



NEW ZEALAND  
ARCHAEOLOGICAL  
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**NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION NEWSLETTER**



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## THE NGAROTO SITE

Wilfred Shawcross

### INTRODUCTION:

Lying between the Waikato and Waipa rivers and in the vicinity of Te Awamutu is a group of small lakes on whose shores a number of earthen mounds have been built. These structures belong to a class of field monument called by G. L. Adkin 'artificial island pa' (Adkin, 1948: 32) and in turn to a broader class of monument including natural and artificial formations termed 'flat land pa, variety A', in the survey of New Zealand field archaeology by J. Golson (Golson, 1957: 94). The defensive value of islands was exploited widely throughout New Zealand, but such artificial platforms are more restricted and have so far been recorded from some four separate localities (see inset, map Fig. 1). Nine or ten have been recorded by Adkin in the Horowhenua area (Adkin, 1948: 32). H. Guthrie-Smith described a certain one and several possible others at Lake Tutira (Guthrie-Smith, 1953: 71). There is a third well-known group in the Hauraki Plains, which have been described by R. C. and K. Green (Green and Green, 1963: 27). The Waikato group is the fourth and relatively recently discovered one (see article by D. Pick in the Newsletter, in press).

The site, N65/18, is one of three on Lake Ngaroto (see map Fig. 1) and is a low, dome-shaped mound some 100 metres long by 70 m. broad and its greatest height is about 3 m. above the surrounding, swampy lake margins (see plan, Fig. 2). Excavations of a private nature, to collect Maori artefacts, had been going on intermittently for several years, but in 1964 the Waikato Archaeological Group, affiliated to the New Zealand Royal Society, commenced on a programme of investigations, consisting of scattered test pits and a very valuable row of squares were set out as a cross section over the short axis of the site. These squares are shown on the site plan with their numbers printed on them. It was as a consequence of these excavations and the generous invitation of Mr D. Pick, that the present investigation, carried out by the Auckland University Archaeological Society, under the direction of the author, and by the Waikato Group, was initiated.

### OBJECTIVES

Nearly a decade ago Jack Golson drew attention to what is probably the single, most fundamental internal problem in New Zealand archaeology, the relationship between those distinctive assemblages of adzes, ornaments

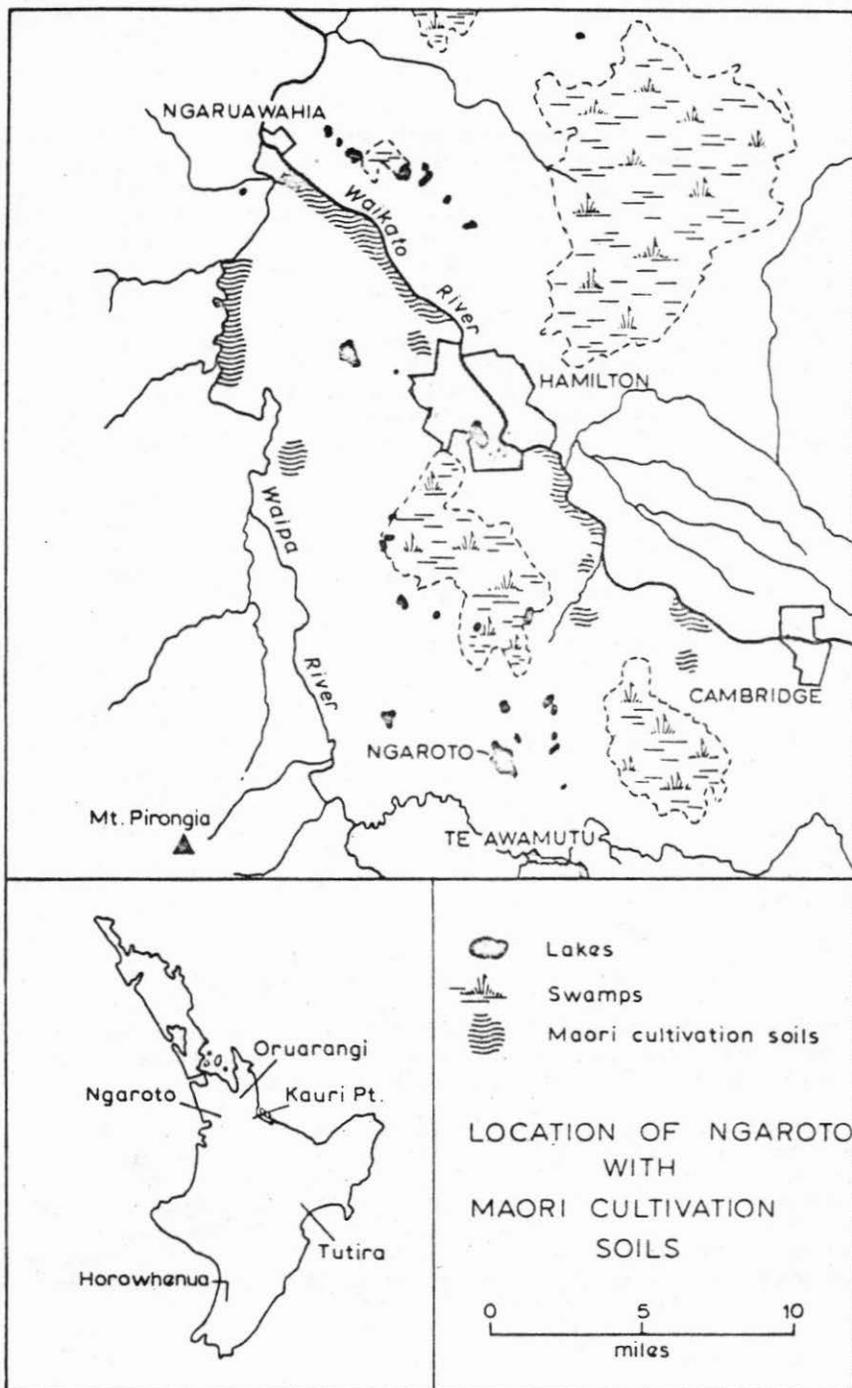


Fig. 1. Map of locality showing Ngaroto, the Hamilton Basin Lakes, the distribution of Maori soils and in inset of the North Island, with areas of other swamp pa.

and fishing gear, often associated with moas and defined by Dr Roger Duff as belonging to the "moa-hunter period", and those equally distinctive but different assemblages which appear to have been characteristic of Maori culture at the time of Captain Cook's explorations (Golson, 1959: 30). When Mr Golson discussed this problem there had been no recent excavation of late sites comparable in control to the already extensive studies of the earlier moa-hunter sites. He was therefore forced to rely on two other major sources, the documentary evidence of early European explorers and the assemblages obtained from several early excavations of sites containing recognizable Maori material. Undoubtedly the foremost of these sites has been that of Oruarangi, an artificial island pa in the Hauraki Plains, whose wealth of well described artefacts helped to bring out very strongly the contrast between early and late assemblages.

There was, however, no evidence in the material for either the relationship of early and late or any time control over the artefacts within the assemblages, that is, it is not possible to tell whether they were formed over a short time or a long one, in which last case they might be expected to show evolutionary patterns. Such control can only be obtained through disciplined archaeological excavation. Appropriately Golson set about examining these problems by initiating the excavation of the Kauri Point site in the northern Bay of Plenty. This is a bank and ditch fortification, set up on the cliffs overlooking the Tauranga Harbour (Golson, 1961: 46). The interim reports on these excavations have considerably increased knowledge of the structural evidence for occupation on such sites, but there has been only the most meagre information on portable artefacts. This dearth has been borne out by subsequent excavations on a number of comparable coastal or inland hill-top pa. However, excavation on the swamp site adjacent to the Kauri Point pa disclosed a very rich assemblage of Classic Maori material, particularly wooden objects which are shown to have been deposited over a span of time comparable to that covered by the different occupations on the dry land site (Shawcross, 1964a: 382). It is also apparent that this is not the normal assemblage of a settlement, but rather the result of some specialized activities and therefore, though a number of important generalizations may be made from the material about Classic Maori culture, the Kauri Point assemblage cannot be treated as the equivalent of the Oruarangi collection obtained under controlled conditions.

For these reasons it is desirable to turn to a site like Oruarangi, more so on the experience gained from the brief investigation of the Paterangi site, a satellite to Oruarangi, investigated by Mr John Terrell and the author (Shawcross and Terrell, 1966). This opened a choice of either investigating one of the remaining Hauraki Plains sites or selecting a comparable site in another area. In spite of the extensive damage which the former sites have suffered, it is evident from the

investigation just noted that sufficient still remains of some to supply very valuable information out of controlled excavations. But the Waikato site was primarily chosen because it belonged to a different region and more especially the different environment of an inland area. (Although Oruarangi and Paterangi are now situated in flat agricultural land some five miles from the sea, it may be supposed that formerly the Firth of Thames was closer to them and that they were connected to it by navigable channels. A point which is supported by the use of very large quantities of marine shells in their construction).

The excavation of the Ngaroto site would thus give the opportunity to investigate the archaeology of an area previously little known, as well as serving as a controlled experiment, on the assumption that it would be analogous to the Hauraki sites, except for a different environmental situation. In addition, the preliminary inspection of the site showed that though it was smaller in area than Oruarangi, its 7,000 sq. metres being about two-thirds of that site, it had a very great depth of stratified deposits; indeed, its continuous succession of man-built floors appear to make it the deepest so stratified site at present known in New Zealand (several early sites such as Motutapu in the Hauraki Gulf and Papatowai in Murihiku are comparably deep, but some of their depth is due to wind-blown sands). This is of importance in two ways, first, such a site is likely to be able to provide a long sequence of occupations and, second, it will preserve the occupation floors relatively undisturbed. This is of particular interest, because much of the effort which has been expended on investigating settlement form in New Zealand has been hampered by the destruction of former occupation surfaces through soil formation, erosion or Maori and recent agricultural activity. On the other hand, where, as at Ngaroto, the floors have been built up, this evidence will be well preserved.

Thus there are some six reasons for selecting this site for investigation. Its evident length of occupation is likely to supply information on Classic Maori culture and also serve as a control in evaluating the Kauri Point swamp assemblage and the Hauraki Plains sites. It will help to form the basis of the prehistory of an area important in Maori culture but hitherto little known archaeologically. Likewise, the choice of an inland environment of lakes and rivers and one also unusually rich in its evidence of agricultural cultivation soils provides a valuable field for economic comparison with the Hauraki Plains and coastal areas. Finally, the manner of formation of the deposits makes it ideal for investigating house structures and their organization within a settlement.

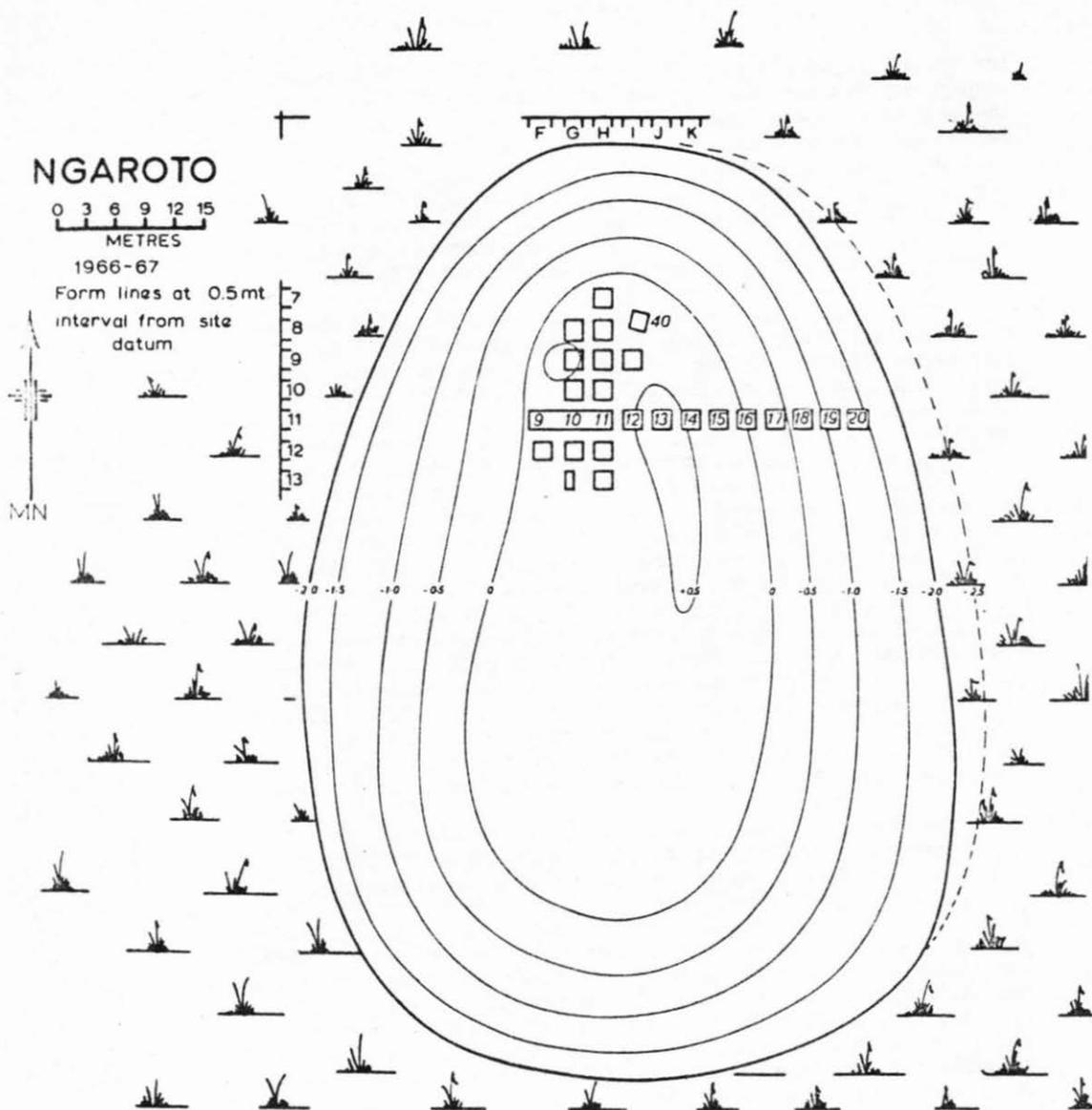


Fig. 2. Plan of Ngaroto sites.

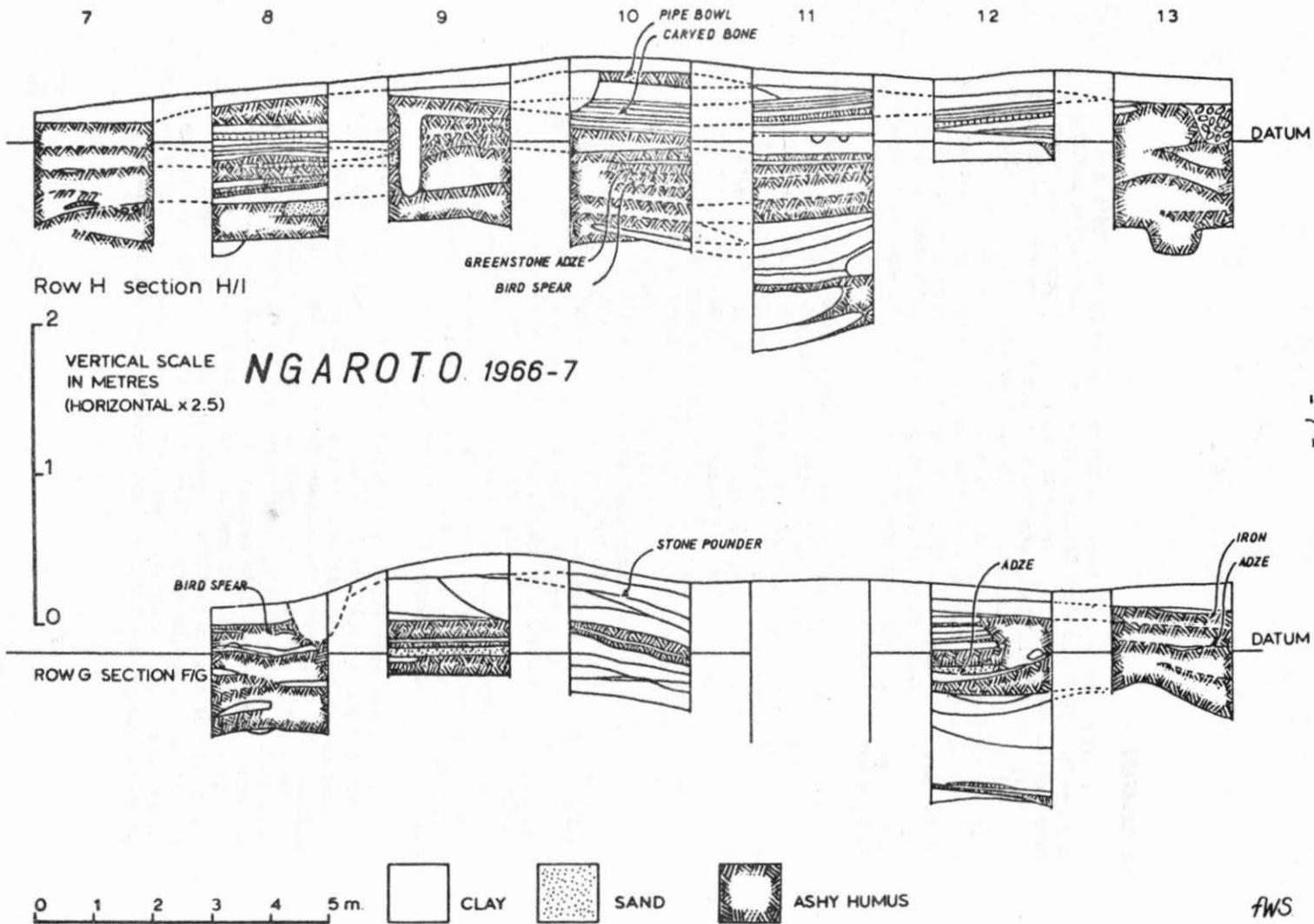


Fig. 3. Sections of Ngaroto site.

## THE EXCAVATION

The main excavations were run between December 2nd 1966 and January 2nd 1967 and were followed by a training excavation lasting four days at Easter 1967. Prior to this, some 10 squares had been opened by the Waikato Group and two of these had been cut down through the full depth of the deposits. It was therefore decided to align the main excavation grid on the already existing cross section and employ the limited working time by extending an area excavation on either side of the cross section. In all, thirteen squares were opened, but none was taken to a great depth at this stage because sufficient sections were already available from the previous excavations and only required to be drawn in detail.

The excavation was controlled by a three metre grid, in which two metre squares were excavated, leaving metre baulks. This gives a slightly greater area coverage than would be obtained without baulks but, more important, the use of baulks made it possible to record the stratification in considerable detail. Inspection of the sections (Fig. 3) will show that the formation of the deposits is extremely complex, and even so a proportion of detail has been omitted in preparing them for publication. Many of the deposits are no more than 2 cms. thick and may consist of clay, sand or a compound ashy substance. Their lateral edges are indistinct and interleave with different materials; they are, in fact, lenses. But, despite their seeming insignificance, these are the most important deposits in the site and it is vital for interpretation that they should be recorded. They cannot only be recorded in plans, partly because their forms are not sufficiently clear. However, the point which needs to be made here is that a system of grids and baulks is the most effective device for controlling and recording such an excavation, and indeed one of the most important activities on this excavation was the drawing of full sections, including those cut in former excavations.

All of the excavation was carried out by hand, using pointing trowels and plasterers' small tools. The aim was to uncover each occupation surface successively in a square, leaving any artefact in situ, and to prepare the surface for a full plan drawing before proceeding with the following deposit. This was inevitably slow, an estimate for the rate of excavation being 0.15 cu. metres a day, but as archaeology is not to be measured in the production of waste but in the discovery of valid information, the rate of work must be a reflection of that objective. There is, however, one aspect in which productivity could be raised, that is the effect of climate on the excavation. At the end of field work it was calculated that one-third of the working hours had been lost through rain, and the general

disruption of work and its effects must have been even more serious. Here a modest outlay on shelter would help to increase productivity considerably.

#### THE DEPOSITS

Lake Ngaroto is formed in a basin of Hamilton clays and Ohaupo silt loam and its shores are bordered by Kaipaki peaty loams. The site stands among the Kaipaki deposits, about 300 metres from the former shore of the lake, clearly shown by the steeply shelving clay. On the 1:31680 scale soil map, the site is marked as an island of Hamilton clay, but its formation is far more complex than this, as the excavations have so far revealed no core of natural deposits. However, in the accompanying paper by Mr Garry Law, a civil engineer, evidence is put forward which indicates that the site was indeed located on a former high point in the lake bed, though the full nature of this has not yet been disclosed by the excavations.

The man-made deposits consist of four types, of which the most obvious are redeposited Hamilton clays as identified in the soil map. These are coloured yellow-red, exhibiting a strong apparent variation in the sections, though this is not so marked when compared against a Munsell soil colour scale, where they range closely round a value of 10 yr 4/4. There is no archaeological significance in these variations, for what are evidently the quarries from which the clays were taken are to be seen as a group of three bare scarps cut into the surrounding clays as close as possible to the site. These sections show all the variation in colour on the site and this is due to the weathering of the parent material. The second kind of deposit is a clean, light coloured (2.5y 6/2) pumice sand. Far less of this material has been used in the construction of the mound and it is mainly found in very thin lenses, of 2 cms or less thickness. Its source is on the opposite shore of the lake, about 500 metres north-east of the site. These first two deposits are archaeologically similar as they both served for the construction of floors and living platforms and both were obtained through quarrying.

The third deposit is quite different and stands out dark in sharp contrast to the clay and sand. It is not however easy to determine its colour value as it is a coarse mixture of several substances. Its chief constituents appear to be particles of charcoal and soil, fragments of shells and burnt oven stones, but it is also consistent throughout the whole investigated area of the site, that is to say, it is always recognizable in spite of its internal variability. This material was also found on the neighbouring mound. It is difficult to tell whether the deposit was deliberately used for building; probably it was, but for a different function. Floor surfaces can be traced with difficulty

through it, but there is little evidence for structures having been formed on it. Its origin is inferred as a man-made material, likely to have been formed as the waste of heating and cooking fires. This would explain the presence of charcoal, oven stones, the fragments of fresh-water mussel shells (Hyridella) and soil particles. But it seems likely that it was redistributed round the site from where it had been formed. Although it originated as a by-product, it seems to have been used in the construction of the site; clearly it would have been labour-saving to use material which was forming on the spot. But another function, though no doubt unintentional, was that it is absorbent and keeps the settlement area free from being waterlogged. This became apparent during the spells of bad weather with heavy rainfall. The excavation camp was pitched on the mound and, apart from a few low-lying hollows, remained remarkably free from water. Experience has shown this to be otherwise on clay soils. This deposit forms approximately half the mass of the entire mound and is clearly significant to the study of the structure and the economy of the settlement. It was called 'ashy humus' during the excavation but it is felt that this name should be replaced by a better one when more is known about the substance.

The final artificial deposit consists of redeposited peat with mixtures of other materials such as shells and wood. This is found at the bottom of the site, overlying the natural base which, in the small section where it is exposed, is a highly organic, compressed, dark brown peat. The redeposition of the upper peat is shown both by its mixture, and by the considerable disturbance evident in the sections. Its origin is obviously immediately at hand and its function must have been as the preliminary basis for the settlement platform. But a question arises over the presence of the timbers. These have been found at the lowest level of several squares where they are seen in the section to belong to the redeposited peat. The horizontal timbers do not seem to have been dressed and lie with their long axes in N.W.-S.E. direction, forming a rough platform. Miss R. M. Bate of the DSIR has pointed out that such rafts of timbers appear to be a natural feature of the Kaipaki peats surrounding many of the lakes in the Waikato basin and they may be explained as stands of timber killed off by a rise in water level. This is not inconsistent with the archaeological observation, for the most likely explanation is that these are timbers found already lying in the swamp when the settlement was formed, and collected to make the foundations of a stabilized platform.

(The information on soils in this section is derived from the 1:31680 scale soil map of Part of Waipa County, compiled by L. I. Grange, N. H. Taylor, and C. F. Sutherland in 1935. The author is also much indebted to Miss R. M. Bate for her stimulating discussion.)

## STRATIFICATION

As was previously observed, the stratification of this site is of the greatest importance and has required very close attention. The three main elements consist of clay platforms of varying thicknesses averaging 20 cms. and often formed of several separate, superimposed clays. Connected with these platforms are thin, laminated floors of clay, sand, or at the extremities, compressed 'ashy humus'. These platforms and floors appear to 'float' on deposits of 'ashy humus'. The relationship can best be seen in the section H/I, where the laminated floors dip towards the centre and are overlaid by a thick platform.

It is clear from such a situation that deposits of the same age are likely to be found at different depths and that, conversely, at any given depth there will be deposits of different ages. Thus, in squares H12 and 13 the deposits immediately below the topsoil are connected to those nearly half a metre below the surface in square 10. Therefore the objectives of the full stratigraphic study will be two-fold; to reconstruct the form of the occupation deposits, and to correlate the floor surfaces.

The sequence is for the present based only on the deep cross-section cut by the Waikato Group, but it is too large and complex to be published here. It shows a succession of clay platforms at various levels and different parts of the site. The basic clay platforms have been alphabetically named, with B the uppermost one to be identified in the section, and lower platforms being named successively. At present the ground surface has been arbitrarily allocated to A, but it seems probable that there is another platform later than B to the north of the section and as yet nothing is known of the larger area to the south.

In this main section some six main platforms have been identified, but, as might be expected, they are not in a strict order and at least two, C and D, were contemporary during part of their use and overlapped. The platforms are associated with sequences of floors and are themselves normally formed of several layers. The total of superimposed floors is shown in the accompanying table.

Platform	A	B	C	D	E	F	G	?	total floors
Floors	?	9	3	5	6	5	4	4+	37+

This is a minimal figure for the number of floor surfaces, and undoubtedly they will be increased by further excavation of the site. One point, however, should be clearly understood. Although the ancient ground surfaces must inevitably have extended over the full area of the site, they were not uniformly built up all over when a new floor was put

down. Both the platform and the floors were quite limited in extent and within and outside them there would be surfaces which remained unaltered during several rejuvenations of adjacent floors.

Part of this process of rejuvenation was on an extremely local scale and consisted in levelling out any small subsidence. This is seen perfectly in a section in square H12, where the fill of a post hole was softer than the surrounding material and formed a depression which no doubt collected water. This depression was filled with several successive clay plugs. Where such a very restricted feature as this has been identified it has been avoided in reconstructing the occupation sequence, but the fact remains that this was the regular process of floor building on a somewhat larger scale and it is difficult to draw a sharp distinction between the magnitudes of these features. Some of the floor laminations were of thin, clean sand and it is inevitable to draw the analogy from a similar process observed in other parts of the Pacific, of spreading a fresh sand floor in a house rather than sweeping the old floor clean.

#### STRUCTURES

The additional structural modifications on the site include heavy timbers placed more or less vertically, post holes and stake holes, circular pits not intended to support posts, and drains, but there are no signs of the rectangular pits which are found on dry land sites and which have formed such a prominent part of archaeological discussion here in recent years.

The surviving heavy timbers are all found in the lower levels of the site and the top of the uppermost is more than a metre below the present surface. All of these timbers are straight and were probably trimmed trunks, about 12 cms. in diameter and have been identified as the Kahikatea or white pine (Podocarpus dacrydoides). Neither their original nor present lengths are known, but they must have been at least two metres long and their upper ends show that they had rotted down to a level about comparable to floor G. They are only found in the main cross section, in the vicinity of squares 11, 12 and 13, and now stand vertically on the east-west plane but are inclined at various angles to the east. On the limited evidence, they must have originally formed part of a broad row of posts oriented in a north-south direction and built at an early stage in the construction of the site. Their inclined angles may have been unintentional, due to pressure and movement exerted by the building up of large masses of earth, such as platform G, behind them, and at this stage it cannot be determined whether they were intended to serve as revetting or defences or some other and unknown function.

Stake and post holes refer here to the marks left in the ground surface by small and large pieces of wood, and now found with a variety of clay or ashy fills. The distinction between them is quite arbitrary, but the frequency distribution diagram based on the diameters of a total of 107 specimens from four floors indicates that there is a sharp increase in numbers below 6 cms. and these have been referred to as stakes.

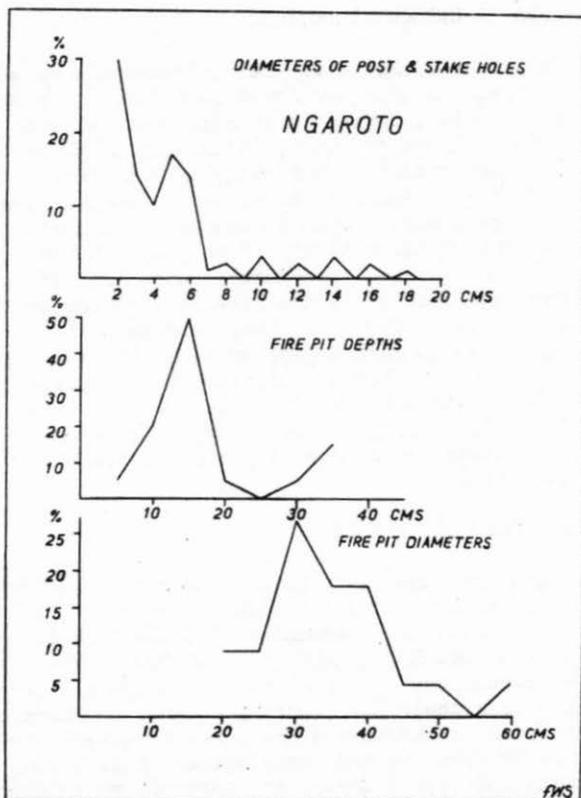


Fig. 4. Diagram showing dimensions of post and stake holes and fire pits.

These holes are most frequently found in the laminated clay floor surfaces and are rarely found in the 'ashy humus' deposits or, strangely, on the thick clay platforms. They vary in frequency up to 170, found in square F12, on a single floor. These holes are of the greatest significance, as they must represent the wooden framed structures on the site and, for this reason, careful attention was paid to their planning and searching for alignments, but in no instance has it been found possible to make any reconstructions from the heavier postholes. On the other hand, two kinds of stake hole alignment are observed.

#### CIRCULAR STRUCTURES OF UNKNOWN FUNCTION

There are two clear examples of these structures, of which the larger and more perfect example was found in G12. It is made of a group of eight stake holes, formed in an oval about 90 cms. long by 70 wide, surrounding a large fire-pit, 60 cms. in diameter. The second group consists of seven stake holes forming an oval 50 cms. long, surrounding a considerably smaller fire-pit. A similar arrangement was discovered on the Ongari excavations in square F135, having a diameter of about 80 cms. only apparently without a fire-pit. However, the upper part of the Ongari deposits had been destroyed so that it is not possible to be certain about the absence of the fire-pit (Shawcross 1966: 57). There is the slight possibility that these represent the kind of small enclosure of sticks used to mark a tapu spot, in these cases presumably ovens. A possible confirmation of this idea is the presence of a quantity of red ochre, filling the stakeholes of the second enclosure. Alternatively, these may represent some undescribed form of cooking device in which a dome-shaped chamber was constructed out of sticks and other vegetable material.

#### LINEAR STRUCTURES, POSSIBLY HOUSES

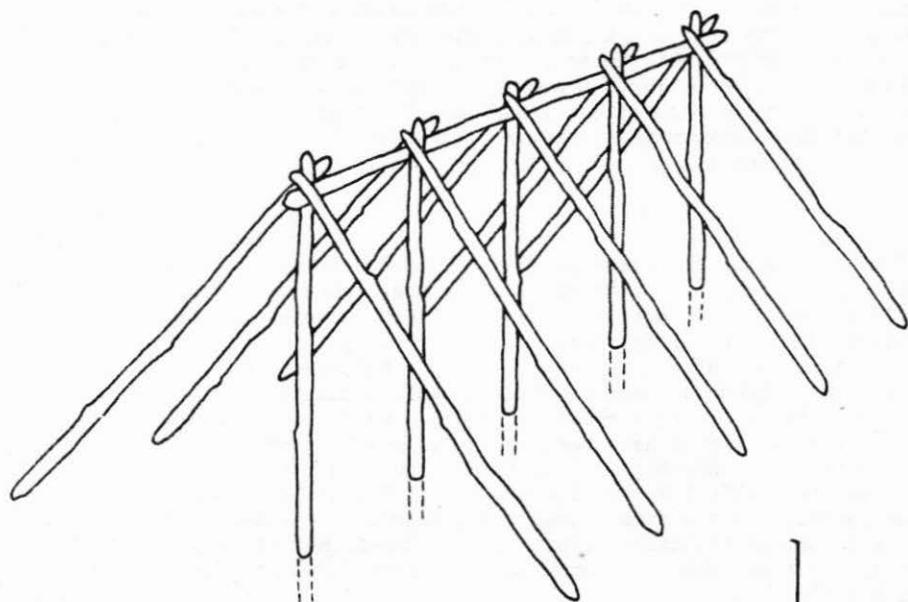
The second, and more important group of light framed structures are single alignments of about five stake holes, spaced evenly some 50 cms. apart. There are at least four examples of these from the present excavation, in squares G8, H9, G9 and F12. Owing to the size of the squares the exact dimensions of these structures are not certain, but they do not extend into their neighbouring squares and careful examination indicates that they are separate and not parts of larger structures, and they would thus be between two and three metres long. They were built out of stakes about 5cms. in diameter and there is no evidence either for more substantial timbers being used in their construction, or for parallel rows of holes. They seem to be associated in three cases with one or more fire-pits but there is no other structural evidence with them except that two have vaguely parallel markings on their clay and ashy humus floors. The Ongari excavation also supplies comparable examples of these linear structures with two in square G135 (Shawcross 1966: 60).

It is evident that these were not substantial structures, because the stakes were light and there were no side or end walls. It may be of some significance to note that these dimensions conform to two measurements employed by the Maori. The distance between the vertical poles corresponds to the tuke(cubit), while the length of the whole structure would be the takoto, the distance between the toes and outstretched fingers of a man lying out on the ground (Best 1924: 131). A single row of posts may be interpreted as a centrally ridged roof without side walls and the close spacing of the posts, which appears so puzzling because it further limits what must already be a constricted space, must have served to support the rafters. Under these conditions the ridge pole would not need to bear heavy loads and would have served rather to give the roof longitudinal rigidity. Such a building would only require fairly light timbers, such as those used to support the ridge and this method of construction evenly distributes the weight of the roof, which must be the most substantial part of the structure. A reconstruction of the framework, without purlins, according to this reasoning, is shown in the accompanying illustration (Fig. 5).

The question of the identification of houses in New Zealand archaeology has become controversial since the recent development of investigations of settlement form here. Field surveys and excavations have disclosed groups of distinctive rectangular pits within pa fortifications and these have been assumed to be houses, but Mr L. M. Groube has detected a number of serious flaws in this assumption. He has strongly argued that the pits more normally served for food storage and that the majority of houses would have been above surface and timber-framed, and it was in order to investigate this problem that he commenced excavations in 1964 on the earliest known planned site of Paeroa in the Bay of Islands (Groube 1964). In the same season the author's own excavations at Ongari showed that the distribution of pits and wooden-framed structures, among which there are at least two comparable to those found at Ngaroto, are mutually exclusive.

These buildings may be provisionally identified as sleeping houses at Ngaroto. They occupy situations showing much use and frequent rebuilding. The evidence for rebuilding includes extra stake holes located slightly off the alignment and with different fills, corresponding in their slight way to the rebuildings observed by Gerhard Bersu on the much more substantial timber building at Little Woodbury in England (Bersu 1939: 82). Furthermore, these structures are associated with the kind of waste such as artefacts, bone, ashes and ochre which might be expected to be found in and round areas of occupation. Finally, as reconstructed, their dimensions correspond closely to the sleeping houses recorded by various explorers and early settlers, to whom attention has been

# NGAROTO



SCALE 1metre

RECONSTRUCTION

fws.

Fig. 5. Reconstruction of light wooden framed buildings.

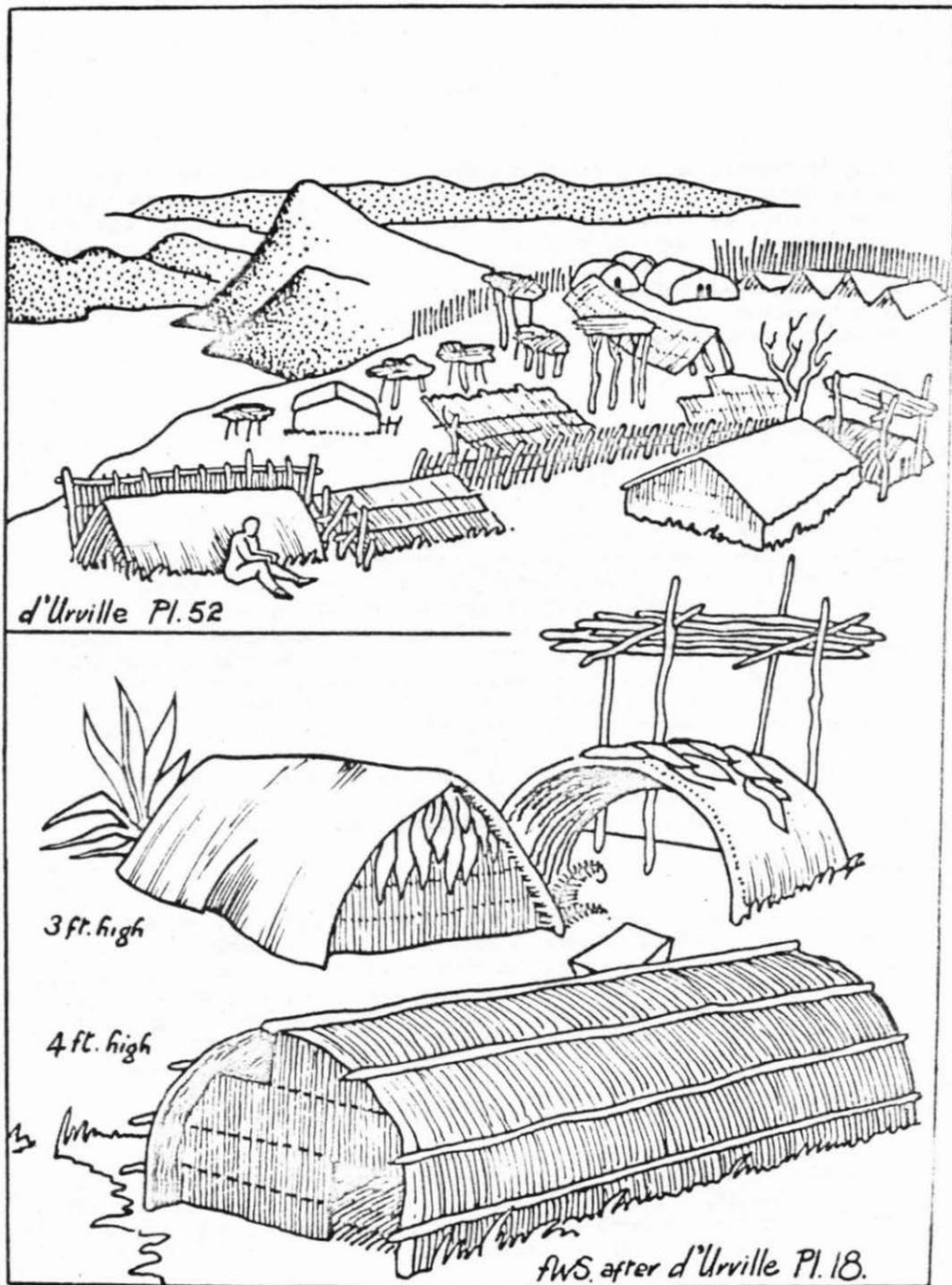


Fig. 6. Copies from d'Urville showing small houses, probably corresponding to those found at Ngaroto.

drawn by Groube, and a particular reference may be cited here to the houses described and illustrated by the French explorer Dumont d'Urville (see Fig. 6), (d'Urville 1833: pl. 18 and 52). Such a house would stand no higher than a man and, by present-day standards, represents extremely cramped conditions, resembling as much as anything a campers' ridge tent. But the thatched roof would give adequate protection against the spells of wet weather, characteristic of this climate, as well as insulation during the frosts of the Waikato basin.

#### FIRE PITTS

Circular, bowl-shaped depressions about 30 cms in diameter and 15 cms. deep (see diagram of frequencies, Fig. 4) are a common feature of the floors. They are found filled with ashy humus, burnt shell, and quite often burnt stones. Some have slightly raised rims and others have previously been noted as being surrounded by stake holes. A few at least must have been within houses and presumably served for heating. But others were most probably outside any shelter and would be for cooking. It is therefore surprising that some of those which seem to have been within houses are found containing stones, suggesting cooking, an activity which ethnographic sources would argue strongly against being carried out in such situations, and which are supposed to have been isolated in a separate area (Buck 1958: 113). There is archaeological evidence for such separation from the Ongari excavations, where an area close against a defensive bank was certainly reserved for earth ovens (Shawcross 1964b: 87). At the very least it looks as if some cooking was carried out at Ngaroto within the general living area or, alternatively, that some of these structures were cooking sheds.

#### DRAINS

Small drainage channels have been found in square H12, where they formed a network joined to several post holes which probably acted as sumps. These channels were cut in clearly defined, compacted floors and were reconstructed on a number of occasions. This square is close to the centre of the mound where rainwater forming on the living platforms would not find such easy runoff as at the edges and drains would be needed to divert such surface water from the house floors.

#### SETTLEMENT FORM

Judging from the sections and plans, the site would have consisted at any time of a number of clay platforms, surrounded by floors on which houses were built. The area of the present excavations almost coincides with one of these platforms and its floors, which are found to form an oval, 18 x 10 metres, with an area of about 150 M.<sup>2</sup> It is not yet

possible to state how many of these platforms would have been in use at a time, or how many houses they carried, but a rough estimate gives the number of platforms as about 20. It is also unlikely that there would have been more than 10 houses on a platform and as the present evidence suggests that the central part was open, with the houses round the circumference, the number was probably smaller.

One interesting point is that the clay platforms must correspond to some unit of social organization, because they represent distinct centres of effort. That is to say, the mound was not built up as a whole, but arose from the growth of separate platforms. Expressed in social terms, this site does not represent the activities of a homogeneous organization of individuals grouped under a single, central authority, because there are no extensive, superimposed building phases, but instead the site grew out of the continuous activities of several separate groups, each concerned with its own living area to which additions and alterations were made when the need arose, but not according to some overall plan for the total site.

#### ARTEFACTS

Previous excavations on the site had produced an interesting assemblage of material, including some three polished stone war clubs of the patu form, a number of greenstone ornaments, stone tops, stone pounders, pumice pots, and perhaps a dozen adzes. The present excavation has amplified and added to this list and has now correlated a number of items with the stratified sequence of occupation floors.

Apart from a few objects such as cartridge cases, which are incorporated in the topsoil and represent recent activities, the assemblage is Maori and can be divided into two on the basis of its entirely indigenous or European influenced elements. In the latter class there are several iron spikes, one of which has been worked into a pot-hook, a broken piece of cast iron from a pot or kettle, a bevelled piece which has been identified as an iron adze (Fig. 7, No. 8), fragments of broken glass and a clay pipe bowl (Fig. 7, No. 9). Those so far found all come from the lattermost deposits on the site and two pieces are shown in the section against their stratigraphic positions.

The indigenous Maori material includes two stone adzes (Fig. 7, Nos. 1 and 3), one of which is a particularly perfect specimen in greenstone; also a small adze-like chisel with a rectangular cross section (Fig. 7, No. 2). A stone pounder (Fig. 7, No. 4) and the broken handle of another comes from the same deposits as the pipe bowl. There are two sandstone rubbers, an almost complete barbed bone point or 'bird spear' (Fig. 7, No. 5) and the tip of a second, two bone needles

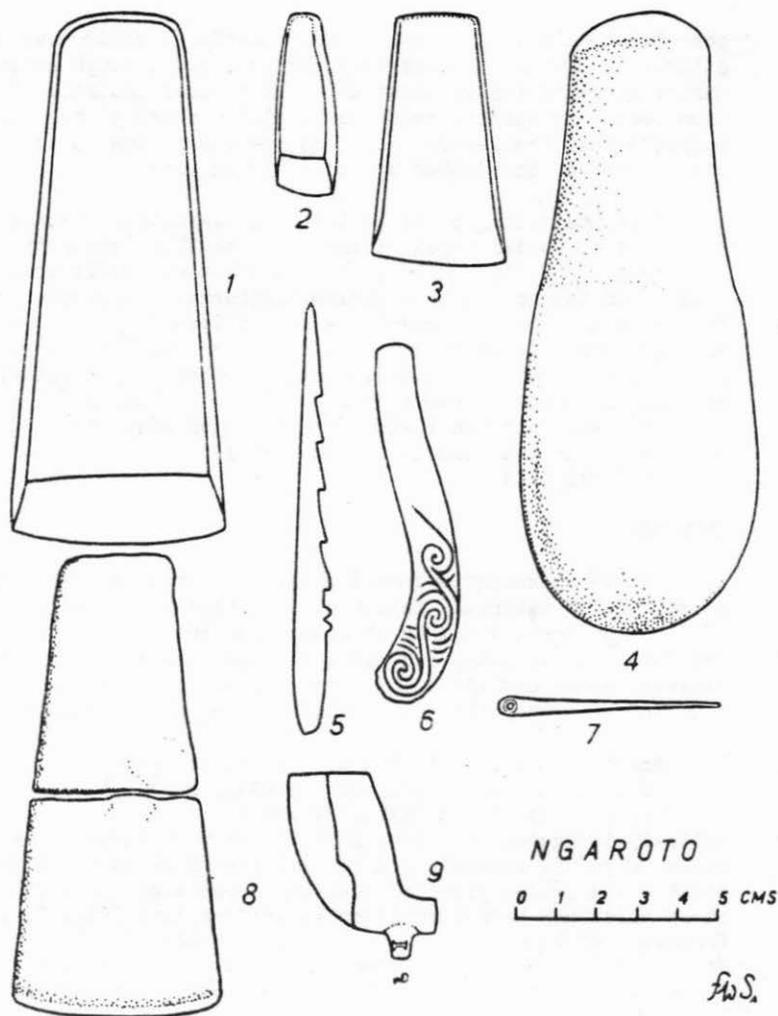


Fig. 7. Artefacts found during current excavations.

(Fig. 7, No. 7) and finally, a unique piece, a human collar bone (clavicle) on which are engraved a number of double spirals in characteristically Maori style (Fig. 7, No. 6): These pieces are plotted on the section. Outside the group of finished artefacts are two pieces of worked bone, one of which is a small segment sawn from a human skull, and there are also two perforated scallop shells and about a hundred stone flakes.

The stratified assemblage is as yet too small to form a basis for more than a generalized archaeological study. In this respect it may be readily compared with the assemblages from the swamp pa of the Hauraki Plains. The adzes, weapons, bird spears, pumice bowls and minor objects such as needles and perforated shells are indistinguishable between the areas. However, the rich fishing gear of the Hauraki sites is not found at Ngaroto. This would not merely represent the difference of the local environment, but also the fact that the occupants of the site were unlikely to have been seasonally engaged in coastal fishing. Other omissions in the Ngaroto assemblage are the musical instruments especially the 'nose flutes' called nguru, and carved bone combs or heru, all of which are well represented in the Hauraki Plains. At least in the case of the ornaments this difference may be a cultural one, reflecting the different treatment of the hair in the two areas. On the other hand, it is difficult to believe that there was no wind music in the Waikato, but the evidence for the manufacture of the flutes at Oruarangi suggests that it was perhaps the making of these instruments which was a locally specialized activity rather than their playing (Fisher 1937: 111), and this would explain an unnaturally large concentration of such instruments.

As General Pitt Rivers explained long ago, unique specimens of art work are often of less use to archaeologists than the common unconsidered objects of everyday life. This is true of the spirally engraved collar bone. Study of a large proportion of the Hauraki Plains material, and a survey of documentary sources, has not so far disclosed a comparable specimen. The significance is probably to be found at a more general level, that is, the use of human bone and its decoration or manufacture into functional objects. There is sufficient satisfactory evidence available to make it quite certain that the Maori did work human bone on occasion (e.g., fishhooks: Hjarno 1967: 33), however, considering the great potential sources of such a useful raw material, one is struck by the severely restricted number of objects so made, as represented in archaeological assemblages. It must therefore be concluded that there was some restraint on the use of human bone and that only strong reasons could justify its working. This applies to the collar bone; it is not a piece of food debris and it certainly did not come by its decoration haphazardly. It is probable therefore that the use of the spiral designs

had some significant meaning to their carver, quite outside the merely decorative application which they have since come to serve. A comparable use of this design may be found in the Kauri Point assemblage of combs (Shawcross 1964a: 388), where it is evident from the unobtrusive use of the element that it was not intended to be purely decorative. In museum collections of woodcarving, some of which material is ascribed back to the time of Captain Cook, the spiral is used very extensively as surface decoration, but when this apparent secularization took place is not clear, and unfortunately this is not the occasion on which to examine the question more thoroughly.

#### FAUNA AND ECONOMY

Under present economic conditions the Ngaroto district is one of New Zealand's most important dairy farming areas (see Descriptive Atlas, ed. McLintock, 1959: 42). However, this has only an indirect bearing on the prehistoric economy. The numerous swamp bordered lakes in the vicinity are still a favoured habitat for waterfowl, though extensive drainage and shooting must have lowered the numbers and there is now a significant proportion of introduced species. The closest area of native bush to Ngaroto is now found on the slopes of Mt Pirongia, some 11 kilometres distant, while the Descriptive Atlas map of pre-European vegetation shows that the local vegetation in former times was scrub and fern (Descriptive Atlas, map 14). These conditions lead to an expectation of the importance of waterfowl and the archaeological search for forest birds as possible evidence for when the destruction of the forest took place.

Two native species of food animal still inhabit the lake, the freshwater mussel (Hyridella menziesi) and the eel, of which there are two species Anguilla dieffenbachii and Anguilla australis schmidtii (Powell 1966: 565). The mussels still exist in some numbers in beds in the lake, while the eels appear to thrive under the present conditions.

No archaeological study has yet been made of the animal remains on the site, but observations during the excavation show that mussel shells are very widespread. They are found either in small pockets of concentrated whole shells or broken and dispersed through the 'ashy humus' deposit. The bones of waterfowl were found in various parts of the excavation and, though never in dense concentrations, seem to have been quite extensive. Presumably the barbed bone points were used on occasion for catching these birds. No evidence for eels has been identified and a preliminary experiment has suggested that the skeleton may not survive. However, a sea fish is quite well represented in the bone material. This is an unidentified species of elasmobranch probably the dogfish or stingray, represented by distinctive vertebral centra.

There are no signs of the teeth of these animals and it is presumed that the flesh was brought to the site dried. The closest sources for these shallow water fish are the Raglan and Kawhia harbours, each about 35 kilometres distant as the crow flies. Alternatively, connection might have been made between Ngaroto and the sea by canoe, but in this case the distance to be covered would be increased to over 130 kilometres. The absence of fishing gear on the site has already been taken as evidence that its occupants had no direct access to sea food resources and consequently the dogfish and a small number of marine shellfish also found on the site must have been obtained through trade.

A few remains of dog, rat and pig have also been found. The pieces are found scattered and fragmentary and do not indicate the eating of large numbers of individuals. Perhaps the most interesting specimens are a number of pig teeth, which are probably deciduous molars, but seem surprisingly large. Pig jaws have been found at Paterangi on the Hauraki Plains (Shawcross and Terrell, 1966) and part of one is in the Otago Museum collection from Oruarangi, obtained by David Teviotdale. The pig would not have been common in the earlier part of the European contact period and indicates a post 1815 date if not later.

An important aspect of the economy, for which there is no direct evidence, is vegetable food. Yet it must have been without doubt the chief edible source of energy in this inland locality. Quite a number of stone pounders have been excavated from the site and it is reasonable to assume that they were used in preparing fern root, previously noted as a significant resource in the environment. In addition, the banks of the Waikato and Waipa rivers show particularly extensive man-made soils (see map, Fig. 1), which must have been created in food crop cultivation. The closest of these artificial soils is a small patch marked some three kilometres to the north-west of the site on the 1:31680 soil map. It is not possible to say how old these soils are, except that they must clearly represent some length of time in their formation and this would probably be too great to be explained by the immense development of agriculture which is recorded as having taken place in the Waikato in the 1850's (Hargreaves 1959: 70).

#### THE AGE OF THE SITE

Discovery of the age and duration of the occupation of the site are primary objectives in this research, but for the present there is only a little indirect evidence. The European material in the uppermost deposits gives some kind of end date for the occupation and it is therefore surprising that there are no obvious European or Maori records for its occupation, yet the artefacts and pigs indicate that this must have lasted perhaps as late as the 1860's, when the area was confiscated.

The question remains how far back into the past such settlement goes. The stratigraphy shows no long breaks in the occupation, which rather appears to have been steady and continuous. Estimates have been made in South West Asian archaeology on the rate of formation of tells, due to the breakdown of mud brick houses: there are no records of how long one of the light structures at Ngaroto would last, but it will be recalled that the patterns of stake holes show that they would have been completely renovated during the course of their use. If a conservatively guessed life expectancy of five years for such a house is made, and this is multiplied by the number of major floors so far observed in the sequence, it will give the best part of two hundred years of occupation. In round figures this makes the date of the beginning of the settlement at about 1650 A.D., coincidentally agreeing with the date proposed by R. C. Green for the commencement of the 'Classic Maori Phase'.

#### CONCLUSION

About 1% of the total area of the site has so far been investigated and these excavations only go down about 1 metre of a maximum depth of 3 metres. In spite of this apparently insignificant proportion investigated, the information is already substantial. The most interesting results undoubtedly lie in the evidence for the nature of settlement, which is seen to consist of a group of separate, contemporaneous clay platforms, each about 150 m.<sup>2</sup> in area. The outer edges of these platforms are made up of many laminated floors on which there are the extensive remains of small, light, wood framed structures identified here as sleeping houses and shown in the reconstruction in Fig. 5. There is not the same intensity of structural evidence found in the central parts of the clay platforms with thicker clay deposits and the function of these areas is puzzling. It is provisionally suggested that these spaces may have served for daily activities such as fern root preparation and also to support above-ground food storage structures. These would be on platforms in such a low lying situation, rather than below ground.

It may be asked how far this evidence, from such a relatively untypical site may be true of the more normal Maori settlement. At the present stage of New Zealand archaeology the published evidence is very scanty and much of the evidence that has been brought to light by excavation might be taken to show a different situation on the dry land. In particular, frequent references have been made to pit houses. It is unimaginable that people lived at Ngaroto in semi-underground conditions and, instead, there is much evidence for light, above surface buildings. Similar structures are also represented in the more normal, dry land site of Ongari but, as they are so indefinite, may easily have been overlooked

in other excavations, where absence of superimposed stratification has left only an indecipherable scatter of post holes. Furthermore, there are the strong arguments put forward by Mr L. M. Groube, both in published and unpublished work, against the over ready interpretation of pits as the normal sleeping houses. Much credit must go to Mr Groube for having warned New Zealand archaeologists away from this undoubted error, and his case has received further support recently from the carefully judged examination by Mr W. Ambrose of the Kauri Point evidence, given at the 1967 Archaeological Conference. These circumstances all support the idea that wooden framed buildings, some of which at least are represented by those found at Ngaroto, were the normal house.

A second point is that the Ngaroto houses were grouped on separate platforms and so seem to reflect a pattern of social organization within the community. This is a pattern which has not hitherto come to light on dry land sites, but this may be explained by the objectives of the other excavations and by the fact that the needs of building on a swamp site have accentuated the evidence.

An important question which is raised by the extensive, stratified deposits of such sites as Ngaroto is the 'type of community patterning', to use the phrase of Beardsley and others (Beardsley and others, 1955: 135). That is, whether the settlement was a 'semi-permanent sedentary' one or 'simple nuclear centred'. This analysis was first applied to the New Zealand situation by Green, who postulated that there was a change-over from 'semi-permanent sedentary' settlements about 1650 A.D. to 'simple nuclear centred' ones in the Auckland Province (Green 1963: 99). With the development of research since 1963 certain of the criteria for this scheme have come under critical examination and recently its evolutionary basis has been challenged by Mr Groube, who has shown that the evidence may equally readily be interpreted as a total inversion of this process (Groube 1967: 19).

There are two serious obstacles to the solution of the community pattern problem. The first is the meaningful definition of terms such as 'semi-permanent sedentariness', which rest on the further definition of such variable factors as 'a period of years' and 'sedentariness' (Beardsley and others, 1955: 140). The second obstacle is the archaeological definition of these factors. The evidence in the ground does not readily resolve itself into an accurate record of how long a group occupied a spot, the size of the group and whether the community seasonally broke up and moved away, and considerable refinements in archaeological study will be required before the identification of such becomes commonplace.

With these qualifications firmly in mind the Ngaroto site may be interpreted as the settlement, of perhaps a hundred or more individuals, occupied continuously over several hundred years. There is no evidence for serious breaks in the sequence but this does not mean that the size of the community remained static throughout the year. Recent work by Mr J. E. Terrell and the author (see Terrell 1967) has shown evidence for the existence of small, seasonal communities; a situation which is acknowledged in ethnographic works and is integral to Mr Groube's argument. No doubt, therefore, the inhabitants of Ngaroto also dispersed for restricted periods, but the site shows such continuity in its main function that its essential permanence cannot be doubted.

If this interpretation is correct, the situation conforms to no single pattern in the Beardsley scheme, but more to a combination of the 'central based wandering' and 'semi-permanent sedentary' patterns, a result which does not invalidate the general usefulness of such a system of analysis, but certainly does require the archaeologist to look at his evidence and use his terminology more critically. Of course, a single incomplete excavation cannot be looked on as a justifiable basis for generalizations about Prehistory, but in the situation of New Zealand archaeology there has been a tendency to construct generalizations on far less substantial evidence.

Turning to the small finds on the site; these have not yet produced such original information. This is due both to the limited scale of the excavations, which have not given a full sequence for a sufficient area, and also because the material in this field is already well known from earlier work. The assemblage closely resembles that from Oruarangi, which has been used as the archaeological type for the North Island Classic Maori, but there are variations which may be explained by environmental and minor cultural differences.

In evaluating the importance of the settlement there is something of a paradox. On the one hand, the structure is large and imposing, representing a great expenditure of labour and intensity of occupation, and may be fairly compared with the tells of South West Asia. On the other hand, there is no record of its importance in historic times, in spite of its evident occupation. The resolution of the paradox must rest on political factors: in historic times there would have been no great chiefs living at Ngaroto, and the important affairs of the Waikato people were in the hands of others. But it may not have always been so, as the massiveness of the site and the presence of traded items such as greenstone, obsidian and sea-foods may suggest.

To conclude, it is clear that further stages of research on this site must be carried out. The area of excavation must be greatly

enlarged, in order to check on the dimensions and distribution of the clay platforms and their associated structures, and a full sequence of the deposits must be obtained. The physiography of the area, particularly the formation of the lake deposits and also the former vegetational history require thorough investigation. Lastly, the archaeology of the whole region deserves investigation from many of the aspects outlined here. Of course this may be said to be equally true for any other area, but the settlement of the interior of the North Island is both a fundamental subject in the study of New Zealand prehistory and also a source of evidence on more general subjects in Anthropology.

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