NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

NEW ZEALAND JOURNAL OF ARCHAEOLOGY

The Hahei (N44/97) Assemblage of Archaic Artefacts

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ABSTRACT

The artefactual assemblage recovered during the recent excavation of N44/97, at Hahei on the east coast of the Coromandel Peninsula, is typical of those from the Archaic sand dune middens in the region. The manufacture and maintenance of adzes, especially those of Tahanga basalt, and the manufacture of drill points and flake tools were the main stone-working activities of the fourteenth century occupants of the site. An examination of the adze preforms and waste flakes indicates that a range of adze types were being made. Drill points, manufactured on site, were used in the only significant bone-working industry, that of making one-piece fish hooks from moa bone. Although stone working was based on locally acquired raw materials, local sources of obsidian were not exploited to any great extent and highly valued stones, such as metamorphosed argillites and nephrite, were obtained from as far away as D'Urville Island and Otago in the South Island.
Keywords: EAST COAST COROMANDEL PENINSULA, HAHEI, ARCHAIC, STONE WORKING, ORNAMENTS.

INTRODUCTION

The Archaic middens along the eastern coast of the Coromandel Peninsula (Fig. 1) have long been recognised as forming a unique site type and their role in the local settlement pattern has been the subject of considerable debate (Golson 1959; Groube 1965; Davidson 1979). There are marked similarities between the middens, both in their subsistence patterns and in their material culture. Indeed, as Davidson (1979) pointed out, the sites are more like each other than they are like any other site. With one or two exceptions, the sites show a relatively unspecialised, broad-based exploitation of the local fauna (Davidson 1979:194), while industrial activities also indicate a highly successful adaptation to local resources.

Adze technology is based on Tahanga basalt, the source of which, Mt Tahanga, lies on the Kuaotunu Peninsula (Fig. 1). Other stone-working activities, such as drill point manufacture, also appear to be based on locally acquired materials. However, the presence, in some sites, of small amounts of non-local stone, some brought from as far away as the South Island, together with evidence from recent obsidian sourcing studies suggest that the situation may be more complex than first appeared.

Evidence for at least one stage in the process of adze manufacture has been found in many of the middens which have been excavated in the past 30 years (Moore 1976). Likewise, drill points and flake tools were being made and used in most of the sites. However, the vast quantities of debris resulting from these activities have largely been ignored in analyses. Indeed, in the majority of the excavations carried out in the late 1950s and early 1960s, waste flakes were not even retained. Recent studies by Leach (1979, 1984) and Leach and Leach (1980), however, indicate that the analysis of such material can provide valuable insights into stone tool technology and pre-European human behaviour.

This paper looks at stone working and other activities of the fourteenth century occupants of a midden at Hahei, on the eastern coast of the Coromandel Peninsula.

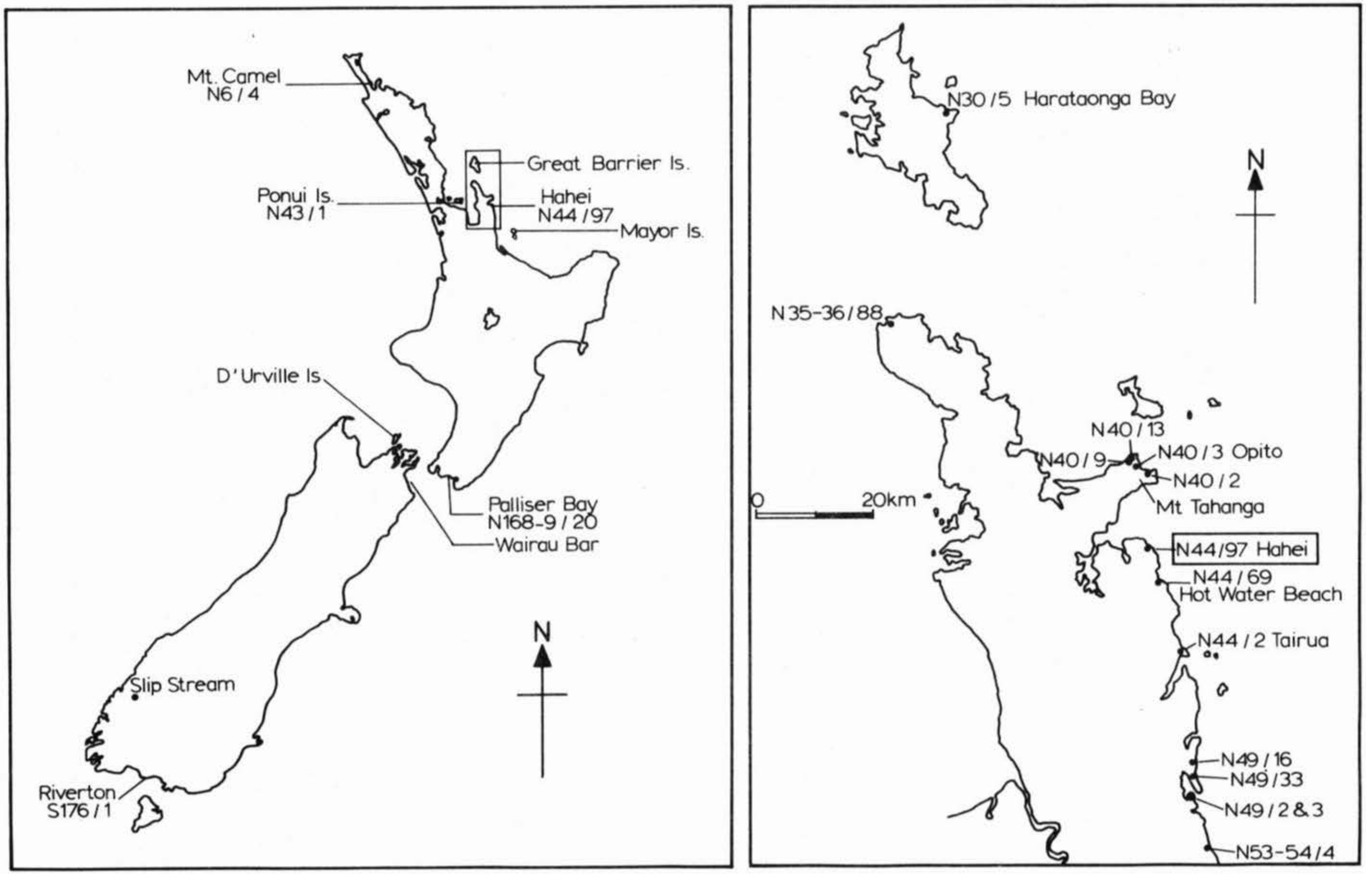

Figure 1: Location of N44/97 and other sites and localities mentioned in the text.

THE SITE

EXCAVATION HISTORY

Site N44/97 is a coastal dune site, located at the eastern end of a long sandy beach, beside a small tidal creek. Headlands at each end of the beach and offshore islands afford the site and beach front some protection from the prevailing winds. Like many of the Archaic coastal dune sites along the Coromandel Peninsula, virtually all of site N44/97 has now been destroyed through roading or housing development. In 1979 a salvage excavation, of what was then one of the few remaining intact areas, was carried out on behalf of the New Zealand Historic Places Trust.

A previous investigation of a disturbed area, 40 metres away (Edson and Brown 1977), together with limited test-pitting of the site (Harsant 1979) indicated that it was likely to be typical of the Archaic sand dune working floor/middens in both the range and the type of artefactual material recovered. Totally unexpected, however, was the presence of six storage pits (Harsant 1984). Hitherto, the evidence had suggested that horticultural surpluses were stored in areas spatially removed from the sand dune working floor/middens (Green 1972a, 1972b; Harsant 1984). As a consequence of excavating these pits, there was not enough time to remove the metre-wide baulks that separated the excavation squares. This was unfortunate as contiguity would have greatly assisted preform reconstruction. Since the reconstruction of preforms using the "jigsaw" techniques of Leach and Leach (1980) was planned, each metre square was divided into quadrants and the material recovered was recorded according to quadrant, layer, spit and, in some cases, depth.

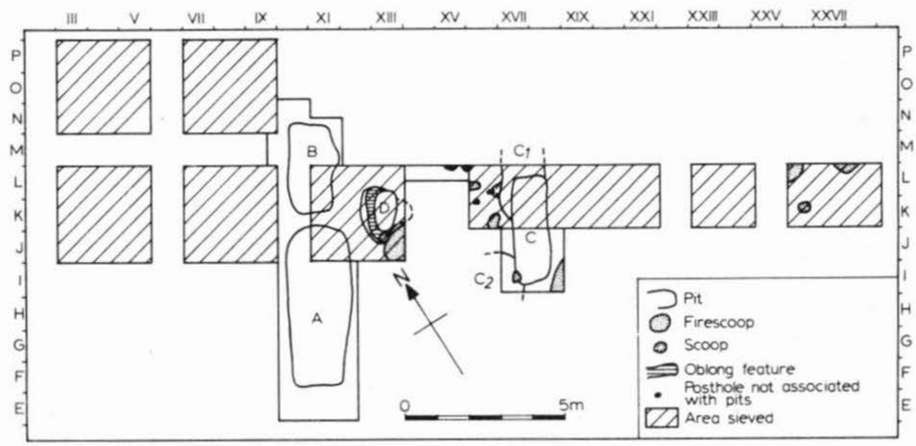

Figure 2: Plan of excavation showing location of features and areas sieved.

Altogether some 72 sq.m were excavated. Only 53 sq.m (74 percent of the total area excavated) were able to be sieved in the time available. The areas not sieved (Fig. 2) were those which were opened in order to define the size of the storage pits. Unless stated, only material recovered from the sieved areas of the site has been included in the data presented below. A 4-mm-mesh sieve was used. When dry sieving was not possible, the material was taken to the creek and wet sieved. No resieving was done in the laboratory. Therefore, to overcome any discrepancy in the

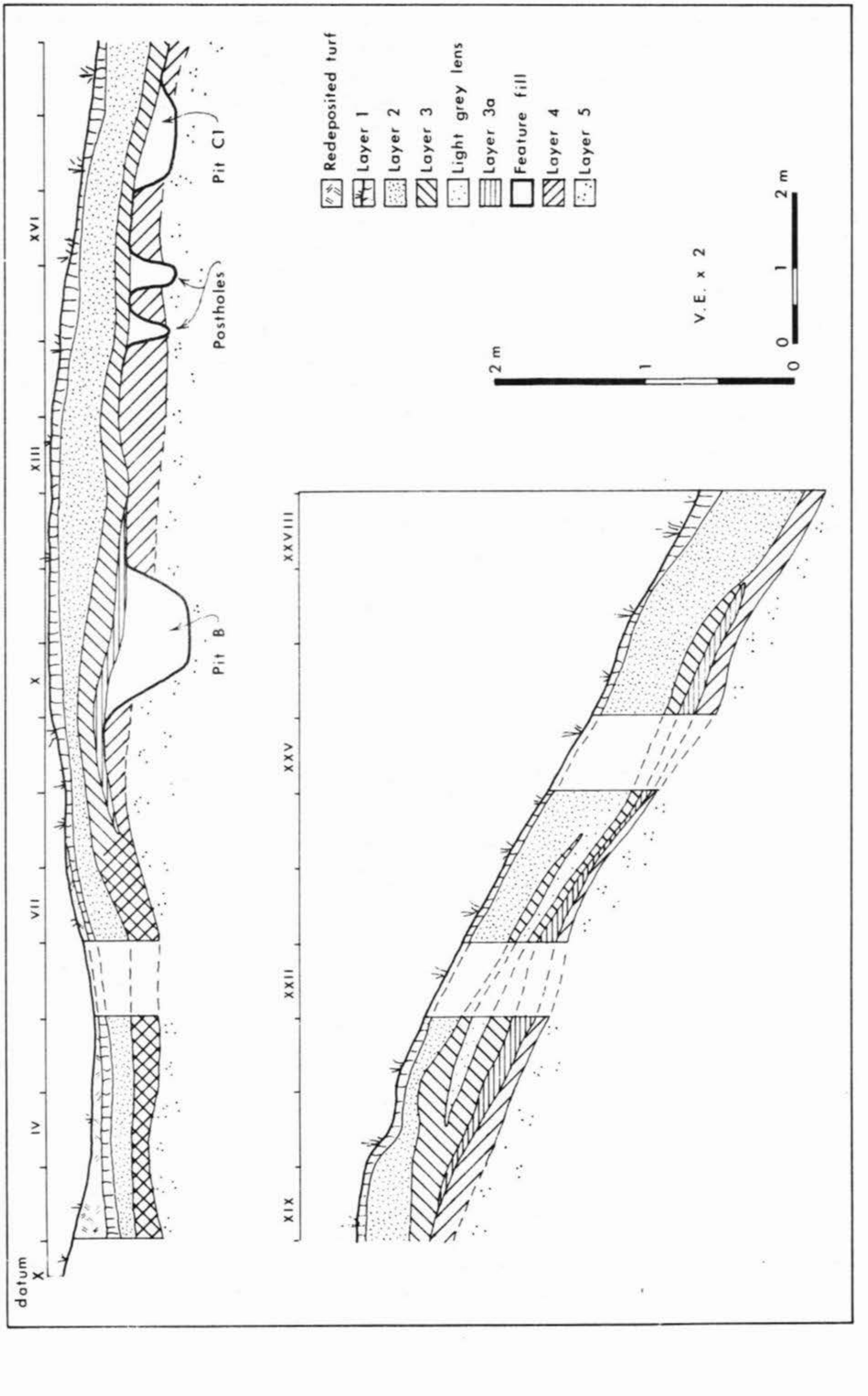

Figure 3: Section through excavated area.

size of flakes recovered during dry and wet sieving (since wet flakes stick together), all flakes less than 4 mm in length have been excluded from the data.

STRATIGRAPHY

The stratigraphy of the site (Fig. 3) has been discussed elsewhere (Harsant 1984). Briefly, it was argued that the occupation of the site was continuous, although it did not always extend down the slope of the dune. The storage pits had been dug into layer 4 during the initial stages of occupation. After they were no longer required they were filled immediately.

Because the transitions between the layers were gradual in most areas, the interfaces were difficult to define in section. They are not, however, considered to be significant layers in themselves. In the western part of the site the soil horizon was poorly developed and layers 3 and 4 merged, were mixed with yellow sand and became indistinguishable from each other. Layer 2 contained some cultural material but this was limited to a few small flakes derived from the underlaying layer. Likewise, layer 4 contained some artefacts "walked" into the upper few centimetres only. Material from both of these layers has been included with that from layer 3. Layer 3a did not extend over the entire site. However, because of the difficulty in defining the exact limits of this lens, all artefacts recovered from it, in the western part of the site, have been treated with those from layer 3. Down the slope of the dune, in squares XXIII-XXVIII, layer 3a formed a sterile layer separating layers 3 and 4 (Fig. 3) and was able to be clearly defined. Consequently, where appropriate, the artefacts from each layer are discussed separately. Four dates were obtained from charcoal in layer 3. They indicate that the site was occupied in the mid fourteenth century (Harsant 1983).

THE LITHIC ASSEMBLAGE

As with other Archaic dune sites in the region, a large quantity of worked stone was recovered. Initially, all stone was sorted on the basis of artefact type (preform, flake, flake with an area or areas of polishing, drill point, file, ornament, etc.) and stone type (Tahanga basalt, obsidian, siliceous material such as sinter, chert and quartz, metamorphosed argillite, volcanic, nephrite and other). The flakes were then classified into "waste" and "used", depending on the presence or absence of modification of the edge. Table 1 gives the total numbers and weights of the various artefact and stone types present.

The majority of the material was Tahanga basalt (79.2 percent by number, 83.2 percent by weight). Siliceous stones, which are also available locally, made up 13.2 percent by number and 10.4 percent by weight while obsidian, obtained from a number of North Island sources, comprised 5.9 percent by number and 4.7 percent by weight. The manufacture and maintenance of adzes and the manufacture of drill points and flake tools were the major stone-working industries of the occupants of the site.

Since some types of stone were used in a number of these industries (for example, Tahanga basalt, which was used to make adzes, drill points and flake tools) the lithic assemblage is discussed below in relation to these four activities rather than to each stone or artefact category.

ADZE MANUFACTURE

The preforms discarded in a site do not necessarily represent the full range of adze types made there. Despite the absence of reversed triangular sectioned preforms,

TABLE 1
NUMBERS AND WEIGHTS OF ARTEFACTS RECOVERED FROM LAYER 3

	TAHANGA BASALT		SILICEOUS		OBSIDIAN		OTHER	
	No.	Wt(g)	No.	Wt(g)	No.	Wt(g)	No.	Wt(g)
Preforms	20	565	–	–	–	–	1	29
Waste flakes	46470	33238	7539		3376		898	335
Modified flakes	9	232	59	3655	87	1960	1	17
Cores	1	28	19		7		–	–
Adze flakes	256	503	–	–	–	–	73	83
Drill points	7	35	192	665	–	–	11	27
Files/Abraders	–	–	–	–	–	–	33	186
Ornaments	–	–	–	–	–	–	1	3
TOTALS	46763	34601	7809	4320	3470	1960	1018	680

Leach and Leach (1980) were able to determine that at least one example of a hog back (Duff type 4) adze had been made at Riverton by the presence of characteristically shaped trimming flakes and a blade whose shape indicated that it had been struck from the front of the cutting edge of a hog back adze. Likewise, Leach and Leach (ibid.) argue that the number and distribution of a characteristically shaped flake formed during the final stages of trimming thick quadrangular sectioned adzes indicates that more adzes of this type were made than the proportions of preforms suggested. In view of the small number of preforms recovered from Hahei (22 compared to 269 at Riverton) and the rather restricted range of adze types represented by them, it was hoped that the examination of the waste flakes would provide more accurate information on all types of adzes being made and their relative importance.

Methods of Analysis

The methods of analysis of both preforms and waste flakes are essentially those set out by Leach and Leach (1980) for their study of adze manufacturing techniques at Riverton. The origin of the preform, whether core or flake, was noted and they were then classified according to the number of edges from which trimming flakes had been struck—quadrilateral, trilateral or bilateral. The reason for rejecting the preform and what its final shape would most likely have been if it had been completed were determined, if possible.

The Tahanga basalt waste flakes are assumed to be debris from adze making. Although some Tahanga basalt flakes had been used as tools, it is probable that these are the product of opportunistic use of waste flakes rather than of deliberate detachment of suitably sized and shaped flakes from a core. The waste flakes resulting from the manufacture of the few Tahanga basalt drill points recovered are likely to be small in size (less than 2 g) and few in number. Thus, they will show up in distribution figures but are unlikely to be statistically significant. The waste flakes were sorted into those weighing more than 2 grams and those weighing less. The latter group were counted and weighed only. Reconstruction was attempted on the remaining flakes (i.e. those over 2 g) but was hindered by both the lack of contiguity of excavation squares and the homogeneity of the stone. There was little variation in the colour or texture of the stone, nor were there many inclusions. These features in the argillite of the Riverton assemblage greatly assisted the reconstruction carried out there (Leach and Leach 1980). After approximately 25 hours of work, only 13 matching pairs had been found. It was, therefore, decided to follow Leach and Leach's (1980) classification of flakes into class A (those with a high proportion of cortex and minimal or no reduction of the edge of the striking platform), class B (those with many reduction scars and only a small area or no cortex) and class C (broken flakes without striking platforms).

Results

Twenty-one preforms were found in layer 3 and a further one in the unsieved area of the fill of pit A (Fig. 2). With the exception of one fine grained black volcanic preform, all were made of Tahanga basalt. Only two had areas of cortex. All preforms had one or, occasionally, two transverse fractures which appeared to be the reason for rejection in each case. Over 70 percent were from the butt end of the preform. Therefore, it may well be that most blade and bevel portions broken off during trimming were not discarded but, rather, were remodelled into either a smaller adze than was originally intended or another tool type. One discarded preform on which the original fracture surface had been retained and the edge reworked, lends support to this view.

The original form of sixteen of the preforms was able to be determined. Fourteen had been made from flakes and two from cores. A further five were unable to be determined. Seventeen preforms (77 percent) had been trimmed bilaterally, two (9 percent) trilaterally and three (14 percent) quadrilaterally.

The preforms represent four major groups or types of adzes.

(i) Medium sized, thick quadrangular cross sectioned.

There are three specimens of which two are cores and the other was not able to be determined. All have been worked quadrilaterally, sometimes bifacially. Two are portions of the butt (Fig. 4a, b) and the other, found in the fill of pit A and, therefore, predating all other preforms, is a mid section. It is the only example which had been hammer dressed (Fig. 4c) and had also been burnt.

(ii) Thin, rectangular sectioned. All have been made from flakes or blades. These can be further subdivided according to size.

(a) Very small preforms, represented by seven butt portions. All have been made from flakes and have unifacial, bilateral trimming (Fig. 4d). An attempt to remove a protruberance on the side of one example by flaking from both the dorsal and the ventral surfaces, however, makes this preform, strictly speaking, trilaterally worked. The only fragment of a finished adze recovered during the excavations belongs to this group, as do the two preforms which were being shaped from larger adzes (see below).

(b) Small sized but larger than those in group (a) above. These three preforms have been unifacially, bilaterally worked. One is the bevel part of a preform made from a very large flake (Fig. 4e). Difficulty has been experienced by the artisan when trying to remove the bulb, which remains as a projection on the left side of the cutting edge. The bevel itself has been very finely retouched. The bulb has not been completely removed from the second of the examples in this group either. It has been made from a flake of black volcanic stone (Fig. 4f). The final preform is a mid section and has cortex on one side of the dorsal surface.

(c) Medium sized, represented by five preforms. Three of these are bilaterally worked (all unifacially with two being worked from alternate surfaces) and the final two are trilaterally worked (Fig. 4g, h).

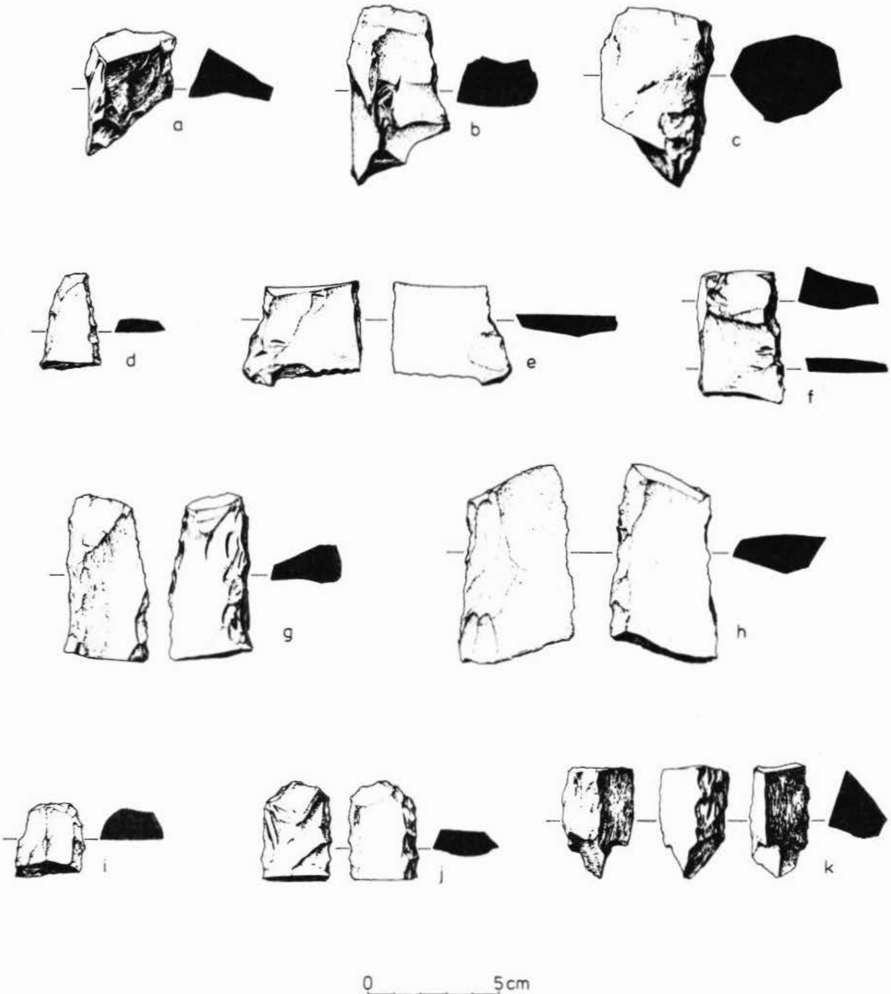

Figure 4: Adze preforms. All except (f) are of Tahanga basalt. a. LXXIII-3, Z2650/2655a. b. JXI-4, Z2650/1036. c. Pit A, unsieved, Z2650/1589. d. JXIII-3, Z2650/1422. e. LIV-3, Z2650/270. f. PIX-4, Z2650/2739. g. JVII-1, Z2650/2302. h. JXII-1, Z2650/1739. i. JXIII-2, Z2650/1157. j. NVIII-3, Z2650/3011. k. KXIX-4, Z2650/2528a.

(iii) Small sized, medium rectangular or slightly rounded cross sections. Both examples in this group have been bilaterally trimmed, one unifacially (Fig. 4i) and the other bifacially (Fig. 4j).

(iv) Small sized, reversed triangular sectioned. One preform only (Fig. 4k) was present from this category. Made from a blade or flake, it has been shaped on the ventral surface by unifacial trimming from both front faces. A poor shaped flake has been removed from the bevel. The finished shape intended for the final preform was unable to be determined.

TABLE 2
DISTRIBUTION OF TAHANGA BASALT BY AREA

Square	Class A	Class B	Class C	Total >2g	Total <2g	Preform	Blade	Modified
JIV	1	16	16	33	565	–	–	–
JV	–	31	19	50	600	–	1 h	–
KIV	2	29	35	66	947	–	1 h	–
KV	–	20	44	64	782	–	–	–
LIII	3	8	10	21	472	–	–	–
LIV	1	37	24	62	1109	1	1	–
LV	2	39	55	96	1076	–	2	–
JVII	–	42	45	87	963	3	1 h	–
JVIII	–	28	19	47	488	1	1	1
JIX	–	17	13	30	567	1	1	–
KVII	–	18	19	37	678	–	–	–
KVIII	1	30	18	49	781	–	3	–
KIX	2	38	30	70	1343	–	1 h	1
LVII	–	28	31	59	590	–	–	–
LVIII	–	32	32	64	930	1	–	–
LIX	–	27	36	63	954	–	1	–
JXI	2	39	75	116	1233	2	–	–
JXII	–	29	42	71	939	1	1	–
JXIII	1	54	57	112	1461	2	2	–
KXI	–	25	49	74	900	–	–	–
KXII	2	19	28	49	956	–	–	–
KXIII	2	59	70	131	1725	–	1	–
LXI	1	37	57	95	1075	–	1 h	–
LXII	–	28	32	60	695	–	–	1
LXIII	–	22	30	52	705	–	–	–
NIII	1	33	23	57	613	–	1	–
NIV	2	41	59	102	1111	1	2hh	–
NV	–	32	50	82	651	–	2h	–
OIII	1	17	21	39	358	–	–	–
OIV	–	50	37	87	907	–	1	–
OV	1	18	18	37	441	–	3 hh	–
PIII	–	25	20	45	362	–	–	–
PIV	2	16	28	46	331	–	1	–
PV	2	44	47	93	834	–	2	–
NVII	–	20	21	41	141	–	–	–
NVIII	2	36	54	92	1070	1	–	–
NIX	–	24	30	54	892	–	1	–
OVII	1	29	41	71	393	–	2	1
OVIII	1	35	47	83	1094	–	2	1
OIX	1	31	32	64	889	–	1	–
PVII	1	42	47	90	1286	–	1	–
PVIII	1	19	30	50	967	–	–	–
PIX	2	9	13	24	704	1	1	–
KXVI	–	25	24	49	521	–	2	1
KXVII	2	32	39	73	601	–	2 h	–
KXVIII	–	18	16	34	472	–	–	1
LVXI	3	17	29	49	692	–	2	–
LXVII	1	23	23	47	769	–	1	–
LXVIII	1	19	7	27	401	–	–	–
KXIX	–	19	11	30	634	1	–	–
KXX	–	22	17	39	629	–	–	1
KXXI up L3	1	6	2	9	112	–	–	–
KXXI	–	32	16	48	391	–	–	–
LXIX	2	27	20	49	674	–	–	–
LXX	–	26	13	39	393	–	1	–

LXXI	–	–	–	–	66	–	–	–
LXXI	–	33	11	44	313	–	–	–
Stone pile	4	77	67	148	218	1	2	2
KXXIII up L3	–	4	1	5	10	–	–	–
KXXIII low L3	–	1	–	1	–	–	–	–
KXXIII L4	1	17	11	29	98	–	1	–
LXXIII up L3	–	–	–	–	15	–	–	–
LXXIII low L3	–	13	4	17	7	–	–	–
LXXIII L4	–	19	13	32	185	1	1	–
LXXIV up L3	–	–	–	–	12	–	–	–
LXXIV low L3	–	4	–	4	31	–	–	–
LXXIV L4	–	19	6	25	33	1	–	–
LXXVI L3	–	–	–	–	5	–	–	–
LXXVI L4	–	7	5	12	59	1	–	–
LXXVIII	–	54	35	89	62	–	–	–
LXXVIII	–	25	14	39	67	1	–	–
TOTAL	53	1812	1888	3753	42717	21	50	10
Firescoop JXIII (sm)	1	26	22	49	914	–	–	–
Firescoop JXIII (lge)	–	1	–	1	97	–	–	–
KXIII feat.	–	6	4	10	200	–	–	–
TOTAL	1	33	26	60	1211	–	–	–
Pit A	1	61	73	135	1181	–	–	–
Pit B	2	58	34	94	839	–	–	–
Pit C	2	29	35	66	1169	–	3	–
Pit D	1	11	15	27	151	–	–	–
Pit E	–	3	6	9	34	–	–	–
TOTAL	6	162	163	331	3374	–	3	–

h indicates a blade struck from the front of a reversed triangular sectioned preform

The numbers of flakes, by class, found in each square metre are given in Table 2. The majority of flakes with intact striking platforms (81 percent) belonged to class B. That is, they showed preparation of the edge of the striking platform prior to detachment from the preform. In addition, 36 percent of class A flakes had some degree of edge reduction and they may, therefore, be the result of the trimming and final shaping of the preform rather than the primary flaking of the parent block. However, they were included with class A because of the amount of cortex on their surfaces. Even so, the proportions of class A to class B flakes indicates that very little primary flaking was being carried out on the site. This stage in the manufacture of the adzes was obviously being undertaken elsewhere—either away from the site or in another, unexcavated, area of it.

The major hindrance to the identification of what type and shape of preform the waste flakes had been derived from was the lack of reconstructed preforms. This, in turn, was due largely to the small size of the preforms and the very fine trimming of the sides as well as the absence of positive and negative bulb scars on the bulbar and non-bulbar surfaces. None-the-less, one important category of class B flakes was identified. These were small blades (defined as flakes in which the length was at least twice the width). Altogether, 53 were recovered (Table 2). These were measured and then examined for signs of edge preparation on the apex and other evidence which would indicate that they had previously formed the ridge on the front of a reversed triangular sectioned (hog back) adze preform. Eleven such blades were found. A further example, from the class C flakes, was also identified. All were triangular in section (Fig. 5a-g) and the apex had been shaped by edge reduction hammering or fine flaking on all but two examples. Nine of the blades are parallel sided and the remainder taper to a point. Only one is irregularly shaped (Fig. 5g). It shows minimal modification of the apex only and it may be that its irregular shape is the result of less careful preparation of the preform prior to its removal.

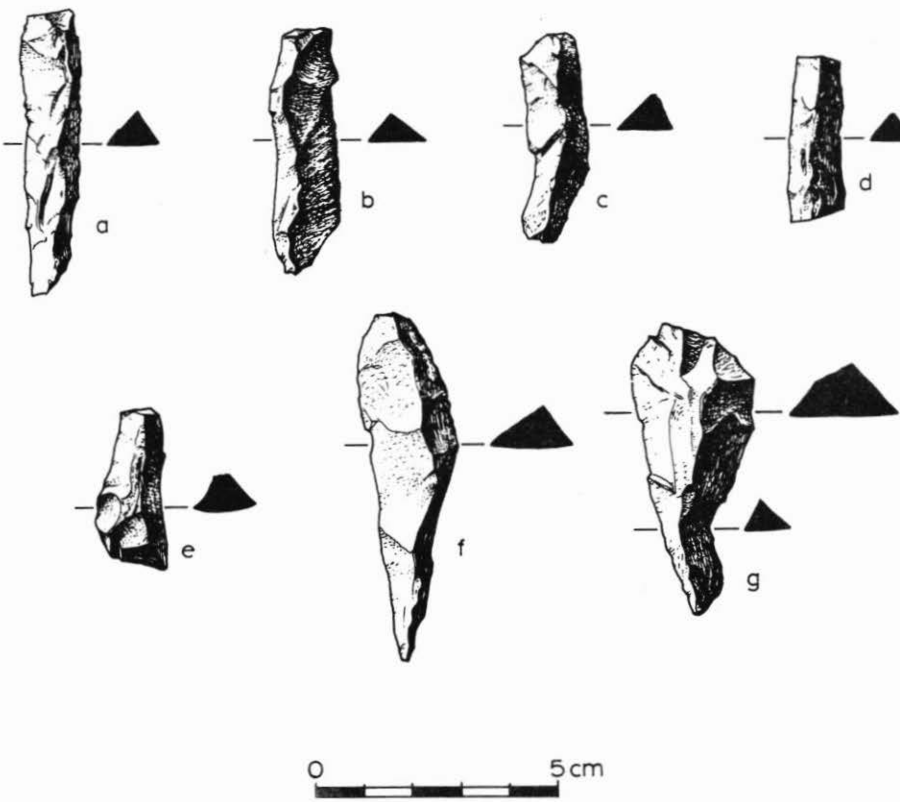

Figure 5: Tahanga basalt blades with edge preparation of the apex. a. OV-2, Z2650/4234. b. LXI-4, Z2650/1440. c. OV-1, Z2650/4024. d. KXXIII-3, Z2650/2686. e. LXVI-2, Z2650/1000. f. NV-4, Z2650/3956. g. KIX-3, Z2650/1842.

The identification of a further two blades as having been struck from hog back preforms was less certain. They do possess some of the diagnostic features but both have pronounced negative scars. The sizes and cross sections of the remainder of the blades vary considerably. The shape of many of them would seem to be fortuitous.

The distribution of the small (less than 2 g) flakes and chips is shown in Figure 6. Findspots of the preforms and the 12 blades from the manufacture of reversed

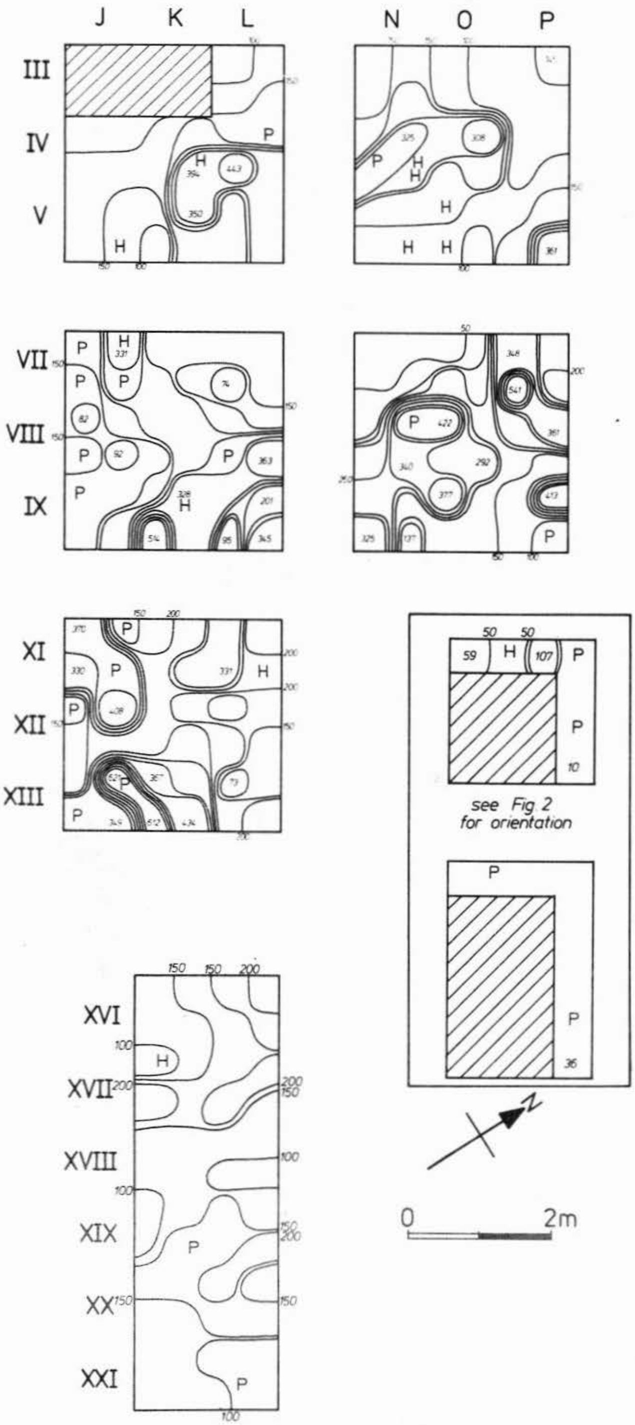

Figure 6: Distribution of 21 preforms (P), 12 blades from reversed triangular adzes (H) and 42,717 small (less than 2 g) Tahanga basalt flakes. Hatched areas not completely excavated.

triangular sectioned adzes are also indicated. Flakes from feature fills (including firescoops) are not included in the figures. Several areas of concentrated adze working can be discerned. All are on the top of the dune. A feature referred to as the "stone pile" during excavation was present in squares LXXI-3 and 4. This consisted of a densely packed deposit of Tahanga basalt and other flakes as well as some worked bone. As can be seen from the distribution diagram, the number of small flakes present in this feature, although greater than the surrounding area, is not particularly high. Compared with other areas of the site a high percentage of the Tahanga basalt flakes were over 2 g (40 percent compared with 7 percent for squares K-L XVI-XXI and 8 percent for the whole site). Flakes over 2 g are also consistently larger and heavier than in the rest of the site. A similar pattern is seen with the obsidian and siliceous material from the stone pile. It would seem likely, therefore, that the flakes had been specially collected and deliberately placed in a pile, possibly for later use.

Five (42 percent) of the "hog back" blades recovered came from an area just 150 cm x 100 cm in size, in square N-P III-V. Debris from adze manufacturing is not as concentrated in this area as it is in adjacent squares and it can be postulated that preforms were worked to the appropriate stage in other areas of the site and then were taken to area N-P III-V for the removal of the necessary blades.

ADZE MAINTENANCE

Although no adzes or preforms of materials other than Tahanga basalt and fine grained black volcanic rock were found, adzes made from a variety of other stone types were among those being reshaped, sharpened and modified into other tools, on the site. Debris resulting from these maintenance activities was abundant in all squares except those down the slope of the dune.

Methods of Analysis and Results

The flake material was sorted into stone type and then classified according to the presence or absence of polish (and grinding marks) and bruising caused by hammerdressing. Table 3 gives the numbers recovered by area. The data presented for the fine grained black volcanic (some pieces of which may be Tahanga basalt) include waste from adze manufacturing as well as maintenance. An attempt to match these flakes with the preform, however, was unsuccessful.

There is considerable variation in the colour and texture of the metamorphosed argillites recovered. All pale grey-pale green flakes were included in one category. Many of them have the distinctive black veining which is characteristic of the Ohana-D'Urville Island metamorphosed argillites. Grey, dark green and other shades of metamorphosed argillite together with a green volcanic form the "other" category.

The nephrite chips recovered have also been included in Table 3 since, although they may not have been struck from an adze, they almost certainly are the result of reshaping some form of artefact. The largest fragment is 10 mm in length and together they weigh 0.3 grams. All are thought to be from the same source, possibly the same boulder (?artefact), at Slip Stream, Dart Valley, Otago (Beck pers.comm.).

TABLE 3
ADZE MAINTENANCE FLAKES, BY AREA

SQUARE	A		B			C			D		E	
	Pol.	H/d	Pol	H/d	Waste	Pol	H/d	Waste	Pol	Waste	Pol	Waste
J-L III-V	25	–	3	–	85	1	–	53	–	–	6	36
J-L VII-IX	46	6	4	–	156	1	1	81	–	4	8	29
J-L XI-XIII	56	7	15	–	113	5	1	58	1	1	2	16
N-P III-V	31	6	3	–	8	–	–	54	–	2	1	7
N-P VII-IX	17	8	3	1	30	–	–	–	–	–	1	–
K-L XVI-XXI	32	1	9	1	26	–	–	13	–	–	2	1
K-L XXIII-XXIV	2	1	–	–	–	–	–	–	–	–	–	–
K-L XXVI-XXVIII	3	–	–	–	–	–	–	–	–	–	–	–
TOTAL	212	29	37	2	418	7	2	259	1	7	20	89
Pit A	6	–	2	–	1	1	–	6	–	–	–	–
Pit B	3	–	–	–	–	–	–	5	–	–	–	–
Pit C	4	–	–	–	1	1	–	1	–	–	–	–
Pit D	1	–	–	–	1	–	–	–	–	–	–	–
Pit E	–	–	–	–	–	–	–	–	–	–	–	–
Firescoop JXIII	1	–	–	–	–	–	–	–	–	–	–	–
TOTAL	15	–	2	–	3	2	–	12	–	–	–	–

A = Tahanga Basalt
B = Black Volcanic
C = Metamorphosed Argillite (grey-green)
D = Nephrite
E = Other

A number of the adze flakes have been polished on two or more surfaces. Three of them have diagnostic features. One is from the butt end of a small, thin, rectangular sectioned adze, another has been removed from the side and bevel of a large quadrangular sectioned adze and the final one is from the bevel and back of a large trapezoidal sectioned adze, which was more than 49 mm in width. It is also worth noting that the dimensions of a polished green volcanic flake indicate that it, too, was derived from a reasonably large adze.

Several fragments of Tahanga basalt adzes, some in the process of being modified, were also recovered. One of these is the mid section of a large trapezoidal sectioned adze (with front wider than back, possibly a Duff type 1A) with polishing on three surfaces (Fig. 7a), another is the modified butt portion of a small quadrangular sectioned adze (Fig. 7b) made from fine grained black volcanic stone, and three are small, thin, rectangular sectioned forms. These are the bevel end of a completed adze, 7 mm in depth and 28 mm in width (Fig. 7c) and two preforms which were being shaped from larger adzes until transverse fracturing caused them to be discarded. Both have areas of polish from the original adze, one on the side and poll and the other on the side and front (Fig. 7d).

STONE POINT AND FLAKE TOOL MANUFACTURE

Stone points have been recovered from most of the Archaic beach middens on the

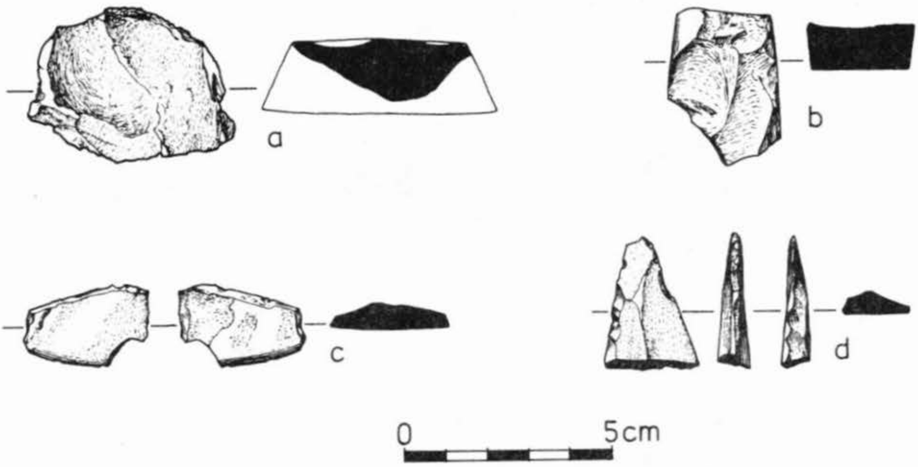

Figure 7: Adze flakes and fragments. a. LIV-1, Z2650/422. b. KIV-4, Z2650/387. c. LIV-1, Z2650/422a. d. KXXVI-3, Z2650/4000.

eastern coast of the Coromandel Peninsula. The majority of these points are made from the locally available siliceous materials, such as chert and quartz, although some examples made of basalts and metamorphosed argillites have been found. Stone points, made from a variety of materials, were being both made and used at Hahei. They were found in various stages of manufacture and use – from unfinished to complete but apparently unused, through to blunted or broken and discarded.

Siliceous waste flakes were found scattered throughout the excavated area. However, they do not only represent stone point production. Siliceous flakes were also used as unmodified tools on this site and while it is likely that some of them were simply selected from the residue of stone point manufacture, the size and shape of many suggest that they were deliberately produced.

A large number of obsidian flakes and several small cores were also found. While the number and weight of the obsidian flakes recovered are considerably less than for the siliceous flakes, more of the obsidian flakes have been utilised as tools, indicating that obsidian was, in fact, the preferred material.

Methods of Analysis

Leach (1979) has argued that the depth of penetration of the drill tip and the diameter of the largest hole made by it are of more cultural significance than the length and breadth of the drill points. Whilst this is undoubtedly correct, the depths of penetration of the Hahei drill points were unable to be measured (see below). Therefore, the more traditional measurements of length, width and depth were taken. Any unusual features such as polishing and double endedness were noted and a record made of the cross section of the mid-point. An examination of a sample of the drill points indicated that rectangular cross sectioned points are usually made by unifacial, bilateral working (although the direction of the flaking often changes) and that triangular sectioned points are made by unifacial trilateral working. Consequently, the cross section provides a rough guide to the method of manufacturing at the least. Furthermore, it enabled a comparison with the Hot

Water Beach (Leahy 1974) and Opito (Boileau 1980) assemblages of drill points to be made.

The method of analysis used for the obsidian and the siliceous material was the same. All flakes were visually inspected for signs of use. Waste flakes were then

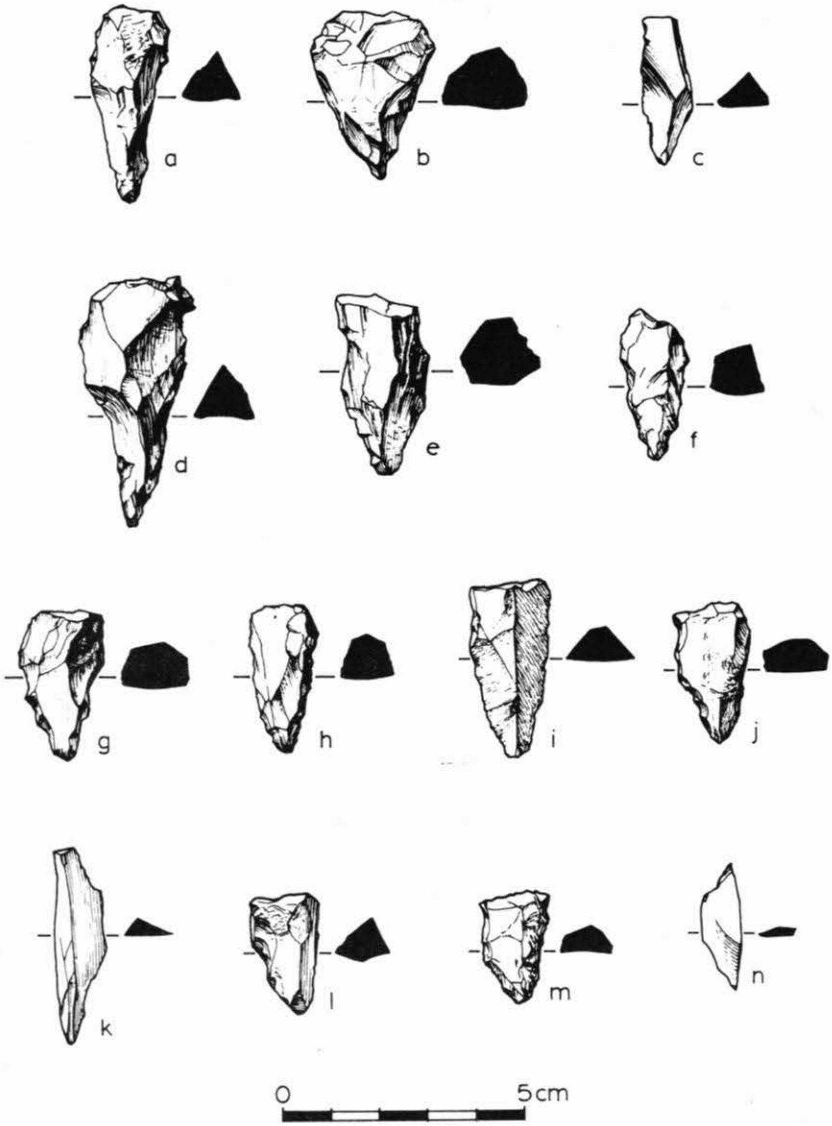

Figure 8: Stone drill points. a-h, siliceous material, i-j, Tahanga basalt, k, black volcanic stone, l-n, metamorphosed argillites. a. OIX-1, Z2650/2934. b. LVII-1+3, Z2650/2168. c. KXVII-1, Z2650/802. d. JXI-3, Z2650/1508. e. LV-4, Z2650/325. f. KIV-1, Z2650/600. g. NVII-4, Z2650/2798. h. LIX-1, Z2650/1951. i. PV-2, Z2650/4032. j. OVII-4, Z2650/2896. k. KXVII-3, Z2650/830. l. JVII-3, Z2650/2413. m. JXI-3, Z2650/1508a. n. JXII-3, Z2650/1531.

sorted into those weighing more than 0.5 g and those weighing less. Small flakes were simply counted and weighed by area. Flakes over 0.5 g were further divided into those with cortex covering more than one third of the dorsal surface, and those without. No further classification of the siliceous flakes was undertaken. Four hundred and forty-four of the obsidian flakes, however, were submitted for trace element analysis, to determine their source. An energy dispersive XRF spectrometer was used. Included in the sample were both utilised and waste flakes. All were over the minimum 10 mm x 10 mm size required for spectroscopy.

Results

A total of 210 complete stone points and fragments were recovered with an additional 16 being found in the unsieved areas of the site (Table 4). Of these 210, the majority (91 percent) are made from siliceous materials (Figs. 8a-h) with the remainder being made from Tahanga basalt (Figs. 8i-j), black volcanic stone (Fig. 8k), and metamorphosed argillites (Figs. 8 l-n), including the Ohana source (Fig. 8n).

Rectangular sectioned points are the most common for both siliceous and non-siliceous materials (respectively, 67 percent and 57 percent of those for which cross sections were able to be determined). Rectangular sectioned points also outnumbered triangular ones in the Opito (N40/3) assemblage (Boileau 1980) although the reverse is true of the collection from N44/69 at Hot Water Beach (Leahy 1974).

The average length of the siliceous rectangular points is considerably more than that of the triangular ones, although their range is less (Table 4). The size range of the non-siliceous points is within that of the siliceous points but there is more variation in their shapes. Since many of them have been worked from (presumably broken) adzes, this variation may be due to the limitations imposed by the adze fragment. Two points, for example, each have two polished surfaces which intersect at right angles, indicating that they have been made from the side edge of a quadrangular sectioned adze (Fig. 8 l). Altogether, nine points have areas of polishing or hammerdressing, indicating their derivation from adzes. Eight percent (two specimens) of the non-siliceous points are double ended, i.e. they have been shaped to a point at each end (Fig. 8k, n), while only 1 percent (also two examples) of the siliceous points have been treated in this way. This may well reflect the comparative scarcity and consequent high value placed on the harder, non-siliceous points by the occupants of the site.

The number of both siliceous flakes over 0.5 g and drill points with one or more areas of cortex on them (9 percent and 15 percent respectively) indicate that the primary flaking of cores was being carried out on the site. Obsidian, too, was being worked from cores with weathered surfaces. Of the 19 siliceous and 7 obsidian cores recovered, 7 and 3 respectively have areas of cortex still intact. This, their small size (the maximum length for sliceous cores is 65 mm and for obsidian 44 mm) and the small size of the flakes suggests that they were originally fist sized.

Although there are more siliceous flakes weighing over 0.5 g than there are obsidian (Table 5), a lesser proportion have cortex. This may well be due to the greater amount of secondary flaking that is required to shape a point than an unmodified flake tool.

TABLE 4
STONE TYPES AND CROSS SECTIONS OF 210 STONE POINTS

	Complete		Broken (body)		Broken	Unfinished
	Tri.	Rect.	Tri.	Rect.	(tip)	
SILICEOUS						
Layer 3	28	56	13	24	41	21
Pit A fill	–	2	1	1	–	–
Pit B fill	–	2	–	–	1	–
Pit C fill	1	–	–	–	–	–
Pit D fill	–	1	–	–	–	–
Total	29	61	14	25	42	21
Length (mm) L.3						
Maximum	510	440				
Minimum	140	130				
Mean	269	287				
Length (all fills)						
Maximum	300	440				
Minimum	300	220				
Mean	300	332				
TAHANGA BASALT						
Layer 3	1	2	–	–	1	3
BLACK VOLCANIC						
Layer 3	1	1	–	–	–	–
META. ARGILLITE (Pale green/grey)						
Layer 3	1	2	–	–	–	–
OTHER						
Layer 3	3	3	–	–	–	–
Total	6	8	–	–	1	3
Length (mm)						
Maximum	410	380				
Minimum	200	230				
Mean	296	285				

The distribution of the small (less than 0.5 g) flakes of obsidian is shown in Figure 9 and that for siliceous small flakes in Figure 10. Some areas have a greater density of stone residue than others, but there is little evidence for specialisation in the obsidian and siliceous stone working industries.

Results (Seelenfreund pers.comm.) were obtained for 397 of the 444 obsidian flakes submitted for XRF spectroscopy (Table 6). Despite the proximity of site N44/97 to two of the Coromandel sources of obsidian (the Hahei deposits [Moore 1983, Fig. 2] are less than 2 km away and the Cook's Bay ones [ibid.] 6 km), neither were exploited to any great extent. The deposit on Great Barrier Island, which at 66 km to the northwest is only 2 km further away than Mayor Island is to the southeast, does not appear to have been of importance either. The use of obsidian from distant sources in preference to local ones is seen in other New Zealand sites, e.g. N44/2, Tairua (Moore and Coster 1984) and N6/4, Mt Camel (Bollong 1983:148). Certainly, Mayor Island obsidian dominates in most of the east coast Coromandel Peninsula Archaic middens, including Hahei where it forms 39.3

TABLE 5
NUMBER OF OBSIDIAN AND SILICEOUS FLAKES WEIGHING 0.5 g OR MORE

AREA	SILICEOUS		OBSIDIAN	
	>0.5 g	% with cortex	> 0.5 g	% with cortex
J-L III-V	232	10.8	132	22.7
J-L VII-IX	327	12.2	90	14.4
J-L XI-XIII	209	11.0	70	21.4
N-P III-V	297	6.1	88	23.9
N-P VII-IX	284	8.8	66	19.7
K-L XVI-XVII	50	4.0	18	22.2
K-L XVIII-XIX	28	3.6	18	38.9
K-L XX-XXI	29	10.3	33	33.3
K-L XXIII-XXIV	1	100.0	10	10.0
K-L XXVI-XXVIII	8	25.0	9	33.3
TOTAL	1465	9.6	534	22.1
Pit A fill	23	17.4	27	14.8
Pit B fill	26	7.7	21	23.8
Pit C fill			6	–
Pit D fill	5	–	4	–
Pit E fill	1	–	1	–
JXIII Scoop	1	–	–	–
TOTAL	56	10.7	59	15.2

TABLE 6
OBSIDIAN SOURCE IDENTIFICATIONS, BY WEIGHT AND NUMBER

SOURCE	CONFIDENCE LEVEL					
	> 95%		< 95%		TOTAL	
	No.	Wt.	No.	Wt.	No.	Wt.
MAYOR IS.	57	223.6	99	188.9	156	412.5
MAY/NOR	19	105.6	30	132.7	49	238.3
HU/GBA/FA	53	175.5	17	29.5	70	205.0
HU/GBA/FA/CO/INL.	38	235.7	4	8.9	42	244.6
FANAL ISLAND	21	39.9	17	25.8	38	65.7
COROMANDEL	3	21.4	–	–	3	21.4
INLAND	11	87.1	–	–	11	87.1
GBA	3	6.9	–	–	3	6.9
NORTHLAND	2	2.0	5	8.4	7	10.4
HURUIKI	10	27.3	1	6.0	11	33.3
OTHER	4	3.5	3	29.3	7	32.8

MAY = Mayor Island
NOR = Northland sources (Kaeo, Weta, Waiare, Pungaere)
CO = all Coromandel sources
INL = Rotorua and Taupo sources
HU = Huruiki
GBA = Great Barrier Island
FA = Fanal Island

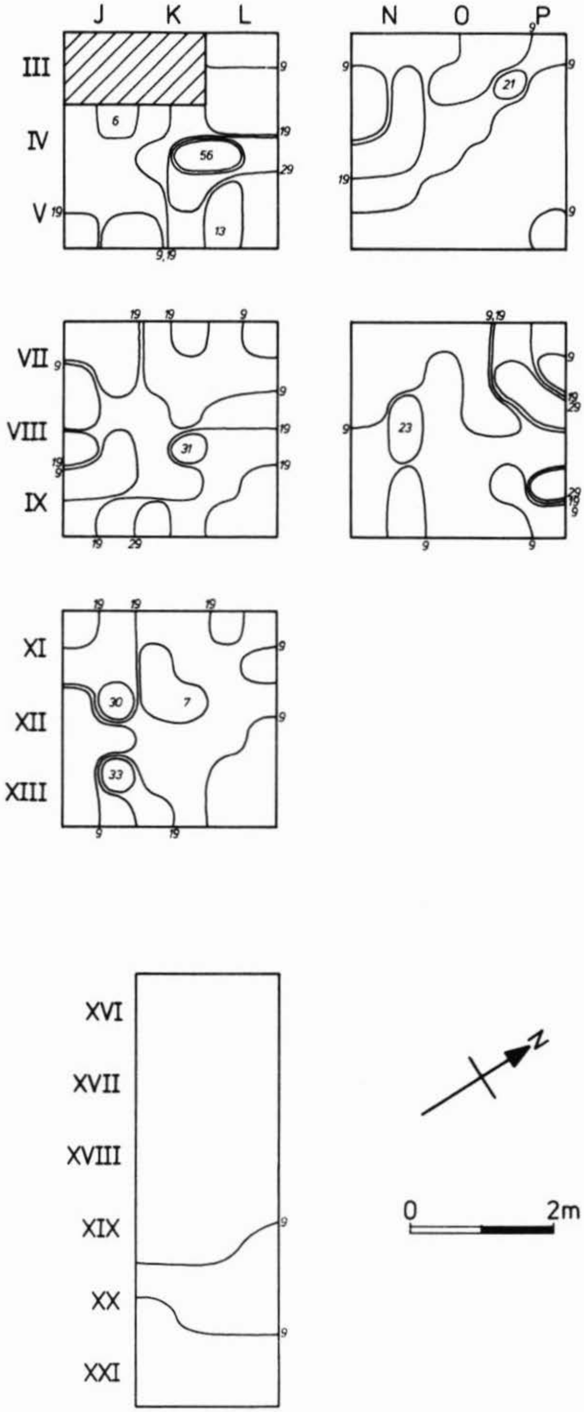

Figure 9: Distribution of 3357 small (less than 0.5g) obsidian flakes. Squares K-L XXIII-XXVIII have not been included since the concentration is less than 9 per 50cm square unit.

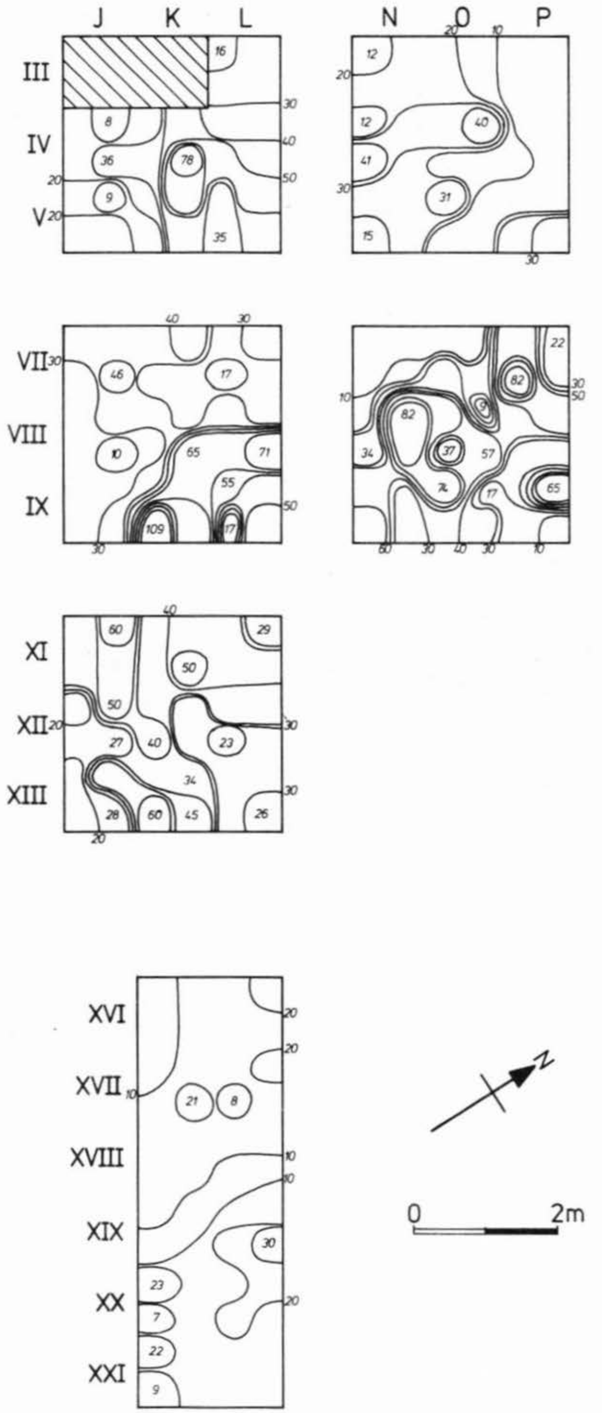

Figure 10: Distribution of 6083 small (less than 0.5g) siliceous flakes. Squares K-L XXIII-XXVIII have not been included since the concentration is less than 9 per 50cm square unit.

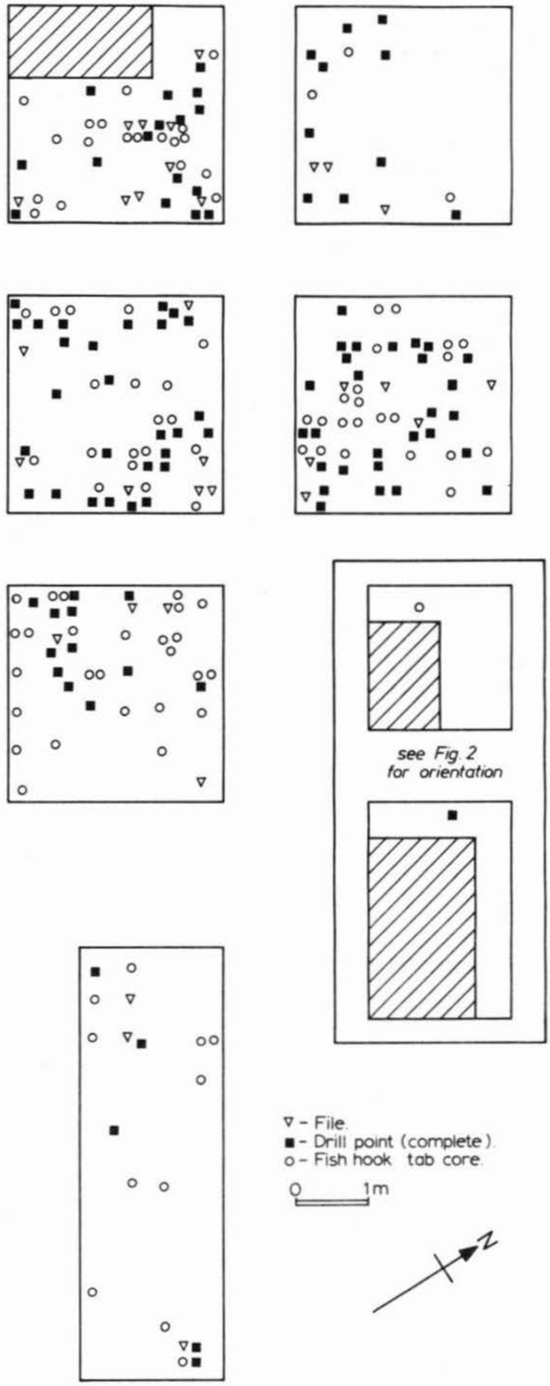

Figure 11: Distribution of stone file fragments, complete stone drill points and bone fish hook tab cores in excavated area.

percent, possibly more, of the total number of flakes analysed (30.4 percent by weight) (Table 6). Obsidian from at least seven different sources, as far away as Northland and Taupo/Rotorua, was used at the site.

STONE POINTS AND FLAKE TOOL USE

In many of the Archaic beach middens on the eastern coast of the Coromandel Peninsula, the stone points found have been associated with residue from the manufacture of fish hooks. This has generally led to their being interpreted as having been used to drill out the centres of fish hook tabs (for example, N40/3, Opito (Boileau 1980) and N30/5, Harataonga (Law 1972)). Leahy (1974), however, suggests that there may have been a functional difference between the triangular and rectangular sectioned points from Hot Water Beach and that the larger basalt points may have been used in woodworking.

The small amount of worked bone recovered from N43/1 on Ponui Island in the Hauraki Gulf as well as the lack of correlation between the distribution of stone points and fish hook debris led Nicholls (1964) to question whether the stone points from the site were being used exclusively to make fish hooks. More recently, Leach (1979) failed to find any direct relationship between stone points and fish hooks in a workshop at N168-9/20 in Palliser Bay. The study of use damage on the 19 stone points excavated from the site suggested to Leach (ibid.) that they had probably been used for drilling materials such as wood, rather than bone.

Two hundred and ten stone points were recovered from Hahei. Although the distribution of these does correspond closely to that of fish hook tab cores (Fig.11), there is some evidence that other objects, which would also require drilling, such as shark tooth necklace units, were being manufactured on the site. In addition, the use of the stone points to drill shell, wood and even stone could not be ruled out. It was hoped, therefore, that a study of the use damage on the drill points would indicate if they had been used to work materials other than bone and that a comparative study of the points and the fish hook tab cores could be undertaken.

A sample of eighteen siliceous points were examined under a metallurgical microscope using magnifications of 100x and 200x when necessary. No striations were present and use polish was limited to minute patches on the raised ridges of a few points only. This polish was not at all distinctive and differed only in intensity and brightness from a natural sand or soil polish which has been identified on many New Zealand stone tools (Kooyman pers.comm.). Consequently it was impossible to determine what materials had been worked by the points, what their depths of penetration were and the maximum diameters of the holes drilled by them. This is in sharp contrast to the siliceous points from N168-9/20 where use polish was identified at low magnifications.

All of the flakes recovered from the site were inspected for use damage. Only a preliminary examination was carried out. No microscopic analysis was undertaken and no attempt made to quantify the edge damage (although the angle of working was assessed visually as acute, moderate or steep). Consequently, the data presented are provisional and the conclusions drawn from them tentative only.

Eighty-seven obsidian, 59 siliceous, 7 Tahanga basalt and one fine grained black volcanic flake were found to have damage which was consistent with their having been used as tools. The edge modification on a further 32 obsidian and 35 siliceous flakes was not distinctive enough to identify them positively as utilised. An additional 36, mostly siliceous, fragments of either points or used flakes were also present. Two main types of use damage were identified. One consists of small "bites"

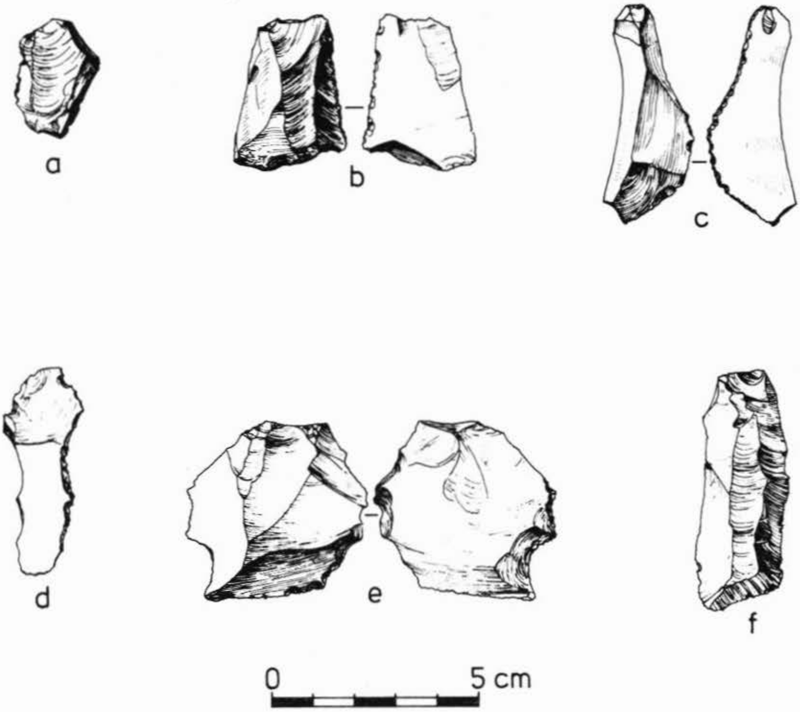

Figure 12: Use damaged stone tools. All except (d) are obsidian. a. OIV-3, Z2650/4156. b. LIX-4, Z2650/1441. c. LXVII-2, Z2650/868. d. LV-1, Z2650/464. e. PIX-4, Z2650/2740. f. KXXI-2, Z2650/3596.

together with light unifacial and, occasionally, bifacial flaking, on acute angled edges (Fig. 12a, b). Such damage is formed through cutting and sawing actions as well as scraping with an acute angled edge (Morwood 1974). The other type of use damage is unifacial flaking on moderate and steep angled edges (Fig. 12c, d). The angle of working appeared to have been increased by retouching prior to use, on a few of these examples. Scraping characteristically produces unifacial damage on stone tools (ibid.). Notches from 4 mm to 14 mm in diameter are present on seven of the obsidian and four of the siliceous flakes (Fig. 12e). Such notching has been found on other assemblages, for example N168-9/20 at Palliser Bay, where it was interpreted as being the result of scraping shafts (Leach 1979).

A greater proportion of obsidian flakes (approximately 55 percent) than siliceous flakes (31 percent) had been used on more than one edge, indicating that a higher value was placed on the former material. In many cases, both types of damage described above were present on different edges of the same flake, suggesting that some flakes were used for more than one function.

Ten percent of utilised siliceous flakes and 9 percent of the obsidian ones were, in fact, blades (Fig. 12f), i.e. they had parallel sides and their lengths were more than twice their widths. Virtually all of the siliceous and obsidian blades in the assemblage had been utilised or were in the "Not Necessarily Used" category. This suggests that straight-sided flakes were specifically selected for use and that their production, therefore, was most probably intentional rather than fortuitous.

ABRADER USE

There is no evidence that the final stages of adze manufacture, those of hammerdressing and polishing, were being carried out in the excavated area of the site. Never-the-less, one hammerstone was recovered. It was from the lower fill (Harsant 1984) of an unsieved area of pit C and is a small, oblong, river pebble with three areas of use (Fig. 13a). Two of these have been hammered or ground flat through use, while the other remains pitted. A fist-sized, disc shaped pebble, which is fire-blackened, was also found in the unsieved fill of pit C. Despite its seemingly ideal shape, there is no evidence that it was used for hammering.

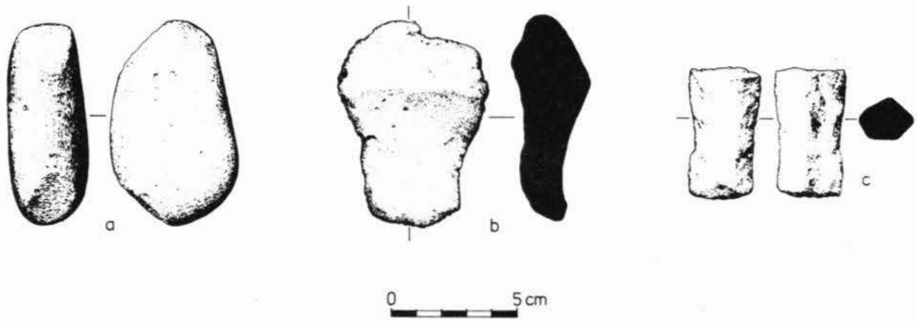

Figure 13: Abraders and hammerstones. a. Hammerstone, Pit C, Z2650/2571. b. Piece of grinding stone, Pit A, Z2650/1591. c. File, stone pile LXXI-3 & 4, Z2650/3571.

Two fragments of grinding stones were also recovered, both from unsieved areas of the site—one from pit A fill, the other from layer 3 in square GXI. The latter is a small piece of sandstone which has been ground smooth on one surface and the former is pumice and has several areas of use (Fig. 13b).

No complete files were recovered but thirty-seven fragments of broken files were excavated from the sieved areas of the site, including three from the fill of pit B and one from pit C. An additional two came from the unsieved areas of layer 3 and three from the unsieved fill of pit A. Two are made of pumice and the remainder are sandstone. Their use as files is evident from the smoothing on the long edges and, where present, the ends. With one exception, all are lenticular or rounded in cross section; they vary considerably in size. The remaining one, which is the largest fragment, is pentagonal in section (i.e. it has been ground on five planes) and has a maximum width of 28 mm and depth of 22 mm (Fig. 13c). Most of the files are assumed to have been used in the smoothing of drilled fish hook tabs. Their distribution in the site, together with that of drill points and fish hook tab cores, is presented in Figure 11.

THE BONE ASSEMBLAGE

The artefactual bone is dominated by residue from the manufacture of one-piece fish hooks. Especially common are fish hook tab cores, the piece drilled from the centre of the tab. Very little other worked bone was recovered. The majority of the artefactual bone is moa bone although at least one drilled fragment of sea mammal and some worked dog and bird bone are also present.

FISH HOOK MANUFACTURE

No complete bones suitable for the manufacturing of fish hooks were recovered, indicating that long bones were cut elsewhere and then brought on to the site for further cutting and shaping into fish hooks. All other stages of manufacture were carried out in the excavated area. Some of these, such as the smoothing of both the tab and unfinished hooks, are under-represented in the debris. There are, for example, only four cut fragments of moa bone which are large enough to be suitable for making into one-piece fish hooks, and only two partially prepared tabs. One of these tabs, which is burnt and broken (Fig. 14a), was found in the firepit in JXIII while the other, together with two of the cut fragments of moa bone, was recovered from the stone pile (adding to the evidence that the stone pile had been deliberately constructed from potentially usable industrial materials). A further fragment of moa bone had been partially shaped and drilled on the top surface only before being discarded. Only two unfinished fish hooks were recovered. This is in sharp contrast to N40/3 at Opito where 96 were obtained (Boileau 1980). Both (Figs. 14b, c) are squared at one end and slightly rounded at the other. One was found in the fill of pit C and the other, which was recovered in two pieces, came from layer 3, KVIII–3.

By contrast 114 complete fish hook tab cores and 20 fragments of finished fish hooks were recovered from the sieved areas of the site (Table 7) and a further 6 and 5 respectively from the unsieved areas. Only eight of the fragments of finished hooks are diagnostic. Of these, seven (including two from unsieved areas) are shank legs with heads intact (Figs. 14k-o) and one appears to be the incurved tip of a point leg. All seven shank heads have simple attachment devices—a step or groove on the internal side and a concavity on the external side. Three are flat on the top of the head, four are notched. Such attachment devices are typical of Crosby's (1966:187) Opito type 1 fish hooks. One-piece fish hooks of this type also dominated the assemblages at N40/3, Opito (Boileau 1980) and N44/69, Hot Water Beach (Leahy 1974), as well as other Archaic assemblages from the east coast of the Coromandel Peninsula.

TABLE 7
NUMBERS AND LENGTHS OF BONE FISH HOOK TAB CORES AND BROKEN FISH HOOKS

	Layer 3	Pit A	Pit B	Pit C	J-K XIII features
TAB CORES					
Number found	101	5	2	4	2
Length:					
Maximum (mm)	310	350	210	280	200
Minimum (mm)	90	140	190	150	150
Mean (mm)	175	270	200	185	175
BROKEN HOOKS	16	3	–	–	–

Given the fragmentary nature of the finished fish hooks, the sizes of the hooks manufactured on the site and subsequently removed are difficult to determine. The range in the thicknesses of the fragments and the size range of the tab cores certainly suggest that a wide variety in sizes of hooks were produced. However, only five cores (of which three are from pit fills), or 4 percent of the total recovered, are over the 300 mm size which Leahy (ibid.) estimates was equivalent to a very large hook at Hot Water Beach.

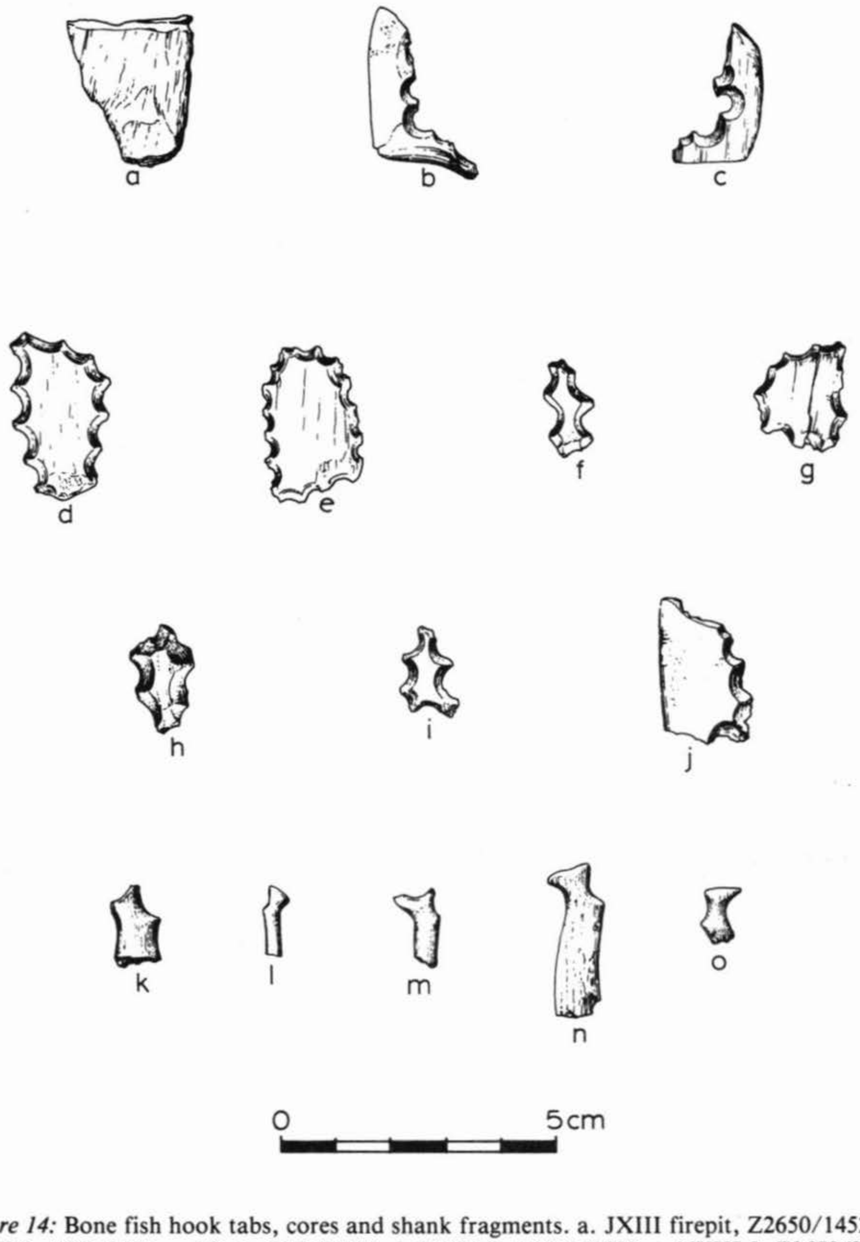

Figure 14: Bone fish hook tabs, cores and shank fragments. a. JXIII firepit, Z2650/1452. b. KVIII-3, 1979/2071. c. Pit C, Z2650/895. d. NVIII-3, Z2650/2797. e. NVIII-2, Z2650/2932. f. LXI-2, Z2650/1461. g. JIX-1, Z2650/2228. h. KXII-1, Z2650/1414. i. JXIII-3, Z2650/1421. j. KVII-1, Z2650/2154. k. Pit A, Z2650/1578. l. LIX-4, Z2650/1937. m. OVIII-2, Z2650/2972. n. Pit A, Z2650/1556. o. KXII-4, Z2650/1622a.

At an average size of 175 mm and a range of from 90 mm to 350 mm, the tab cores in the Hahei collection are rather small compared with the Hot Water Beach cores (mean 220mm; range 70-340) and Opito (mean 285; range 120-520).

Consequently the lack of information on the range of species and sizes of the fish procured at Opito and also Hahei (see below) is unfortunate.

A decrease in the size and number of one-piece moa bone fish hooks produced, through time, has been noted in a number of Archaic sites (e.g.Opito, N40/3) and localities (e.g. Harataonga Bay) in the region, where it has been attributed to the increasing scarcity of moa bone. At Hahei, the tab cores from the pit fills, which are stratigraphically earlier than layer 3, are larger than those recovered from layer 3 (Table 7). However, only a small number were recovered from the pit fills and, in addition, the time depth involved is not considered to be great.

Fish hooks of materials other than moa bone were also being made on the site. There is one piece of a large tab of sea mammal bone (Fig. 14j) and both pit fills and layer 3 contained worked dog bone, including jaw bone, although there is no indication that the artefacts being made were fish hooks. None of the dog teeth recovered were modified.

A small amount of worked bird bone was also found. This is limited to small fragments and pieces which have been cut. One bone tube was recovered from the fill of pit B.

ORNAMENTS

In a region which is noted for both the variety and quantity of its Archaic ornaments, site N44/97 at Hahei stands out as being unusually rich. Two elephant seal tooth pendants and 21 ivory reels (belonging to two necklaces) were found in association with a burial (Edson and Brown 1977) about 40 metres away from the excavated area discussed in this report. Also collected at the time was a single *Carcharodon* tooth unit.

One complete and one broken stone reel, one bone tube and two *Carcharodon* tooth units were found during the 1979 excavations. The complete reel (Fig. 15a) is 180 mm in length and 160 mm wide. It has a ridge at each end and a central median one, none of which are notched. The maximum diameter of the hourglass longitudinal perforation is 80 mm. The end ridges are chipped and show signs of weathering. The fragment (Fig. 15b), which was recovered from the fill of pit C, is from a reel of the same style but, at 210 mm in length, it is slightly longer. Stylistically both reels belong to Edson and Brown's (1977) variety A. They have, however, been made from mudstone (Mason pers. comm.) rather than ivory.

One tube, made from dog bone (Fig. 15e) was found. At 14 mm in length, it falls within the size range of the 78 dog and bird bone tubes in the Opito assemblage (Boileau 1980).

Both modified *Carcharodon carcharias* (white pointer shark) teeth recovered in 1979 are smaller than the previous find. They and four unmodified *C. carcharias* teeth excavated are from a young shark and are probably pre-emergent (Darby pers. comm.). One of the modified teeth (Fig. 15d) has been cut in a similar manner to that reported by Edson and Brown (ibid. Fig. 38) but it has two perforations (both of which have broken). The other tooth has a single perforation only. The sides have been cut more severely and are slightly indented (Fig. 15c). An unperforated shark tooth worked in a similar manner to this one was found at Wairau Bar and was described by Duff (1956:225-226) as a tattooing chisel, bilaterally reduced for hafting. The presence of three similarly worked *C. carcharias* teeth at Hahei, however, suggests that their use as necklace units is more likely. A broken *mako* shark (*Isurus* sp.) tooth was also found.

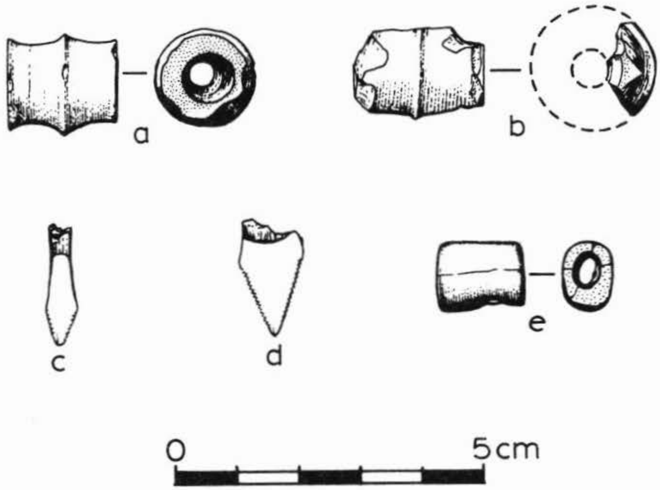

Figure 15: Ornaments. a-b, Stone reels. a. KV-1, Z2650/625. b. Pit C, Z2650/3285. c-d, *Carcharodon* teeth. c. LV-4, Z2650/174. d. LIV-3, Z2650/228. e. Bone tube, Pit B, Z2650/1719.

THE FAUNAL ASSEMBLAGE

Faunal material was scattered throughout the site but more concentrated around the firescoops and down the slope of the dune. Much of it was weathered and fragmentary and some of the bone had been gnawed by rats. This made identification difficult in many cases.

Fish

A minimum number of four snapper (*Chrysophrys auratus*), three leatherjackets (*Parika scaber*) and two *Pseudolabrus* sp. (belonging to two different species) was calculated. In addition, there were a lot of small fragments of snapper premaxillas and dentaries which were not included in the minimum numbers (Davidson pers.comm.). It would appear, therefore, that snapper was the predominant fish caught. They, together with the leatherjackets and labrids, could have been taken, by line, from Hahei Bay.

The spine of a ray (Elasmobranchia) and a coxa of a decapod crustacean were also present. Two species of sharks, *Isurus* sp. and *Carcharodon carcharias*, were represented by teeth only. It is likely that the teeth were brought to the site to be made into ornaments and that the sharks, themselves, were consumed elsewhere.

Shellfish

The minimum numbers of shellfish present are given in Table 8. Numbers of bivalves were calculated by dividing the total number in two. The opercula of the cat's eye, *Lunella smaragda*, were counted and the whorls of other gastropods. Both soft shore and rocky shore species were exploited, with cat's eye being the more favoured. However, all of the shell was in a very poor state of preservation and the predominance of *Lunella* sp. could be due in part, at least, to differential preservation. Certainly, very few *Lunella* sp. whorls survived in the site.

TABLE 8
MINIMUM NUMBERS OF SHELLFISH PRESENT IN LAYER 3

	JIII-LXIII NIII-PIX	KXVI-LXXI	LXXVI-LXXVIII
Lunella smaragda	265	192	28
Cookia sulcata	8	4	3
Neothais scalaris	10	4	3
Strutholaria papulosa	2	–	–
Paphies subtriangulatum	4	3	1
Paphies australe	5	42	4
Paphies sp.	3	25	–
Chione stutchburyi	–	1	2
Maoricrypta costata	–	–	1
Pecten sp.	–	–	P
Haliotis sp.	P	–	–

Birds

Again, the bird bone in the site was poorly preserved and fragmentary. Only five bones were able to be identified with certainty. A minimum number of one spotted shag (*Stictocarbo punctatus*), one small petrel (*Pterodroma* sp.) and one native wood pigeon (*Hemiphaga novaezeelandiae*) were present (McGovern-Wilson pers.comm.). A fragment of what is thought to be a blue penguin (*Eudyptula minor iredalei*) was also recovered.

Other

Fragments of dog bone were found scattered throughout the site. Much of it was industrial and not more than one individual was represented (Darby pers.comm.). Only a few fragments of sea mammal bone were recovered and, again, these were probably industrial waste. Rat (*Rattus exulans*) bones were also found over the whole site. Minimum numbers were not calculated. The weathered state of much of the lithic and faunal material indicates that the site has, at some time, been exposed for a period, before recovering. During exposure, the bone has been gnawed by rats. Consequently, some of the rats deposited in the site could be natural. Certainly a semi-articulated skeleton, found in layer 2, is. A fragment of the probable left mandible of a tuatara, *Sphenodon punctatus*, was also present (Mason, pers. comm.).

The volume of faunal material recovered from N44/97 was small. However it shows a pattern of exploitation of the local environment that is similar to other Archaic sites in the region. This is based on the generalised hunting, fishing and gathering of a wide range of ecological zones, close by the site.

DISCUSSION

The excavated assemblage from N44/97 is dominated by Tahanga basalt waste flakes. A study of these in conjunction with discarded preforms has enabled a fuller understanding of the processes of adze manufacturing used by the artisans. Roughly flaked preforms were brought to the site for secondary trimming and final shaping before being taken elsewhere for hammerdressing and polishing. Viewed alone, the discarded preforms suggest an almost exclusive production of small to medium thin, rectangular sectioned adzes. However, the trimming flakes show that other forms were also being made; reversed triangular (hog back) adzes were recognised from the presence of diagnostic blades struck from the front side of the cutting edge. This technique of prepared blade detachment is an ancient one. It was known and used by the Riverton stoneworkers in the 12-14th centuries and the D'Urville Island adze makers (Leach, pers.comm.) as well as those living at Hahei in the fourteenth century. The distribution pattern of adze manufacturing debris has shown several areas of concentrated Tahanga basalt flaking and, furthermore, points to specialisation in adze manufacturing techniques.

The level of maintenance carried out on both Tahanga basalt and "exotic" adzes, brought on to the site and subsequently removed, demonstrates the high value placed on scarce resources by the occupants. Nephrite, perhaps, illustrates the extreme case of this.

The large quantity of discarded drill points and their apparently brief period of usage, however, shows that local siliceous stone was freely available. Obsidian also, despite its importation from considerable distances, was in abundance. Not all seemingly suitable flake tools show evidence of use although a fuller examination of them is required to confirm this.

The high level of craftmanship evident in the stone working is also seen in fish hook manufacture. Only one rejected tab, two broken and unfinished hooks and seven shank fragments of broken hooks were recovered although at least 114 cores had been successfully removed from drilled tabs. The almost complete lack of potentially usable bone in the site also indicates careful management of resources. A decrease in the size and number of one-piece fish hooks over time, noted in many sites, including Hot Water Beach, and other areas on the east coast of the Coromandel Peninsula has been explained as due to an increasing scarcity of moa bone. In view of the small size of the Hahei fish hooks it is tempting to place its occupation between that of layers 5 and 4 at Hot Water Beach. The two sites are an easy one to two hours walk apart, less by canoe. However, the species and, especially, the size of fish to be taken must have influenced the size, and possibly shape, of hook made. The lack of a good sample of fish bone from Hahei to compare with that from Hot Water Beach is much regretted. An emphasis on line fishing, indicated by the one-piece hooks made, is reflected in the fish bone that was recovered. Snapper is the most common (as at Hot Water Beach and most of the Archaic sites in the region). In contrast to many other sites, however, no trolling lures or fish likely to have been taken by them were found in the deposits.

CONCLUSIONS

Site N44/97 at Hahei clearly belongs to a well established cultural tradition which persisted for several centuries during the Archaic period on the east coast of the Coromandel Peninsula. The high level of achievement of this tradition is well attested by the richness of its ornaments. It is based on a well defined adaptation to and exploitation of local resources. It did not develop and exist in isolation, however, but was a part of an extensive network for the exchange of goods, if not ideas. Stone, probably in the form of finished adzes, was obtained from as far south as Otago. Since the evidence from Hahei and other Archaic middens in the region reflects the production of what would appear to be a surplus of Tahanga basalt adzes, or rather preforms, it is possible that their export played a part in that exchange network. Further detailed studies of the adze technology of the Archaic occupants of the east coast of the Coromandel Peninsula would help elucidate this.

ACKNOWLEDGEMENTS

I have received considerable assistance from many people during the preparation of this report. I would like to thank Moira White and Nikki Stewart (laboratory assistance), Andrea Seelenfreund (obsidian sourcing), Brian Kooyman (use damage), John Darby (bone identification), Rick McGovern-Wilson (bird bone), Janet Davidson (fish bone), Richard Newall (illustrations), Caroline Phillips (Fig. 3) and Shirley Tunnage (typing). Aspects of the analysis and interpretation of the site have benefited greatly from discussions with Janet Davidson and Helen Leach. Their encouragement and help is gratefully acknowledged.

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Received 27 August 1984