NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION NEWSLETTER

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SIMULATED ASPECTS OF PREHISTORIC ATTACKS ON ONE TREE HILL

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(A revised version of a paper presented to the NZAA Conference, Wellington, 1975)

Abstract

Elapsed time trials and a test on the longest range weapon known to the Maori, the *kotaha* and *kopere*, were carried out to see how successful these would be in a simulated direct attack on One Tree Hill. The results suggest that if *pa* had equal numbers to an attacking force it would be virtually impregnable. The result may support inferences as to the sort of warfare that was taking place in prehistory.

INTRODUCTION

Maungakiekie, One Tree Hill (N42/6), a major and centrally located volcanic cone on the Auckland Isthmus, is protected by very steep slopes. This paper attempts to better understand the defensive properties of the site by simulating two aspects of an attack on it. The tests carried out were:

1. time trials; i.e., running up-slope

2. weapon testing; to examine the effectiveness of the *kotaha* and *kopere* (sling stick and dart) in attacking defended hill *pa*.

It was hoped to show the quality of the defences for the protection of those within and also to provide insights with respect to the nature of prehistoric warfare.

TIME TRIALS

In an attempt to evaluate a direct attack situation, elapsed time trials were taken of a person running up slopes to various points of the *pa*. These trials were considered to be analogous to those of a prehistoric warrior attempting the feat of storming a given position. For the purposes of the simulation it was assumed that in prehistory the slopes were unimpeded by palisades.

The location of trials conducted during 1973 by the author are shown in Figure 1. Their heights and distances are shown in Figure 2. The tests yielded the following results:

Slope 1

A small scarp on the southern side of the *pa* 57m long and with a slope angle of 16 degrees, took 13 seconds to cover in a sprint.

Slope 2

Another small slope on the southern side 52m long and with a slope angle of 19.5 degrees, also took 13 seconds.

Slope 3

A longer scarp, entering in the breach crater on the western side, which was divided into three by terraces, was 102m long with a slope angle of 18 degrees, took 37 seconds to run up.

Slope 4

A more difficult run ascending a northern slope to the top of the central crater rim, was 120m long, with a slope angle of 18 degrees, took 49 seconds to complete.

Slope 5

A very long and steep slope from the breached crater on the east to the summit, was 137m long, had a slope angle of 27 degrees, and took 123 seconds to run and clamber up.

All of the slopes were grassed, and the runner, to save energy and to increase speed, used multi-gripped football boots. The elapsed times were recorded with a reliable wristwatch and the lengths of the slopes

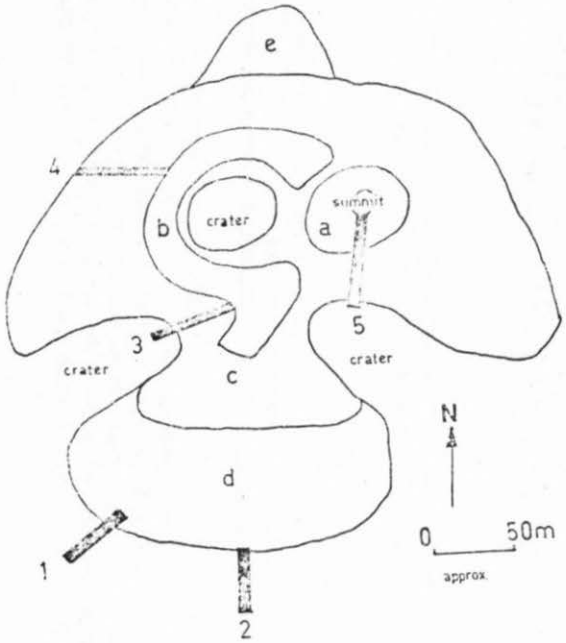

Figure 1.

Sketch of upper area, One Tree Hill, showing slopes tested and areas defined by height.

a = highest e = lowest.

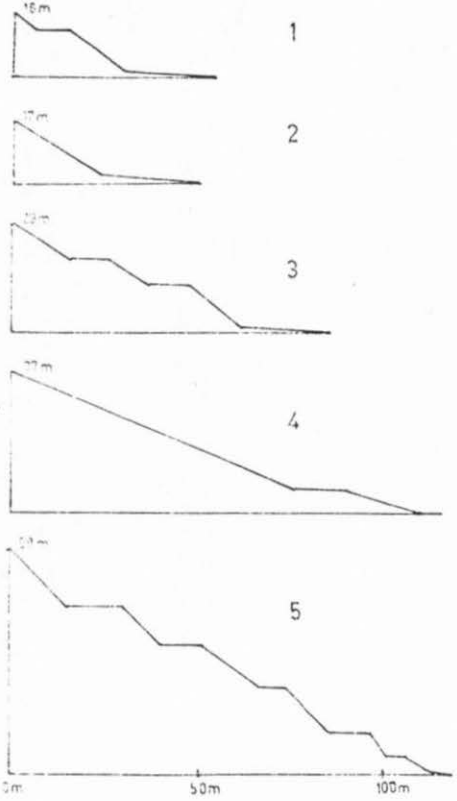

Figure 2.

One Tree Hill time trial slopes (heights and distances approximate).

were measured with a string marked at two-metre intervals. The weather was fine, and only Slope 5, in the shadow of the hill, was slippery from surface moisture. The conditions then were optimal and the fitness of the runner reasonable. His capability on the flat, at the time of the tests, was 100m in 12-13 seconds and 400m in 60-65 seconds.

The particular slopes chosen tested different approaches to several areas of the *pa*. They varied in length and difficulty, and represented the problems of gaining access to separately defended areas within the *pa* (Fig. 1).

DISCUSSION

(a) Human capabilities

On Slopes 1, 2 and 3, upon reaching the crest of the slope, the runner felt able to continue exertion as a Maori warrior would have had to if the inhabitants were defending. However, on Slopes 4 and 5 he was too tired to continue without rest. In fact, on Slope 5 the going was so difficult that parts of it were walked. It is realised that the runner was not under the same stress as an attacker would be, and perhaps an attacker in a real situation could perform feats not normally achieved. Whatever the case, the one thing that became apparent was that the runner, upon reaching the top, would either be too tired to defend himself against attack, or his chances of success would be reduced owing to his physical condition.

(b) Opposition

Any attacker running up the slopes, if seen, would be the recipient of many missiles thrown from positions of height advantage, be they rocks, spears or darts. These would impede progress even if one had a shield, such as a flax mat (Smith, 1897: 75; Savage, 1807: 52-3), or a defensive stick (Savage, 1807: 66-7). In this situation the defenders have the advantage, especially if behind a palisade.

(c) Steep Slopes

Slopes themselves, without palisades, offer an effective defence under attack. The steeper and/or longer the slope, the more time it takes to scale it. For example, Slope 2, although being shorter than Slope 1, still took the same time to run - probably because of its greater slope angle.

These three factors combined suggest that anyone attacking a *pa* with long steep slopes will be at a disadvantage. If slopes are there, it forces an attacking party to conduct war with them in mind. They not only offer a good position for defence, they also place the attackers at the greatest disadvantage.

WEAPON TEST

If an attacker is at a severe disadvantage in running up a slope, what weapon would help him attack a hill *pa* from a distance? Experiments were conducted to determine how close an attacker had to approach to attack, or besiege a hill *pa*. The weapon chosen was the *kotaha* and *kopere*, most probably the longest range weapon in prehistoric New Zealand. Hamilton (1972: 188; and Plate XXX) provides a description and instructions for its use. A series of tests were held after the author became familiar with the weapon and, while learning to use it, he also tested its ability as a siege weapon.

The maximum distance attained in throwing a dart from a makeshift sling stick was 52.5m. This was the most successful of several throws. The tests were conducted on flat ground when the wind was still. However, distances did not approach those recorded by Hamilton (1972: 244) of 70-80 yards, or Smith (1897: 75) of 150 yards downslope. It is probable the poor quality of the replica and the lack of mastery of the weapon led to these inferior results. From the experiments, I would estimate that a good weapon in the hands of an expert could certainly be thrown much further than 52m, and perhaps more than 100m in favourable conditions. This would mean that the weapon could have outdistanced the spear, the World and Olympic Javelin record standing at 94.58m, and perhaps be within the range of other distance weapons known from elsewhere in the world such as the bow and arrow or the sling (Korfmann, 1973: 37). While a 100m throw may have been a possibility, Hamilton's figure of 70-80 yards appears to be a conservative assessment for its performance on the flat.

DISCUSSION

An attacker would have to be closer than 100m to a palisade if attacking a hill *pa* with darts. However, the defenders, being upslope, have the advantages, because downslope at this range the attackers, unless sheltered, would be under fire not only from darts but possibly throwing spears and rocks.

Trials conducted with the sling stick and darts upslopes suggested that the weapon was not very satisfactory in such situations.

Heights of at least 16m have to be reached, quite apart from the distance. Thus, on Slope 3 two darts tested did not even reach halfway to the terrace at which they were aimed. In short, given that this represents the longest range weapon available to the prehistoric Maori, there was no weapon which could easily have been used in laying siege to a volcanic cone hill *pa*.

CONCLUSIONS

Running up steep scarps revealed that slopes in themselves offer a formidable barrier to any attacking party and the weapon test showed that the prehistoric Maori, like some North American tribes (Larson, 1972: 390), had no specialised weapons with which to conduct a seige. Both factors suggest that Maori warfare, when associated with these large volcanic cone hill *pa*, was more likely to depend upon surprise attack (Vayda, 1970: 42-57).

The volcanic cone *pa* appears to be a refuge used when an attack was imminent. The defenders, if strong in number compared to the attacking force, could either remain in their *pa*, and hold their position like the Monte Casino monastery during World War II (Cassels, 1972: 8), or they could come out to try to expel the invaders. The weapon test enhances this argument because no prehistoric weapon is suited to seige fighting. In fact, many of the weapons including the *patu*, *taiaha*, *pawhenua*, *kotiate* and *hoeroa* all seem most suited to close fighting.

The tests conducted indicate the security of such sites but more importantly they add further understanding on aspects of prehistoric warfare. Large hill *pa* probably would have required strategies other than direct assault to be successfully taken. The weapons normally used suggest that the fighting took place mainly at close quarters.

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ACKNOWLEDGMENTS

For assistance in the tests I would like to thank M. Bellingham, G. Partington, P. Sykes and A. Smith. Also, without the aid and encouragement at one time or another from the following, this paper would never have reached fruition: Prof. R. C. Green, Mr R. J. S. Cassels, and Dr G. J. Irwin. Finally, I am grateful for the discussion and encouragement that was offered by many others.