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NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION NEWSLETTER



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ARCHAEOLOGICAL RESEARCH AT LAKE MANGAKAWARE, WAIKATO
A SUMMARY OF RESULTS

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Archaeological research on the Lake Mangakaware sites was commenced in August 1968, and continued in April 1969, May 1970 and December 1970. After the first excavations (August 1968) at Mangakaware Site 2 (N65/35) a short report was published in the Newsletter for March 1969 (Bellwood 1969). In August 1970, I prepared a report on the results of the first three periods of research for the 42nd ANZAAS Conference in Port Moresby, Papua, New Guinea, and this paper, since revised, is about to be published in the latest volume of the Proceedings of the Prehistoric Society (Bellwood 1971). Because these reports are available, it is not intended to duplicate published information here. However, the final period of work, in December 1970, was carried out after the Prehistoric Society report was submitted, and several new and important items of information were recovered at this time. This report, then, will be concerned mainly with the new results from trench E of Site 2, recovered in December 1970. In addition, a few conclusions made in the original Newsletter report require updating.

The location of Lake Mangakaware is shown in Figure 1. On the western side of the lake is the excavated site, MA 2; on the eastern side are two pa, or perhaps a single pa with annexe, for MA 3 has very little sign of occupation. MA 1 (N65/28) was described first in the pages of this Newsletter by D. Pick (1968), and in April 1969 Mr K. M. Peters of the Department of Anthropology, Auckland University, surveyed the site and carried out test excavations. As Mr Peters' report is presented in this issue, no further discussion will be undertaken of this site.

Lake Mangakaware - A Background Summary

The Mangakaware pa were made habitable by the deposition, over the damp underlying peat, of successive layers of a sandy clay derived from nearby quarries, and stratification consists for the most part of floors of this material, separated by varying thicknesses of occupation debris. Subsequent waterlogging has led to excellent preservation of evidence.

Of the three pa, MA 1 has the greatest depth of deposit (two metres), and MA 2 is much shallower ($\frac{1}{2}$ metre), while MA 3 appears to have been little occupied. All were fortified, and palisade lines survive virtually complete at ground level. MA 1 is doubtless the oldest site, and may have been settled from the Lake Ngaroto area by a section of the Ngati Apakura tribe. In the early 19th century the area was occupied by Ngati Puhiaue (J. B. W. Robertson - personal communication), evidently closely related to Ngati Apakura.

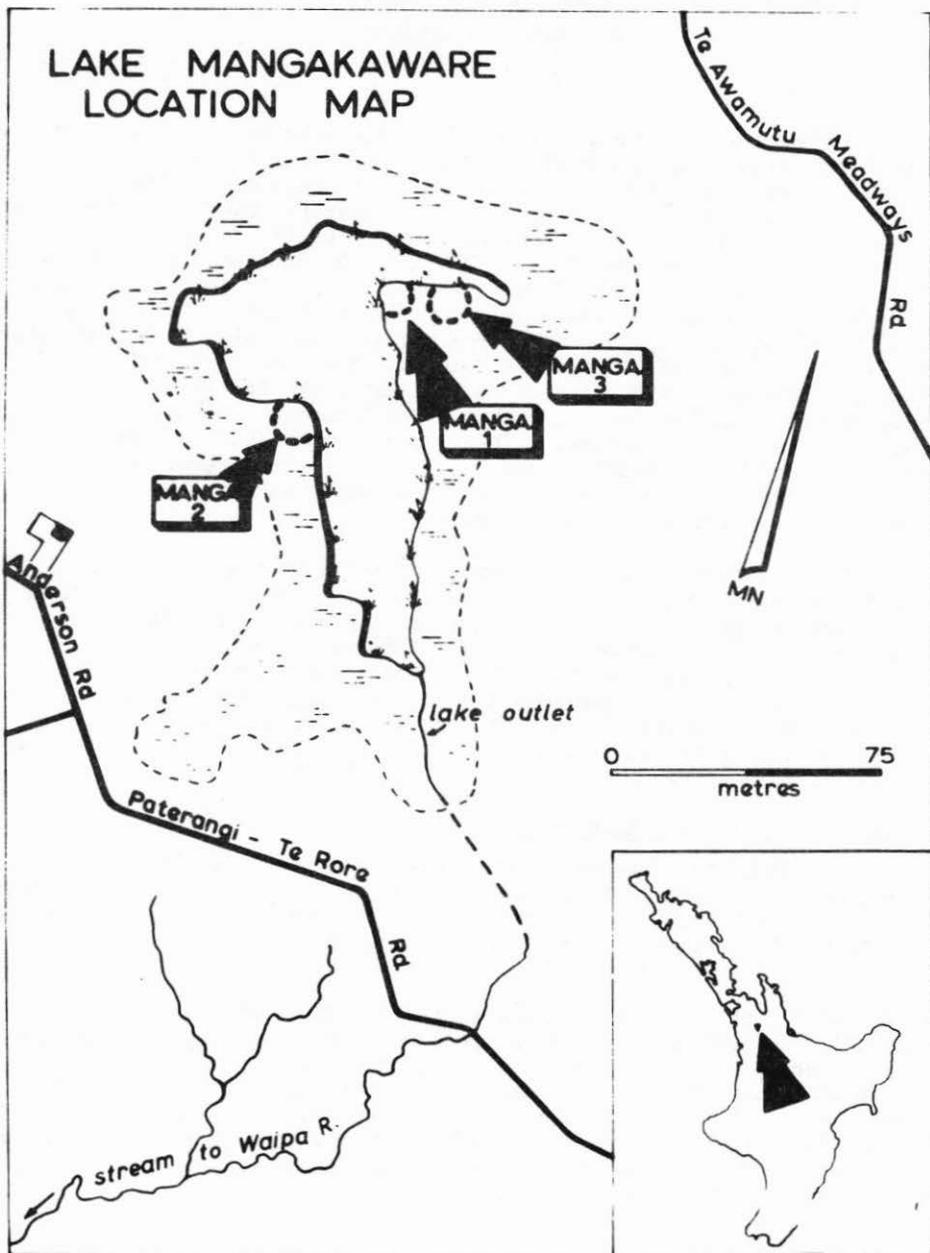
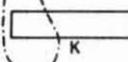
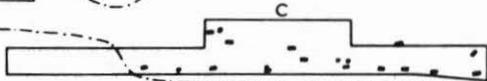
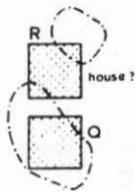


Figure 1. Location Map of Lake Mangakaware.



MANGAKAWARE 2
site and trench plan
0 1 2 3 4 5 6 7 8 9 10
m

Figure 2. Site plan of Mangakaware site 2. Trenches are lettered A to Z, and areas of sand lenses are enclosed with dashed lines.

The lake was originally joined by an outlet stream to the Waipa River, and may have been approachable by canoe. Three complete canoes still lie at the bottom of the lake, and have not yet been lifted. By water, the lake is about 100 miles from the sea, and about 25 by land over the lower slopes of Pirongia Mountain. Fish and marine shellfish found in the MA 2 excavations indicate that the inhabitants had some form of contact with the coast.

Mangakaware Site 2 - A Background Summary

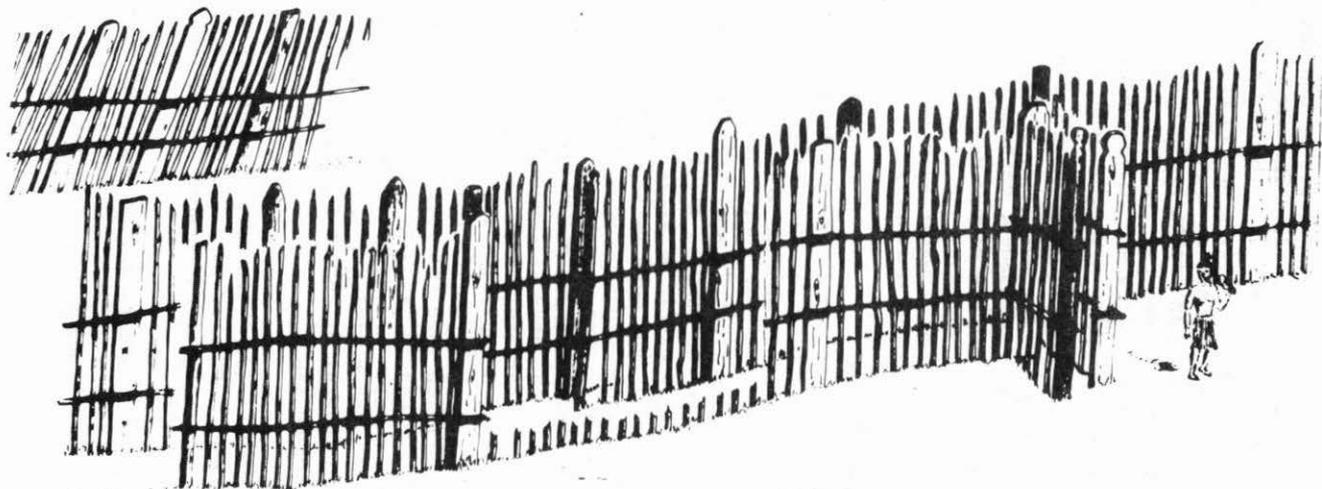
This site covers 2,100 square metres, of which 400 have been excavated (see Figure 2 for excavation layout). However, much of the inside of the pa was not used for house or floor construction, and the unaltered peat surface was allowed to remain (as determined by excavation and test-bores taken over a five-metre rectilinear grid). It is estimated that about half of the actual habitation area has been excavated, and it is rather unlikely that further excavation will add to the site plan as it is known at present. The unaltered peat areas are sterile of archaeological deposits, as several trenches have shown (although they were of course utilised, if only for walking over).

The site was occupied for an estimated 50 years, and a carbon date of A.D. 1670 \pm 76 (N.Z. D.S.I.R. R2579) from a house-post represents an approximate mid-point in the occupation span. This occupation evidently ceased with an attack on the pa which appears to have been successful. Part of the western palisade line was apparently uprooted and a number of broken weapons, together with a human tibia rubbed with red ochre, were found together in the entrance passage.

The defensive palisades have been fully described in the other reports, and consist of two rows on the landward side and around trench E, but just a single row around the side of the pa abutted by the lake. Microscopic analysis of palisade timbers has established the use of matai (*Podocarpus spicatus*) and pukatea (*Laurelia novae-zelandiae*), but so far this work of identifying timbers has only just begun (with help from Dr R. N. Patel of the Forest Research Institute, Rotorua).

The entrance passage into the pa is reconstructed in Figure 3. In my first report (Bellwood 1968: 45) I mentioned the existence of a fighting stage in this area. At this time, only a small section of the entrance area had been uncovered, and this interpretation may now be seen to be erroneous. The entrance passage as now recovered is very narrow (60 cms to 1 metre wide), and would be unlikely to have supported such a structure.

The internal layout of the site has been almost fully recovered. The central part was an open space, built up with sand lenses over an area of at least 500 square metres. This area served no doubt as a marae, and contained numerous hearths and haangi, together with isolated posts which may represent storage structures. However, no houses were built in this area.



MANGAKAWARE 2 Trench C.
A reconstruction of palisades and entrance.
0 1 2 3 4 mtr

Figure 3. Mangakaware 2 - a reconstruction of the entrance.

Positions of the houses grouped around the inside of the pa against the lake are shown in Figure 2. The big house in trench Y and its associated shelter have been described in more detail elsewhere, and a reconstruction for this house, prepared from the excavation plan, the numerous house-timbers found in the lake mud, and ethnographic descriptions of house construction, is presented in Figure 4. The notched wall-slabs and the tenoned rafters were found in quantity in the lake, together with several perforated door-jambs. Items tentatively identified as window-sills have also been recovered.

The complex of structures in trench E will be described in the following section, but at this point we may summarise the main aspects of the pa layout, namely palisades, central open space, and houses grouped along the lake edge, with a single possible outlier in trenches Q and R. In the lake itself is at least one raised four-post storehouse (originally suggested to be a canoe landing-stage in my 1968 report, page 45, but this suggestion is rather unlikely).

The Trench E Complex

This area has produced many problems of interpretation, owing to its stratigraphic and structural complexity. Fourteen major sand lenses have been demonstrated for this area by excavation, of very varied size and shape. Some form overlapping series, while others are not overlapped at all. This means that determination of exactly how many structures were in use at any one time is difficult (but not impossible, if one allows for a slight margin of error). Furthermore, the structures themselves may, for the most part, be well-preserved and delineated. However, attributing function to a structure is by no means easy. Functions such as eating, sleeping, cooking and storage do not necessarily give rise to distinct types of building, and it is evident that some of the E structures had several functions, or even changed their functions over time. Furthermore, in and amongst the structures and sand lenses are many hearths, haangi, and ash and charcoal layers, which complicate matters further. It remains a distinct possibility that haangi were in use in houses which were not obviously used for cooking purposes, and therefore these haangi may have served purely as heating devices. In brief, the E complex is characterised by many different structures, such as the lenses, the buildings, the hearths, and so forth, each of which may have had several different functions, not only at one particular time, but also through time.

Figure 5 shows the E complex in its second phase of construction. Five phases are evident overall, but details of each of these cannot be presented here. Phase 2 has also been chosen for illustration because it complements the plan for trench E shown in Figure 2, which represents phases 3 to 5.

The phase 2 features may be described from north to south, beginning with the internal palisade which surrounds the complex. This can be seen to run along the inner side and, together with the main outer palisades, delineates an area 20 metres long by 5 to 7 metres wide.

MANGAKAWARE II AREA E PHASE 2

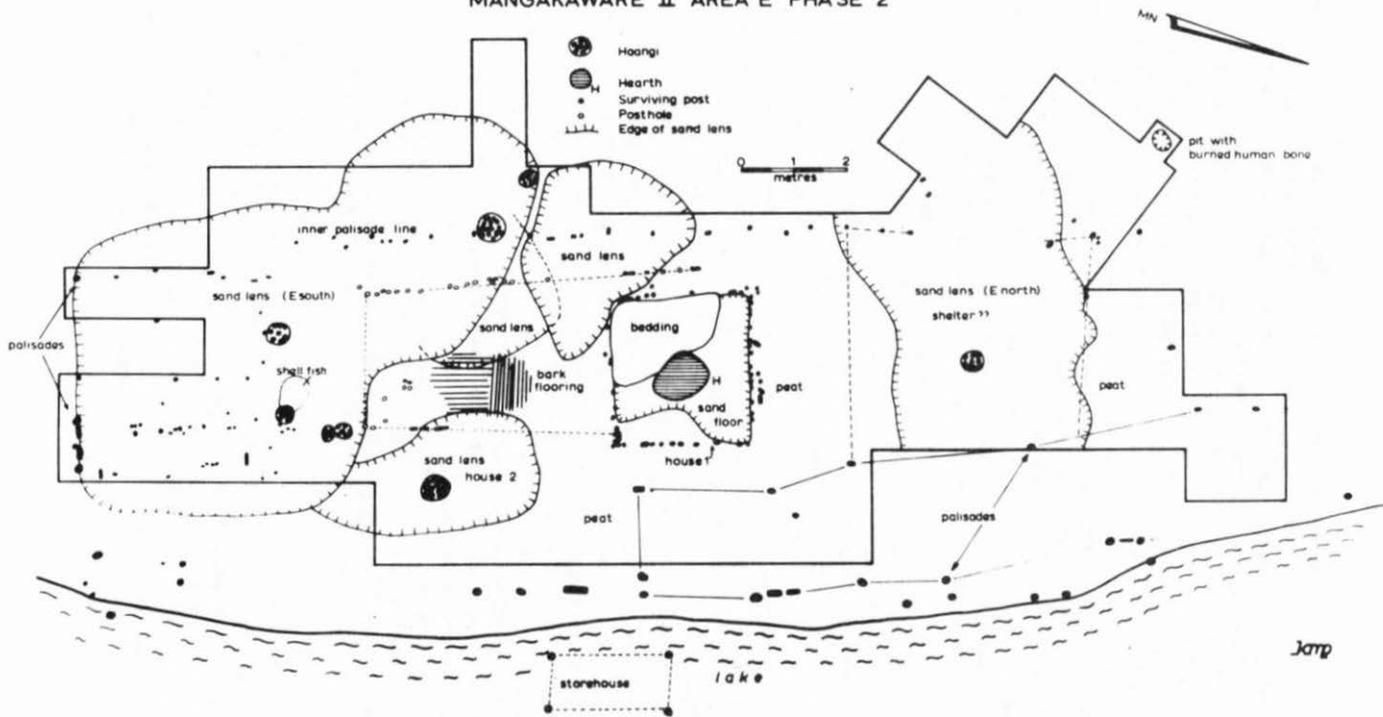


Figure 5. Mangakaware 2 - plan of trench E during its second construction phase.

At the northern end of the enclosure is a single sand lens (E. North). This contains one haangi, and to its north-west lies a small pit which contained a large amount of burnt human bone. It has been suggested that this feature may somehow relate to the successful attack against the pa (Bellwood 1971). A problem immediately arises with this lens. Was it open to the sky, or was it roofed? Roofing would be no problem at all, as timbers 4 to 5 metres long would bridge the gap between inner and outer palisades, and no intermediate earth-bound timbers would be needed. If it were roofed, it would doubtless provide a useful sleeping area for the warmer months of the year. Lake Mangakaware is very frosty in winter, and one would expect the inhabitants of the pa to huddle together in the thicker-walled houses at this time of year. Unfortunately, and perhaps owing to the nature of the case, structural evidence for this lens has not survived in sufficient quantity to allow resolution of the problem, for there are no intermediate earth-bound timbers.

The difficulties of recognising some of the flimsier structures inside a pa may be seen from examination of an illustration of a pa in the Bay of Islands in 1827 (Wright 1950: opp. page 176, from expedition of Dumont D'Urville). Many of the structures here consist merely of lean-tos, which in some cases would leave traces of no more than two posts. Yet such structures might well have been sleeping areas for many people. This illustration also shows that several houses were completely open at one end, a further point of relevance. The problems of identifying some of these flimsy structures have been illustrated by Shawcross from his excavations at Ngaroto, another of the Waikato lake pa (Shawcross 1968: 14-18).

To the south of sand lens E north lies House 1, and the two are separated by an area of unaltered peat. House 1 is a solid structure, three metres long by 2.80 metres wide, with tree-fern walls on three sides, and a wall of heavier timbers on the eastern side against the lake. Within the walls are 80 centimetres of deposit, and the history of the house is fairly complicated. In phase 1, the house appears to have been entered from the lake side, but was totally rebuilt with fresh walls and entrance on the inland side in phase 2. Figure 5 shows this second phase. In the lower levels are clay floors with hearths, and apparently areas of bedding, composed of twigs and leaves containing many small seeds of kahikatea (Podocarpus dacrydioides), which would indicate that this bedding was laid down in autumn. At present, this house is interpreted as a winter sleeping house for its earlier phases, and no summer seeds or fruits are present (see below). However, the upper levels contain haangi, and greater thicknesses of ash and charcoal, and lack evidence for bedding, suggesting that the structure was converted into a cooking house. It is certainly the most substantial structure in the whole E complex, and its rather narrow entrance, under 80 cms wide, would suggest that it was originally constructed to be a sleeping house. In this case, it is clear that to give a single function to a structure may be misguided. Furthermore, all the floors of this house, and also

of all the other houses, contain shellfish, suggesting that eating was also carried on inside them.

South of House 1 lies a large structure, 4.60 metres long by up to three metres wide. This structure does not appear to have had a single sand lens floor, although three overlapping lenses run along its western side. Along the eastern side was a carefully-laid area of bark-strip flooring and many fragments of Phormium matting. A small area of this structure in phase 1 yielded carbonised seeds of titoki (Alectryon excelsus), karaka (Corynocarpus laevigatus), and miro (Podocarpus ferrugineus), which together indicate occupation through the warmer months of the year. The seeds and fruits have been identified by Miss J. Goulding of the Auckland Museum.

This structure does not have a separate north wall, and abuts directly on to House 1. The southern end appears to have been open. In phase 3 it was demolished, and replaced by the smaller shelter shown in Figure 2. At the same time, the small House 2 was constructed, but in phase 2 the area of House 2 was apparently an open sand lens containing a haangi. House 2 yielded remains of plank walls, but was clearly very small, at 2.50 metres long by two metres wide. This may almost certainly be interpreted as a sleeping house.

It will also be observed that the main outer palisade, which is double alongside lens E north and House 1, is only a single line opposite the shelter and against House 2. Furthermore, at this point there is the four-post structure in the lake, which would appear to have been a storehouse. Presumably, there was a beaching point for canoes here, and an entrance into the enclosure.

The southern sand lens of trench E is quite large, and contains a number of haangi on its surface. Right at the southern end, adjoining the main palisade, is a structure covering an area of 4 by 4 metres, containing 55 posts. These posts are arranged mainly in five north-south lines. Interpretation of this structure has been beset with a number of problems. It has no real floor, for the sand lens is very thin here. Neither does it have hearths or occupation deposits. Therefore, it is clear that it was not a surface dwelling or cooking house. Also, there are of course too many posts to allow such an interpretation. Two possible interpretations are suggested here. Firstly, it might have been a structure with a raised floor, such as a storehouse. This corner of the pa is low and wet, and a raised floor might have been necessary. However, many of the posts are very flimsy, and furthermore such a structure would be in a very vulnerable position right against the landward palisades. The structure is marked as a storehouse in Figure 2.

Interpretation as a raised storehouse had occurred to me during the actual excavation. At the same time, there seemed a possibility that the posts might represent eel-drying racks. Mr D. Sutton suggested this to me again at the Auckland conference, and this would now seem to be the

best interpretation. The drying of split eels on racks by sun and wind is described by Best (1929: 96) and Buck (1958: 106). The absence of hearths between the racks would suggest that artificial heat or smoke was not applied. Hence the best interpretation for the 55 posts would be that they represent five parallel drying racks, each four metres long, and the two eastern ones show signs of having been reconstructed at least once.

One other problem arises, for if these were in fact drying racks, one would expect to find eel skulls and vertebrae in this area. Nothing of this nature was recovered, and because the soil was passed through a machine designed to extract seeds and fruits, which it did with considerable efficiency, there can be no doubt that eel bones have not been preserved. The peat under the site is strongly acid (pH 5.25), although the deposits have become neutral in the house-floor layers, presumably by chemical alteration from habitation residues and shellfish. The area of the racks, being virtually raw peat, has a strongly acid pH value, which must account for the absence of eel bones.

General summary of evidence for houses and shelters

1. Trench Y - a slab and post walled house covering 6 by 2.20 metres. This is the largest structure on the site.
2. The trench T shelter, of which three posts survived together with the sand floor, covering about 2 by 2.50 metres.
3. The structure represented by floors but no evident walls in trenches Q and R.
4. Trench E northern lens - a possible shelter some four metres square, for which evidence is uncertain.
5. Trench E House 1, 3 by 2.80 metres, with close-set tree-fern walls. This structure may have served as a sleeping or a cooking house.
6. Trench E House 2, 2.50 by 2 metres, with plank and post walls.
7. Trench E central shelter, 4.60 by 3 metres, abutting on to House 1.
8. Trench E shelter which replaced 7 above in phases 3 to 5, of trapezoidal shape, approximately 3.50 metres long by 1.50 to 2.50 metres wide.
9. Trench E drying racks, being five racks each four metres long.
10. Isolated posts in the central area of the pa.

General summary of evidence for seasonality of occupation of structures

1. The three houses with solid walls, namely that in trench Y, and trench E Houses 1 and 2, contain numerous hearths, which suggest winter use with heating. Trench E House 1 has bedding in its lower levels which appears to have been laid in autumn (above). None of these structures has any other seeds or fruits which might indicate spring or summer use

except for E House 1 which has one seed each of miro and karaka from one of the upper layers, by which time the house may have been used for cooking anyway.

2. The trench E shelter of phases 1 and 2 has numerous carbonised seeds, indicating occupation through spring to autumn, as noted above. In addition, the presence of flax mats inside this structure might indicate occupation in a fairly dry period of the year. Neither this shelter, nor its successor, nor the trench T shelter, had hearths during use. The trench E northern shelter may also fall into this category, although this does have one haangi.
3. The above information suggests that it is possible to differentiate between two kinds of dwelling unit:
 - (a) winter houses, which have thick walls, and, in one case certainly, small doorways, together with hearths and haangi, the latter for heating or cooking;
 - (b) summer shelters, with thin walls which do not enclose all sides, no hearths (i.e., these shelters were not for cooking), and in one case Phormium mats and bark boards, together with food remains indicating summer use.
4. General economic evidence for the site, indicating all year round occupation with a fluctuating population, has been presented elsewhere (Bellwood 1971). This conclusion has not been altered by the results of the December 1970 excavations, and indeed it has been strengthened. It is impossible to demonstrate the degree of fluctuation of the population directly from the archaeological evidence, although a smaller resident population for summer and a larger one for winter living partly on stored foods, may be inferred from generalised ethnographic accounts. Unfortunately, the acid soil has rendered the shellfish useless for the method of seasonal dating from growth rings (Coutts and Higham, 1971).

Further evidence of seasonality was recovered in December 1970. An unfinished basket made from the leaves of Juncus planifolius, containing seeds of the same plant, indicates activity in January or February. Seeds of Phormium from occupation levels also suggest summer occupation (Miss J. Goulding - personal communication). The eel-drying racks, if this is the correct interpretation, could have been in use all year round, although eels are most plentiful in their autumn migration period (R. Cassels - personal communication). The many agricultural tools from the lake surely suggest spring to autumn activity, and, finally, it seems unlikely that such a well-defended site would be left entirely abandoned at any time of the year.

Hence the warmer months are amply represented in the seasonal evidence as recovered by excavation. The winter months are less so,

because there are fewer plant foods likely to survive from this time. Cook, however, noted that the thick-walled houses were used in winter, and that in summer people lived "dispers'd up and down in little Temporary Hutts" (Reed 1969: 147). This statement gives rather general support to the identification of summer shelters at Mangakaware, and also indicates the summer dispersal of population. Banks noted that fires were lit in the middles of houses in winter, and that the hearths were surrounded by straw for sleeping (Morrell 1958: 134-5).

Conclusions

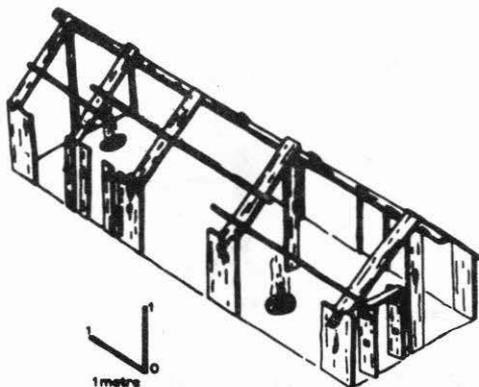
No mention has been made in this article of the artefacts from the excavations and the lake. These total well over 200, and are mostly of wood. A brief listing has been presented in my 1971 report, and many more items were recovered in December 1970. Because these are still undergoing preservation, discussion of all the artefacts must wait until a final report is prepared. However, it is clear that they will form one of the largest dated Classic Maori assemblages ever recovered.

This short report has been concerned mainly with the plan of the site, its structures, and some aspects of economy. Laboratory analysis is still proceeding, and many items such as seeds, fruits and timbers still await identification. Conservation of artefacts is expected to take until late in 1971. However, no more excavation is planned for the site at present. Many problems remain unsolved, and may never be solved by further excavation at the same site. What is needed now is good comparative information from other excavations on Waikato swamp pa, especially on house types and function, general layouts, and economy. The results from Mangakaware cannot really be assumed to be typical of the Waikato until they are shown to be typical (or alternatively, atypical). Very possibly, it may also be the case that the three Mangakaware pa, while being distinct structural units, may have functioned in many respects as a single social unit. They are all much the same size, and seem to have similar plans. Furthermore, it is most unlikely that sites so close to each other would be occupied by unrelated and possibly hostile groups. The inhabitants of all three pa must surely have been related, if, of course, it can be shown that the pa were in contemporary use. This would explain how the inhabitants of MA 2, who most probably did not number over 30, were able to construct such strong defences.

References

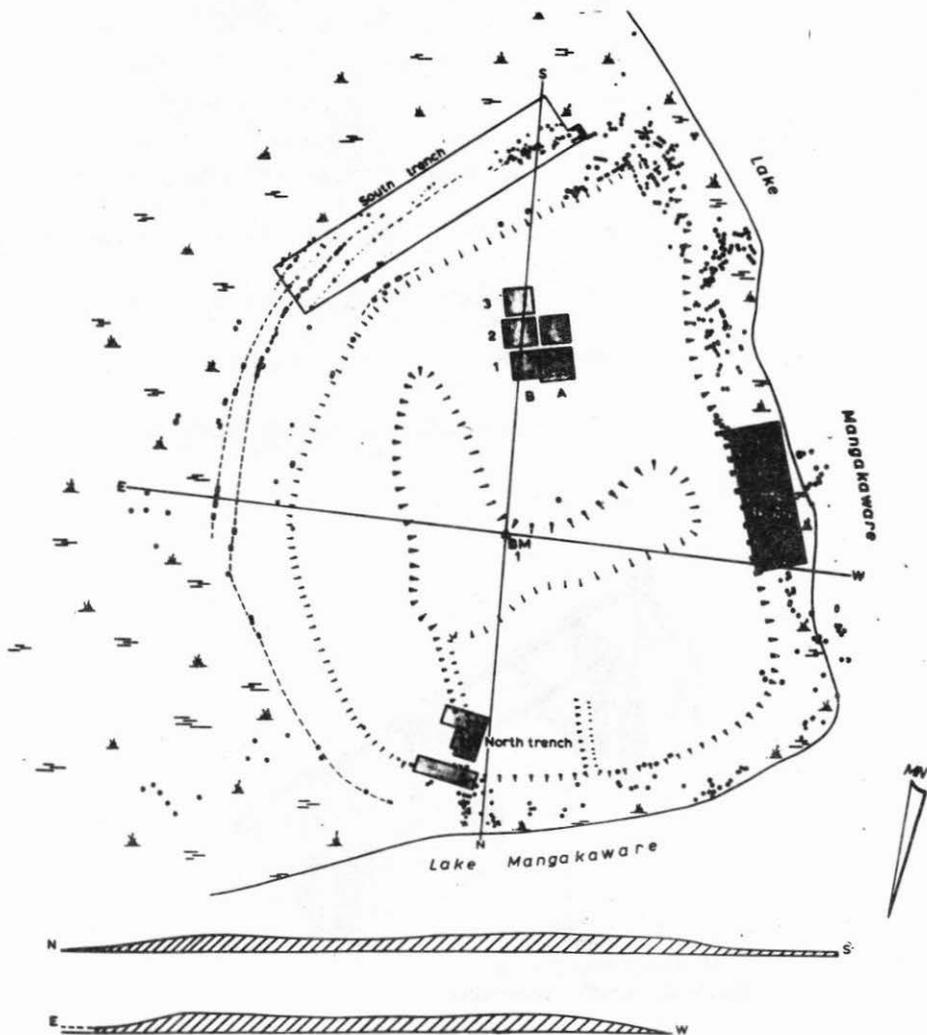
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MANGAKAWARE - 2
Reconstructed wharepuni

Figure 4. Reconstruction of a Mangakaware 2 plank walled house, based on the trench Y house plan, and house timbers found in the lake.



LAKE MANGAKAWARE PA NO 1 N 65/28, (L.M.1)

0 10
mtr