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# THE BURDEN OF DEFENCE IN PREHISTORIC NEW ZEALAND

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The large numbers of pa that have been identified to date have implications for any explanation of what happened in New Zealand in the late prehistoric period. Davidson (1984: 181) has noted that "the threat of warfare permeated all aspects of Maori life in the late eighteenth century. Enormous effort was invested in the building of fortifications." Recent revisions of the chronology of pa construction have served to underline the effort invested by reducing the period of pa building to a comparatively short 350 years at most.

This paper briefly reviews the nature of warfare, the role of fortifications, and models of pa-building and population growth. Pa construction is only the most visible archaeological indication of the burden of defence. Behind it stands a range of activities, such as making weapons or training for combat, which are archaeologically either less visible or entirely invisible.

## **The Scale of Pa-building**

### *Number and distribution*

There is currently some 6500 recorded pa in New Zealand. Over 97% are north of a line drawn through the North Island at around Latitude 40°05' S (refer to map in *Archaeology in New Zealand* 43(1):18, 2000 or <http://nzarchaeology.org/recording.htm>).

### *Chronology*

Recent studies (Schmidt 1992, 1996; McFadgen and others 1994) indicate pa construction belongs to a period of about 350 years from between about 1500 and 1850 AD.

## Warfare, weapons, and fortifications

### *Warfare*

In late prehistoric New Zealand warfare was endemic and force of arms was the ultimate arbiter of disputes (Ballara 1976). The forces engaged in warfare were, however, generally small (Vayda 1970). Rev. Richard Taylor (Journal 6 October 1847) noted that "a chief might raise 20 or even forty men for a taua [but] a great chief as Te Heuheu might raise 200." The most common form of warfare in late prehistoric times was small-scale raids aimed at capturing or destroying resources and killing the enemy. Adult male captives were usually killed, and neither age nor sex was any guarantee of survival. Warriors and fortifications were essential to the survival of communities.

Oral traditions confirm the significance of fortified places in the pattern of warfare. Warfare was not a minor distraction in the lives of chiefs and their followers: their role as warriors was central to their lives and their mana. The hope of material gain was probably also a factor in promoting warfare. War was a central preoccupation and its effects flowed through into every area of life, including social organisation and ideology. No model of late New Zealand prehistory can ignore the central importance of warfare.

The symbolic importance of fortified places (Barber 1996), whether related to either group-identity or status, does not diminish the significance of their defensive function. The desire for prestige complements, and does not preclude, defensive purposes (Keeley 1996: 57; Chapman 1999: 107). Symbolic importance can be overemphasised at the expense of the defensive function. A show of strength has always been used to help discourage attacks.

It is important to note that always having to be ready to fight is not the same thing as always fighting (Vayda 1970: 83). Measures taken for protection against attack would have imposed an on-going burden on groups beyond that imposed by any actual involvement in warfare and, as is the case with many fortifications worldwide, probably many more pa were built than were ever attacked.

### *Weapons*

Until the advent of the musket, all attacks on strongholds were dominated by hand to hand fighting. Thrown weapons such as stones, darts, and spears (Salmond 1991: 414-422) had a very limited effective range (not much more than 25 m). Their inaccuracy restricted their usefulness to a limited set of circumstances such as when attackers were rushing the defences *en masse* thus creating a larger target for thrown weapons at a close range. If the attackers

could be channeled into a small area by defensive structures, they would be more vulnerable because they were crowded, and would be less able to defend themselves against thrown weapons and the thrust of long spears. In hand-to-hand fighting advantages of height and reach are extremely important. Fortifications tilt the odds heavily in favour of the defender. The best hope of success for the attacker usually lay in surprise, in exploiting complacency, or in treachery.

With the advent of muskets, men on the fighting-platforms, previously nearly invulnerable, were exposed. This was clearly demonstrated by the French during their attack on Paeroa Pa in the Bay of Islands on 14 June, 1772 (Salmond 1991: 399).



*Figure 1. Te Ruaki pa (Q21/5), South Taranaki. The pa (upper right) has later been extended to enclose a large area of sloping ground (lower left). A regional stronghold, Te Ruaki was attacked and taken by the Waikato in the 1830s. Photographer: K.L. Jones, DoC.*

### *Fortifications*

A stoutly defended and well-provisioned stronghold was extremely difficult to take. Physical obstacles such as scarps, ditches and banks, and palisades formed

the perimeter. A perimeter was, however, only as strong as the weakest point and one of the fundamental principles of tactics is to “never rely for security on your first line of defence” (Saunders 1989: 189). Outer walls set around inner ones, the division of the interior into separate compartments, and the presence of an inner stronghold (citadel) added depth to the defense. A citadel is a self-contained fortress, usually within or adjacent to a stronghold, intended as a place of last resort. The various defensive elements provided means for delaying, breaking up, or halting an attack. All these defensive arrangements are evident in pa.

A solid defence does not necessitate shoulder to shoulder manning of the entire perimeter. It is the points of attack that need to be defended, not the whole length. The important thing is to “get there first with the most men.” Unless caught by surprise, defenders could always move men more quickly to any point around the perimeter than their assailants, that is the defenders hold the interior lines.



*Figure 2. Raho Ruru pa (S27/26), Wairarapa. The site has a length of lateral and transverse ditch (centre), with traces of palisade holes behind, and a second section of transverse ditch (lower left). There are raised rim pits both within and without the defences. Photographer: K.L. Jones, DoC.*

Small fortifications are generally more vulnerable than large and the existence of larger pa probably reflects the pragmatic concern of small groups with collective security against large-scale raids. The combination of a concentration of force and availability of larger fortifications would provide adequate protection against most eventualities.

Fortifications protect not only the people and facilities within their perimeter but also provide a base from which defenders may impose control over the surrounding area. Although archaeologists sometimes identify possible weaknesses in the defences of pa, such assessments are usually based on current surface evidence. Palisades, in particular, are often archaeologically invisible at the ground surface. Current surface traces may not be a good guide to the prehistoric reality.

### **The 'Cost' of Building and Maintaining Fortifications**

Fortifications require large inputs of labour to build. Pa building required a greater labour input than any other form of construction undertaken in prehistoric New Zealand (Davidson 1984: 184). An eighteenth-century observer noted that the erection of strongholds "must cost them immense labour considering the tools they have to work with are only made of wood & stone" (Beaglehole 1968: 200). Most pa were probably built or re-built in relatively intense bursts of effort. The extent of the work required would have varied enormously from site to site. There were at least two options available to groups who lacked resources: they can make do with less, or make what they already had last longer. Fortifications required constant maintenance as ditches filled in, banks crumbled away, and palisades fell and rotted. An existing work could, however, be refurbished in times of threat with less effort than building a new one. The extent of re-building of pa in prehistory is largely unascertainable but it is well attested in historical records of the early 19<sup>th</sup> century and several excavated sites have produced long and complicated histories that may indicate periodic refurbishment of the defences.

Pa were chosen to give the greatest possible security but considerations of location and access to resources were also important and the choice of a site must often have represented a compromise among the requirement for defence, the topography of the site selected, and the time and labour available.

### **Models of Pa-building and Population Growth**

#### *Growth of population*

Most models of New Zealand prehistory require a rapid increase in population in the early and middle part of the sequence (Groube 1970: 141; Davidson 1984:

57; McGlone and others 1994: 158; McFadgen and others 1994: 230; Houghton 1996: 189-191). The key variables are:

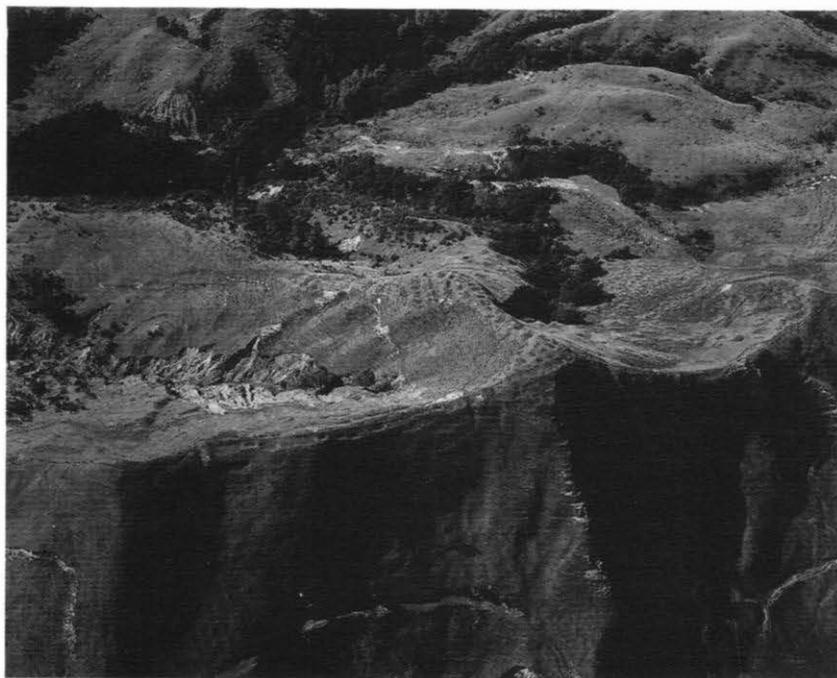
- the date of first settlement,
- the size of the founding group,
- the size of population at the end of prehistory, and
- mean annual population growth.

Slight changes in the assumptions made can produce different results but a period of rapid population growth in the early and middle of the prehistoric sequence is unavoidable given best guess constraints on time available and population size at the end of prehistory.



*Figure 3. Pa (W15/109), Eastern Bay of Plenty. The site has a well-defined length of lateral and transverse ditch (centre), with a subdued section of ditch and bank (centre left) cutting off the headland. Photographer: K.L. Jones, DoC*

Recent studies of radiocarbon dates (Anderson 1991; McFadgen *et al.* 1994; Higham & Hogg 1997) suggest that New Zealand was settled in about the 13th century. Houghton (1996: 189-191) adopts a date of settlement of about AD 1200 and notes that, with an initial group of 14 people (genetic evidence now indicates a considerably larger group was involved) and an annual growth rate of 1.6%, the population would reach 100,000 in 550 years. Larger initial populations, shorter periods of time, and slower growth rates would produce the same outcome. Houghton (1996: 89-191) concludes that a short settlement time is compatible with a small founding group and that population size at contact is not crucial: a couple of decades could easily take it from the lower to the higher end of the likely range of figures.



*Figure 4. Pa (Z15/128), East Coast. Situated on a ridge-peak and adjacent ridgelines, only short lengths of ditch and banks were required to defend the pa. There is an outer trace lower left and two further defensive lines just left of ridge peak. Extensive levelling of the ridge-top and the upper slopes is evident and much of the available space is utilised for pits. Photographer: K.L. Jones, DoC.*

If 6500 pa were built in the 350 year period between 1500-1850 AD, then on average 18 new pa were built every year. If it is assumed, however, that the number of pa being built reflected the growth of population then the rate of pa building may have increased dramatically in the seventeenth and eighteenth centuries.

### **The Burden of Defence**

A group had to be large enough to gather all necessary resources, often requiring dispersion on a temporary basis, but with the necessity to also be able to defend themselves against intruders. Defence was a potentially large, and probably anticipated, call on labour. Effort put into defence, however, is effort not put into economic activities. Successful wars were, however, profitable. Material gain is often overlooked as a motive for war but, for a larger group attacking a smaller neighbour, warfare offered the prospect of plunder and future control of access to prized resources. Smaller communities were protected to some extent by the tactical advantage of defence over attack, and by alliances between groups. Considerations of balance of power meant that, as Minogue (2000: 54) notes, "neighbours are commonly enemies, while neighbours-but-one are allies."

The requirements of defence have made a large call on resources of most communities around the world throughout history. The history of Europe has plausibly been summed up as "preparing for war, waging war, or recovering from war" (Minogue 2000: 49). Today the burden of defence is usually stated in terms of defence expenditure as a percentage of Gross Domestic Product or Gross National Product (Pugh 1986). In the early 1980s defence expenditure world wide was generally very low - around 2% of GDP for New Zealand (it has since gone lower still), but much higher for USA - around 6% - and higher still for countries such as South Korea. In times of war the figures can go very high. A basis for comparison is that ultimately all costs are labour costs. It has been estimated, for example, that "in the half century of the Hannibalic and Macedonian wars, ten per cent and often more of all adult Italian males were at war year by year, a ratio that rose during the wars of the first century [B.C.] to one in every three males" (Finlay 2000: 68). The United Kingdom experience in two world wars showed that burden of defence could reach staggering levels but that this effort could only be sustained for short periods. These figures indicate that the requirements of defence have historically made a large call on the resources of communities. For many the effort proved unavailing and they were overwhelmed. Conditions in prehistoric New Zealand make it likely that considerable effort was routinely put into war and preparations for war.

The burden of defence in prehistoric New Zealand is often built in as a significant factor in regional models (see, for example, Allen 1994). Quantitative models are, however, rare. Groube (1970) modeled population growth and the construction of pa and attempted to build in the constraint of the burden of defence. He approximated the burden of defence by calculating the average percentage of the population involved in fort building per year. A group that builds a replacement fort every 50 years, for example, is committing an average of 2% of its population to fort building per year. He concluded that to keep values for burden of defence realistic, the growth curve for both population and fort building needed to initially grow exponentially, followed by a reducing rate of increase. This is one of the few attempts to model the growth of population and pa construction and allow for the likely impact of a significant burden of defence.

The values Groube worked with would differ from those accepted now. Currently accepted values exacerbate the problem as the figures for the number of pa are higher and the period of pa-construction is shorter than he allowed and the population size at the end of prehistory is generally considered to be at the lower end of the figures he considered.

Groube noted the limited ability of the economy to maintain a surplus to support warfare and fort construction. Defence and economic well being are inextricably linked and to sustain a defence effort requires adequate economic strength. There is a trade-off between requirements of defence and efficient resource exploitation. Defence does not, however, just impose costs: it may also benefit some economies by ensuring better control over resources.

Some authors have emphasised low yields from gardens and a heavy reliance on wild foods even in horticultural areas (McGlone and others 1994) but it is possible that these models underestimate the economic capacity. Recent experimental research (Harris and others 2000) tends to suggest that a respectable yield of 10t/ha for kumara (Leach 1976: 181) is of the right order. It is clear from distribution data that pa are mainly a feature of the kumara growing areas, suggesting a strong link with horticultural production, but most pa occur in areas which are economically more productive generally (Leathwick 2000) so the association may not simply be with gardening. The different pattern of warfare in the South Island, with its significantly fewer pa, may be a reflection of the relative weakness of economic base of southern communities compared with northern. The question is could so much effort be devoted to warfare and preparations for war without a productive economic base? A well-

known Maori proverb compares the fame of the gardener and that of the warrior but communities required both, and neither could operate well without the other.

### Conclusions

Warfare, and preparation for war, were major preoccupations in late prehistoric New Zealand. The effects flowed into every area of life because, as Davidson (1984: 52) says, "violent death was obviously a possibility at any time in prehistoric New Zealand." Not preparing for war, and neglecting their fortifications, were options that were not available to the inhabitants of late prehistoric New Zealand.

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### References

- Allen, M.W. 1994. Warfare and economic power in simple chiefdoms: the development of fortified villages and polities in mid-Hawke's Bay, New Zealand. Unpublished PhD thesis, University of California at Los Angeles.
- Anderson, A. 1991. The chronology of colonisation in New Zealand. *Antiquity* 65: 767-795.
- Ballara, A. 1976. The role of warfare in Maori society in the Early Contact Period. *Journal of the Polynesian Society* 85 (4): 487-506.
- Barber, I. 1996. Loss, change, and monumental landscaping: Towards a new interpretation of the "Classic" Maaori emergence. *Current Anthropology* 37 (5): 868-880.
- Beaglehole, J.C. (ed.) 1968. *The Journals of Captain James Cook on his Voyages of Discovery. Vol. 1: The Voyage of the Endeavour 1768-1771*. Cambridge, Cambridge University Press for Hakluyt Society.
- Chapman, J. 1999. The origins of warfare in the prehistory of Central and Eastern Europe. In Carman, J. and A. Harding (eds) *Prehistoric Warfare: Archaeological Perspectives*: 101-142. Stroud, Sutton Publishing Ltd.
- Davidson, J.M. 1984. *The Prehistory of New Zealand*. Auckland, Longman Paul.
- Finley, M.I. 2000. *Ancient History: Evidence and Models*. Pimlico, London.

- Groube, L.M. 1970. The origin and development of earthwork fortification in the Pacific. In R.C. Green and M. Kelly (Editors), *Studies In Oceanic Culture History Vol. 1*:133-164. Pacific Anthropological Records 11, B.P. Bishop Museum, Honolulu.
- Harris, G., M. Burtenshaw, J. Davidson and F. Leach 2000. An experimental garden at Robin Hood Bay near Port Underwood, Marlborough. *Archaeology in New Zealand* 43: 301-313.
- Higham, T.F.G.; Hogg, A.G. 1997. Evidence for late Polynesian colonisation of New Zealand: University of Waikato radiocarbon measurements. *Radiocarbon* 39 (2): 149-192
- Houghton, P. 1996. *People of the Great Ocean: Aspects of Human Biology of the Early Pacific*. Cambridge University Press, Cambridge.
- Keegan, J. 1994. *A History of Warfare*. Pimlico, London.
- Keeley, L. 1996. *War Before Civilisation: The Myth of the Peaceful Savage*. Oxford University Press, New York.
- Leach, H. 1976. Horticulture in prehistoric New Zealand: An investigation of the function of the stone walls of Palliser Bay. Unpublished PhD thesis, University of Otago
- Leathwick, J.R. 2000. Predictive models of archaeological site distributions in New Zealand. Science & Research Internal Report 181, Department of Conservation, Wellington.
- McFadgen, B., F.B. Knox and T.R.L. Cole 1994. Radiocarbon calibration curve variations and their implications for the interpretation of New Zealand prehistory. *Radiocarbon* 36 (2): 221-236.
- McGlone, M., A. Anderson and R. Holdaway 1994. An ecological approach to the Polynesian settlement of New Zealand. In D. Sutton (editor) *The Origins of the First New Zealanders*: 139-163. Auckland University Press, Auckland.
- Minogue, K. 2000. *Politics: A Very Short Introduction*. Oxford University Press, Oxford.
- Pugh, P. 1986. *The Cost of Seapower*. Conway Maritime Press, London.
- Salmond, A. 1991. *Two Worlds: First Meetings Between Maori and Europeans 1642-1772*. Viking, Auckland.
- Saunders, A. 1989. *Fortress Britain: Artillery Fortification in the British Isles and Ireland*. Beaufort Publishing, Liphook.
- Schmidt, M. 1993. 'Few have been tested by spade': pa excavation and radiocarbon dating in New Zealand archaeology. M.A. Research Essay, University of Auckland.
- Schmidt, M. 1996. The commencement of pa construction in New Zealand prehistory. *Journal of the Polynesian Society* 105: 441-451.
- Vayda, A. 1970. *Maori Warfare*. Polynesian Society Maori Monograph 2.