ARCHAEOLOGY IN NEW ZEALAND

EXCAVATIONS AT V23/21, BLACK HEAD, PORANGAHAU, HAWKE'S BAY

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In October 1990, at the time of the exhibition, *Nga Taonga o Tamatea; 'Hokowhitu'*, held at Waipukurau, an approach was made by Mr Donald Tipene of Porangahau for an excavation to be carried out on land traditionally associated with his ancestors. His intentions were that younger generations should develop a deeper interest in and value their ancestral background through involvement with the excavation. The excavation of a small dune midden adjacent to Rangitoto pa on the Hunter Trust property, Parimahu Station, took place over seven days in April 1992.

The purposes of the excavation were:

1. to corroborate oral history claims for long occupation, especially those relating to Te Angiangi and Te Whatuiapiti;
2. to substantiate the claim of the late Dr J.E. Simcox that surface collected items donated to Hawke's Bay Museum are associated with the earliest period of occupation in New Zealand; and
3. to consider changes in resource exploitation through time as seen in the stratigraphic remains of the midden.

History

The history relating to the area and events that occurred in the past is summarised by Piri Sciascia in the catalogue *Nga Taonga o Tamatea; 'Hokowhitu'* (Sciascia 1990: 7–9), which accompanied the exhibition of the same name. In short, history acknowledges that the ancestor Te Angiangi, a descendant of Rangitane, was responsible for gifts of land to Te Whatuiapiti and his related hapu.

Two of the kaihaukai (food feasts) which are part of the history of this district were named Nga Tau Tukuroa and Te Uaua Tamariki. These feasts were elaborate, with related groups of hapu trying to outdo one another. The food was specially gathered and put into great piles carefully valued and named. A return

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feast had to be of the same scale and, if possible, exceed it. When on these two occasions the return was thought to be less than the original gift of food, land was given over as compensation (Sciascia 1990: 7–9. These events are thought to have taken place in the 16th century.

During the early European farming days of the 19th century and early decades of the 20th century, surface collections were made in the dunes of moa bones and moa bone artefacts. Other artefacts, such as bird spear points, fishhooks and lures and adzes, were also collected. Dr J. E. Simcox, who was born at Porangahau in 1884, "as a youth, developed an interest and began collecting artefacts from the dune areas of Porangahau. While attending Medical School in Otago, he met and became friends with ethnologist, Dr H.D. Skinner", who was later Director of Otago Museum. "Their common interest in the material culture of the Maori combined with Skinner's knowledge and influence, is reflected at times in Simcox's notes" (Millar 1993).

In the late 1930s Dr Simcox donated much of his collection to Hawke's Bay Museum. Many artefacts in this collection are of 'Archaic' appearance. Some large adzes are made of Nelson argillite. Silicious limestone from the Aohanga area, on the coast south of Porangahau, was also used.

The first part of the present Hunter Trust property was purchased from the Government on 6 August 1863. This was Grant No. 1139 in the Crown Grant Register (14–70) and included rural sections 25, 27, 28, 29 and 30 (Blackhead)—561 acres in total. The purchaser was George Hunter, a Wellington merchant and son of Wellington's first mayor, also George Hunter. He arranged for two of his brothers to take on the management of the land, named Parimahu Station. Sheep were purchased in New South Wales. In 1992 the property was still associated with the Hunter family through the Hunter Trust and ownership of the land was in the hands of a group of associates operating within the Trust. Recent land use has included the farming of beef cattle and sheep. At the time of excavation the station was operated as a cattle breeding concern. The excavated site and Rangitoto pa are fenced and covenanted for protection by the Department of Conservation.

In 1964 the Hawke's Bay Archaeological Society recorded Rangitoto hill pa (V23/4, Figure 1) and nearby "occupational sites" or "middens" (V23/3). These were reported by Mr A.C. Verry to the filekeeper of that period, J. Munro (also Director of Hawke's Bay Museum). Site records state that these sites are located on the beach side of Blackhead Road on the property of Parimahu Station. Evidence listed as "supporting moa-hunter occupation" includes: moa egg shell; sawn moa-bone; moa-hunter type patu of obsidian; moa-hunter type necklace pieces; and that the area is near a valley suitable for moa. A swamp and stream are adjacent, and the sea is ca.1500 m away across dunes. The sites are recorded as being on "wind-eroded dunes." Mention is made of a small, roughly

Figure 1. Rangitoto pa from the west. The sea can just be seen beyond the pa on both sides.

made (not unfinished), adze of baked argillite, three "lampstones" and two more adzes of "Maori type (both broken) of baked argillite." Reference is also made to the earlier finding of "five human skeletons" by Mr E. Lee.

In 1989–1990 several more sand dune middens were recorded by Nigel Prickett on Duncan McIntyre's farm Taikura next to the Hunter Trust property to the south (Prickett 1990a). V23/21 was recorded following an initial visit by the writer with Donald Tipene, Elizabeth Pishief (Hawke's Bay filekeeper) and Pam Bain of the Department of Conservation to Rangitoto pa and its vicinity on 30 September 1991.

Archaeological knowledge of Hawke's Bay was summarised by Aileen Fox who shows the known distribution of Archaic sites, mostly recorded by Simcox (Fox 1982: 64). The biggest group of these is in the Porangahau and Black Head districts. In a review of central Hawke's Bay archaeology Nigel Prickett (1990b) illustrates a necklace of 14 imitation whale teeth and two reels, all of whale ivory, formerly owned by the Hunter family and now in the Museum of New Zealand Te Papa Tongarewa, Wellington. Also pictured are a bone harpoon point from Black Head in the Simcox Collection, and a massive serpentine reel from Pakuku (Herbertville), both in the Hawke's Bay Museum.

It was the presence of these and other Archaic items at the *Nga Taonga o Tamatea; 'Hokowhitu'* exhibition that inspired Don Tipene to initiate the excavation and so learn more about the early history of the Porangahau district. The material on display was only some of the evidence for significant Archaic settlement on the Hawke's Bay coast south of Cape Kidnappers, which deserves to be better known. The Palliser Bay archaeological project (Leach and Leach 1979a) may be compared for early settlement in a similar but less favourable environment.

Ecology

A recent Department of Conservation ecological survey of the area describes the overall landscape as one of "hill country of low to moderate relief bounded by an emergent coastline" (Maxwell et al. 1993: 3). The coastline is characterised by "cliffs up to 200 m high, and exposed headlands separating long shallow bays with sand and/or boulder beaches, some backed by dunes up to 20 m high", and that "yellow-brown sands (excessively drained soils of low to medium fertility) have formed on a soil parent material of coastal wind-blown sand" (Maxwell et al. 1993: 5).

> Alternating mudstone and sandstone sequences also form most of the 130 km long coastline of the ecological district. Also common in eastern Hawke's Bay is moderately hard, light grey upper Cretaceous 'Whangai' argillite... Ranges of Whangai argillite extend northeastward from Wanstead and south west from near Porangahau almost as far as Akitio and southwest from Wanstead to Weber and beyond. Small blocks of limestone are also preserved overlying mudstone at Kairakau Beach and Cape Turnagain. (Maxwell et al. 1993: 4)

Porangahau is a site of local submergence and a major sand spit and estuary has formed there. About 100 m south of the rocky Black Head, the Waikaraka stream enters the sea. At the edge of the beach the stream has swelled into a lagoon containing much raupo. Historical maps (Crown Grant Register 1863 and 1866; Walshe 1934), and aerial photographs taken in 1937 (photograph Z/55) and 1953 (2003/26) indicate that this lagoon has had a transient nature, fluctuating in area throughout the years. This combination of resource zones is in close proximity to Rangitoto pa and the midden reported here.

The climate of eastern Hawke's Bay produces very warm summers with day temperatures occasionally exceeding 32°C with dry föhn north-west winds. Winter temperatures are moderate. Annual rainfall is 1000–1500 mm over most of the district. Most rainfall recorded in winter is associated with easterly winds.

The area is a coastal strip subject to strong maritime influences such as exposure to salt and moderation of temperature extremes caused by the proximity of the sea. Here the coastal forest consists of a mixture of broad-leaved species, most commonly karaka, titoki, ngaio, mahoe, lacebark, pigeonwood, rewarewa, putaputaweta and wharangi. Steep coastal faces probably never supported tall forest but more likely were covered by shrubland including wharariki, *Olearia solandri*, tauhinu, manuka and kanuka with some matagouri, spinifex and pingao. This countyryside is now dominated by pastureland and exotic pine plantations and native vegetation is restricted to small isolated patches, modified by introduced animals, plants, fire and logging.

The site

The excavation was limited to an area of 2 x 4 m on top of a sand dune covered by midden (Figure 2). The dune is the largest in a paddock bounded on the north by the Waikaraka Stream, on the west by the Hunter Road and to the east by Rangitoto hill pa and the Pacific Ocean. To the south are more dunes, now mostly in pasture. Rangitoto pa (V23/4) is the pa of Whatuiapiti, an ancestor of Ngati Kere of Porangahau. Oral tradition dates the pa to the 16th century.

> The pa is surrounded by dunes with commanding views in all directions. The site consists of a number of house sites, terraces and defensive scarps which are clearly visible. The north face overlooks the surrounding dunes and has a long terrace and a number of small terraces. Also, a large boulder, possibly used as a hoanga or sharpening stone is situated at the base of the site. A high defensive scarp protects the north-east face which also has an entrance track. A large amount of slumping has occurred on the southern, seaward slope, although features are still very visible. (Bain 1991)

The large dune on which the excavation was sited has been trampled by stock, walked over by various curious people, and has experienced the blasts of scouring winds over hundreds of years (Figure 3). Since the overburden of midden was laid on top a large portion of the dune has been blown out. Midden lies in broadly spread scatters, especially around the blown out area and also tumbling from the stock-damaged sides of the dune. From these damaged areas it can be seen that there has been considerable cultural activity, with charcoal, obsidian and shattered hangi stones exposed along with the shell spills. While this midden is not the only one in the paddock to be located on top of a dune it is, nonetheless, the highest and most dense midden to be observed in the locality (Figure 4).

It is hard to understand why a dune should be chosen as a site for the deposition of so much shell. Curiosity and speculation decided the issue of whether to excavate that site in favour of others. Proximity to a wide variety of resources had obviously been a factor in favour of the establishment of the nearby

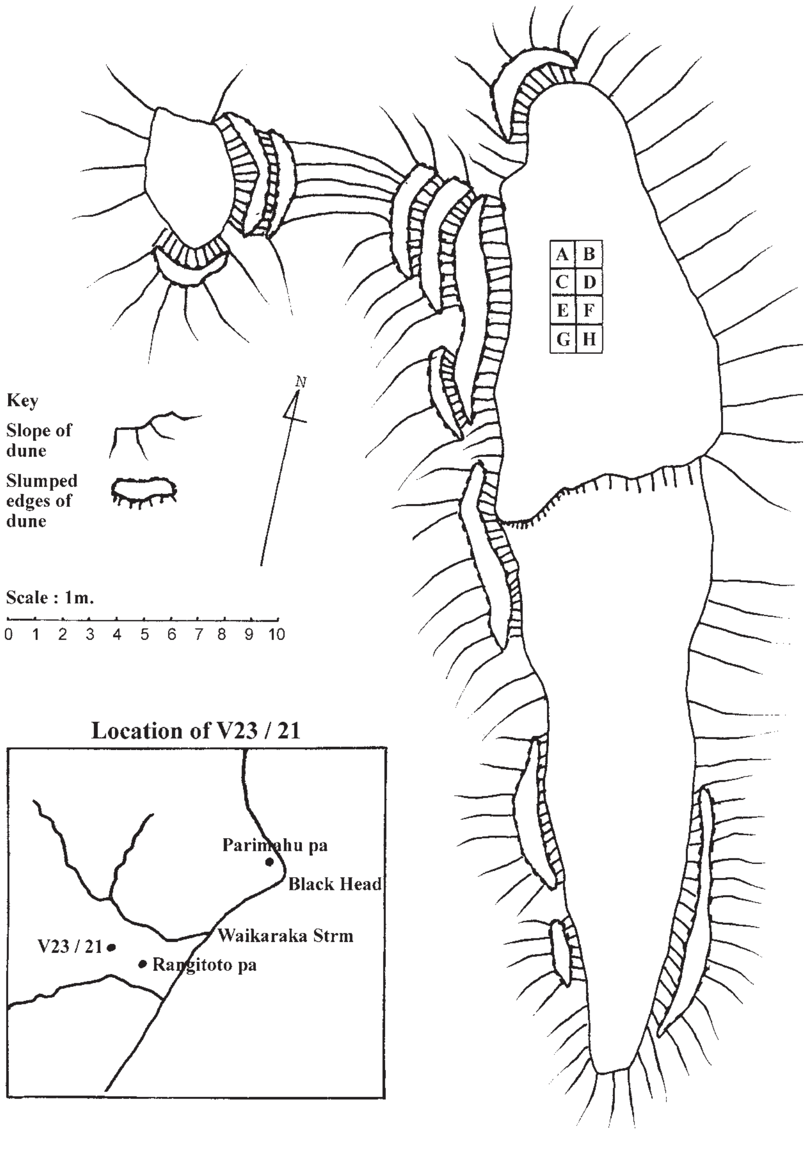

Figure 2. Excavation plan and site location.

Figure 3. V23/21 site: shell spilling from dune.

Figure 4. V23/21 site: close-up of eroding section at top of dune.

hill pa. The expansive panoramic views would no doubt have been strategically advantageous. Shelter, in terms of indigenous shrubs and trees, is absent in this field today, although there are groves of karaka and ti trees still growing in abundance alongside the Waikaraka Stream as it nears the road, ca. 750 m from the excavation site. Habitats which are likely to have been exploited would have included fresh and sea water, with the lagoon and estuary being the buffer zone. Species of shellfish, crustaceans, fish and birds would have been available, depending on vagaries of weather, tides and the condition of the lagoon.

The excavation

Following receipt of permission from Maori elders, Hunter Trust land owners and New Zealand Historic Places Trust, the excavation commenced on 4 April 1992 (Figure 5). A karakia was held beginning on Rangitoto summit and concluding at the dune midden to be excavated. Although the weather was bitter a large group of local residents attended the ceremony.

The area for excavation measured out using tape and compass was 2 x 4 m. The site was cleared of rushes, rattail grass, paspalum and other pasture grasses. Initially clearing was tackled using spades but these were soon discarded when it became apparent how thin the vegetation and root layer were. Shell toward the centre of the area was so close to the surface as to be entangled in

Figure 5. Excavation at the V23/21 site.

the roots of the vegetation. We completed the task of clearing by hand, using secateurs and trowels. Excavation seemed to be relatively straightforward inasmuch as, while there was some 'marbling' between layers, they were nonetheless mostly distinct from each other. Five of the one metre squares were fully excavated, in which five layers were discerned between the turf and the natural sandy base, as follows (see Figure 6):

1 topsoil or turf layer;
2 dark sandy soil with crushed shell;
3 layer composed of abundance of loose shells;
4 very black greasy soil with much charcoal;
5 shell and grey sandy ash. Layers 4 and 5 proved to be the most complex as often the appearance was marbled and one layer might appear as a lens (rather than a layer) within the other;
6 relatively thin layer or 'bed' of charcoal;
7 yellow sand or natural base layer.

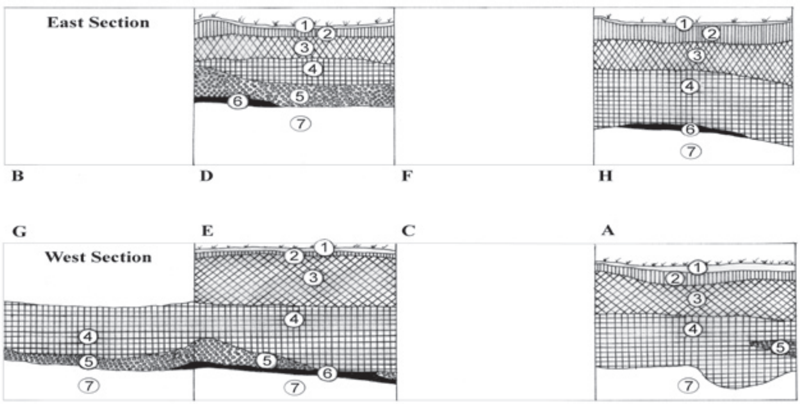

Figure 6. Sections along the east and west sides of the excavation (see Figure 2).

Finding no sterile soils between layers it seems that the deposits may have been laid down during one event. There were no features suggesting any long-term settlement or use of the site. Features were limited to combinations such as ash with hangi stones, or obsidian with bone material, suggesting the on-site, preparation and cooking of fish, birds, dog and shellfish. Certainly the amount of shell would account for more than one meal. Perhaps some food was prepared and dried for later use. This report does not consider in-depth quantitative analysis, therefore no true measure of numbers of consumers over time have been considered. However, a casual estimate might suggest that the quantity of the remains could, perhaps be the result of meals for one week for a group of ca. 20 individuals.

Worth mentioning is the finding of a fragment of bone bird spear in the E3 baulk. Unfortunately, this became notable by its subsequent mysterious disappearance from the collection. The point style was similar to those collected in the locality and referred to by Dr Simcox as being Archaic. In his report on the faunal remains Michael Taylor (see Appendix 1) refers to Best (1977) who states that "in the past the bird species identified were usually taken with a variety of snares, although spears were also used less commonly in various situations."

The most significant square excavated in terms of material was Square D, followed by E. Layers of most interest (especially in Square D) were 4 and 5. Taylor notes that overall a greater variety of bird species came from Layer 5—tui (*Prosthemadera novaeseelandiae*), pigeon (*Hemiphaga novaeseelandiae*), parakeet (*Cyanoramphus novaezelandiae*), kaka (*Nestor meridionalis*) and saddleback (*Philesturnus carunculatus*)—whereas from Layer 4 he counted slightly fewer species—tui, pigeon, parakeet and New Zealand quail (*Coturnix novaezelandiae*). Layer 3 provided only two species (tui and parakeet). Except for the quail, birds represented are all forest species. These further confirm the proximity of nearby forest.

Results

This excavation was of great interest to the local people, a great number of whom are descendants of Te Whatuiapiti and his associates (Figure 7). Bus loads of school children arrived from as far distant as Manawatu as well as the local kohanga reo, primary and secondary schools. A great deal of time and enthusiasm was expended by visitors and workers alike as the reasons and expectations for the excavation were considered. It was an especially important experience for the excavation team. While the interest shown was positive and an uplifting experience, the numbers of visitors were a concern in terms of environmental considerations. At the same time as one or two of the workers were busy explaining the site and its contents, the others were fully engaged in keeping a watchful eye, and ushering people along a carefully chosen pathway to avoid further damage to the fragile dune surface.

Michael Taylor (University of Auckland) carried out a thorough analysis of recovered faunal samples (see Appendix 1). He inventoried all samples and then emptied and air-dried them. Once dry, the samples were sorted for bone,

Figure 7. Visitors to the excavation, including television crew.

identifiable shell elements, artefacts and other items of interest. In his report (Appendix 1) he remarks that "testing of several of the complete midden samples for landsnails for ecological analysis revealed that very few were present and that consequently landsnail recovery was not warranted." Taylor notes that "all the birds represented, except the NZ quail, are forest species, although the tui, parakeet and kaka travel long distances for food. Saddlebacks do not have full flight and remain in a forest environment."

Shellfish can be listed as: tuatua (*Paphies subtriangulata*), catseye (*Turbo smaragdus*), Cook's turban (*Cookia sulcata*), mudsnail (*Amphibola crenata*), paua (*Haliotis iris*), blue mussel (*Mytilus edulus*), green mussel (*Perna canaliculus*), cockle (*Austrovenus stutchburyi*) and pipi (*Paphies australis*). Taylor's analysis "revealed a marked change in the contents of the midden between layers 2–4 (except D4) and layer 5. In layers 2–3 in all squares, tuatua was by far the most numerous shellfish", making up ca. 95% of all species. In the past tuatua was obtained in large quantities from the open coast and was probably collected from close to the site. Possibly this represents gathering of the shellfish for drying and storage. A variety of rocky shore molluscs, with catseyes the most numerous, were also found in Layers 2 to 4, but for Square D, Layer 4 where blue mussels were the most numerous, although ten of the

19 shells were very small and would not have contributed significantly to the food consumed. Cook's turban shells were present in small numbers in all layers and squares. Many of them are deliberately broken and their use for hooks is a possibility although no hooks were identified from the excavation. One dark rock shell (*Haustrum haustorium*) was noted from Square G Layer 4 and a triangle shell (*Spisula aequilatera*) from Square A.

Shellfish from Layer 5 demonstrate a very different range of activities from those in Layers 2–4. In Layer 5 shellfish collection was focused on an estuarine environment, not the open coast. Pipi and cockle were the most numerous shellfish in Square D, Layer 5. Rocky shore species are also more numerous than tuatua.

Taylor identified a minimum number (MNI) of 30 individual fish, with tarakihi (*Nemadctylus macropterus*) and kahawai (*Arripis trutta*) being by far the most numerous. "'Both species are common in the region. All the fish identified can be caught using a hook. Black Head probably offers locations that would be suitable for hook and line fishing" (see Appendix 1). Other species are wrasse (Labridae sp.), snapper (*Pagrus auratus*) and blue cod (*Parapercis colias*).

Charcoal recovered from the samples of each stratigraphic layer was analysed by Rod Wallace of the archaeological laboratory at University of Auckland (Appendix 2). While a greater knowledge of the environment at the time the midden was laid down would have been desirable, we must instead rely on results of the charcoal analysis which indicate some of the vegetation species available close by at that time. The analysis identified: kaimako (*Pennantia corymbosa*), akeake (*Dodonea viscosa*), mapau (*Myrsine australis*), ramarama (*Myrtus bullata*), kanuka (*Kunzia ericoides*), mahoe (*Melyctus ramiflorus*), raukawa (*Pseudopanax edgerleyi*), putaputaweta (*Cardopetus serratus*) and Pittosporum shrub species, as well as totara (*Podocarpus totara*), rata (*Metrosideros robusta*), titoki (*Alectryon excelsus*), matai (*Prumnopitys taxifolia*) and rewarewa (*Knightia excelsa*) (see Appendix 2). Further information on neighbouring forest can be inferred from faunal identifications (Appendix 1).

Dating

Three samples were sent to the Radiocarbon Dating Laboratory, University of Waikato. Results as follows include the original reported radiocarbon age and calibrations as carried out by Fiona Petchey of the Radiocarbon Dating Laboratory in May 2005. The marine curve reference (Marine04) is from Hughen et al. (2004), with the regional average δR for New Zealand of -7+/-11 ^{14}C years (Reimer and Reimer 2005). The charcoal calibration depends on the southern hemisphere calibration curve (shcal04) of McCormac et al. (2004).

Wk-2515

Marine shell (tuatua) from Square D, pocket of shell within Layer 5

Reported radiocarbon age: 1040 ± 60 BP

cal. 1 sigma:	AD 1290–1400
cal. 2 sigma:	AD 1230–1440

Wk-6251

Marine shell (tuatua) from Square E, Layer 3

Reported radiocarbon age: 940 ± 50 BP

cal. 1 sigma:	AD 1350–1450
cal. 2 sigma:	AD 1310–1480

Wk-6366

Charcoal from Square D, Layer 5. Identified as: Pittosporum sp., mapau, ramarama, mahoe, akeake, raukawa, unidentified shrub species and putaputaweta (see Appendix 2).

Reported radiocarbon age: 540 ± 50 BP

cal. 1 sigma:	AD 1400–1450
cal. 2 sigma:	AD 1310–1350, 1380–1480

These radiocarbon determinations have been tested to see if they are statistically different using the mixed calibration option in OxCal v3.10 (Bronk-Ramsey 1995, 2001).

The OxCal programme takes each calibrated age and produces a combined calibrated range which it then compares to each individual date calibration. The computer compares the single date with the combined dates to see how they match. If they compare favourably, then that suggests there are statistical grounds for accepting that result, if they do not, then the archaeologist or radiocarbon dater might then question the grounds for combining any of the dates (Tom Higham pers. comm. 2001).

The pooled calibrated age for the three dates is AD 1395–1435 at 1 sigma and AD 1320–1350 and 1380–1450 at 2 sigma, that is, late 14th or early 15th century. Petchey writes that the OxCal pooling of the three samples shows they are "statistically indistinguishable." For the technically minded, "<An is the value (dependent on n) below which the agreement index (A) should not fall (Bronk-Ramsey 1995). These three results are in good agreement: n=3; A=85.1 (<An=40.8%)" (Petchey pers. comm.).

Radiocarbon dating supports the stratigraphic evidence for a single short-term occupation, not interrupted by any period long enough for the development of non-cultural deposits between the cultural layers. The pooled date indicates an age for the site which is comparatively early in the human history of New Zealand. Future work in this little studied part of New Zealand may test this date for the V23/21 midden.

Conclusions

Have the results fulfilled the purposes for which the excavation was undertaken?

The carbon dating results appear to confirm a time scale of long occupation of the locality. This does not mean that occupation was constant but was at least intermittent and may have been as a result of seasonal influences or any number of a wide range of other influences. The late 14th or early 15th century date appears to pre-date the sixteenth century exchanges of land between Te Angiangi and Te Whatuiapiti. The radiocarbon results do not indicate any more recent occupation.

As stated above, surface collected items from this locality have been associated with the earliest periods of occupation. This excavation exposed few artefacts (i.e., articles modified from raw materials), the most interesting being the bird spear point, which, however, disappeared from the collection. Rather, the material comprised largely floral and faunal remains with some obsidian and a small amount of chert. However, Taylor notes in his report that, "many of the Cook's turban shells had been deliberately broken and their use for hooks is a possibility." The presence of obsidian and chert suggest some sort of processing activity.

Changes in resources through time are apparent and may be as a result of fluctuating influences of weather patterns as reflected in the waxing and waning of the nearby lagoon. The site apparently registers the values of the locality as a seasonal workshop and gathering area of the abundant food stores of a wide variety. It was an area returned to with some consistency over time. The proximity of Rangitoto pa and the historical evidence of its occupation suggest that occupation is not likely to have been localised at the excavation site. Indeed, no evidence was found to suggest any long term occupation at the site. Rather, the site is seen as an area for the processing of foods as the seasons provided. The processed foods may be seen as being for the consumption of the inhabitants of Rangitoto. Other dune midden sites in the locality may have had a similar purpose.

Acknowledgements

I would like in particular to thank Donald Tipene of Porangahau for his suggestion that this excavation be undertaken and for his support during the project. Thanks are also due to the people of Porangahau, and especially Te Poho o Kahungunu marae, for taking part in the excavation and for their interest in the work. The Hunter Trust allowed the work to take place on Parimahu Station; managers Winton and Roseanne Hall provided accommodation in the shearers' quarters and helped in many other ways. Elizabeth Pishief, Hawke's

Bay filekeeper, and Pam Bain, Department of Conservation, were present at the first visit to the site and during the excavation. Tom Higham and Fiona Petchey contributed regarding the changing world of ^{14}C dating. Michael Taylor prepared the report on faunal material. Rod Wallace identified the charcoal samples. Nigel Prickett edited my draft report and prepared it for publication. Shaun Higgins scanned the illustrations.

APPENDIX 1. A faunal analysis of Site V23/21

Michael Taylor

This report describes an analysis of shell and animal bone recovered by archaeological excavations from site V23/21, an eroding stratified midden situated in the broad coastal dunes near Porangahau in Hawke's Bay. A long sandy beach and the rocky point of Black Head are the dominant features of the shore environment. The site is located on sand dunes near a small stream. The 1934 cadastral map for the area appears to show the stream feeding a small swamp or estuarine system which has fluctuated in size throughout the years.

A previous excavation was carried out in the area by the Hawke's Bay Archaeological Society during 1964 (?) and Porangahau and Black Head are noted as a source of early style artefacts.

The material analysed was excavated from up to five layers in five one metre squares called A, D, E, G and H. The main type of samples collected were 'complete samples' which were shovelled directly into sample bags. Other samples included collections of shells, bone, and charcoal which were selected by the excavators as 'diagnostic' of the excavated material.

Processing

An inventory of all bags present was compiled and each bag was emptied into a tray and air dried over several weeks. Once dry each sample was sorted for bone, identifiable shell elements, artefacts and other items of interest.

Testing of several of the complete midden samples for landsnails for ecological analysis revealed that very few were present and that consequently landsnail recovery was not warranted.

After sorting, the residue was set aside for recovery of charcoal for palaeo-vegetation analysis. As most complete samples contain abundant charcoal they should provide good results.

Shells were sorted into species and totals counted. The totals for bivalves were divided by two to arrive at a figure for the minimum number of individual shellfish.

Because of variations in the layers present in each square and because all layers were not equally sampled emphasis in the analysis was given to Squares

A and D. These squares were the most completely sampled. Also, significant quantities of Layer 5 were present only in Square D, all of which was recovered. Shell results are presented only for Squares A and D as there was little variation in the shell species present between squares or the species mix within layers. Differences or additional species found while sorting bone samples from other squares are noted in the results below.

Bone was divided into bird, fish and mammal categories which were identified using comparative material at the University of Auckland Department of Anthropology archaeology laboratory and at the Auckland Museum. Additional assistance in identifying material was given by Brian Gill (Auckland Museum), Phil Millener (then at Museum of New Zealand), Rick McGovern-Wilson and Ian Smith (both at the time at Otago University).

Analysis of bird bone followed the method outlined by Leach (1979a) except that the bone portion categories were simplified to complete ('C'), proximal end ('PE'), distal end ('DE') and shaft ('S'). Where damage or modifications to the bones were noted or suspected, bones were examined using a 10x hand lens under a bright light.

Fish analysis followed the method of Leach (1986), except that processing of the information was carried out manually not by computer.

The maximum minimum numbers of individual animals for mollusca (Table 1), fish (Table 2), birds (Table 3), rats (Table 4) and dogs (Table 5) are presented below. Nineteen pieces of obsidian and three of chert were recovered during the excavation and subsequently from the midden sorting.

Shellfish

The results raise questions about samples from Square D Layer 4. These were limited in quantity and produced an MNI of only 70 individual shellfish. The sample from D4 was the only one from the excavation to contain significant quantities of bird bone and estuarine shellfish such as cockle. D5 was the only other stratigraphic unit to contain significant quantities of these, suggesting that Layers 4 and 5 in Square D may belong together. Concentrations of bird bone (discussed below) also suggest that D4 and D5 may belong together. Some uncertainty also exists over Layers 4 and 5 during the excavation as several bags were labelled as originating from Layer 4/5.

Table 1. Shellfish identified from Square A

Layer	tuatua (*Paphies autralis*)	catseye (*Turbo smaragda*)	Cook's turban (*Cookia sulcata*)	mudsnail (*Amphibola crenata*)	paua (*Haliotis iris*)	blue mussel (*Mytilus edulus*)	green mussel (*Perna canaliculus*)	cockle (*Austrovenus stutchburyi*)	pipi (*Paphies australis*)
2	232	4	1	P	–	–	–	1	–
%	97.48	1.68	0.42	–	–	–	–	0.42	–
3	409	21	P	–	1	–	1	2	–
%	94.23	4.84	–	–	0.23	–	0.23	0.46	–
4	518	8	1	1	1	–	1	–	–
%	96.36	2.42	0.30	0.30	0.30	–	0.30	–	–

Table 2. Shellfish identified from Square D

Layer	tuatua (*Paphies autralis*)	catseye (*Turbo smaragda*)	Cook's turban (*Cookia sulcata*)	mudsnail (*Amphibola crenata*)	paua (*Haliotis iris*)	blue mussel (*Mytilus edulus*)	green mussel (*Perna canaliculus*)	cockle (*Austrovenus stutchburyi*)	pipi (*Paphies australis*)
3	540	12	4	4	1	1	–	4	–
%	95.40	2.12	0.71	0.71	0.18	0.18	–	0.71	–
4	37	4	4	P	1	10	–	14	–
%	52.86	5.71	5.71	–	1.43	14.23	–	20.50	–
5	50	39	9	4	–	18	1	208	36
%	13.70	10.68	2.40	1.09	–	4.93	0.27	56.98	9.86

Table 3. Percentages of shellfish identified by environment

	Estuarine	Open coast	Rocky coast
A2	0.42	97.48	2.1
A3	0.46	94.23	5.3
A4	–	96.36	3.62
D3	0.71	95.40	3.9
D4	20.00	52.86	27.13
D5	66.84	13.70	19.37

The analysis revealed a marked change in the contents of the midden between Layers 2 and 4 (except D4) and Layer 5. In Layers 2–3 in all squares tuatua was by far the most numerous shellfish forming 94–97% of all species. In the past it was obtained in large quantities from the open coast and was probably collected from close to the site. Possibly this represents gathering of shellfish for drying and storage. A variety of rocky shore molluscs were also found in Layers 2–4 (except D4). Catseyes were the most numerous secondary species in Layers 2–4 (except D4). In D4 blue mussels were the most numerous, but ten of the 19 shells were very small and would not have contributed significantly to the food consumed.

Cook’s turban shells were present in all layers in all squares in small numbers. Many of the shells had been deliberately broken and their use for hooks is a possibility although no hooks have been identified from the excavation. One dark rock shell was noted from Square G Layer 4 and a triangle shell from Square A.

The shellfish from Layer 5 demonstrate a very different range of activities from those in Layers 2–4. In Layer 5, shellfish collection was focused on an estuarine environment, not the open coast. Pipi and cockle were the most numerous shellfish in D5. Rocky shore species are also more numerous than tuatua.

Fish

An MNI of 30 fish were identified with tarakihi and kahawai by far the most numerous (Table 4). Both species are common in the region. All the fish identified can be caught using a hook. Nearby Black Head probably offers locations that would be suitable for hook and line fishing.

The presence of fish in all layers indicates that fishing was an activity that was undertaken throughout the occupation of the site. However, the numbers of fish identified suggest that it may have declined in importance through time. A parallel decline in the complementary activity of collecting rocky shore shellfish is also indicated by the shellfish totals.

Table 4. Fish identified at Site V23/21

Layer	tarakihi (*Nemadactylus mactropterus*)	kahawai (*Arripis trutta*)	wrasse (Labridae sp.)	snapper (*Pagrus auratus*)	blue cod (*Parapercis colias*)	
3	1	1	1	1	–	
4	3	2	1	1	–	
5	8	7	2	1	1	
Total	12	10	4	3	1	30

Two of the snapper can be estimated to be 62 cm and 52.8 cm long respectively.

The range of fish recovered at V23/21 is comparable to that recovered from the Washpool Valley site (Leach 1979b) and to the Black Rocks Point site (Anderson 1979) both at Palliser Bay, although the numbers are much smaller and the variety less.

Mandibles from two crayfish, both from Square D Layer 5, were also identified and these also were most likely taken on a rocky shore. Some kina spines were noted in a sample from G3, but no mandible pieces were located.

Birds

Bird bones were plentiful and concentrated in a small area. They showed a particular pattern of survival in that the shafts were frequently broken and the ends survived to be identified.

A maximum MNI of 20 birds were identified. It should be noted that the total of eight individuals for tui is a 'maximum' number and was obtained by adding the identified individuals from each layer. However, if the bones are treated as a single assemblage and stratigraphic units are pooled for tui the MNI is reduced to 6. Similarly the number of pigeons is reduced to four, parakeets to two and the total number of birds to 15.

Bird bones were plentiful in Square D Layers 4 and 5, with only ten of 109 identified bird bones not coming from these stratigraphic units. One or two identified bird bones came from E4/5, H4, and H4/5 which are probably all stratigraphically the same as D4 and D5. Four bones came from E3 and the

Table 5. Maximum minimum number of birds from V23/21

Layer	tui (*Prosthemadera novaeseelandiae*)	pigeon (*Hemiphaga novaeseelandiae*)	parakeet (*Cyanoramphus novaezelandiae*)	kaka (*Nestor meridionalis*)	saddleback (*Philesturnus carunculatus*)	New Zealand quail (*Coturnix novaezelandiae*)	
3	1	–	1	–	–	–	
4	2	1	1	–	–	1	
5	5	4	2	1	1	–	
Total	8	5	4	1	1	1	20

quail from A4. Only tui or parakeet bones were identified away from D4 and D5 except for one kaka bone from E4/5.

All the birds represented except the New Zealand quail are forest species, although tui, parakeets and kaka travel long distances for food. Saddlebacks do not have full flight and remain in a forest environment. Often in the past they were taken incidentally while other birds were being targeted (Best 1977: 323). The implication from the saddleback in the midden and the variety of other forest species is that at the time of occupation of the site there was forest nearby. Identification of the charcoal should provide further insight into this. Forest birds identified were usually taken with a variety of snares, although spears were also sometimes used (Best 1977: 192–216, 229–267, 291–307, 319–321, 323).

Unlike the other birds, the quail was a ground dwelling species, once abundant in open country. It was usually taken with ground snares (Best 1977: 192, 234).

All birds excavated are believed to have been common in pre-European New Zealand. Today the quail is extinct, the saddleback is only found on off-shore islands and the red-crowned parakeet is very rare. The modern status of these once common birds illustrates the magnitude of the environmental changes that have occurred in the area of the site.

Most bird bones came from Layer 5. Their absence from Layers 2 and 3 may indicate that exploitation was focused more on shellfish. Alternatively environmental change may have caused a reduction in the numbers of birds available in the area (see Leach and Leach 1979b: 255).

Although no other middens from the east coast area are available to compare V23/21 with, a comparable collection although much larger was made at Palliser Bay at Washpool (Leach 1979b).

As noted above bird bone showed a distinctive pattern of survival for although it had undergone considerable attrition and breakage, the assemblage did not show the distinctive traces resulting from dog or rat attrition. Dogs normally eat the ends off the bones as these cancellous ends are the softest part and blood rich. This leaves only the shafts or, if the birds are small or the dogs hungry, nothing at all. Rat attrition, which is distinctive from that of dogs, is discussed in the following section. The implication is that it is humans that are breaking the bones, probably to extract the marrow. But this problem warrants more study for a more definitive answer.

Rats

Most rat bone came from Square D Layers 4 and 4/5. One vertebra came from D5 and a caudal vertebra from A4. At least two individuals are present in Square D and the high proportion of body parts that survive is unusual (Table 6).

Table 6. Rat bone from V23/21

context	ulna	radius	humerus	scapula	fibula	tibia	femur
	L R	L R	L R	L R	L R	L R	L R
D4	1 1	1 –	1 –	– –	– –	1 –	– 1
D4/5	1 1	– –	1 1	1 1	– 1	1 –	– –
D5	– –	– –	– –	– –	– –	– –	– –
Total	2 2	1 –	2 1	1 1	– 1	2 –	– 1

cont...	pelvis	mandible	maxilla	skull	vert.	ribs
	L R	L R	L R	S T	L S C	
D4	– 1	– –	– –	– –	– – 2	–
D4/5	1 1	– 1	1 1	– 6	6 6 3?	12
D5	– –	– –	– –	– –	– – 1	–
Total	1 2	– 1	1 1	– 6	6 6 6	12

Such body representation may be taken to represent rats that were buried whole rather than having been eaten by people or dogs. The remains of these become broken and scattered. Here the unbroken nature of most of the bones and presence of very small elements support the contention that the rats were buried intact.

Rats commonly tunnel beneath middens to take advantage of the roof from the weather offered by shells and the proximity to the food waste of humans. Such tunnels, often dug in sand as at this site, are very much subject to collapse and burial of the rat occupants.

The abundance of bird bone in the same samples as the rats gives rise to the questions of whether the bird bone may have been accumulated by rats. The marks left by rat teeth are easily observed on assemblages where rats are contemporary with the bones (Taylor 1984: xx). Rats also gnaw bone in characteristic ways. With bird bone this consists of gnawing open the bone shafts to gain access to the bone marrow and eating the cancellous tissue at the bone ends creating a characteristic of rat attrition called 'scooping out' (Taylor 1984: 88).

All identified bird elements were closely examined using a 10x hand lens but none of the signs of rat attrition on the collection was observed on the bird bone. Thus it is unlikely that the rats and the remains of birds are contemporary.

Dogs

One or two dogs were identified from the assemblage. Dog bone was fragmentary and found scattered in small pieces in 13 sample bags from six stratigraphic units: Squares A, D and H Layer 4, Square H Layer 4/5 and Squares D and E Layer 5.

The only elements that could be identified were a piece of maxilla with three teeth, a mandible, another mandible fragment, a small piece of pelvis and a rib. Six stratigraphic units contained small fragments of what are probably the remains of bones but these were too fragmentary to be further identified. The survival of these elements is consistent with other sites where cranium is usually most common and where mandible and pelves both usually survive better than long bones (Taylor 1984: 170–171). Dog bones normally undergo heavy attrition by other dogs which destroy all but the hardest parts of the most robust elements.

A mandible broken into several pieces was the largest bone recovered. It is the most robust element of dog and the fragile condition and extensive splitting of this example is not normal (Taylor 1984: 171–172). Its condition may indicate that the mandible was cooked. This seems to be common in Archaic sites, compared with later Classic sites when mandibles were more commonly used for tool manufacture.

Stone knife marks were identified on one piece of rib. There were about 11 marks just lateral of the head and transverse to the long axis of the bone. They were made from an inferior angle and are clearly a result of butchering, probably from cutting the dorsal muscles from the dog's spine.

Only the shaft of the rib survived. The absence of the cancellous ends and the presence of tooth puncture marks on the surviving shaft indicate that the rest was eaten probably by another dog (Taylor 1984: 93–94). Plant roots had also damaged the rib surface.

Other mammal

One bone, a burnt fragment from the posterior angle of a scapula was also recovered from Square D Layer 4/5. The animal from which it came could not be identified, but was bigger than a dog.

Conclusions

The excavation was limited in extent and only small samples were obtained. Consequently conclusions must be somewhat tentative. However, the abundance of bone in the samples recovered allowed some observations to be made.

The faunal remains from the midden contained a variety of shellfish from different environments, birds including extinct and rare species, fish, dogs and rats. It can be regarded as fairly typical of an Archaic site. The faunal evidence is consistent with an early date for the site. Fishing, shellfishing and birding were important activities. The raising and consumption of the domesticated dog is also indicated.

Marked change in the contents of the midden occurred between Layers 2–3 and Layer 5. This was most notable in the bird and shellfish taken. Dog is absent from Layers 2 and 3. Types of fish are more consistent between layers, but fish also seems to reduce in importance from lower layers. These changes may represent a shift in exploitation strategies, such as may have occurred between seasons. Probably this is what the site represents.

However the changes may represent more fundamental changes in the environment such as have been identified at Palliser Bay (Leach and Leach 1979b: 254-255). Undoubtedly dramatic changes have occurred in the Porangahau area, but whether some of these happened during the occupation of this site remains to be demonstrated. No comparable sites have been previously excavated in the area, and the collection is therefore important in helping to fill in a long stretch of coast about which there has been little previous information. The nearest large scale excavations at Palliser Bay, although some distance away, provides comparable results.

APPENDIX 2. V23/21 charcoal identifications

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Square E – Layer 3/4

C14 dating sample = 2.5 grams			
Kaikomako (*Pennantia corymbosa*)	5		
Akeake (*Dodonaea viscosa*)		2	
twig of ?		1	
Mapau (*Myrsine australis*)		1	
Residue			
Totara (*Podocarpus totara*)		20	
Matai (*Prumnopitys taxifolia*)		8	
Rewarewa (*Knightia excelsa*)		3	

Square E – Layer 5

C14 dating sample = 3.0 grams			
Akeake		1	
Ramarama (*Myrtus bullata*)		2	
Kanuka (*Kunzia ericoides*)		3	
shrub sp.		2	
Residue			
Totara			50
Matai			6

Square D – Layer 5

C14 dating sample = 11.7 grams			
Pittosporum sp.		4	
Mapau			5
Ramarama		6	
Mahoe (*Melicytus ramiflorus*)		3	
Akeake		2	
Raukawa (*Pseudopanax edgerleyi*)		4	
shrub spp.		4	
Putaputaweta (*Carpodetus serratus*)	1		
Residue			
Totara			9
Matai			6
Rata (probably *Metrosideros robusta*)	3		

Square D – Layer 5

C14 dating sample = 1.5 grams		
Kaikomako		2
Putaputaweta		1
Pittosporum sp.	2	
Mapau		1
Shrub spp.	1	
Residue		
Totara		1
Matai		2
Rewarewa	1	
Rata		4

Square A – edge of ash lens

Matai		10
Rata		1
Titoko (*Alectryon excelsus*)	1	

No material suitable for dating was available in this sample

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