

City without a state? Urbanisation in pre-European Taamaki-makau-rau (Auckland, New Zealand)

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Introduction

Urbanisation is a world-wide phenomenon, and the purpose of this paper is to discuss archaeological evidence for the development of a pre-European urban centre in New Zealand. Some urbanisation has been spontaneous, developing out of particular local situations, while elsewhere it has resulted from contact with urban cultures through trade or conquest. This paper discusses an indigenous urban development of the Maaori people who have one of the world's most isolated cultures, in a context where any direct influence from other urban cultures is implausible. Although the ultimate ancestry of the Maaori culture, on linguistic grounds, is probably in south China in the second millennium BC, when early urban centres were present there, it cannot be supposed that social institutions had continuity over the intervening years. However, it can be suggested that Maaori urbanisation had its origins in a similar complex agrarian society.

The rarity of archaeological evidence of this kind of initial stage of urbanisation and a lack of a clear theoretical framework for the analysis of urban development make it difficult to compare the New Zealand data with urbanisation elsewhere. However, it is hoped that this chapter will provide relevant comparative information for the discussion of the earliest African towns, established prior to contact with the Asian trade systems with which they were eventually closely associated.

Aotearoa: the land and its people

Aotearoa (New Zealand) was the last major land area to be colonized by humans, probably only 1000 to 1500 years ago. The people came from the islands of east Polynesia (Fig. 1); on linguistic grounds the people of the Cook islands are the nearest relatives of the Maaori (Bellwood 1978; Jennings 1979). The east Polynesian islands were probably originally settled by voyagers from the western Polynesian islands (Samoa and Tonga) perhaps a thousand years earlier. In turn their ancestors probably came from the islands of southeast Asia or coastal southern China about 1500–

1000 BC. Thus the Maaori people were geographically and chronologically remote from the Asian trade systems and urban centres, and any development of urban centres cannot therefore be suspected of being derivative.

The Maaori, like other Polynesians, were a maritime people, dependant on the sea and capable of long-distance exploration and colonisation. According to traditional histories they continued to live in close association with the sea, with the abundance of seafood making it possible to travel widely around New Zealand, as well as back to the islands on some occasions.

The Polynesians were also agriculturists and the Maaori transferred their traditional agriculture to the new country, probably settling first in northern and coastal districts where the climate was relatively good and where good agricultural soil was found (Bulmer 1988; Bulmer 1989). Although these districts approached a sub-tropical climate, the rainfall was much lower than that of their tropical homelands, so adaptation of agricultural methods included selection of the most adaptable crops, seasonal cropping, the development of pit storage for wintering root crops, and the use of natural swamps for gardens.

The impact of Maaori settlement on the environment of their new country was substantial. Large areas of the country were deforested, although much of this cannot be attributed to clearing for agriculture because it occurred in districts with soils or climates that were unsuitable for gardening. The Maaori were also hunters and collectors of the natural resources of the forest and grassland, contributing to the demise of a large numbers of native birds species, including the large flightless moa.

The Maaori generally thrived and by the time of the first European visitors in 1769 their population was estimated to be 100,000 or more (Pool 1977, pp. 40–6). Most of the Maaori lived in the northern half of the North Island, and the densest population was in the few districts with large areas of good agricultural soils (Bulmer 1989). There were also many places with small settlements based on pockets of suitable agricultural soils. Most of the southern South Island was too cold for traditional agriculture, and there a sparse population lived by hunting, fishing, collecting and trading.

Maaori settlements observed in the late eighteenth century by the English expedition of Captain Cook and a few other explorers included a wide variety of sizes, from small beach encampments, small and large villages, to fortified headlands and hill tops, the largest settlements being towns of 400–500 houses (Salmond 1991, pp. 210, 373). These early visitors did not venture far from their ships, and therefore did not see many of the inland settlements. However, the numbers of warriors that visited the ships, usually groups of about 50 or 100 men, suggest that Maaori communities commonly included about 250 people, and that sometimes two communities joined together (Salmond 1991, pp. 137–8). There was also indication of much larger settlements

and confederations of groups in a few districts, such as the Bay of Islands where about 1000 warriors appeared (Salmond 1991, p. 395).

These early visitors' descriptions provide glimpses of a highly sophisticated people who lived in 'a virtually urban culture' (Shawcross 1963, p. 7). This paper describes the archaeological evidence of the large and numerous settlements of one of the most populous districts (Gorby 1970, p. 55), known to the Maaori as Taamaki-makau-rau, 'Taamaki desired by many' (Taua 1988), alluding to its abundant natural resources. According to Maaori tradition, the people of Taamaki were once 'as numerous as sandflies' (Sullivan In Progress).

The most prominent sites of Taamaki are the terraced volcanic cones (Fox 1977; Davidson 1978; Davidson 1984; Bulmer 1987; Bulmer 1994a), around which were extensive fields of walled gardens (Sullivan 1972), and a variety of other kinds of settlement sites. One archaeologist has described this as

... an earlier urban landscape – a collection of towns [that] was in active process of evolution towards greater technical and social complexity and it is probably no exaggeration to call it a city. (Sullivan 1989, p. 1)

There are no European accounts of the Taamaki cone settlements in existence and their understanding thus depends on archaeology and traditional histories. The first European descriptions of Taamaki date to the 1820s, some fifty years later, when the cones were found to be uninhabited. Maaori traditional histories suggest that most of the settlements were abandoned in the mid to late 1760's, the decade prior to the arrival of Captain Cook, and none was occupied by the 1790's (A. Sullivan, *pers. comm.*). The sites are sacred to the Maaori people of today as the settlements of their ancestors, associated with a number of tribes, but the majority with Te Wai o Hua (Taua 1986). While the following study will refer briefly to analyses of some of the traditional evidence, the main task here is to review the contribution archaeology can offer.

Some definitions

Maaori terminology did not distinguish between sizes and complexity of settlements, but rather whether they were fortified, *paa*¹, (Williams 1975, p. 243), or unfortified, *kaalinga* (Williams 1975, p. 81). Both of these terms encompass sites of a variety of sizes and functions. Therefore a group of English terms will be used in the following discussion.

An extensive search of the literature on the archaeology of settlements and urbanisation in other countries indicates that 'hamlet', 'village', 'town' and 'city' are used widely to indicate

¹The italicized words are in Maaori, one of the two official languages of New Zealand.

differences in sizes and functions of communities, but they have no absolute or generally accepted definitions. 'Hamlet' and 'village' are terms used commonly in New Zealand and Polynesian archaeology, but they are not consistently defined, and even very large settlements have generally been referred to as villages. For the purposes of this paper and the discussion of the Taamaki cone sites the following definitions will be used:

Hamlet

A 'hamlet' is a small discrete settlement site, usually a group of terraces, pits and other signs of occupation on a ridge, slope or beach front. These sites include one or a few houses and associated domestic buildings, features and storage structures. The hamlet reflects the extended family household level of socio-political organisation (Green 1993, p. 9). Some hamlets were fortified, but most were not. They were commonly dispersed around garden lands in low density settlements.

Village

A 'village' is a larger settlement site, consisting of a cluster of hamlets, and including community facilities, such as storage structures, guest houses, ritual sites, fortifications and meeting grounds. Villages were 'compact settlements' with their gardens outside the perimeter of the settlement site, some being permanently occupied year round and others being occupied only in winter or during war by people who at other times resided in garden hamlets.

Town

A 'town' is an even larger compact settlement, its site being equivalent in size to a cluster of villages, and having central community facilities as well as the community facilities associated with the village-sized sub-sections.

City

A 'city' is a group of towns and villages in proximity to each other and with a larger capital town. This definition is specifically relevant to the archaeological evidence of Taamaki. Although it is recognised that the use of 'city' in this context will be debated, and some might prefer another term, such as 'town cluster', it is suggested that Taamaki was probably comparable to cities in many other countries in their earliest stages of growth. In any case, there is a need to emphasise that there was a residential and political confederation in Taamaki that was of a larger scale and greater complexity of organisation than the individual towns and villages of which it was comprised.

Urbanisation

The term 'urbanisation' is used here in the general sense as '... the process whereby human beings congregate in relatively large number at one particular spot of the earth's surface' (Mabogunje

1968, p. 35). Research in many countries has shown that such urbanisation has occurred all around the world. In the archaeological sense, urbanisation includes the development of towns, which are larger and more complex settlements than villages.

State

The term 'state' has many definitions, but it will be used below to mean a society that has a centralised and specialised institution of government (Haas 1982, p. 3) on a regional or inter-regional scale (Johnson & Earle 1987, pp. 269–70). Urbanisation and state formation have often been closely associated, and the question of whether urbanisation in Taamaki was accompanied by the development of a state will be briefly introduced because it has been argued that other Polynesian 'chiefdoms' were incipient states (Cordy 1981; Kirch 1984), although they did not develop urban centres.

The cultural landscape of Taamaki-makau-rau

Taamaki-makau-rau was a district with a number of unique or unusual advantages, in particular its extensive volcanic lands, its position nearly surrounded by harbours, and its strategic location in transport and communication. This district was arguably the best in the country for traditional Maaori agriculture (Best 1925, p. 6), being one of the few relatively large areas of soils suitable for traditional agriculture in the favourable climate of the northern part of the country. The Taamaki volcanic district includes about 80 km³ of basaltic fields with red and brown loams, and a similar area of ash soils, dotted with volcanic eruption centres (Fig. 2). Of the more than fifty eruption centres – scoria mounds and cones and tuff explosion craters – twenty-nine were scoria cones that were reshaped by the Maaori into terraced fortified settlements. The basaltic fields were used primarily for gardening, but some settlements were also located there, and the ash soils were probably also cultivated, although little evidence of this remains.

The volcanic lands of Taamaki are not continuous, but occur in twenty-two more-or-less distinct fields, derived from one or a cluster of cones or other eruption centres (Kermode 1993). Outside and between these fields are sedimentary soils, mostly heavy clays unsuited to traditional agriculture that remained forested, probably until relatively recent times (Bulmer 1985). Thus the volcanic cones and their fields comprised a series of relatively discrete islands of agricultural occupation, separated and surrounded by uncultivated countryside.

There were also a number of *paa* and a few small settlement sites on the edges of the adjacent harbours, but the region surrounding the volcanic district was otherwise virtually uninhabited (Bulmer 1987). This is no doubt due to the fact that there was little land suitable for traditional gardening in the vicinity of the volcanic lands. Some harbour edge sites near volcanic

fields were occupied in association with their gardens, but others were seasonally occupied fishing settlements or strategic fortifications for people whose gardens were in other districts.

The pre-human vegetation of Taamaki was mainly mixed podocarp-broadleaf forest (Newnham 1990), and archaeological evidence suggests that this forest remained in the vicinity of the volcanic lands until relatively recent times (Bulmer 1985). It was rich and varied in its resources for hunting and collecting; although the country lacked indigenous land mammals, a large number of species of birds, including the flightless moa, and the introduced Polynesian rat were hunted. The forest also contained a wide variety of useful and edible plants, fruits and nuts. Extensive areas outside the Taamaki volcanic district were also cleared of forest, presumably by Maaori agency; by 1820, when the first European visitors described the area, most of the land was covered in manuka (*Leptospermum scoparium*) and fern scrub, although much of this clearance was on land that was not suitable for agriculture and presumably the result of accidental fires.

Many other districts in northern New Zealand had extensive harbours, but Taamaki was unique in being practically surrounded by water (Fig. 2). The Waitemataa harbour on the north, the Manukau harbour on the south, and the Hauraki gulf to the northeast are referred to as their 'food basket' by Maaori. Fishing, sea mammal and sea bird-hunting and shellfish-collecting supplied not only the local residents but many visitors from other districts. Their resources were, in pre-European times, inexhaustible.

Taamaki was also strategically placed in respect to boat travel and communication, at a cross-roads between major centres of population in Northland and the Waikato river valley to the south. Waitemataa harbour provided boat access to the Hauraki gulf and its islands and to the Pacific Ocean and the east coast of Aotearoa, while the Manukau harbour was a route to the Tasman Sea and the west coast. Travel between the two harbours was accomplished by way of three portages across the narrow isthmus between the Taamaki river and the Manukau, and across the main isthmus along the Whau Creek (Brown 1954). This offered the shortest land distance in the country between the east and west coasts. Further portages crossed northward from the Waitemataa to the Kaipara harbour and southward to the lower Waikato river via the Waiuku inlet and portage.

The volcanic cone settlements of Taamaki

Previous investigation of the cone sites

The volcanic cones of Taamaki (Fig. 2) are a distinctive group of large and complex fortified settlement sites which have been the subject of study by a number of archaeologists, including the author. The present paper is one of a series of discussions of the available information on the

cones (Bulmer 1994a; Bulmer In Preparation) and the issues of urbanisation and the development of social complexity (Bulmer 1994b; Bulmer In Progress).

The amount of information able to be gathered about the original twenty-nine scoria cone sites varies, because all have been damaged to some extent by quarrying and urban development. Four of them are known only through traditional historical references, and from information about their general size, shape and locality, based on geological surveys (Searle 1981; Kermodé 1993). Today only fifteen of the cone sites survive mostly intact, and fragments of nine others also still exist. The mapping of the sites has been carried out through field survey and research into photographs, paintings, maps and survey records. The results to date are detailed maps of 12 of the cone sites and maps of parts of thirteen others. Current work includes a project of mapping one of the largest sites through aerial oblique photography and computer generated contour and feature maps, supplemented by field survey.

Archaeological excavations have been carried out on ten of the sites, beginning in 1954 (Bulmer 1994a), although the results of much of this work is not yet available. This is largely because all of the work has been ‘rescue’ archaeology, mainly carried out by volunteers and inadequately funded, and time and money has not been found to analyse and publish the results. The published reports that have been produced contain much interesting and important information, but so far no large-scale excavation of any of the sites has been carried out. This means that there is much that is not yet understood about these complex and important sites.

The structure of the cone settlement sites

The cone sites consist of levelled platforms on the rims of the craters of the cones or on peaks and promontories, with terracing down their slopes on one or more sides. Some have earthwork defences – ditches and banks – across access routes and crater rims. The site earthworks are in all cases focused on the upper parts of the cones, suggesting that they were chosen as sites for their natural defences, i.e. their generally steep slopes and high elevation above the relatively level lands below.

The terraces are arranged around the cone sites in tiers, mainly on their outer slopes, with unoccupied slope in between. The number of levels in the tiers varies. The smallest, the Motukoorea site, is terraced in three levels, while the largest site, Maungakiekie (Figs 3, 4), has up to seven levels of terraces around the entire complex of cones, from base to summit. The largest series of terraces found so far is on the western side of Maangere, where there are ten terraces in a tier. The social significance of the tiers of terraces is of some interest, possibly reflecting status distinctions, a subject that warrants archaeological investigation.

Archaeological evidence suggests that nearly all terraces were used as sites for houses and associated domestic structures and activities, such as food storage, cooking, and wood- and stone-

working (Bulmer 1994a). However, few terraces have been excavated so far, and there are few surface indications of houses. The main surface features of terraces are depressions from former store pits, and scarps, banks and walls sub-dividing terraces. Only one terrace has so far been found that was used for a garden, the lowest terrace on the northern side of Maungakiekie. Archaeological evidence shows that the extent of use of terraces and their depth of deposit varies a great deal. Some were repeatedly occupied and reconstructed by filling and levelling, with up to 4 m of build-up of fill and deposits, while others have little depth of deposit, suggesting that they had been used briefly on only a few occasions.

While there is at present no way to establish the numbers of houses on the terraces on the cone sites, it has been argued on the basis of historic information from the late eighteenth and early nineteenth centuries (Fox 1983) that each terrace supported the house and other facilities of a single family. However, the variation in size of the terraces, from a few to more than a hundred metres long, and their sub-divisions suggest that this is not a simple equation. There is little surface evidence of houses, as most Maaori houses were made of wood at ground level. The stone edged fireplaces that are commonly used to identify house sites in other districts occur only rarely in Taamaki and the local hearths are generally shallow pits that leave no surface indication. However, terraces are discrete residential units, and further archaeological investigation should make it possible to interpret them more precisely.

There is indication of major sub-divisions of terracing on some sites in the form of strips of unterraced slope and groups of terraces arranged in tiers, that probably related to sub-divisions within the community. Another indication of divisions of residence on the cone sites are the boundary walls that run downhill from the crater rims to the garden land below. These sometimes separate terraces, and sometimes run through them, and their connection with the boundary walls in the fields (see discussion later) suggests subdivisions in residences related to the major land divisions below. Divisions of residences were probably also marked by fence lines that are not now visible on the ground surface, but could be found through excavation.

The selection of the naturally defended steep volcanic cones as sites for settlement, the location of the settlements on the upper parts of the cones, and the presence of fortifications on many of them indicates that they were *paa*. The archaeological evidence from excavations and surveys is that at least nine of the cones were fortified with ditches and banks on their summits and the summits were probably palisaded on the outer edge of the platform. The evidence for palisading on the terraces is conflicting; only four sites have been excavated on terraces, two of which were palisaded and the other two were not. All of the cone sites that have fortifications, have central defences, either summit citadels or encircling defences of the entire site, or both. The three largest cone *paa* have multiple fortifications on separate peaks and promontories, suggesting major sub-divisions within these settlements.

The size of the cone settlements

The cone sites are unusual in being a group of large settlement sites. In order to compare them with each other and with other sites, two measures of size will be used. The first is the site area, that is, the area of earthworks as measured on a site map. All earthworks, terracing, storage pits, other levelling and fortifications are included here in site area, not just the parts of the sites that were fortified. I differ in this from some other archaeologists, who have measured only the fortified sections of sites, or who have calculated the area of level ground in the sites, not their areas. I consider that the space between the level living areas is a part of the settlement structure as well.

The cone sites vary in area from 0.5 to 45 ha, only one being less than 1 ha (1-a). The frequencies of size groups have a skewed 'normal' curve, with most sites being between 1 and 19 ha, and there are three very large sites from 35 to 48 ha in area. Some of the sites have been combined into composite sites on the basis of the archaeological evidence: the cones that are in the same volcanic field and within 2 km of each other have integrated field wall boundaries, exemplified best at Matukurua (Bulmer 1987; A. Sullivan, *pers. comm.*). This is supported by traditional histories that indicate these two cones were occupied by a single group and that other such sites were also similarly parts of combined settlements. With the areas of such related sites combined, the majority of cone settlements were from 10 to 29 ha in area and none was less than 1 ha.

The size of the cone sites was apparently not determined by the size of their cones; most sites were considerably smaller than their cones, although the proportion used varied. In all cases where the cones were not fully terraced the site was on the upper part and the lower slopes were unterraced. This is illustrated in the maps of three settlements on medium sized (10–16 ha) cones (Fig. 5). The smallest site, Motukoorea, occupies only part of its rim and only about 10 per cent of its cone. The site on Te Kopuke covers about half of the cone, while a third site, Puketaapapa, occupies about 90 per cent of its cone. Only one settlement, Maungakiekie, covered its entire complex of cones, and was also the largest site in the district.

Numbers of terraces in the cone settlements

The number of terraces on the cone *paa* can be used as another measure of the size of the settlements (Table 1–b). The twenty-four cone sites that have been mapped in part or whole had from 17 to 170 terraces, although these are of course minimum numbers, due to the incomplete condition of all of the sites.

The numbers of terraces of the sites, when counted as individual settlements, show that the sites varied widely across the size range, with the median number of terraces 50, and only one distinct group of three very large sites. Two very large sites, Maangere and Maungakiekie, have

more than 150 terraces. A third site, Maungawhau, in the 120–9 terrace range, should also be in this largest size group; it has at present fewer surviving terraces due to having been more heavily damaged than the others. Half of the sites have less than 50 terraces. However, with related sites combined, added to the remaining individual sites, three distinct size groups are apparent. The small group includes sites of from 10 to 59 terraces, medium sized sites have from 70 to 119 terraces.

It can be suggested that these size groups may correspond to the settlement size categories defined at the beginning of the paper. The small sites are equivalent to villages and the medium sized and largest sites to towns. None of the sites are small enough to be considered hamlets, i.e. a settlement unit that has one or a few terraces only.

The population of the cone settlements

The large size of the cone sites and their fame in Maaori tradition have led to speculation about the size of their former populations. For example, the geologist von Hochstetter (1867, pp. 243–5) suggested that the district's population would have been twenty to thirty thousand, and that the largest site, Maungawhau, would have held three thousand people. Others have suggested even larger numbers, such as Elsdon Best (1924, p. 47) who thought the largest site might have held four or five thousand people. Archaeologists try to estimate population from a variety of evidence, and the accuracy of this exercise depends on the quality of the evidence (Hassan 1981). Four kinds of evidence have been used by archaeologists to estimate the population of Taamaki cone *paa*: (1) the numbers of terraces and (2) food store pits, (3) the length of defended site periphery, and (4) the storage capacity of pits.

The evidence of numbers of terraces and numbers of food store pits were used to estimate the population on the basis of early historic evidence that each terrace held a single residence, that each family had two food store pits, and that the average family had six adults plus sub-adult children (Fox 1983). It was argued that earlier estimates had exaggerated the size of pre-European Maaori communities.

On the basis of numbers of terraces and pits, the population of four of the cone sites was estimated and compared to examples of other *paa* sites. This study estimated that the smallest of the four cone sites, Te Kopuke, had a population of 102 (using pits) or 198 (using terraces), while the largest, Maungakiekie, had a population of 930 (using pits) or 1074 (using terraces). These figures were based on numbers of adults only and it is suggested here that in order to make the figures comparable to other population studies, the average size of family needs to include the children, for the purposes of this discussion three children per family. This would increase Fox's population estimates by 50 per cent. It was also argued by Fox that because of the damage to the sites, the estimates are perhaps 20 per cent too low.

There are problems with this method. Fox's average family size of nine may be too conservative, for example, the average family may have had 15 to 20 persons (Davidson 1984, p. 150). The numbers of pits are probably less accurate than the numbers of terraces, as many pits have been filled in and are not visible on the ground surface. However, in spite of the difficulties, numbers of terraces seems to be the best indication of residential units available at present.

Other estimations of population of the cone sites have been less satisfactory. Brown's (1954) calculation of the number of people needed to defend the perimeter of some of the sites (45 people per chain, i.e. c. 20 m) has to be discounted because it has been found that perhaps only some of the cones had perimeter defences. Another study estimated the population of Maungakiekie on the basis of the volume of *kuumara* (sweet potato) that could have been stored in the 215 store pits that have been recorded on the site (Hole 1991). The analysis assumed an average depth of pit and that the pits all were used for *kuumara* storage, neither of which can be supported by the available evidence.

The recent mapping and further study of field evidence makes it possible to extend the estimates of population based on numbers of terraces to 24 of the cone settlement sites. Such estimates are offered very cautiously because on present evidence it cannot be established how many of the terraces on particular sites that were occupied at the same time and when. These problems are here stated clearly, suggesting that further archaeological evidence be sought to establish the history of size change and contemporaneity of occupation of the sites.

Using the numbers of terraces now recorded and an average of, say, 15 persons per family, the population of the cone sites would have varied from 255 at Motukoorea, the smallest extant site, to 2550 people at largest, Maungakiekie *paa*. There is a total of 1495 terraces recorded on the 24 Taamaki cone sites so far mapped, all of which are seriously damaged and many terraces have been destroyed, and therefore these are minimum numbers only. However, if all of the terraces now recorded were occupied at once, the city of Taamaki-makau-rau could have had a population of 22,500. It is of considerable interest that the figures produced by this method are not unlike those offered by von Hochstetter in 1864 of 3000 people on the largest sites and 20,000 in the district.

Dating the occupation of the cone settlements

The archaeological evidence from the cones suggests that the settlements, as a group, were continuously or repeatedly occupied over a considerable period of time. Radiocarbon datings have been obtained from thirty-six samples from ten of the cone *paa* (Bulmer 1994a), but the excavations from which they came are unrepresentative and not all were carried out in connection with a research design. The interpretation of the radiocarbon dates will not be considered here in detail, but a few generalisations can be given:

- 1 There is a possibility that the first occupation of Taamaki volcanic cones and nearby sites is relatively early, before the end of the Archaic period (AD 8–900 to 1200).
- 2 The three sites that have a series of dates so far appear to have been occupied for some hundreds of years.
- 3 Dates from two of the sites, Maungataketake and Matukutuururu, suggest that they were occupied in the ‘Period of Expansion and Rapid Change’ (Davidson 1984, pp. 223–4), between AD 1200 and 1500.
- 4 Evidence from nine of the ten sites so far dated suggests that they were all occupied in the ‘Traditional Maaori Period’ (AD 1500 to 1769), and the tenth, Maungakiekie, was no doubt occupied then as well, on the basis of traditional histories that it was the capital town of Taamaki in the 1700s.

Traditional histories refer to some of the cone sites having been occupied relatively early, when some of the colonizing canoes from east Polynesia first arrived (A. Sullivan, *pers. comm.*). These traditions can be tentatively assigned through genealogies to the fourteenth and fifteenth centuries AD. Other traditions that can be associated to the sixteenth, seventeenth and eighteenth centuries have more detailed genealogies, and name all but two of the cone sites as having been occupied some time in that period. Traditions that refer to events and people in the early to mid-eighteenth century suggest that at least Maungakiekie, Maungarei, Te Taatua, Maangere, and Matukurua were occupied during that period and associated with Te Wai o Hua tribe.

The volcanic fields of Taamaki

The volcanic fields that surrounded the cone settlements provide evidence that relates directly to the cones, being the sites of their gardens and of other kinds of settlements. The basaltic fields contained countless stone and earth constructions, a highly visible archaeological landscape. This landscape has been the subject of substantial archaeological investigation (Sullivan 1972; Bulmer 1987; Bulmer 1994a). Although most of the original 8000 ha of basaltic fields in the Taamaki district has now been destroyed by urban development, some fields survived under pastoral farming until the 1980’s. Evidence for the former presence of walled gardens in at least 17 of the 19 basaltic fields has been established through the study of aerial and ground level photographs, maps and field surveys (Sullivan 1972; Veart 1986; Bulmer 1987).

The surviving volcanic fields of Taamaki have been investigated in a series of projects since 1970. The most detailed mapping of any field was done at Matukurua by Agnes Sullivan. Nearly all of the original 500 ha of fields at Matukurua was mapped in detail through low-level aerial

photos and ground survey, and excavations were carried out on a number of selected features (Sullivan 1974; A. Sullivan, *pers. comm.*). Twenty-one other projects of detailed mapping and excavations of volcanic field sites have followed, mostly 'rescue' work, funded by developers in the path of industrial sub-division. In light of the destruction of the field sites, two substantial areas have been set aside for permanent protection. The fields of Taamaki will be discussed briefly here as they provide the evidence for the territories of the individual villages and towns.

Land boundaries

The volcanic land was divided by main boundary walls that extended down from the top of the cone, and outward in a radial fashion toward the perimeter of the volcanic fields surrounding the cone (Sullivan 1972). These walls created a series of linear land units, which were further subdivided by cross and linear walls and alignments. The boundaries also followed the natural contours of the basaltic fields, such as rock ridges, and the resultant garden plots were roughly rectangular, although there were some enclosures with curved walls.

The study of the remnants of the main boundary walls has indicated that they extended to the perimeter of the basaltic fields, up to 1 km from the cones (Sullivan 1972; Bulmer 1983a; Bulmer 1987). At one site, Matukurua, the ends of some of the walls were marked with right angled cross-walls at the perimeter of the field, although other walls continued beyond the volcanic land a short distance further, into swamp gardens. Also, where more than one cone was present in the same field, such as Matukurua, the radiating walls from the two were joined together, in between the cones, in a rectangular pattern. This pattern was probably present in other composite sites as well.

The ash soils associated with the volcanoes were also no doubt used for gardening, but there is little archaeological indication of this, as they did not have surface rock or rock and earth constructions.

The linear land units defined by the boundary walls divided the garden lands into sections with a variety of kinds of terrain, growing conditions and soils. The volcanic fields varied in their depth of soils, aspect to the sun and winds, drainage and many other factors important to gardens. Thus each land holding group, having rights to use one or more of the major land units, had access to a variety of garden land, and had direct access from the perimeter of the fields to the central settlement.

Gardens

Most of the area of the fields was used exclusively for gardens, and included many thousands of stone and earth garden features. There has been relatively less investigation of garden features of the volcanic fields, in parts of only two of the volcanic fields (Bulmer 1983a; Bulmer 1983b; Bulmer 1994a). The rock and earth features include mounds, walls, terraces, stone-faced scarps,

and walled enclosures, and the archaeological evidence suggests that a variety of different crops were grown on and in these features.

The garden features created many kinds of growing conditions which improved soil structure, nutrients, moisture and temperature (Coates 1992). One special form of garden structure, the earth and rock mound, has a capacity for permanent cultivation, year after year. These structures, which varied greatly in the specifics of their construction were able to significantly increase soil temperature and the length of the growing day and growing season, and to retain moisture in periods of low rainfall.

Habitations

There are archaeological features related to habitation in the Taamaki stone fields, but these are relatively few and occur only in certain parts of the fields. Settlements have been found in the fields in three kinds of position: (1) on ridges and terraces (a small number of mid-field occupation and camp sites), (2) on the periphery of the fields, and (3) adjacent to, or near, the cones. The settlements on the periphery of the fields are mainly groups of hamlets that may reflect low density village sites or series of fishing settlements. There is only one small fortified hamlet on the edge of one of the fields. Clusters of hamlets next to a few relatively low gradually sloping cones are probably extensions of the cone settlements rather than separate sites.

A unique settlement area has been found on a plateau about 1 ha in area next to Matukutuuru. Excavations there showed the former presence of a large pole house and associated store pits at one end and large oven pits at the other, with a number of other features elsewhere on the plateau (D. Veart, *pers. comm.*). This appears to be some kind of specialised occupation, possibly accommodation for visitors to feasts or other public occasions associated with the cone settlement.

These settlements have been discussed in greater detail in other articles (Bulmer 1987; Bulmer In Progress), but it is significant here to note that the evidence of habitation in the Taamaki volcanic fields is not widespread and varies in its character. This probably relates to the various kinds of terrain in the volcanic fields, which vary in soil depth and quality, drainage, rockiness, and many other factors affecting its usefulness for gardens or habitation. However, there is also a lack of overall pattern of habitation in the volcanic fields, which contrasts with popular assumptions that there were dispersed hamlets in the gardens or that there was little occupation in the fields at all.

Social and economic change in Taamaki

The archaeological evidence discussed above probably reflects primarily the cone settlements and their fields in their final, largest and most complex, stage of development. On the evidence of

traditional histories this was between about AD 1700 and 1770. However, these sites were the end product of perhaps hundreds of years of development, so it is important to consider what evidence for change has been found so far.

Settlement growth

There is some indication that the cone sites of Taamaki were the product of settlement growth, reflecting an increase in population. The earliest cone settlements may have been small terraced sites on the summits of the cones and they appear to have expanded downhill as they grew larger. The settlements appear to have increased both in size and numbers of terraces. The lack of evidence for dispersed small settlement or equivalent village or town sites in the fields suggests that the settlement growth occurred after the cone sites were first occupied.

A model of site growth can be suggested on the basis of the field and excavated evidence from the sites (Bulmer 1994a). The smallest cone site, on Motukoorea Island (Fig. 5–a), can be suggested as an indication of what the early sites may have looked like. The settlement was village size, as defined at the beginning of this paper. It occupied only part of the rim of the crater, and the entire site was fortified by transverse ditches and banks at both ends and presumably by palisading around the lowest terraces. Te Koopuke (Fig. 5–b) illustrates what such a settlement looked like after it had grown somewhat, probably first replicating itself by building houses and further defences around the crater rim until it was completely covered, and then expanding further downhill by adding terraces, mainly on the outside of the cone. Puketaapapa (Fig. 5–c) and Maungakiekie (Figs 3, 4) illustrate the final stage of this model of settlement growth, with terraces present all around their slopes and nearly to the base of their cones.

This model of site growth is based on stratigraphic evidence at Matutuururu (Wiri Mt), where there were first slope gardens, then a garden wall over the top of the gardens, prior to the construction of a habitation terrace (Sullivan 1975). A lens of shell midden in the early garden soil was presumably derived from habitation further uphill. There is also surface evidence from other cones that has been interpreted as showing similar sequences (Sullivan 1972).

The increase in the number of terraces can be interpreted as an increase in population. The period of time involved (perhaps a few centuries), the scale of the larger settlements, and the lack of extensive occupation in the fields, suggest that the large increase in population may reflect immigration from other districts, not just natural increase of the local communities.

Centralisation of settlement

It appears that the cone settlements were compact settlements throughout their occupation and the analysis of the field evidence indicates that the cone settlements were not seasonally or temporarily occupied *paa*. The lack of evidence for widespread hamlets on the volcanic lands surrounding them suggests that they began as, and continued to be, centralised permanent settlements. This

contrasts with the dispersed hamlet settlement associated with gardens characteristic of many Maaori communities in the eighteenth century (Firth 1929, pp. 111, 166; Groube 1965, p. 53; Davidson 1984, p. 166; Green 1990).

It can be argued that the cones were able to be centralised settlements because of the proximity of large areas of garden land immediately around the settlements. There was ample garden land within a short walk (1–2 km) of all of the cones. It has been argued that the reason for the original establishment of the settlements on the volcanic cones was for defence, situating the settlements on their summits to take advantage of their natural defences. This probably consisted of the gathering together of local communities that previously lived in on the harbour edge and navigable streams adjacent to volcanic land. The people who lived in the cone communities would have continued to travel in summer to ‘resource specific’ camps, for the purpose of fishing, hunting, collecting and obtaining other particular resources, such as rock. This was characteristic of all Maaori communities.

Increasing social complexity

A centralisation of former undefended settlements in the volcanic district would have involved the establishment of community facilities and new forms of cooperation. Particularly the organisation of gardening became a community matter, with the need to establish boundaries for adjacent gardens and community labour for public works.

The increase in community size to a level of towns is a new, even more complex, level of organisation and authority. It required the coordination of labour and allocation of residential and garden territory for the entire community and the construction and shared use of central facilities, such as boundary walls, defences and community food storage. Further, the coordination of major sub-sections of the community would require a new kind of authority.

The understanding of the implications of the above changes can be assisted to some extent by the study of Maaori society at the time of, and immediately after, first European contact in the late eighteenth century. Recent analysis of some of the earliest eyewitness accounts of Maaori culture provides some useful insights, but much of it is interpreted through the bias of the observers and there was little detailed understanding of the significance of their observations. Unfortunately, there developed in the late nineteenth and early twentieth centuries a generalised ahistorical concept of Maaori society (Salmond 1991, p. 432), and this has little to offer in the present discussion. The generalised model has been widely used by archaeologists and anthropologists in general discussions of Polynesian society (such as Cordy 1981; Kirch 1984; Johnson & Earle 1987). Maaori society has invariably been cast in these discussions as one of the least ‘complex’ of Polynesian societies. For example, it has been stated that the largest Maaori polities were ‘simple’ chiefdoms that included no more than 1000 people, prevented from

becoming more complex by a low population density and unproductive agriculture (Johnson & Earle 1987, p. 228).

Needless to say the quality of evidence on which such generalisations are based is poor, and these discussions generally err in incorrectly assuming a uniformity of Maaori society. This study has indicated that Maaori society in some districts exhibited what is probably a high degree of complexity. This general idea was presented at least thirty years ago (Green 1963, p. 39): the 'Classic' Maaori settlements of the period AD 1650 to 1800 included

coalescence of population within a region, so that some now dwelt permanently in large internally differentiated settlements based on a greater complexity of social organisation. ... segmentation and stratification among the major social groups ... recognisable in the archaeological evidence.

While this is not the place to discuss in detail the nature of late eighteenth-century Maaori society, two aspects are of particular interest here: the kinship basis of settlement and the ranked system of leadership. While the system of settlement was segmentary, based primarily on common ancestry, it was not stratified. Hamlets were occupied by *whaanau*, extended families of three or four generations, and *paa* were communal settlements occupied by *hapuu*, a group of *whaanau* related through a common ancestor, each family having a separate section of the *paa*. Groups of *hapuu*, related through descent from common ancestors, were politically, but not residentially, associated to *iwi*, tribes. The different levels of this model were not rigid; a large and prosperous *whaanau* could grow into a *hapuu*, sub-dividing into a number of new *whaanau*, and a large and prosperous *hapuu* would grow into an *iwi* and sub-divide into constituent families (Firth 1929, p. 317). Conversely kin and tribal groups went out of existence or amalgamated in less prosperous times. In terms of this model, the Taamaki towns were originally groups comparable to *hapuu* and grew *in situ* into groups on the level of social complexity of *iwi*. The archaeological evidence suggests large communities comparable to tribes.

In attempting to understand the social change implied by the development of the Taamaki towns, it is also of interest that Maaori leadership was not stratified, but based on rank ascribed through primogeniture and family status (Best 1924, pp. 345–7; Firth 1929, p. 133; Winiata 1967). *Whaanau* were led by *kaumatua*, elders, *hapuu* by *rangatira*, chiefs, and tribes were led by *ariki*, highest status chiefs. In terms of comparable authority, the largest Taamaki towns must have been led by *ariki*.

In the first century after first European contact, there were also *iwi nui*, confederations of tribes, led by *ariki nui*, that could field two or three thousand warriors. It is generally argued that these were a post-contact phenomenon, but the evidence of Taamaki suggests a group of tribal towns coresident in one district at the same time.

Traditional histories support such an interpretation, and they indicate that many of the cone settlements were affiliated to Kiwi Taamaki's eighteenth-century confederation, but do not present a consistent picture of how many sites were occupied at the same time. At least five of the largest cone sites were repeatedly named and appear to have been contemporary (A. Sullivan, *pers. comm.*). The chiefs of these towns were said to have lived at Maungakiekie with the *ariki nui* Kiwi, as well as maintaining residences at the other *paa*. It can be suggested that the confederation of the Taamaki towns is a consequence of their proximity to each other. Either they would have to be under a single authority or at least some of them would have needed to be abandoned, at least during hostilities. The establishment of a regional authority in Taamaki would have been advantageous in enforcing peace and cooperation in the district.

This authority is reflected in the development of the three much larger towns. The location of these three capital towns is dictated by their size and geological position, not by the selection of a central site. None of the three largest cones is geographically central to the cone settlements in general. Maungakiekie, the ultimate capital town is in the centre of the Taamaki isthmus, with more distant access to the harbours than most of the other cone sites. Maungawhau and Maangere may have been earlier capitals of northern and southern districts prior to the establishment of Maungakiekie as overall capital. It is suggested that this reflects the development of an indigenous and uniquely Polynesian kind of city.

Agricultural intensification

The cone settlements were supported by a sophisticated garden system that allowed the cultivation of a wide range of crops (Bulmer 1983a). Sullivan (1975) has suggested a model of change in gardening in Taamaki by which this system was created, beginning with swidden gardens on the volcanic lands, followed by the establishment of slope gardens on the cones, and finally the walled fields surrounding the cones, with intensified agriculture (Sullivan 1985).

The intensification of agriculture is indicated by permanent walled land boundaries, the large scale of the garden units, the abandonment of fallow as a method of soil restoration, and the use of specialised garden structures and techniques. These subjects have been discussed in detail elsewhere (Sullivan 1985; Bulmer 1989), so will not be considered further here, but they indicate the successful adaptation of traditional agriculture and made possible the increase in population in Taamaki.

The demise of Taamaki city

If Captain Cook had visited Taamaki in 1769, he probably would have found a virtually abandoned landscape. The death of Taamaki city occurred, according to traditions, before Cook's first visit and was apparently an indigenous occasion and not a result of European impact.

The world is scattered with the sites of abandoned cities; most cities decline or are destroyed in war (Mabogunje 1968, p. 42). There is no archaeological evidence so far to document the abandonment of the cones, but it is of considerable interest to consider the testimony of the traditional histories and to speculate what evidence further archaeological research might produce.

According to traditional histories, the people of Taamaki abandoned their cone settlements after they were defeated in war and their *ariki* Kiwi was killed, probably in the mid to late 1760's (A. Sullivan, *pers. comm.*). The traditions explain that most of the local population was not killed, but instead people either found refuge with relatives in other districts or stayed to live with the conquerors, as relatives, or, for those that were not related, as slaves. One of the cones, the capital Maungakiekie, was occupied for some decades by the conquerors, but was eventually abandoned in the 1790's, when its inhabitants moved to harbour edge villages.

It is interesting that the volcanic district of Taamaki was not generally reoccupied by Maaori, although particular parts were, and eventually much of the land was acquired in 1840 and later for the new city of Auckland. There are a number of possible explanations for the lack of interest in reoccupying Taamaki. The forest had been cleared from much of the surrounding land, perhaps as recently as the late eighteenth century, and this may have changed the local environmental conditions to the extent that the gardens were no longer viable, or that the settlements were not viable without access to forest resources. There were other significant changes to the Maaori way of life in the late eighteenth century as well, including the cultivation of new European crops for sale and the establishment of European extractive industries, such as sealing and timber. Also there were epidemics of European-introduced diseases that decimated the Taamaki population, even though it was not yet in direct contact with Europeans.

An important factor in the demise of Taamaki city may have been political and military. The death of the *ariki nui* and the dispersal of the group of chiefs he led meant that the confederation died as well. This suggests that the growth of an urban centre in Taamaki was probably not accompanied by the establishment of a system of government or administration that would enable the confederation to perpetuate itself beyond the life of its leader. Taamaki thus had not become a city-state.

Taamaki city in wider perspective

I have so far been primarily concerned with the archaeological evidence of the settlement sites on the volcanic cones of Taamaki, and it is necessary to at least briefly consider whether this development was unique or whether there were similar settlements elsewhere in New Zealand or in other places in Polynesia. It is also of interest to view Taamaki city in a world-wide perspective

as an unusual example of an urban development outside the influence of other urban centres and world trade systems.

Towns and urbanisation in Aotearoa

There does not appear to have been any other district with a comparable development of a group of towns elsewhere in New Zealand. Although there are a few very large sites in other districts, such as a volcanic cone with more than 400 terraces at Pouerua in Northland (Marshall 1987), the settlements with 400 to 500 houses observed by the earliest European visitors to Aotearoa were described as individual sites. The only other district that has a group of relatively large settlements is Motutapu, an island on the periphery of the Taamaki volcanic district (Davidson 1978; Bulmer 1994a). This island has a series of relatively large *paa* around its periphery and a large central terraced town site, as well as hundreds of much smaller dispersed settlements thought to be associated with gardens.

Evidence of Maaori settlement patterns in six other districts in northern New Zealand indicates that three of these districts (Pouerua, Pukepoto and Oruru) had large population centres. These were all in districts that had large areas of land suitable for traditional agriculture. They all had relatively large compact settlement sites, but the arrangement of these in the landscape differs. Two districts had large settlements distributed at intervals along lines of hills, taking advantage of sites on promontories and hilltops with natural defences. The third, Pouerua, had settlement patterns similar to Motutapu, with a central town site, smaller *paa* around the edge of its volcanic field, and hundreds of small dispersed settlements.

Three other districts (Waitakere, Pouto, and Karikari) had scattered small hamlets dispersed in the vicinity of their gardens. They all had small areas of garden land that could support only small populations. In one of these districts, Pouto, some of the hamlets were fortified, and there were three larger regional *paa* in strategic positions. In the other districts with small-scale settlements, Waitakere and Karikari, the scattered hamlets were associated with small citadels, all of which were under 1 ha in size, and occupied only in wartime.

On present evidence it is not clear whether these two variants in size and complexity of Maaori settlement were distinct, or whether they reflect two ends of a continuum. The uncertainty is partly due to a lack of chronological evidence of the occupation and growth of the settlement in most of the districts. Only two districts (Pouto and Pouerua) have archaeological evidence of settlement change, and these had contrasting patterns. Pouto showed a change from a large regional *paa* to dispersed small hamlet *paa*, while the evidence from Pouerua suggests a change from small dispersed settlements to larger centralised settlements.

This evidence makes it clear that in those districts where only a small agricultural population could be supported, settlement organisation was based on a family hamlet level, with

non-residential association on a village level of organisation. In districts with ample garden land, larger centralised settlements developed, including the growth of towns in some places.

Towns and urbanisation in Polynesia

It is of considerable interest that research in Polynesia has shown that large fortified and unfortified settlements developed in a number of island groups earlier than they did in New Zealand, but they were also in existence at the same time as the Maaori fortified towns. Large compact settlements are reportedly rare in Polynesia (Green 1990, p. 29), but they are widespread (Bellwood 1979, pp. 315–17) and their apparent rarity may be due to the state of archaeological research, at least in some island groups.

Archaeological research in Fiji and Samoa has indicated that large fortifications and unfortified settlement sites are widespread (Davidson & Green 1969; Davidson & Green 1974; Jennings, Holmer & Jackmond 1982; Best 1984; Best 1993). There are fortified headlands, hilltops and volcanic cones that are structurally comparable to Maaori *paa*, and it seems likely that such fortifications will be found to be more widespread in other parts of Polynesia. There are also large unfortified settlements, such as the 20 ha chiefly complex on Tongatapu (Bellwood 1978, p. 72), and undefended coastal villages of more than 200 ha in western Samoa (Jennings, Holmer & Jackmond 1982).

The large settlements reflect comparable changes in settlement in these other island groups, including the growth of settlement size, centralisation, and increased settlement complexity. However, only the Samoan undefended settlements appear to be as large as the Maaori examples, and none appears to have developed an urban centre such as Taamaki. However, there are many parts of Polynesia that are virtually unknown archaeologically, and the question remains open.

Most of the attention paid to social complexity in Polynesia has been focused on ‘chiefdoms’, making use of ethnographic and historic evidence to interpret the archaeological remains (Cordy 1981; Kirch 1984). A number of societies, particularly Hawaii and Tonga, have been described as ‘states’, but it has been asserted that no urban centres had developed. This interpretation is too narrow; it is arguable that the development of towns, which are structurally and economically of a higher level of complexity than villages, comprises urbanisation, even if cities possibly did not eventuate other than in Aotearoa. However, the growth of large and densely settled populations is given as one of the dominant factors in the evolution of Polynesian chiefdoms (Kirch 1984).

There are fundamental differences in the analyses of Polynesian chiefdoms that make it difficult to compare Maaori urbanisation and settlement complexity. In particular, the use of ethnographic evidence from historic and traditional sources to interpret the pre-European archaeological evidence means that the archaeological evidence is sometimes not analysed in its

own right. It is argued that Polynesian chiefdoms were characterised by stratified grades of chiefs, the separation of chiefs from their kinship base and the commoner class, the taxation of commoners to support the chiefly classes, and economic specialisation of the classes. The archaeological evidence offered in support of this socio-political complexity includes an increase in territorial size, stratified kinds of religious structures, houses, and burials (Cordy 1981). It is argued that urbanisation did not develop and contrasting archaeological evidence, such as towns reported by visitors, are explained as conglomerations of individual settlements around the residences of important people.

While it has been generally recognised that different Polynesian societies developed distinctively different kinds of chiefdoms, there has been a general assumption that development was unilineal, with Hawaii becoming the most complex, an incipient state. However, the evolution of Maaori society does not fit with that unilineal model, and it is interesting to consider that the Maaori probably had the largest and most complex settlements in Polynesia.

A world perspective

Settlement size

A study of the size of settlements and their growth into non-industrial cities (Fletcher 1986) suggests that there are world-wide patterns of settlement size and growth that are not dependant on particular cultures. These are thought to instead relate to constraints in the frequency and the effectiveness of communication within settlements, the size of which are related to their economic condition. It is suggested that communities stabilise in three general size groups: (1) mobile and semi-mobile agricultural communities that are the smallest group of settlements, ranging in size from 0.1 to 1.5 ha, (2) sedentary communities that are larger, ranging from 10 to 150 ha, and (3) the largest settlements, non-industrial urban centres, that range from 10 km² to 150 km².

The archaeological evidence of the settlements in Taamaki and to other Maaori settlement patterns, apparent in six other northern districts referred to above, are to some extent comparable to these suggested world-wide patterns of settlement size. The widespread traditional Maaori settlement pattern associated with semi-mobile extended family hamlets is similar to the semi-mobile settlement type proposed by Fletcher (1986), with nearly all settlements less than 1 ha. Only some districts, those with ample garden land, illustrated sedentary settlement sizes, with nearly all settlements being less than 10 ha, but ranging up to 48 ha (Best 1927; Davidson 1987). Taamaki city, in a district of about 160 km², is a similar size to pre-industrial urban centres elsewhere.

According to Fletcher's studies, in a condition of stability of settlement size, each of these size ranges has a similar pattern of relatively frequency of size groups. The great majority of settlements are small, medium size settlements are common, large sites are rare, and very large

sites very rare. According to Fletcher's analysis, each settlement size range stabilises for long periods and then changes. Settlements grow larger, from one size range to the next, and the stage of growth is indicated by the relative distribution of sites of different sizes within the size range. During the process of growth, small sized sites become less common and larger sites become more common. It is of interest that half of the Taamaki cone *paa* are medium-sized (Table 1), suggesting that the settlement system was in the process of rapid change from a group of sedentary settlements to an urban centre.

There are other constraints to settlement growth considered in this paper. It has been pointed out that the districts in northern New Zealand that had small scale settlements had small areas of garden lands. For social or political reasons the residents had chosen to live in these areas, and in order to increase their group size they would have had to move to another more productive territory.

Other constraints to group size were discussed by Forge (1972) in explanation of the small scale settlements in the New Guinea area. Earlier discussions had emphasized that ecological limitations of group territories had served to limit group size, while pressure of war encouraged an increase in group size. Forge found that in egalitarian communities that had only 'big men' of non-hereditary status as leaders, the size of settlements was constrained by the number of adult men (35–80) who could effectively work in a face-to-face group. Forge (1972, p. 372) extended the argument to neolithic cultivators without hierarchical institutions, and suggested that the basic residential unit is from 150–350 people, depending on the wealth and resources of the groups. Thus the basic agricultural settlement unit is 250 ± 100 . This can be compared to Salmond's (1991, pp. 137–8) suggestion that many Maaori settlements in the late eighteenth century had about 250 people. This is a similar group size found in the analysis of the small settlements in some districts in New Zealand, discussed above.

The correlates of city growth

There is a growing academic interest in the study of the earliest stages of urbanisation. It has been found that many of the factors, such as a written language, metallurgy, or the presence of non-agricultural specialists, that have generally been thought to have been essential to cities (Sjoberg 1960; Trigger 1972) may not have been present in their earliest settlements. Some urban centres had beginnings outside the areas of writing and metallurgy, and they had a variety of economic bases, including agriculture. Possibly most cities had their earliest origins in an agricultural centre, and it is argued in relation to African urbanisation that elite power was typically first acquired by control of land of unusually high productivity (Connah 1987). Cities generally develop in positions of clear environmental advantage, supporting the increase in size of political units, and consequently the need to defend them. This was characteristic of Taamaki, where a very large district of high quality land was present in a highly strategic position.

Another important component of African urbanisation was trade, particularly of copper, iron and salt, and this eventually enabled the exploitation of long distance international trade systems (Connah 1987; Sinclair, Shaw & Andah 1993). The strategic location of the urban centres in respect to trade was an important part of their elites' acquisition and maintenance of power. This was characteristic of the development of coastal city states in southeast Asia, although there were also inland cities that developed as religious, rather than trade, centres (Reed 1976, p. 19). Although Taamaki city was situated on the cross-roads of travel and communication in northern Aotearoa, commercial trade did not develop there, as Maaori exchange of goods was based on gifts. Most importantly, Maaori exchange of valuables was restricted to the realm of Aotearoa, and never was part of a system of international trade, being relatively isolated in the southern Pacific.

The development of the political elites and state structure has generally been the socio-political accompaniment of urbanisation:

over the past four millennia, communal societies were repeatedly transformed from within under conditions of population growth, subsistence intensification, decreased mobility, technological reorganization, and labour mobilization.

(Nassaney 1992, p. 132)

While the study of the Taamaki settlements is still in its early stages, there seems little cause to argue that it was an incipient state, even though urbanisation is thought to be typical of an early stage of the development of 'pristine' states (Price 1978, p. 180). 'Pristine' states are those that are genuinely indigenous developments, in contrast to 'secondary' states, which develop in response to the influence of existing states and often do not exhibit urbanisation (Price 1978, p. 176).

Summary

This chapter has discussed an example of indigenous urbanisation from its archaeological reflection, and attempted to briefly compare this evidence with urbanisation elsewhere, in other districts of New Zealand, in Polynesia, and outside of the Pacific area. It is suggested that urbanisation is not necessarily accompanied by the development of specialisation or reorganisation of the means of production, or by the development of non-kin based political or military control. In the case of Taamaki-makau-rau, the urban centre was a development of a new level of socio-political complexity, based on wealth derived from traditional agriculture, a strategic position in transport and communication between districts, and the proximity of a group of prosperous towns.

The volcanic cone settlements probably began as small centralised settlements on the summits of the cones, located there for defensive reasons, possibly by about AD 1200. They grew in size and prosperity over hundreds of years, based on the development of intensive agriculture on the extensive volcanic lands surrounding the cones. By the early eighteenth century, when they were united in a political confederation under a paramount chief, they probably reached their maximum size, .

Taamaki-makau-rau was not part of a formal trade system, but was in communication with other districts through a network of tribal kinship. Many other districts maintained dispersed small scale settlements based on restricted garden lands, while a few others better endowed with land developed central towns. Similar towns developed in some other parts of Polynesia, and are said to have centred around important leaders' residences or religious centres. However, no other centre such as Taamaki has so far been reported, and it appears to have been unique. Taamaki-makau-rau suggests a higher level of residential complexity and organisation than has previously been found in the Pacific, although it compares to incipient cities and states in many other parts of the world.

These issues are tantalising, and this paper is hopefully only the beginning of the study of urbanisation in Taamaki-makau-rau. It is hoped that it will contribute to the study of the beginnings of urbanisation in general and of urbanisation in Polynesia in particular, and the re-examination of the relationship between social complexity and settlement patterns.

Acknowledgements

I would like to express my gratitude to: SAREC, for holding the Mombasa Conference – the culmination of its research programme on urbanisation in east Africa – and making it possible for me to attend, and for inspiring the writing of this paper; the many archaeologists whose work on Auckland sites are referred to. Because Auckland archaeology has hundreds of references, I have cited my review papers whenever possible, but their advice and information is here acknowledged with thanks; Sally Maingay for preparing the illustrations; Janet Davidson, Joan Maingay, Agnes Sullivan and Bruce McFadgen, for reading and helpfully commenting on an earlier draft of this paper. However, any errors of fact or dubious opinions that remain are my own responsibility.

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Captions for Illustrations.

Fig. 1. Map of the distribution of Austronesian languages, showing the location of New Zealand and Taamaki-makau-rau (after Jennings 1979, Fig. 1.3).

Fig. 2. Taamaki-makau-rau. The map shows the location of the volcanic fields and cones.

Fig. 3. Archaeological map of Maungakiekie, the capital of pre-European Taamaki.

Fig. 4. Maungakiekie from the southeast (Photo: Whites Aviation).

Fig. 5. Archaeological maps of three of the Taamaki cone *paa*, showing differences in site size.

(a) Motukoorea

(b) Te Kopuke

(c) Puketaapapa

Table 1. Measures of the size of the volcanic cone *paa* of Taamaki-makau-rau.

(a) Area of terracing

Single sites (n=25)

With associated sites* (n=17)

(b) Numbers of terraces

Single sites (n=24)

With associated sites (n=18)

* Associated sites are two or more cones in the same volcanic field and within 2 km of each other.