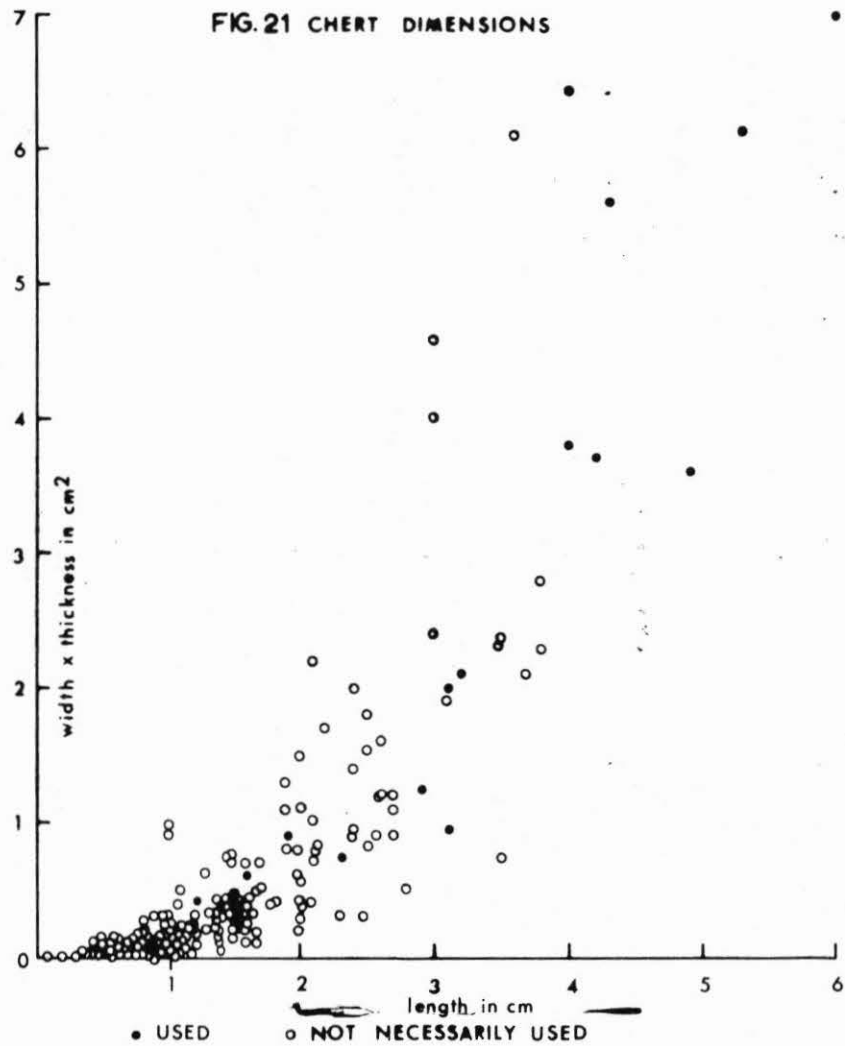
Two approaches have been used in this analysis: firstly a basic description of what was found; secondly, an attempt to relate functional characteristics of the assemblage, including stratigraphic and spatial distribution and use-wear on individual flakes to other evidence of site activities. The dimensions of all stone material were recorded, using a measuring board, to within  $\pm 1$  mm. Measurements taken were:

- (a) length (cm) - the maximum dimension in any plane;
- (b) width (cm) - the maximum dimension at right angles to length;
- (c) thickness (cm) - the maximum dimension in the plane at right angles to length and width.

Measurements were taken in this way rather than in relation to the striking platform of flakes (Shawcross, 1964; Leach, 1969) because interest was primarily in functional rather than technological attributes. This also meant that measurements could be taken for cores and chips. Next, all pieces except *haangi* stones were examined using a bi-polar microscope at 4-40 X magnification for evidence of use. Coating techniques were not necessary for obsidian, but for cherts and coarser materials diluted Indian Ink was applied and allowed to dry prior to examination. Criteria of use included:

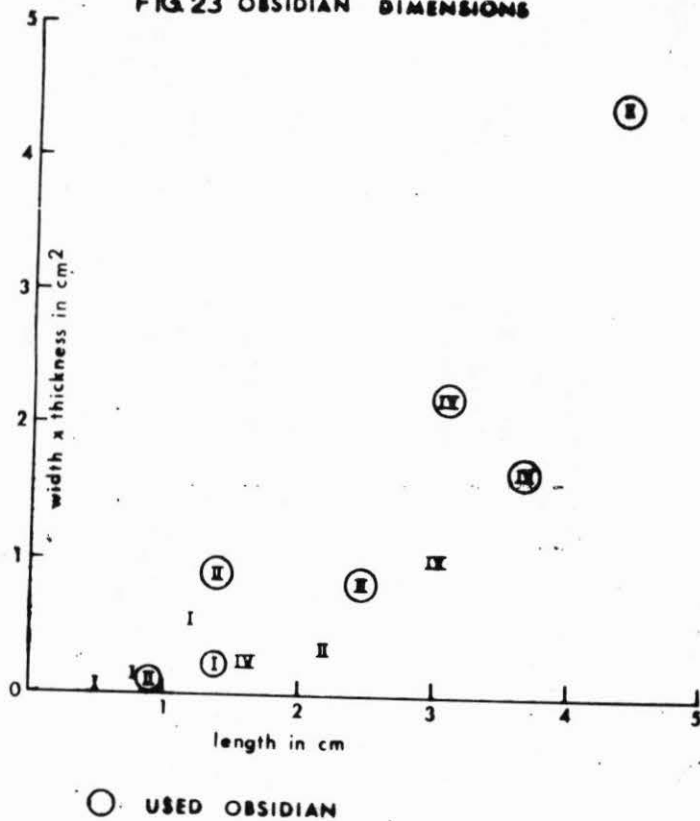
- (a) Regular bifacial or unifacial edge damage (Jones 1972; Morwood 1974); on coarser materials the blunting of flake scars was also required.
- (b) Small scratches or striations incurred during use. As Semenov (1964) has indicated, these show how the flake was used, while evidence for depth of penetration may also show the nature of the material worked.
- (c) Dulling of obsidian or polishing of coarser materials due to friction between the tool and material being worked: this is usually edge localised. For all specimens with identified use-wear the length, shape and angle of the working edge was recorded, as was edge-wear type and severity, presence of striations, etc.

As seen in Table 1, the predominant material at the site was chert. This varied from yellow-brown to grey-black in colour, a feature typical of northern Wairarapa cherts (Keyes, 1970), but as chert exposures are found in the area, the chert is probably of local origin. Where visible, original surfaces were either weathered or water-rolled, a fact



**FIG. 22 CHERT FUNCTIONAL DISTRIBUTION**

**FIG. 23 OBSIDIAN DIMENSIONS**



consistent with collection of nodules from exposures in stream banks or material from stream beds. In general, the assemblage was of a morphologically undifferentiated nature and tool manufacture probably paralleled the Australian situation where often a nodule of material was smashed up and the flakes required selected from the debris (Gould *et al.*, 1971). The opportunism of Maori stone technology is particularly evident in the late occupation at Site I; here large stones were required and water-rolled stones gathered for the purpose. More extensive use was made of river material for tool manufacture than in any other area of the site; in such circumstances, no functional distinction was made between cores and flakes except where technologically relevant. Different activities are evidenced in the areas excavated which have also provided different dates. The sites have, therefore, been individually treated.

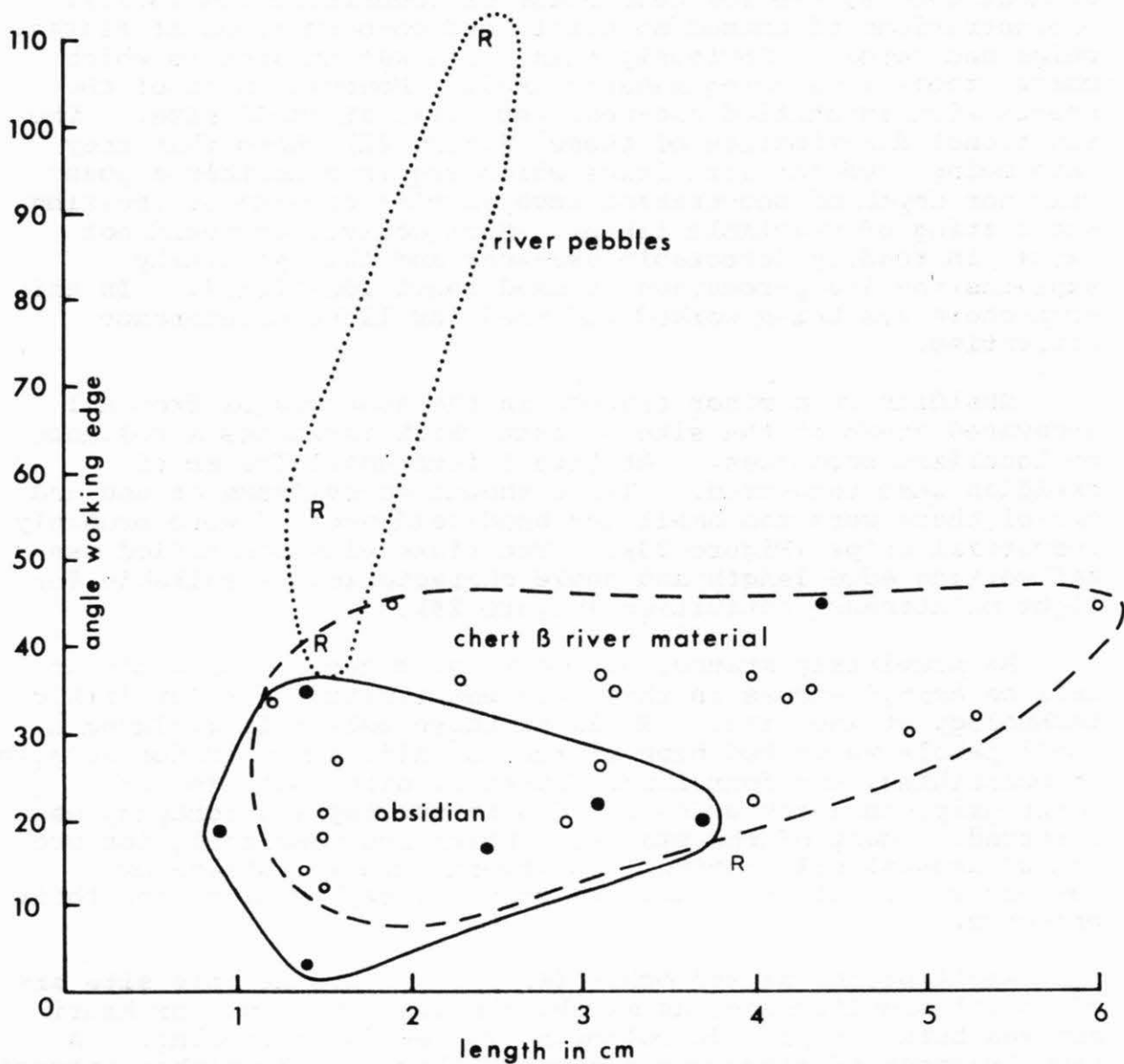
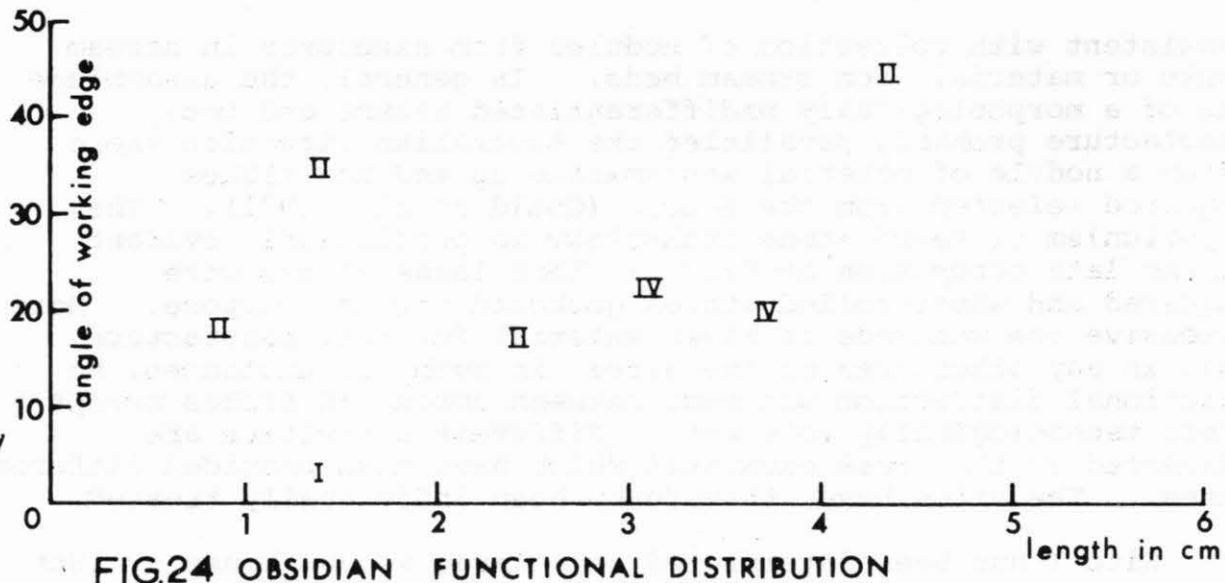
Site I has been interpreted as a large wooden house of 18th century date. The most interesting features of the stone material from this area concern the chert (Figure 21). Notable features are: the large number of chert pieces, the small size of most cherts, the low percentage of identified use (3.7%), concentrations of unused material, and co-occurrence of flakes, chips and cores. Obviously then, this was an area in which chert tools were being manufactured. However, most of the cherts with identified use-wear were also of small size. The functional distribution of these (Figure 22) shows that they were being used for activities which required neither a power grip nor depth of penetration such as fine carving or incising and cutting of vegetable fibre. Such activities would not result in readily detectable use-wear and this partially explains the low percentage of used chert identified. In this area chert was being worked and used for light maintenance activities.

Obsidian is a minor element in the assemblages from all excavated areas of the site, a fact which indicates a reliance on localized resources. At Site I four small flakes of obsidian were recovered. Three showed no evidence of use and two of these were too small for hand-held use and were probably industrial chips (Figure 23). The flake with identified use had working edge length and angle characteristics suitable for light maintenance activities (Figure 24).

As previously stated, use of river material for tools as well as *haangi* stones in this area has implications for lithic technology at the site. Tools of these materials included a small pebble which had been broken in half, and used for scraping or burnishing, and four large flakes of size suitable for a power grip, on which evidence of both cutting and scraping was observed. Many of the smaller pebbles are unsuitable for use but of unusual colouration. Aesthetic considerations or the activities of children, are possible explanations for their presence.

Small pieces of red ochre (*kokowai*) found at this site are of social significance, as may be the resinous gum, for kauri gum was burnt to provide colouring matter for tattooing. A tiny fragment of glass was recovered which may be either intrusive or indicative of the early 19th century date obtained from this area.





Site II was distinguished from Site I firstly by the high percentage of identified use in both cherts (43.5%) and obsidian (80%). Here, it appears chert was being used but not worked, as many of the 'unused' pieces of chert are of small angle and size range and suitable for activities for which use-wear would be difficult to detect. Secondly, this area contained all of the larger cherts recovered from Te Awanga and the severity of edge damage on these is not found on any specimen from Site I.

Pit A was a storage pit which had not been re-used after its abandonment: hence only a piece of quartz, one used and one unused obsidian flake were found. Pit B had originally been a storage pit also, but after its abandonment for storage it had been used as a cooking area. The more extensive use of this area, in contrast to Pit A, is reflected not only in the stratigraphic complexity but also in the numbers and variety of materials recovered (Table 1). With the midden and *haangi* stones providing evidence of food preparation and consumption one would expect the assemblage to reflect these activities. Use of the acute angled chert for food preparation is probable, but speculative, as this material is unsuitable for striation formation. However, from Layer 2 a flake of obsidian was recovered on which occurred marked parallel and occasional transverse striations up to 6 mm from the working edge. This depth of penetration and the mechanics of use documented by the striations on this piece indicate use for butchering or cutting up of fish, as do shape, size, and angle of the working edge. Evidence of other activities is provided by the occurrence of a large greywacke flake and by eight large pieces of chert found together. The severity of edge damage, their size, and working edge angles and lengths are consistent with woodworking. As at Site I, red ochre was recovered. It appears then, that this abandoned pit was used for a variety of activities, including food preparation and consumption, and woodworking. The high percentage of used materials and the lack of small industrial chips or cores makes it unlikely that stone was worked in this area, in contrast to Site I.

Adjacent to Pit B was an occupied area, probably with a sleeping house. Evidence for a minimum of maintenance activities was provided by two small flakes of unused chert and a core and a large obsidian tool on which unifacial edge damage, together with a concavity, indicated scraping of a thin shaft 7 mm in diameter.

Site V was a small occupied terrace. No obsidian was recovered but the used chert is of similar functional distribution to Site I (Figure 22). This may correlate with the presence of *haangi* stones and the absence of midden. Another similarity between these two areas is the use made of a small half pebble for scraping or burnishing, but an obvious dissimilarity is that here chert was not being worked, as the small number of pieces, their relatively high percentage of identified use (44.5%), and the absence of industrial waste shows. The assemblage then from this site reflects use of the area for light maintenance activities.

## Resource utilization

Use of different resources was investigated as a potential indicator of political or social determinants. Use of different resources at Te Awanga and their functional distribution in terms of length and angle of working edge (Figure 22, 24) is best seen in contrast to an assemblage obtained from Tokoroa, where all tools have been manufactured from one material, obsidian (Law 1973; Morwood, 1974). As seen on Figure 25 obsidian is with one exception clustered in the small length and angle range. This one exception is significantly different in its edge damage type as well as its size and angle of working edge (Figure 24). This has been used for scraping; the rest have functional attributes and damage types associated with light cutting. The restriction of obsidian to this activity range is not solely determined by functional requirements at the site, as the functional distribution of cherts shows, but probably arises because of the scarcity of a resource which is not locally available. It has been noted of chert that: "In many sites this rock type is more abundant than obsidian which it appears to have replaced or substituted for use as small cutting and scraping implements" (Keyes, 1970:128). The functional distribution of cherts from Te Awanga overlaps with that of obsidian (Figure 25) but many are of greater size range. This, together with the severity of edge damage, indicates that at this site cherts were used for a range of activities for which obsidians were not. This may have been dictated partly by the differing physical properties of the materials (Crabtree and Davis, 1968:427) but mainly by the scarcity of the material. Green (1964) has suggested that size of flakes produced may vary inversely with distance from, or accessibility to, the resource. Providing functional requirements are met, this may be so, but the fact that all of the larger used cherts are from one small area of this site would indicate the importance of function in determining size characteristics. However, assuming a representative sample of site activities has been investigated, and functional discrimination discounted, a reliance on localized resources can be interpreted in a number of ways: either the stressful conditions resulting in pa occupation forced a reliance on local resources; or a change in land ownership meant that some resources were no longer accessible; or the economics of transportation favoured use of resources that were readily available locally.

## Conclusions

The restricted range of artefactual material and other evidence suggests that occupation of the site was never intensive but recurrent. Activities at the site included limited food preparation and consumption, chert working, light maintenance activities and woodworking, and these activities are reflected to varying degrees in the assemblage. The site inhabitants made use of nearby chert exposures for tools, and river boulders for both *haangi* stones and tools. The small numbers and sparing use of obsidian is undoubtedly correlated with the fact that it is exotic to the area; this, as indicated, may have more general implications for New Zealand prehistory.

Acknowledgement: I should like to thank Lady Fox for the opportunity to work on this material.

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TABLE 1

## Distribution of Stone Material

	Site I	IIA	IIB	II+	IV	V
<u>Obsidian</u>						
Total	4	1	3	1	4	-
Used	1	1	2	1	2	-
<u>Chert</u>						
Total	203	-	20	3	2	9
Used	7	-	10	-	0	4
<u>River Material</u>						
Pebbles:						
Total	26	1	9	-	-	10
Used	1	-	-	-	-	1
Flakes:						
Total	13	-	1	-	1	2
Used	5	-	1	-	-	-

+ ?house site adjacent to Pit B

The broken blade of an adze of metasomatised argillite was found when a track was bulldozed behind the homestead in 1977, about a kilometer from the pa. It measures 45 mm long and 55 mm wide at the base of the blade, and is highly polished on both faces. Mrs K. Prickett reported that the material appears to be typical Nelson - D'Urville Island ultramafic belt metasomatised argillite. The adze shows evidence of use along the blade with edge damage in the form of striations and buffing. It appears to have been remodelled at least once after the initial breakage.

A small greenstone chisel was found in 1975 in the vegetable garden, which adjoins a group of raised-rim pits close to the river. It measures 31 mm long and 16 mm wide.

Both finds have been retained by the owner. The finds from the excavation are in the Hawke's Bay Museum at Napier.

APPENDIX 4X-ray Fluorescence Analyses of two Samples  
of Obsidian

R.F. Hemming  
Geology Department  
Auckland University

Of a number of samples from the site only two (a) Samples Site II, 96 and (b) Site IV were used. Other samples were not analysed because the chips did not present a plane surface large enough for irradiation.

Sample Preparation

The two expendable samples were ground up in a tungsten carbide mill and mixed with fibrous cellulose in the ratio 4 : 1, by weight and then pressed into a thin disc.

Method of Analysis

Similarly manufactured plates of two rocks; a Taupo obsidian and a Mayor Island obsidian, were used as standards. Analyses were made for four elements that were thought to strongly discriminate between obsidians whose source lay somewhere within the Taupo volcanic zone and those from Mayor Island. Analytical conditions for the four elements are summarized below.

Results

Surprisingly the two samples are of very different composition. Sample (a) is similar in composition to the Taupo obsidian standard especially in the ratio of Ba:Sr:Zr. Sample (b) on the contrary is very different in composition to the Taupo obsidian and rather close to the Mayor Island obsidian.

Because of their contrasting compositions, the two obsidian chips have undoubtedly come from two very different sources. Sample (a) is probably from a site within the Taupo volcanic zone while (b) could be from Mayor Island. It was pointed out by Carmichael (1962) and Jack and Carmichael (1968) amongst other workers that obsidian erupted from one volcano or volcanic centre bears a unique trace element abundance pattern which may serve to distinguish it from obsidians from other volcanoes, even those within the same co-magmatic province (the Taupo volcanic zone would be regarded as a co-magmatic province because the magmas have all arisen from a very similar source).

Defining the sources of these two obsidians would take more careful analysis and one would also need a reference collection of obsidians from sites over the North Island. The two samples

are from different sources and one of them, (b) could be from Mayor Island, though the Sr content is markedly higher than the Mayor Island standard.

Analysis Procedures: all analyses were carried out on the Phillips X-ray Fluorescence analyser in the Geology Department at Auckland University. Corrections were made for background only.

Crystal	Element	Line	Peak 20	Counting time (secs)	Accelerating voltage Kv	Current Ma
LIF200	Ba	L <sub>1</sub>	87.35	100	60	40
LIF220	Sr	K <sub>1</sub>	36.05	40	64	35
LIF220	Zr	K <sub>1</sub>	32.25	40	60	40
LIF220	Ce	L <sub>1</sub>	111.85	40	60	

All measurements were made with a gold X-ray tube.

TABLE OF ANALYSES, VALUES IN PPM

Sample	Ba	Sr	Zr	Ce
"Mayor Island" obsidian	40	<1	1309	367
"Taupo" obsidian	766	74	185	74
(a) Site II	818	73	177	91
(b) Site IV	83	61	714	240

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APPENDIX 5

## Pollens from Buried Soils

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 Christchurch

Five samples were examined from Sites I and IV. Only the sample from the soil beneath the rampart on Site IV had a good flora; all the rest are very depauperate. In all the samples there was a great deal of microscopic charcoal fragments and what pollen there was is eroded to some extent.

It appears that the vegetation growing on the buried soil (Sample 1, Site IV) was *Pteridium* (bracken) dominated, with minor amounts of various scrub species. Only three tree species were recorded, *Podocarpus spicatus* (matai), *Nothofagus* sp. and *Dacrydium cupressinum* (rimu). *Podocarpus spicatus* was the most abundant tree type. From my results at Lake Poukawa, the vegetation of Te Awanga would fit fairly well into the late clearance phase, with the original forest very much reduced in extent and a dense bracken/swamp/scrub mosaic covering the landscape.

The floras from the early palisade post-holes on Site I are very similar to Site IV but with less variety; there is no reason why the pollen may not have washed in or have been worked by soil animals. There appears to be no introduced pollen such as *Pinus* or *Salix* so the holes were not open in European times.

POLLEN TYPES RECORDED FROM SITE IV, BURIED SOIL  
 UNDER THE PA RAMPART

*Pteridium* (abundant)  
 Unidentified bryophyte spore (abundant)  
*Podocarpus spicatus* +  
*Dacrydium cupressinum* +  
*Nothofagus* sp +  
*Muehlenbeckia*  
*Phyllocladus* +  
 Compositae +  
*Coprosma* +  
*Rubus* +  
 Gramineae +  
*Plantago* +

*Geranium*  
*Wahlenbergia* +  
*Cyathea* +

+ = recorded more than once,  
 all others once only.



APPENDIX 6

## Radiocarbon Dates

T.A. Rafter

Institute of Nuclear Sciences  
Gracefield

Lab.No. NZ	Material	Site	Result bp, old half-life of C14	Result BP, new half-life corrected for secular effect
1911	wood, totara	IV, post K	340±60 (ad 1610)	430±60 (AD 1520)
1912	wood, <i>Pseu- dopanax</i> sp.	I, post F	130±90 (ad 1820)	<140
1913	wood, totara	II, Pit A, door sill	3530±90 (1580 bc)	3910±90 * (1960 BC)
1914	wood, totara	II, Pit B, post	1050±90 (ad 900)	1020±120 (AD 930)
1915	charcoal	II, cooking place, hearth	420±70 (ad 1530)	450±70 (AD 1500)
1916	charcoal	I, under house floor	490±70 (ad 1460)	520±70 (AD 1430)
1917	wood, totara	II, Pit A, post	760±80 (ad 1190)	750±80 (AD 1200)
1918	wood, totara	IV, post L	550±60 (ad 1400)	570±60 (AD 1380)
2711	charcoal and wood	XI, posthole lowest layer	410±80 (ad 1540)	460±80 ** (AD 1490)
2712	wood, totara	IX, post 4	250±60 (ad 1700)	330±70 (AD 1620)
2713	wood	IX, posthole 3	1550±90 (ad 400)	1520±100 *** (AD 430)
2714	charcoal	XI, cooking place, hearth	350±60 (ad 1600)	430±50 (AD 1520)
3416	soil	I, early palisade posthole	300±60 (ad 1650)	390±60 **** (AD 1560)
3462	soil	I, early palisade posthole	130±50 (ad 1820)	140±50 **** (AD 1810)

Notes: \* Fossil wood, result confirmed by re-run.

\*\* Sample possibly contaminated by cooking place above.

\*\*\* Fossil wood.

\*\*\*\* Since the sample point was not sealed off from subsequent vegetative matter, the true age of both these samples may be older by an unknown amount; the dates have therefore been disregarded in the report.

APPENDIX 7

## Soils

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D.S.I.R.  
Havelock North.

The site is situated on a high terrace of the Maraetotara River. The terrace is of middle Pleistocene age and is mantled with Pleistocene loess and some volcanic ashes of various ages. The volcanic ashes present are:

Aokautere ash (20,000 BP)  
Waimihia ash ( 3,500 BP)  
Taupo pumice ( 1,850 BP)

The presence of these marker beds has allowed some chronology of the events in the formation of the present landscape. The Aokautere ash is found at a depth of 2 m on the flat ridge top with approximately 5 m of loess below it down to the river gravels. On the valley sides the Aokautere ash is found just above the gravels with a thin coating of loess above it. This means that the terrace was dissected and the main valley system was formed prior to 20,000 BP but erosion of the valley sides also continued after the Aokautere ash fell.

The Waimihia ash and the Taupo pumice are found on the flat ridge tops at a depth of 27 to 31 cm and 14-16 cm respectively. These ashes are not found on the valley sides so erosion has continued into recent times.

The soil on the pa site is generally formed on loess with up to 30 cm of volcanic ash deposits in the flatter portion of the ridge top. On the valley sides the soil is formed directly on loess. The loess has a hard pan at a depth of 60-100 cm. The soil is a member of the Matapiro series which is common on the rolling plains and hills of Hawkes Bay.

Matapiro profile, Te Awanga N135 399200

Horizon	Depth cm	
A <sub>1</sub>	0 - 14	very dark greyish brown (10YR 3/2); sandy loam; friable, nutty; diffuse boundary.
A <sub>12</sub>	14 - 23	very dark greyish brown (10YR 3/2) with very pale brown (10YR 7/3) worm casts; sandy loam with one piece of Taupo lapilla at 14-16 cm; friable; nutty; diffuse boundary.
A <sub>13</sub>	23 - 27	very pale brown (10YR 7/3) with very dark greyish brown worm casts; sandy loam; friable; single grain; sharp boundary.
A <sub>2</sub>	27 - 31	very pale brown (10YR 7/3); coarse sand with a few Fe Mn concretions; loose; single grain; sharp boundary (Waimihia ash).
B <sub>1</sub>	31 - 41	dark -yellowish brown (10YR 4.5/4); heavy silt loam with a few Fe Mn concretions; very firm; weak prismatic structure with thick dark brown clay skins.
B <sub>2</sub>	41 - 76	light olive brown (2.5Y 5/4) with many yellowish brown (10YR 5/6) mottles; silt loam; firm; blocky with thin dark brown clay skins; sharp boundary.
B <sub>3x</sub>	76 - 101	light olive brown (1.25Y 5/4); sandy loam with many thick clay skins in horizontal and vertical joints; very hard; massive pan; indistinct boundary.
C <sub>1</sub>	101 on	light olive brown (2.5Y 5/4); sandy loam, hard; massive (loess).

APPENDIX 8

## Wood and Charcoal

Paul Smith

<u>Species List</u>	<u>No. of samples</u>
<u>Dicotyledons:</u>	
<i>Pseudopanax</i> sp.	27
<i>P. arboreum</i>	4
<i>Leptospermum</i> sp.	47
<i>L. scoparium</i>	10
<i>L. ericoides</i>	33
<i>Beilschmiedia</i> sp.	3
<i>Hebe</i>	30
<i>Discaria toumatou</i>	9
<i>Gaultheria</i> sp.	8
<i>Cassinia</i> sp.	15
<i>Sophora</i> (tentative)	6
<i>Knightia excelsa</i>	6
<i>Hoheria</i> sp.	4
<i>Rubus</i> sp.	11
<u>Gymnosperms:</u>	
<i>Podocarpus totara</i>	40
<i>Dacrydium cupressinum</i>	24
<u>Filicopsida:</u>	
<i>Pteridium</i>	<u>23</u>
Total:	300
	===

Notes on species identified

*Pseudopanax*. Anatomically the species of this genus are very similar and only a small number of diagnostic features can be used to separate them. Further, some species are similar and hence difficult to separate from representatives of the genus *Neopanax*. Because of this authorities have divided the two genera into groups using wood anatomy and morphological characters as criteria. Samples identified as *Pseudopanax* comprised the *colensoi* group, but in only four cases was it possible to break this group into a specific rank, this occurring with *P. arboreum*. This species forms a tree of up to 8 m tall with stout spreading branches. Its distribution covers the whole of the North Island, being a floristic component in lowland forests and coastal

associations.

*Leptospermum*. It is possible to distinguish between *L. scoparium* and *L. ericoides* by using a small number of diagnostic features, but when a sample is small, or fissured by extreme heat, the distinction between the two species is less clear. The genus has a wide distribution, both forms being located in diverse habitats from lowland to sub-alpine zones. In life-form the genus tends to be plastic, changing according to the conditions to which it is exposed. If growing on a favourable station where it is not exposed to excessive wind, and where rainfall is sufficient, the plant will usually form a tree up to 4 m tall in the case of *L. scoparium*, and 12 m in the case of *L. ericoides*. Burrell (1965) observes that both species may initiate succession on poor pasture land, but that *L. ericoides* grows quicker than *L. scoparium*, the latter soon being over-topped and largely eliminated. The plant usually forms a canopy in this seral formation for shade tolerant species such as *Griselinia* sp., *Hoheria* sp., *Dacrydium cupressinum* and other softwood species. *Leptospermum* may also occur as climax vegetation with *L. ericoides* as dominant. Cockayne (1958:385) observed for southern Hawkes Bay: "forest is rare, except on the mountains, the climate being dry, so that possibly the present covering of *Pteridium* and *Leptospermum* is more or less primitive". The genus will not survive conflagrations that are too intense, thus Burrell (1965) claims that the proposed widespread fires of the Polynesians may have reduced the occurrence of the genus.

As a coastal plant *Leptospermum* is found on several stations from rocky shore (Cockayne 1967) to dune hills (Moore and Adams, 1963) and coastal forest (Cockayne 1967). It will not tolerate excessive wind or salt spray. On rocky areas it frequently occurs with *Hebe stricta*, but in coastal forest its associate species include *Macropiper excelsum*, *Pittosporum crassifolium*, *Corynocarpus laevigata*, *Coprosma* spp, *Dysoxylum spectabile* and *Dodonaea viscosa*.

*Beilschmiedia*. Anatomically it is very difficult to distinguish between the two species *B. tawa* and *B. tarairi*. The latter has a much more limited distribution than *B. tawa*, fading out of forests at about 38°S.lat. I think it probable that the samples of *Beilschmiedia* examined were *B. tawa*. In distribution this species is very abundant in the North Island, being floristically dominant over a very wide area. It appears most abundant in the central North Island while elsewhere it is locally abundant or scattered (Entrican *et al* 1957). The species will grow on a wide range of soils, but will not thrive when drainage is poor or dry conditions persist. Rainfall must not fall below 40 in. (1016 mm) and must be well distributed throughout the year.

In life form the tree will reach 24 m or more in height, with a trunk of 1 m diameter. The bole may show considerable variety in form being erect and round in cross-section, or crooked and irregular. *Tawa* is a strongly shade-tolerant species, characteristically forming a dense all-age underwood beneath a partial upper canopy formed by tall *Podocarps*. Associate species include *Dacrydium cupressinum*, *Podocarpus*

*totara*, *Knightia excelsa* etc.

*Hebe*. The genus has a wide New Zealand distribution, Allan (1961) defining 79 species, Richards (1956) observes that *Hebe* is an extremely hardy plant that will grow under most ecological conditions. Kirk (1869) observed that dense thickets of *Hebe* grew on alluvial soil, and that it was particularly common on soils modified for Maori cultivation. The genus occurs in two of seven plant communities of the sea coast defined by Cockayne (1958), namely the rock and cliff community and coastal scrub community. The latter is a formation of compact life-forms, usually shrubs, but it may also contain stunted trees. *Hebe* is a component in all associations of this community. In a seral *Pteridium* community the genus will form part of the undergrowth with such genera as *Coprosma* and *Geniostoma*, eventually breaking through the *Pteridium* canopy to form a shrub layer.

*Discaria*. Only one species, *D. toumatou* is represented in New Zealand. It occurs throughout the North Island in zones ranging from montane to coastal scrub where its stations include dunes, open, and rocky places. It commonly forms thickets.

*Gaultheria*. There are eight species of this genus in New Zealand, six attaining a shrub-like life-form. Only two of these, *G. antipoda* and *G. subcorymbosa*, have a general distribution, all remaining representatives being confined to montane or sub-alpine stations. *Gaultheria antipoda* has the widest distribution, being found throughout the North Island in lowland zones, open or rocky stations.

*Cassinia*. Five species are recognised and numerous varieties defined. One species (*C. leptophylla* var. *spathulata*) was particularly abundant around Napier, occupying dry stations on hills near the sea. All species except *C. retorta* occur south of latitude 38°. They form shrubs 2-5 m tall and grow abundantly on coastal dunes, scrub and grasslands.

*Sophora*. This identification is tentative because of the lack of a suitable reference specimen. However, *S. tetraptera* has been recorded in the Hawke Bay area, particularly in valleys and along river banks of the south-east. Allan (1961) notes that this species occurs close to streams and on forest margins, particularly in East Cape areas. *Sophora microphylla* occupies similar stations throughout the North Island.

*Knightia*. Only one species is found in New Zealand, *K. excelsa*. This forms a tree up to 30 m tall with a trunk of 1 m in diameter. It has a wide distribution, particularly in lowland forest areas.

*Hoheria*. Of the five species recognised, three occur in coastal areas and lowland forests. *Hoheria populnea* occurs from North Cape to 38° South; *H. angustifolia* and *H. sexstylosa* from 39° South. Cockayne (1958) recorded the presence of *H. sexstylosa* in the East Cape Botanical District in river valley and coastal stations.

*Rubus*. The four species of this genus that occur in the North Island are lianes with stout climbing stems, but may form a bushy growth with densely interlacing branchlets if in an open station. *Rubus cissoides* is not uncommon on rocky shore areas.

*Podocarpus totara*. A tree up to 30 m tall with a trunk that may reach 2 m in diameter. It is found distributed throughout the North Island in zones ranging from lowland to sub-alpine forest. Anatomically it is extremely difficult to distinguish from *P. hallii* (Hall's totara), a slightly smaller tree when mature, but having the same distribution as *P. totara*.

*Dacrydium cupressinum*. Franklin (1968) notes that this is the most widely occurring of all indigenous trees, being present in the majority of forest classes as a canopy tree, dominant or co-dominant. It regenerates well after forest destruction provided there is a good seed source nearby.

Common Names:

*Pseudopanax arboreum*: five-finger  
*Leptospermum ericoides*: kanuka, tea-tree  
*Beilschmiedia tawa*: tawa  
*Hebe stricta*: koromiko  
*Discaria toumatou*: wild-irishman, tumatu-kuru  
*Cassinia*: cottonwood, tauhinu  
*Sophora*: kowhai  
*Knightia*: rewarewa  
*Hoheria*: lacebark, houhere  
*Rubus*: bush lawyer  
*Dacrydium cupressinum*: rimu  
*Podocarpus spicatus*: matai  
*Podocarpus totara*: totara

SITE I

<u>Species identified</u>	<u>Quantity of samples present</u>
<i>Pseudopanax</i> spp.	19
<i>Leptospermum</i> spp.	15
<i>L. ericoides</i>	8
<i>Pteridium</i>	7
<i>Hebe</i> spp.	7
<i>Discaria toumatou</i>	7
<i>Pseudopanax arboreum</i>	4
<i>Podocarpus totara</i>	3
<i>Beilschmiedia</i> spp.	3
<i>Rubus</i> spp.	2

A number of samples could not be identified because they were too small for accurate examination, or had been distorted and fissured through extreme heat. It is, however, even under these adverse conditions, possible to state whether they are Dicotyledons or softwoods. Fourteen samples are thus listed as 'miscellaneous Dicotyledons', and five as 'miscellaneous Gymnosperms'.

Considerable difficulty was experienced in identifying softwood material that was only partially carbonized. In some samples the surface of the wood had been scorched, but beneath this superficial layer of cells, the remainder had decomposed, the cell walls breaking down and leaving a confused anatomy. No identification was possible, even when the structure was supported in wax. Other fragments of softwood were examined, all being non-carbonized but in a reasonable state of preservation. A special problem presented itself in all cases. The vertical cells of all Gymnosperms resemble 'tubes', the walls of which may be specially thickened, thus showing microscopically as spiral threads ascending the cell wall. However, if a wood is allowed to dry rapidly the cell wall may show delicate 'helical checking' which closely resembles spiral thickening. In the samples examined it was decided that the spiral feature was due to checking. It was noticeable that the range of species was greater from the remains of the external turf bank and drain than from the floor of the house. Deposits representing the living area contained a scattering of *Leptospermum* sp. *L. ericoides*, *Pseudopanax* spp., *P. arboreum*, and *Hebe* spp., whilst the turf bank and drain contained in addition *Discaria toumatou*, *Rubus* spp., *Podocarpus totara*, *Beilschmiedia* spp. as well as much unidentifiable twig material. Samples from three post-holes of the early palisade were examined. The filling contained numerous fragments of charcoal too small for identification, and twig material of Dicotyledon origin. In two post-holes there was a small quantity of bracken (*Pteridium*).

#### SITE II

##### Pit B

<u>Species Identified</u>	<u>Quantity of samples present</u>
<i>Hebe</i> spp.	15
<i>Pteridium</i>	12
<i>Leptospermum</i> spp.	12
<i>Cassinia</i> spp.	12
<i>L. scoparium</i>	10
<i>L. ericoides</i>	9
<i>Rubus</i> spp.	9
<i>Pseudopanax</i> spp. ( <i>Colensoi</i> sp.)	8
<i>Gaultheria</i> spp.	8
<i>Knightia excelsa</i>	6
<i>Sophora</i> spp.	6
<i>Hoheria</i> spp.	4
<i>Discaria toumatou</i>	3
Miscell. Dicotyledons	10

This site produced the greatest quantity of charcoal principally because of its occupation depth and the presence of fire scoops. Hearths tend to produce large quantities of charcoal that cannot be identified because extreme heat tends to destroy anatomical features. Such samples have not been included in the above list. Many samples also appeared "greasy", but much of this can be removed by soaking in alcohol.

Five species were identified from this site that do not



occur elsewhere. They are: *Gaultheria*, *Sophora*, *Knightia*, *Hoheria* and *L. scoparium*. It is significant to note that these species tended to be more abundant in the earliest levels, with a gradual change to the dominance of *Leptospermum* spp., *Hebe* spp., *Cassinia* and *Pteridium* etc.

SITE II

Pit A

Species Identified Quantity of samples present

Wood:

<i>D. cupressinum</i>	6 (15)
<i>P. totara</i>	5 (25)
<i>L. ericoides</i>	2
<i>Leptospermum</i> spp.	2

Charcoal:

<i>P. totara</i>	12
<i>L. ericoides</i>	10
<i>D. cupressinum</i>	9
<i>Hebe</i> spp.	6
<i>Leptospermum</i> spp.	6
Miscell. Dicotyledons	11
Miscell. Gymnosperms	7

Centre posts:

Posthole, <i>P. totara</i>	
" <i>D. cupressinum</i>	
" <i>P. totara</i>	

Pit door slab:

*P. totara*

Stake-hole:

*P. totara*

The large quantity of *P. totara* and *D. cupressinum* is due to the fact that as the wood decayed, pieces broke away from the post structure and were scattered over a small area on the pit floor.

SITE IV

Posthole K, post butt,	<i>Podocarpus totara</i>
Posthole L, post butt	<i>Podocarpus totara</i>

SITE V

<u>Species Identified</u>	<u>Quantity of Samples Present</u>
<i>Leptospermum</i> spp.	12
<i>L. ericoides</i>	4
<i>Hebe</i> spp.	4
<i>Pteridium</i>	4
<i>Cassinia</i> spp.	3
Miscell. Dicotyledons	10

The identifiable material from this site consists entirely of material commonly found in scrub formations.

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## PLATES



PLATE I: Tiromoana pa, air view of the inner zone from the south-west. In the background the Maraetotara River and southern Hawke's Bay. Photo: R. Flemming, Hastings Aero Club.



PLATE II: Tiromoana pa from the north-east, showing the inner rampart and row of palisade slots. In the background Te Awanga. Photo: A. Fox.



PLATE III: Tiromoana pa, occupied area outside the inner defences. The figure stands on a probable house site. Photo: K. Peters.



PLATE IV: Tiromoana pa, external terraces. The ranging pole marks the position of the house on Site X. Photo: A. Fox.

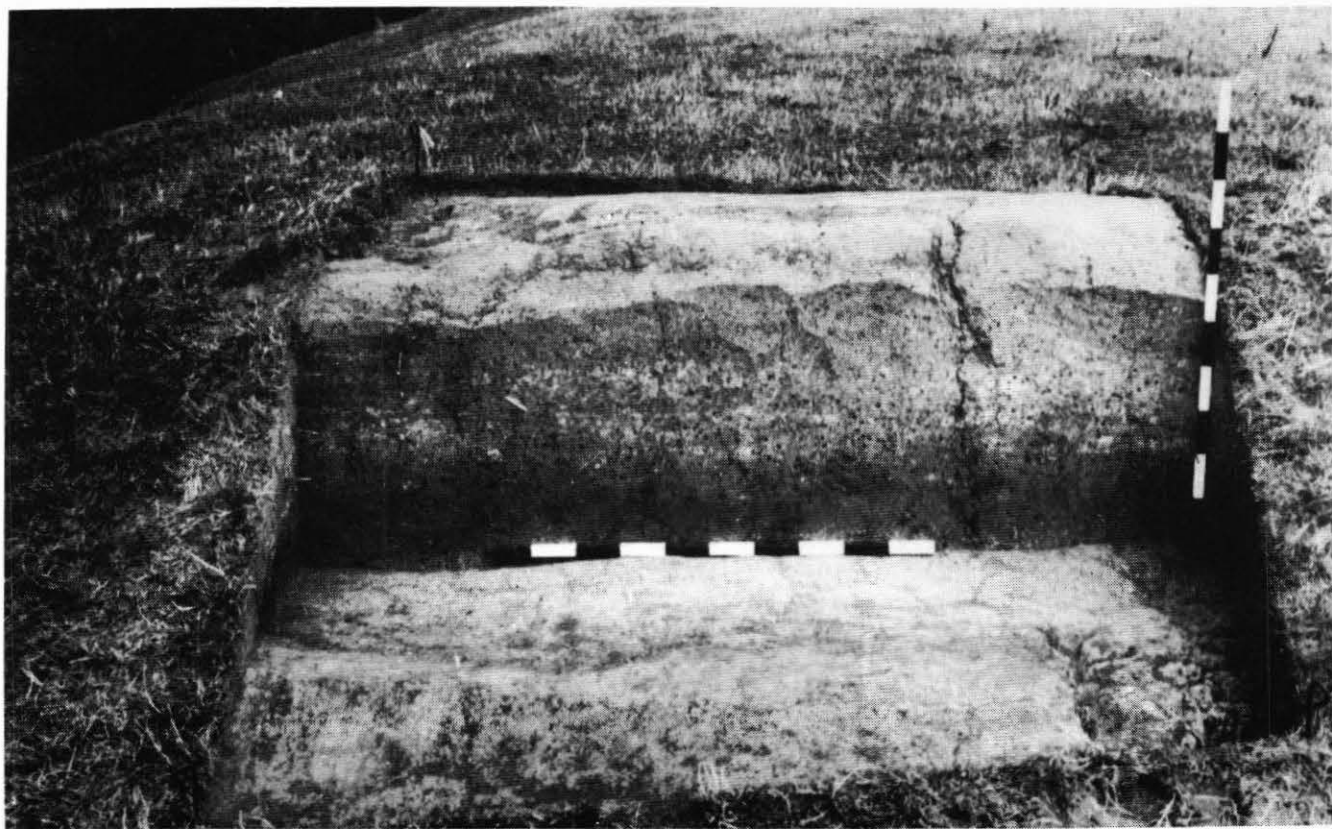


PLATE V: Site VII, the face of the outer rampart, showing layering.



PLATE VI: Site, I, post-holes of the early palisade beneath the later house bank.

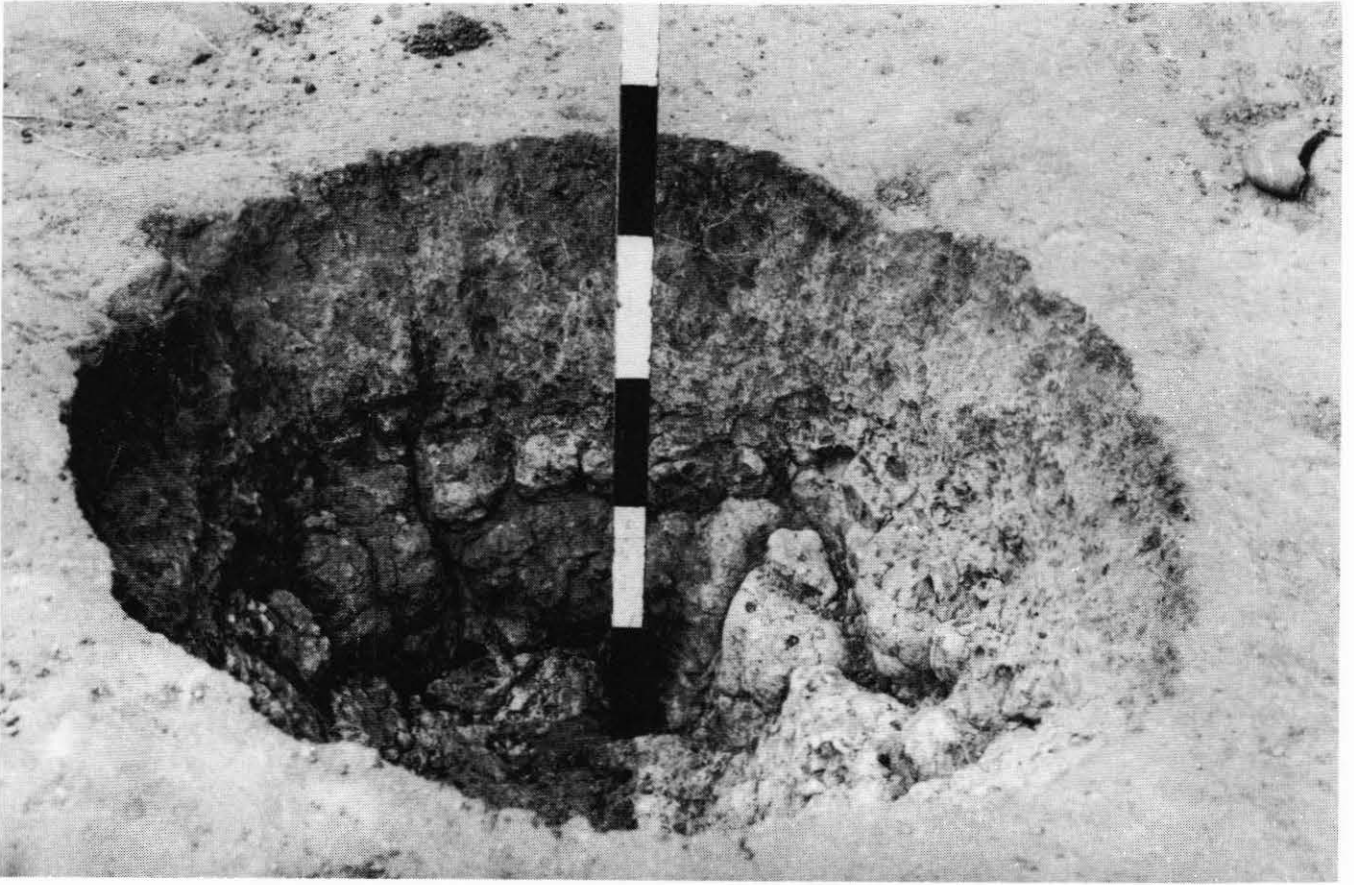


PLATE VII: Site, I, post-hole of the early palisade, cut into the loess.



PLATE VIII: Site IV, excavated area behind the rampart. Ranging poles in post-holes E, D and stage post A; rear stage post-holes B and C in foreground.

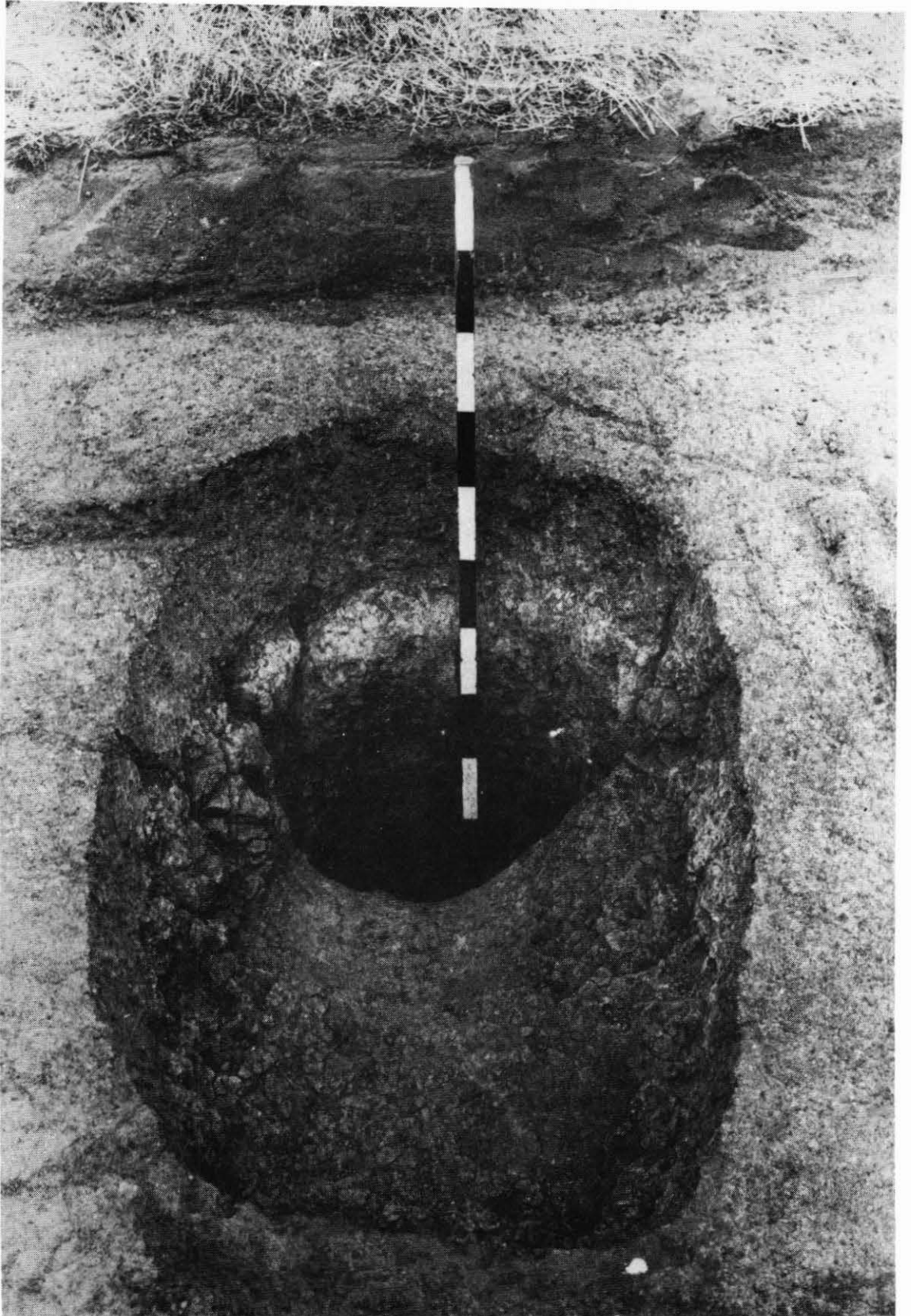


PLATE IX: Site IV, post-hole E, showing ramp construction.



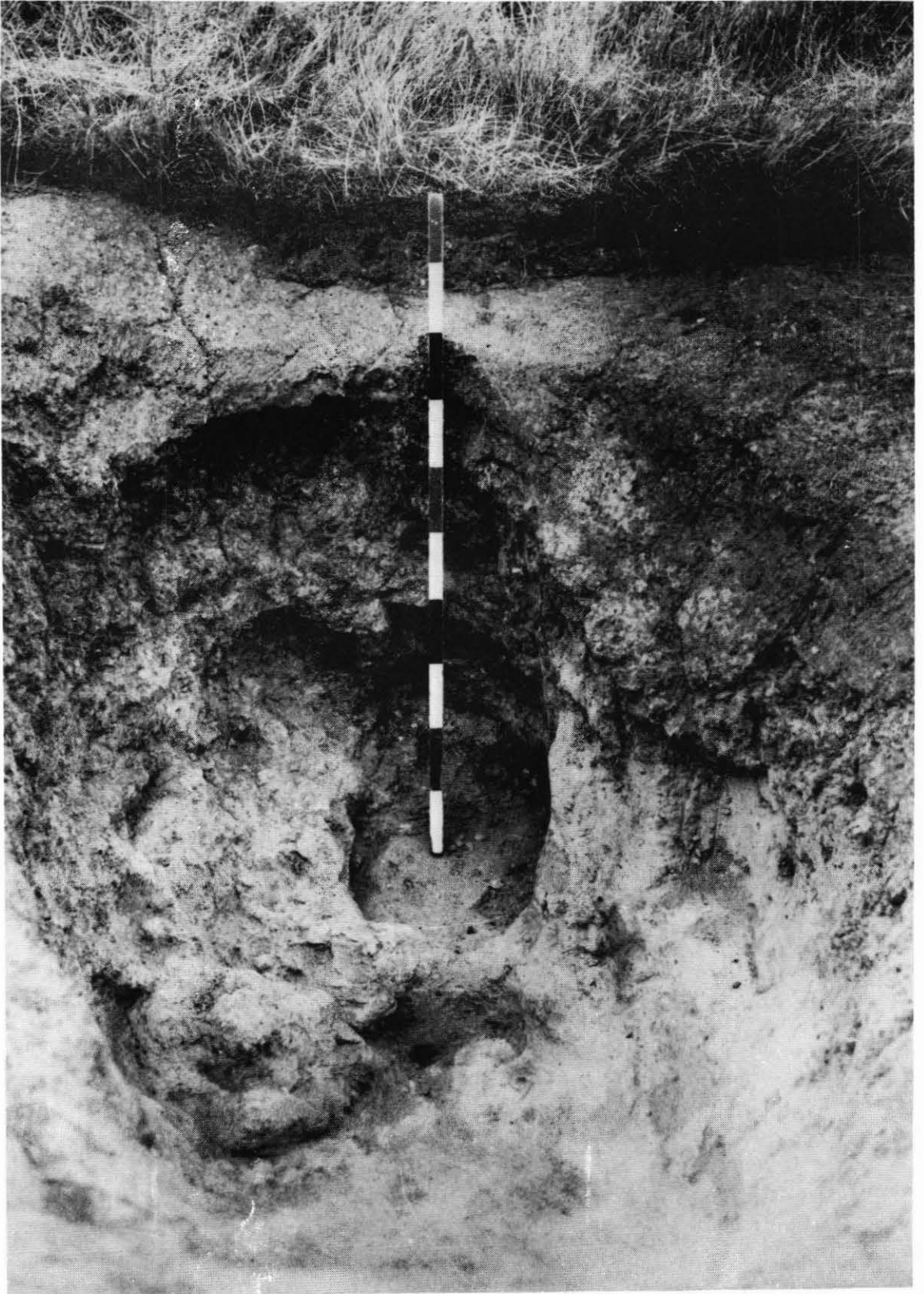


PLATE X: Site VI, post-hole U, with damaged ramp in foreground due to the removal of the post.

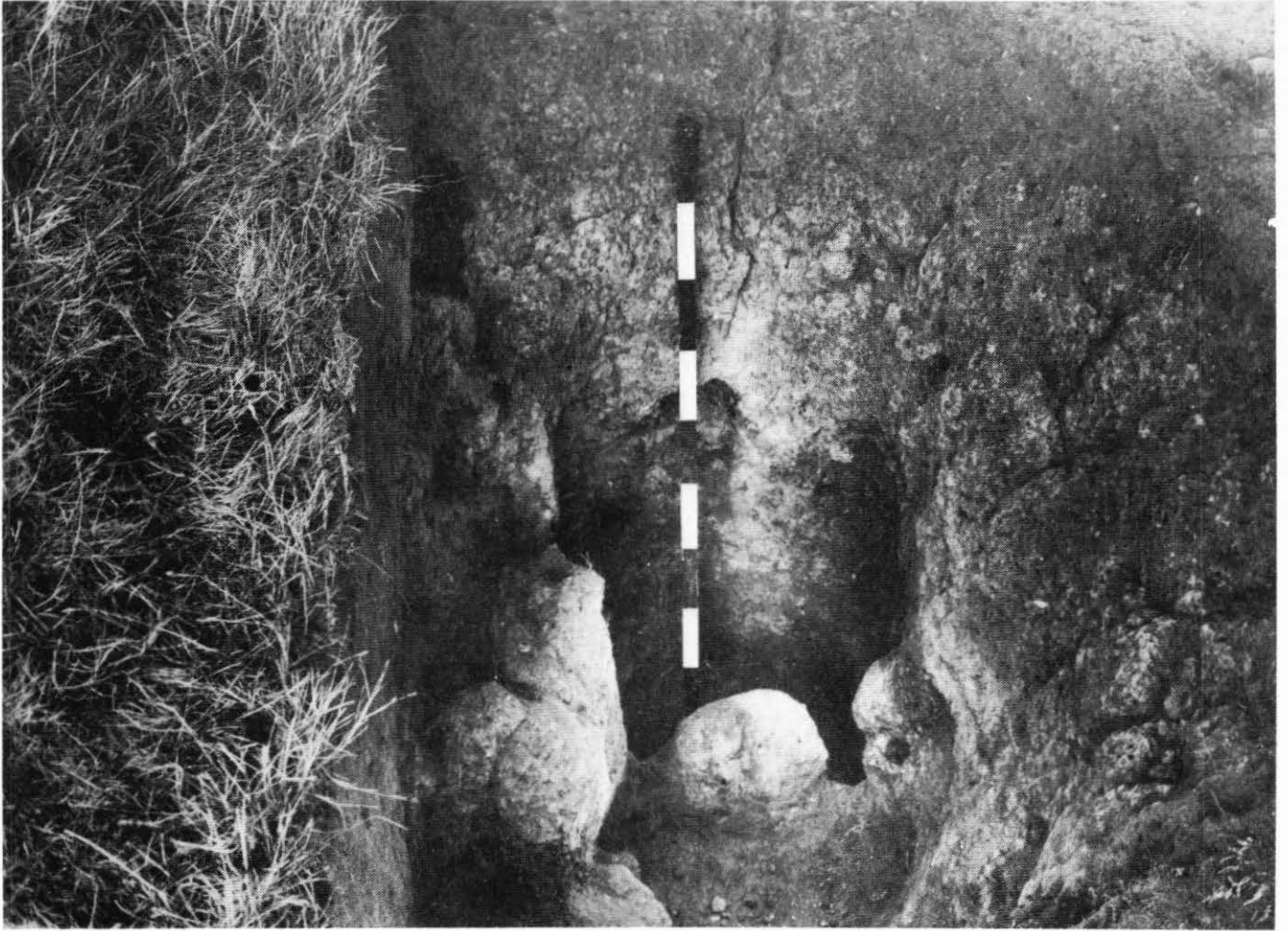


PLATE XI: Site VI, post-hole M, showing loess packing in front of the post.



PLATE XII: Site II, Pit B, with centre posts and collapsed wall on left. The section shows the black layer of the later cooking place.

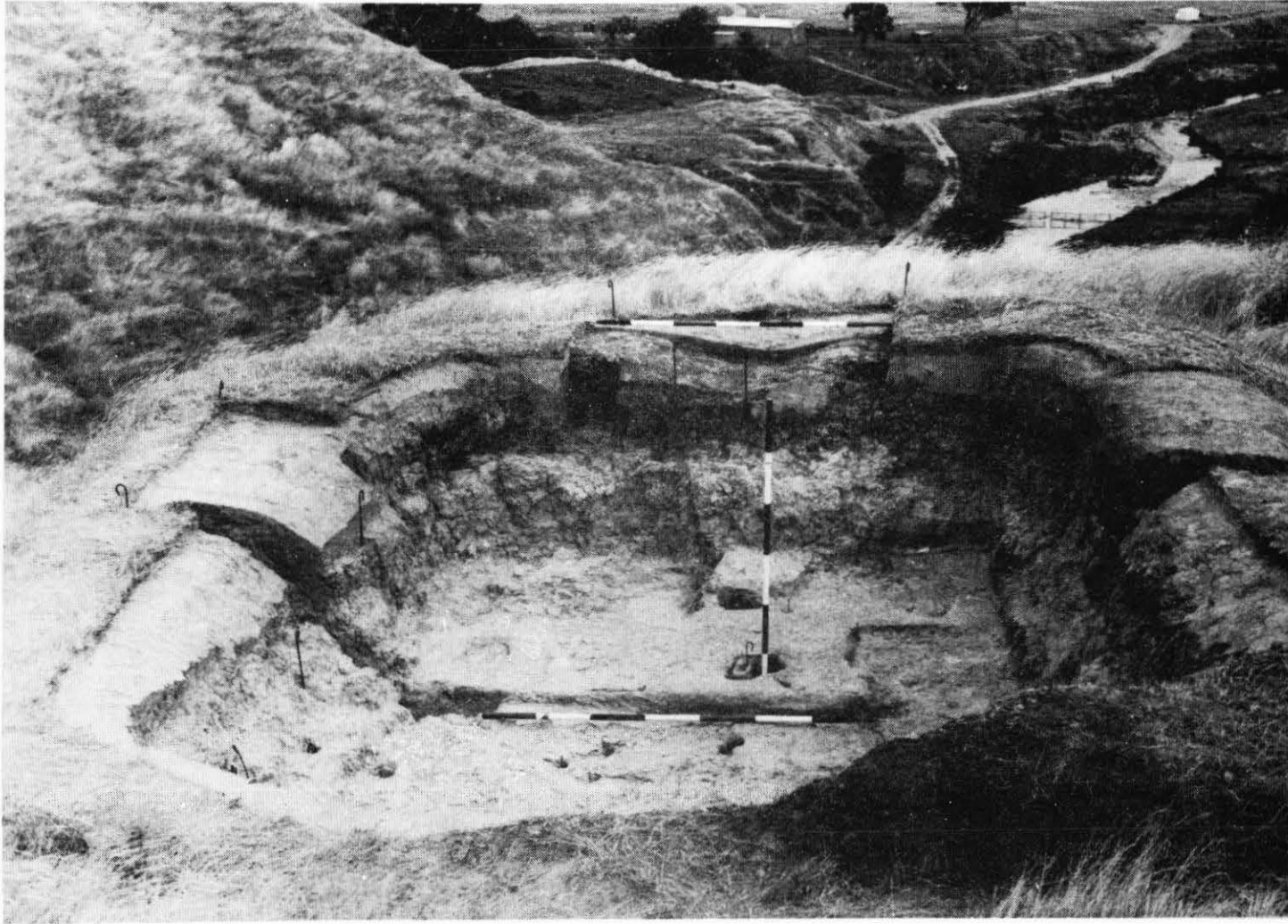


PLATE XIII: Site II, raised-rim Pit A, showing centre post-holes and end 'buttness' step. The entrance with the timber sill is behind the ranging pole.



PLATE XIV: Site V, terrace with row of post-holes, probably for the front of a shed.



PLATE XV: Site I, general view of the embanked long house; the ranging pole on the house floor is aligned with the centre posts, those in the background mark the line of the early palisade.

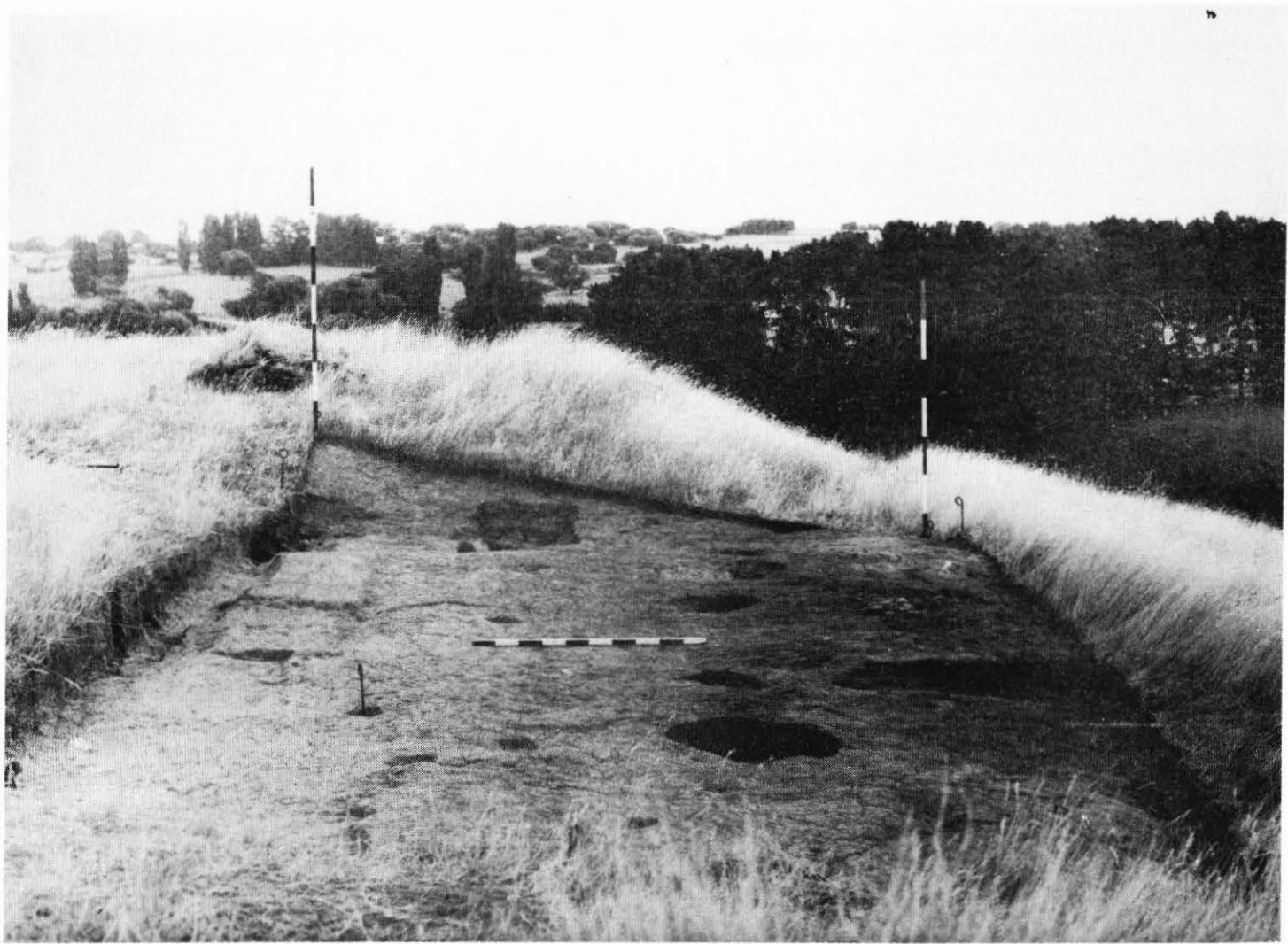


PLATE XVI: Site I, embanked long house, showing the holes for side wall timbers beside the external bank.