NEW ZEALAND JOURNAL OF ARCHAEOLOGY

New Zealand Mataa from Marlborough, Nelson, and the Chatham Islands

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ABSTRACT

Fifty-six New Zealand mataa were examined for manufacturing and usage evidence. Most mataa were probably used for a range of cutting purposes; some may be adze preforms. The distinctive butt modification or tang was probably designed to make it easier to hold the tool in the hand, rather than for hafting. The modification is most plausibly explained as an adaptation of a generalised East Polynesian adze manufacturing tradition.
Keywords: MATAA, NEW ZEALAND, CHATHAM ISLANDS, EASTER ISLAND, LITHIC TECHNOLOGY, USE, WEAR, HAFTING, EDGE DAMAGE, TYPOLOGY.

INTRODUCTION

The term mataa is conventionally applied to Polynesian flaked stone tools which have a flaked tang (Skinner 1927:183). The "type specimens" are distinctive of the material culture of the later period on Easter Island (Heyerdahl and Ferdon 1961:52, et passim). In New Zealand tools referred to as mataa have been recorded from the Chatham Islands (Smith 1892:81; Edge-Partington 1898: Plate 223; Giglioli 1911; Balfour 1917a, 1917b, 1918; Skinner 1923, 1928; B. F. Leach 1973). Supposedly related implements were reported in the earlier part of this century from the Western Pacific (Seligmann and Joyce 1907:326–328; Seligman 1915:161–2; Nevermann 1934:337–353).

Considerable attention was devoted to the earlier Chatham Islands and Western Pacific reports because of the diffusionist principles then adopted by ethnologists. The similarity in mataa still draws the attention of scholars (Bellwood 1978: 126, 141), but the role of mataa in a diffusionist argument has been explicitly rejected (Bormida 1951:306–308; Metraux 1957:232, 322).

While we now have systematic studies of "waisted" blades from Melanesia and the Western Pacific (Bulmer 1977) and of mataa from Easter Island (Mulloy 1961), a thorough study of New Zealand mataa has not been undertaken. The present study has as its object a technological and functional interpretation of mataa in New Zealand; distribution and technological affinities of mataa are also considered including a discussion of whether or not they were hafted.

DEFINITION OF MATAA

The first use of this term for a type of flake tool is unclear, but it is presumably borrowed from a native Easter Island usage (q.v. Thomson 1889:536) and adopted by New Zealand scholars. The word mataa is used in Maori to mean the glassy or crypto-crystalline rocks favoured for flaking; a variant of the word found in Hawaiian also signifies a stone suitable for flaking (Tregear 1891). It is possible that this general term has been applied to a specific class of tool.

In considering the subject of this study, it was deemed essential to avoid defining mataa as hafted flake tools, since hafting is one of the matters at issue. Hafting is probably implied by Skinner's use of the term "tang" in the definition "an implement with a flaked tang" in his principal work on flake tool classification (Skinner 1927:183). Knapp in a further study of flaked stone tools uses the term "handle" to distinguish one of his classes of scrapers, cautiously adding "for holding or hafting" (Knapp 1928). The term "tang" is here adopted for want of a more convenient word and is used in a strictly morphological sense: it is not to be taken to imply hafting. The definition of mataa used in this study is as follows:

> a mataa is any flaked stone tool, excluding drill points and flake adzes with ground cutting edges, which after removal from the core has been altered or retouched to form a tang.

This definition is admittedly open to the charge of being vague, allowing too many ill-assorted specimens to constitute a "type". However, the definition is so formulated to allow straightforward unambiguous decisions on membership of the class. This is regarded as essential to a valid consideration of variability and technological affinity within the class.

PREVIOUS CLASSIFICATIONS

Although native Easter Islanders in the 1880s purported to have a classification of mataa (Thomson 1891:536), and apparently still do (Heyerdahl and Ferdon 1961:398–399), this seems a relatively doubtful source for items last used in the 18th century. Furthermore, an indigenous classification may not suit the purposes of one which needs to span the whole of the Pacific and is underpinned by different preoccupations. H. D. Skinner is reported to have devised a classification (Metraux 1940:167) which may exist in manuscript. Recent enquiries to the Hocken Library, Dunedin, New Zealand, and the Bernice P. Bishop Museum Library failed to produce any trace of a copy of this classification. Mulloy attempted to use the Skinner and also the Bormida (1951:301–303) classifications, but concluded:

> that the material represents a continuous range of variation without objective natural order, and that the only classification possible must involve the subjective selection of ideal types from an infinite series of possibilities, and the arbitrary reference of intermediate forms to one or another of these. By this method any number of classifications could be devised, and each would do equal violence to reality. This is not surprising in view of the crudeness of the artifacts. In most cases the outline of the blade is determined by the fortuitous shape of the unmodified flake. (Mulloy 1961:151)

This is good commonsense and no attempt to sub-classify mataa morphological variation is made in this study.

There is a growing body of New Zealand literature on the description and interpretation of Polynesian flaked stone tools (Shawcross 1964, Bellwood 1969, Jones 1972, Morwood 1974, H. M. Leach 1979) which emphasises the need to concentrate on the used edges of the tools (e.g., White 1967, Hayden 1977). The emphasis is on determining the function of edges and the possible ways in which the tool was held and used. Formal "cultural" variation may exist in flaked stone tools, but this cannot be isolated from usage and manufacture. The present study is based on this approach and rejects the typological approach.

Mataa Assemblage Studied

Fifty-six mataa from New Zealand were studied from collections held in store rooms in New Zealand museums: six are from the Nelson/Marlborough area, one from Whangateau north of Auckland, and 49 from the Chatham Islands. Chatham Island specimens are made from chert (very common), schist (common), and obsidian (rare). The Nelson/Marlborough specimens are made from argillite and the Whangateau specimen from obsidian. About 30 mataa from the Otago Museum and three from the National Museum were on display and these were not examined closely. The assemblage composition was as follows:

(1) National Museum:	8 specimens, Nelson/Marlborough or Chatham Islands,
(2) Nelson Provincial Museum:	2 specimens, Nelson/Marlborough,
(3) Canterbury Museum:	33 specimens, mainly from Chatham Islands but with one from Wairau Bar, 2 specimens "hafted",
(4) Otago Museum:	12 specimens selected from a Chatham Islands flake collection,
(5) Mr J. M. McEwen:	1 specimen, Chatham Islands.

METHOD

There is no consensus among New Zealand archaeologists on attributes necessary for routine analysis of flaked stone artefacts. Although minimum standards are desirable, this project follows recent analyses in adopting measurements of overall size, lengths of retouched or altered edges, and effective edge angle of altered edges. An "altered" edge is one that shows signs of retouch or use damage or both. Specimens were examined and measured as follows:

All specimens

(1) Visual inspection of edges and manufacturing technique,
(2) Visual inspection aided with magnifying glass,
(3) Examination, aided with a 10X binocular microscope and reflected light from a diffuse source, for evidence of striation and minute edge damage.

Canterbury and National Museum specimens only

(4) Measurement of butt width at a point halfway along its length; measurement of overall length from the butt of the specimen,
(5) Measurement of all worked or used edges as follows:
  (a) unifacial or bifacial edge alteration (following the procedure of White 1967; Jones 1972; 90–98),
  (b) edge length (Jones 1972:90–98),
  (c) effective edge angle (Jones 1972:90–98),
(6) Measurement of distal edges as for (5) a, b, c,
(7) Where the striking platform was intact, the platform angle (B. F. Leach 1969:52–53) was measured.

The numerical data were gathered as a measure of overall size in comparison with Easter Island mataa, for an indication of how the edges of the mataa were used, how distal edges differed from the edges of the butt, and whether the specimens were the likely byproducts of adze manufacture. Examples of mataa were selected to illustrate the range of variation established by steps 1 and 2, and were described in detail (see Appendix 1).

The Canterbury and National Museum specimens were obtained at an earlier stage in the study, and provided a sufficiently large sample for the gathering of numerical data on edges. The Otago Museum specimens were examined at a later stage as a check on the comparability of assemblages of varying origin.

RESULTS

MANUFACTURING TECHNIQUE

The flakes selected for mataa manufacture usually had feathered distal or lateral margins (Fig. 1a). The proximal lateral margins of the flake were then heavily altered, frequently bifacially but occasionally on one surface only, reducing the proximal width of the flake and blunting its edges (Fig. 1b). In most cases of unifacial alteration, the flake was struck on the ventral surface with the retouch flakes coming off the dorsal surface. Occasionally, specimens had been altered from the surface of the original platform. Some specimens had minute (less than 3mm) step-fractures on to previous flake scars on both ventral and dorsal surfaces, suggesting a blow or blows in the plane of the flake on to the margin.

In some cases, the flaked alteration had been followed by pecking to produce a rounded surface (Fig. 1c). In others, initial heavy alteration (up to 2cm deep) had been followed by lighter alteration directly on to the edge and producing minute step fractures. Systematic alteration of the distal margins was rare but occasionally light (less than 3mm) unifacial alteration occurred. Other alteration is described in the section on usage.

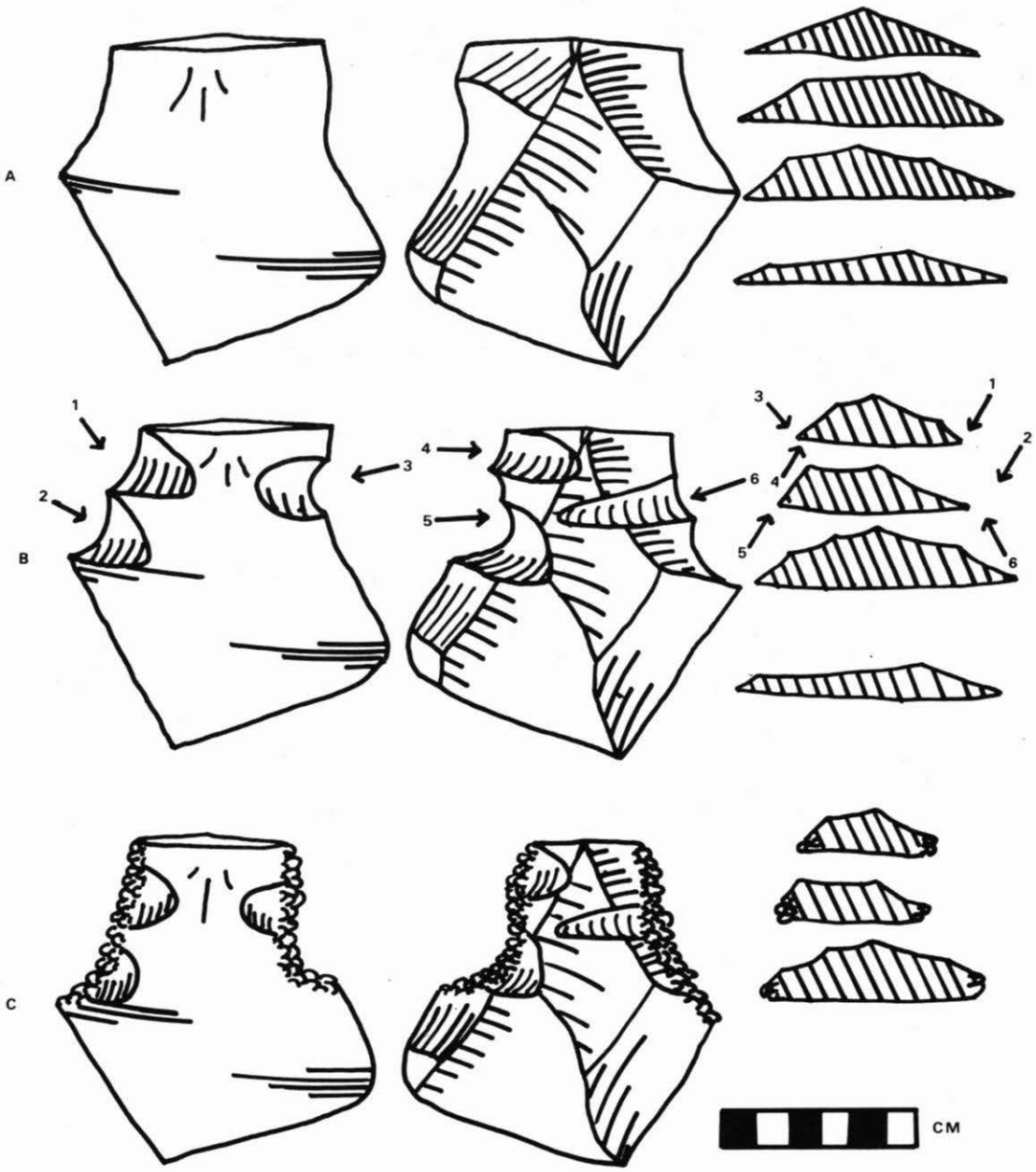

Figure 1: Suggested stages in the manufacture of mataa: (a) flake selected with feathered distal edges, (b) alteration of proximal margins by deep invasive retouch in sequence, 1, 2, 3, . . ., (c) pecking of proximal margins.

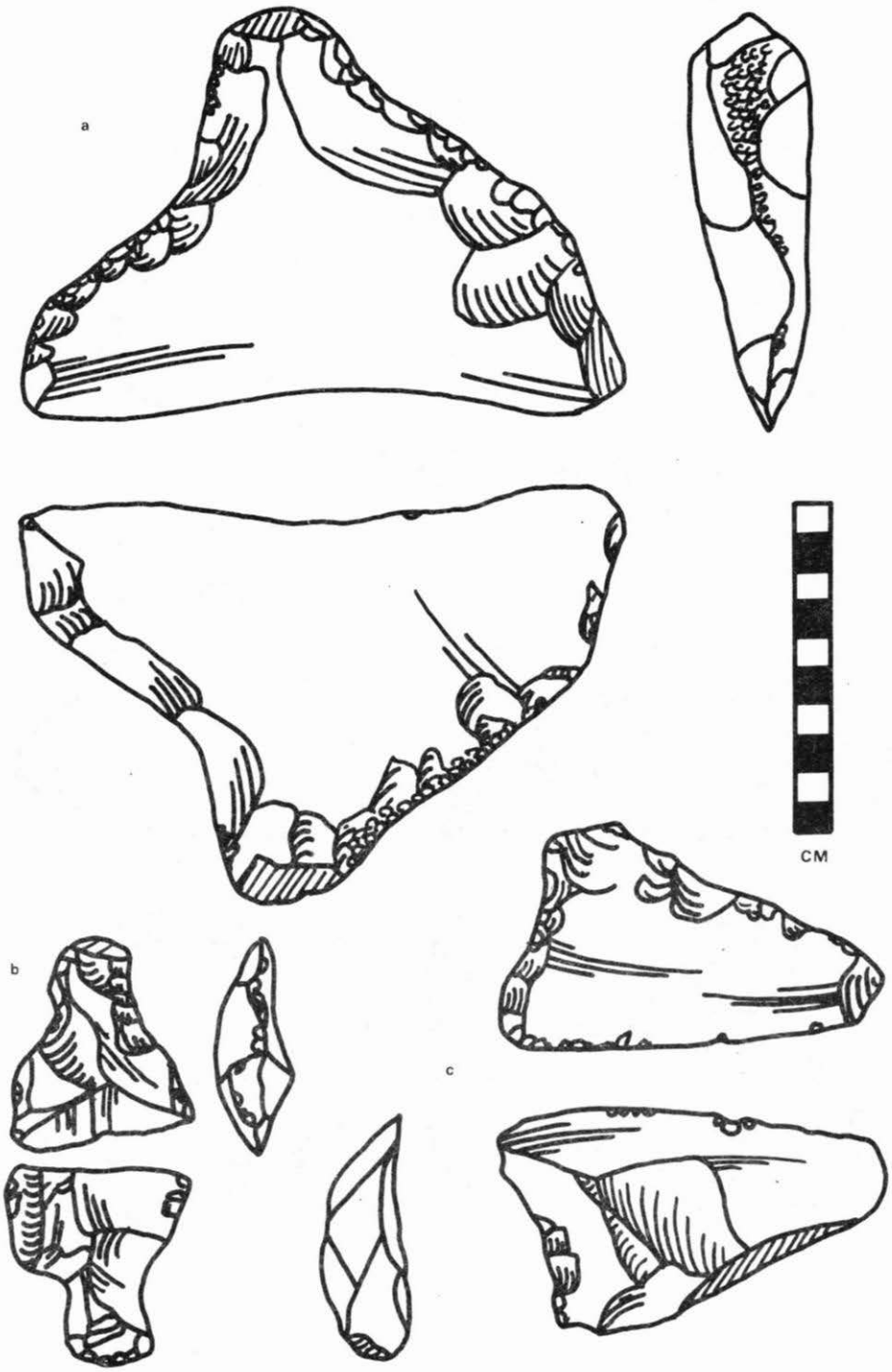

Figure 2: (a) E38.118 (CM), (b) D63.878 (OM), (c) D19.261 (OM).

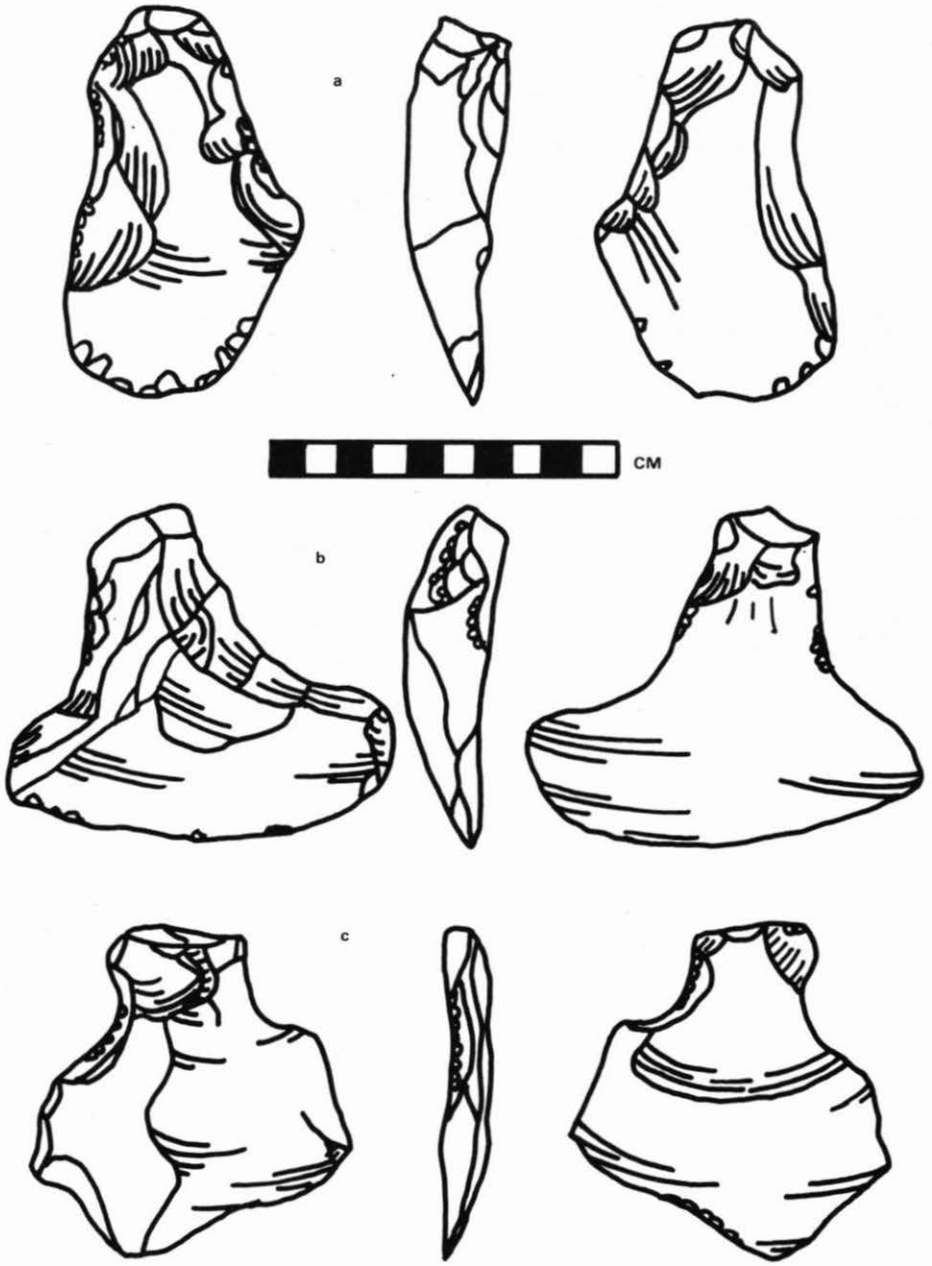

Figure 3: (a) D62.137 (OM), (b) 1383 (Wairau Bar) (CM), (c) 5001 (Grenville Harbour, D'Urville Island) (NM).

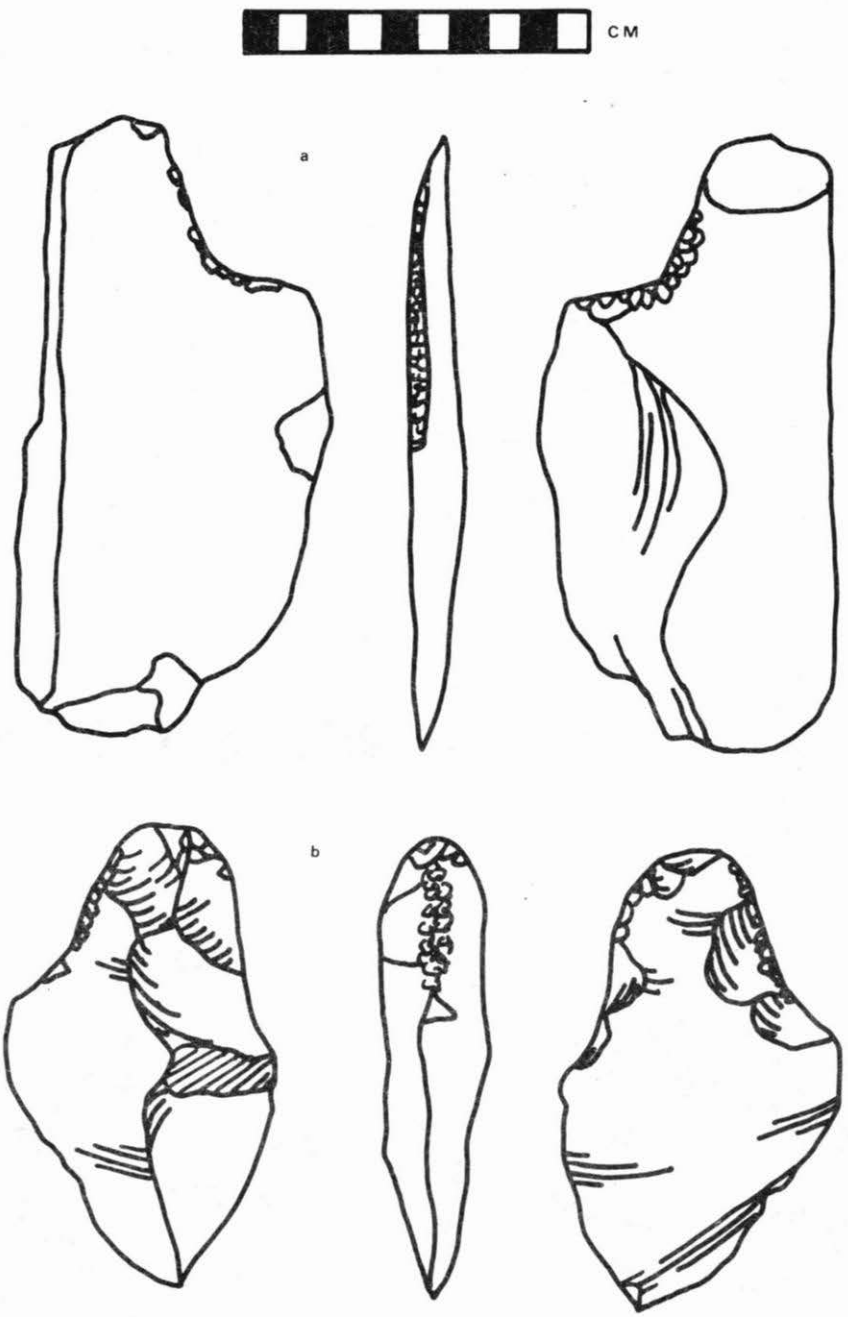

Figure 4: (a) D72.144 (OM), (b) E145.231 (CM, Barker collection).

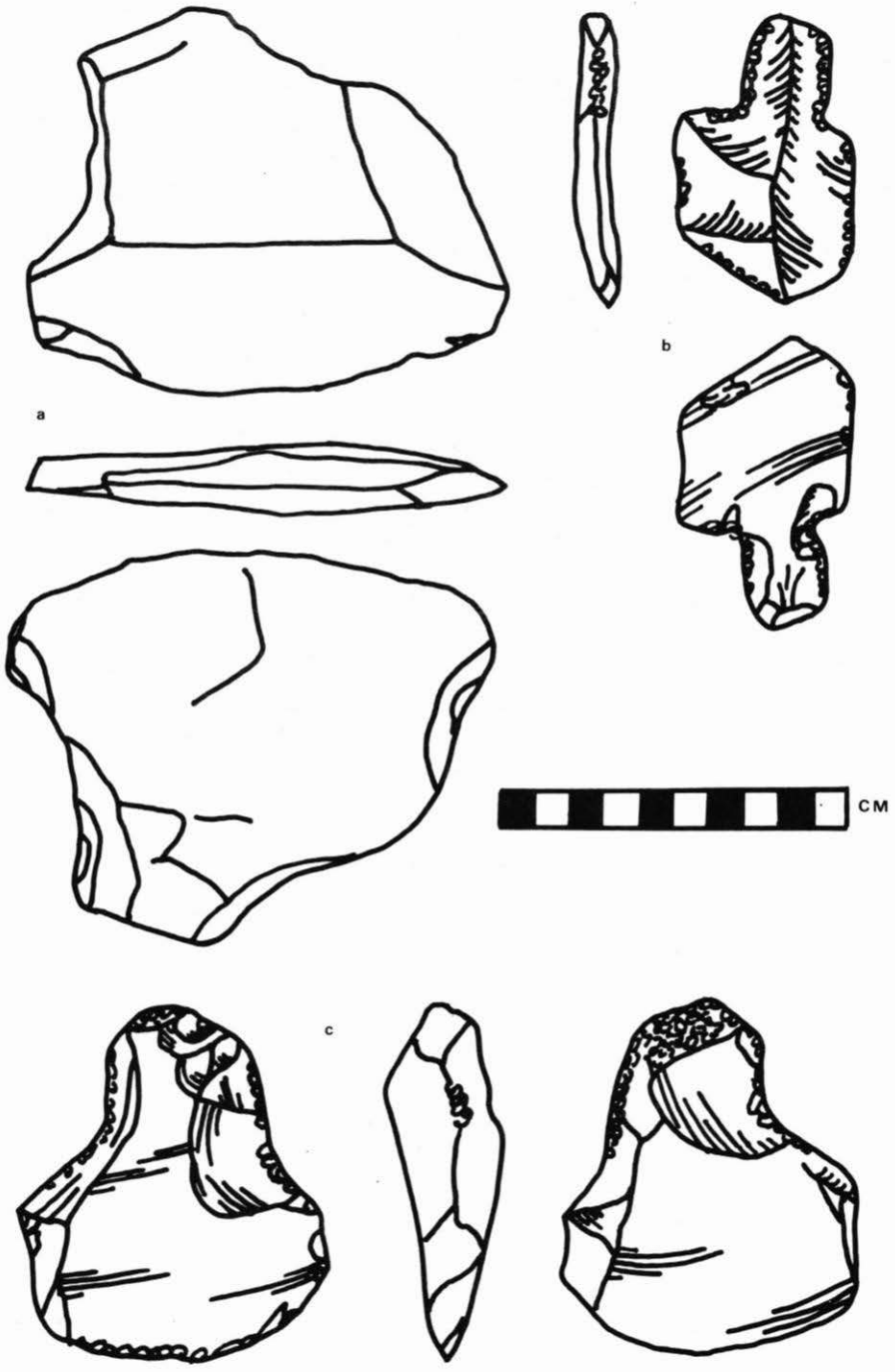

Figure 5: (a) 588 (CM), (b) E176.57 (CM), (c) ME 10886 (NM).

Striation

One obsidian example (CM, E176.57) showed striation (see detailed notes on Fig. 5b). The other obsidian example (NM, ME 7520) was vesicular in texture and lightly sandblasted on some surfaces. No striations were detected on it. No striations were detected on any of the chert, argillite, or schist specimens.

Numerical Data

Tables 1–3 provide summary statistics of measurements made on mataa length, butt width, edge lengths and effective edge angles.

TABLE 1

LENGTH OF MATAA AND TANG WIDTH

	Mean	SD	SE mean
National and Canterbury Museums			
Length of mataa (cm)	10.4	2.9	0.5
Tang width (cm)	3.7	0.8	0.1
		n=40	
Otago Museum			
Length of mataa (cm)	11.4	4.0	1.2
Tang width (cm)	4.0	0.8	0.2
		n=11	

TABLE 2

LENGTH AND EFFECTIVE EDGE ANGLE OF ALTERED SECTIONS OF EDGES (USUALLY MORE THAN ONE ALTERED SECTION ON EACH TOOL); DISTAL EDGES INCLUDED

	Mean	SD	SE mean
Bifacially altered; length (cm)	5.3	3.0	0.4
Bifacially altered effective edge angle (°)	51	17	2.5
		n=45	
Unifacially altered; length (cm)	2.0	1.6	0.2
Unifacially altered effective edge angle (°)	92	15	1.7
		n=79	

TABLE 3

LENGTH AND EFFECTIVE EDGE ANGLE OF ALTERED SECTIONS OF EDGES; DISTAL EDGES ONLY

	Mean	SD	SE mean
Bifacially altered: length (cm)	5.4	3.0	0.5
Bifacially altered effective edge angle (°)	53	13	2
		n=43	
Unifacially altered: length (cm)	2.8	2.2	0.7
Unifacially altered: effective edge angle (°)	71	9	2.9
		n=10	

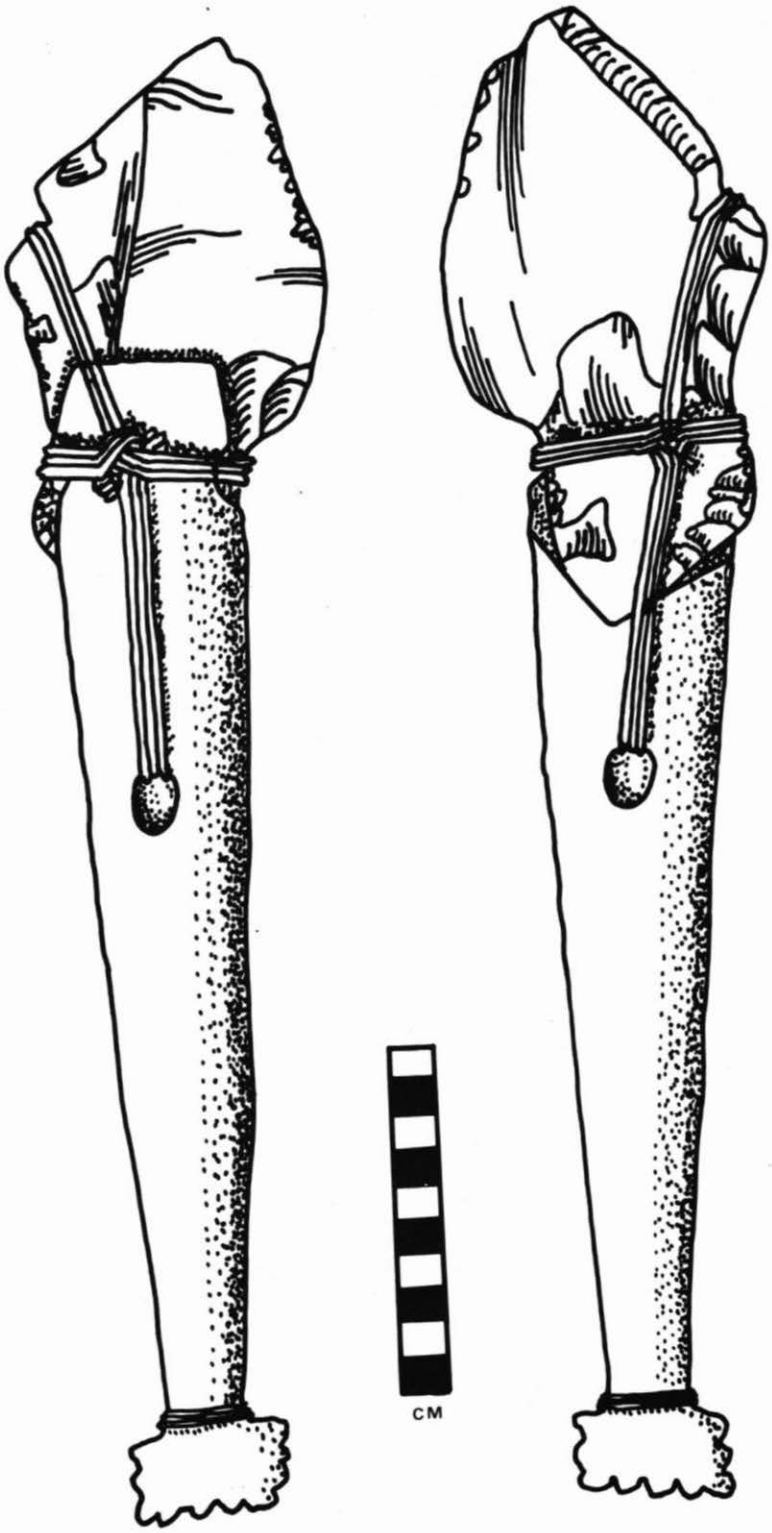

Figure 6: Hafted mataa; the haft is probably spurious (E 138.1192) (CM).

Hafted mataa

The two hafted mataa contain stone bits similar to the mataa examined in this study. The butts are fitted into a notch on one end of the haft, and lashed into place by binding the bit through a hole in the haft (Fig. 6). The hafts have the following dimensions:

Museum Accession	Length (cm)	Width at centre (cm)	Thickness at centre (cm)
E38.94	340	4.2	2.4
E138.1192	360	3.3	2.0

The end of the haft opposite the bit has in both cases been shaped into a notched tab. The hafts are considered to be of doubtful authenticity because:

1. The bits are ill-fitted and are inadequately lashed to the haft,
2. The hafts have been worked with steel tools, with subsequent rough rubbing by stone,
3. The items are probably 19th century in origin (one was apparently collected by Von Haast) but have no documentation as to their probable source (Trotter 1980: pers. comm.).

While the hafts have been made in recent times it is possible that the stone bits were surface-collected and they are assumed to be genuine.

DISCUSSION

DISTRIBUTION, AFFINITY AND CHRONOLOGY OF MATAA IN NEW ZEALAND

Although museum flake collections have not been exhaustively searched in the course of this study, it would appear reasonable to assume that mataa distribution and frequency of occurrence in mainland New Zealand is limited (cf. Skinner 1927:183). Given the large volume of adze flaking debris and the subsequent manufacture of flake tools in the Nelson region (q.v. Knapp 1924), the examples of mataa are proportionally small in number. A technological parallel with the Chatham Islands specifically based on the Nelson examples cannot therefore be sustained.

In contrast to New Zealand flake collections, the bulk of Chatham Islands flake collections is small but mataa are frequently represented. Even if some allowance is made for selective collecting, and this will have occurred on both the mainland and the Chatham Islands, mataa appear to be a distinctive element of Chatham Islands stone flake assemblages. Since most mataa are from surface-collected assemblages and few excavated examples have been described, it is difficult to estimate the age of the form. The specimens excavated and surface-collected at Waihora, Chatham Islands, would lie within the 16th century duration proposed for that site (Sutton 1979:77–84). Examples of Chatham Islands Archaic provenance have not been reported. Nelson/Marlborough examples presumably date from the period of exploitation of the locally available argillite, but this source was used for a long period with poorly defined termination.

MANUFACTURE

The key initial step in manufacture of a mataa is the selection of a flake with a suitable working edge, which would normally be feathered. Chatham Islands mataa appear to be the result of low-angle percussion on angular cores of chert. Although platforms were distinguishable on most mataa, they were heavily altered so that the measurement of platform angle would have been unreliable. The Nelson/Marlborough mataa, however, had reasonably intact platforms, and six specimens had a mean platform angle of 77° (SD = 7, SE mean = 2.9). The Nelson examples probably derive from adze debris, since the mean platform angle is closer to that of adze debris than to the mean platform angles of flake tool debris (Jones 1972: Table 1). (The use of the by-products of adze manufacture as flake tools is amply documented in Knapp (1924).)

The type of stone used has probably affected the morphology of the tools. This

is perhaps most noticeable in the schist examples, which could not have been conchoidally flaked but have instead been split along natural cleavage planes, with the desired outline and edges hammered and ground from the flattish plate. The result looks different from other mataa and comes within the range of ulu, which are frequently represented in circum-Pacific assemblages (Skinner and Simmons 1974) and are known archaeologically, e.g. in the Alaskan Kodiak tradition (Dumond 1978). These similarities can only be caused by similar environmental conditions, e.g. the availability of suitable schists and the need to use the resultant schist artefacts for similar functions.

The method of reducing the butts of New Zealand mataa is similar to tang formation on Easter Island mataa (Mulloy 1961:151–152). However, the mean width of the Easter Island mataa tang (1.6–1.9cm, loc.cit.) is approximately half the mean width (3.7cm) of the butts of New Zealand mataa and a similar function cannot be assumed.

MATAA SIZE

The mean length of New Zealand mataa (10.4cm) is greater than that of other known New Zealand flake debris assemblages, e.g. Oturehua, the largest known, is 8.8cm; basalt from Tairua, Bed 2, is 5.7cm (Jones 1972: Table 2). This is considerably greater than the 3.5cm suggested as "the minimum for an unhafted power grip" (Morwood 1974:96). The New Zealand mataa also have a mean length 2.3–3.6cm greater than those from Easter Island (Mulloy 1961:152). Melanesian adze blades hafted on to footed handles have a mean length of 9.0cm (Crosby 1973:268). The latter mean length is close to that of New Zealand mataa, but the differences are significant at the 5% level using the Students' "t" test. These figures suggest that larger flakes are being selected (or made) for the manufacture of mataa, and the size approaches that suitable for the manufacture of adzes.

MATAA FUNCTION

The mataa in New Zealand is customarily regarded as a butchering knife; many museum labels so describe it, and it occasionally slips into the literature under this description. Flensing (skinning and butchering of sea mammals) cannot be rejected as a possible function, but an extended range of uses must be considered.

Distal edges are predominantly bifacially altered (compare Tables 2 and 3). The ratio bifacial: unifacial for the assemblage as a whole is approximately 1:2, the ratio for distal edges is approximately 4:1. This difference arises from the unifacial alteration being predominantly on the proximal (and platform) margins of the tools; these are the margins that have been retouched. The distal margins, on the other hand, are the edges thought to have been used.

This study has used effective edge angle (i.e., the angle of the edge in direct contact with the work) in contrast to the more commonly used definition of edge angle of the flake section, sometimes called "spine-plane" or "planar" edge angle (Tringham 1974:178, Jones 1972:90–98). Effective edge angles are usually higher than the corresponding planar edge angles (Jones 1972, Tringham 1974:176–177). Allowing for this difference in definition, it can be seen that edges bifacially altered with the effective edge angles of New Zealand mataa (Table 3) are in the range usually regarded as used for heavy cutting or sawing (Semenov 1964:20, White 1969:39, Wilmsen 1970:156–157, Jones 1972:137–161, Morwood 1974:78, Wylie 1975:23).

The mean length of the mataa bifacially altered edges is six to eight times that of the edges analysed by H. M. Leach (1979:147) from Palliser Bay and two to three times longer than edges from Heaphy River and Tairua (Jones 1972:126). These measurements place the edges well within the range of heavy usage suggested by Morwood (1974). A range of cutting uses is therefore most likely for the bifacially altered edges of the mataa. The cutting of flesh cannot be ruled out, although sawing of fibres, wood and possibly bone are likely.

Many of the unifacially altered margins, including those forming the butt reduction,

could have been used for scraping. This is believed to have been an occasional function rather than a routine one. Butt margins occasionally illustrate pecking similar to that of stone flaking hammers. It is possible that some specimens have similar functions to flake hammers identified at Riverton (Leach and Leach 1980: Fig. 23).

HAFTING

The hafting of New Zealand mataa has never been critically examined. The generally accepted mode of hafting is shown in Figure 6. The origin of this inferred mode is probably to be found in the hafting of Easter Island spears described in the 18th century (Forster 1777:563), examples of which are held in museums. The latter have been formed as tangs for binding into the "thin ill-shapen sticks" of Forster's account. By virtue of the greater butt width of the New Zealand mataa, a similar function cannot be assumed. The New Zealand hafted mataa (Fig. 6) and its companion piece (not figured) have already been described as spurious for a number of reasons. The mechanical properties of the tool add weight to this proposal. The predominant functions suggested do not need the leverage or momentum available from a hafted tool. Furthermore, for butchering and some wood or fibre cutting, precise control of the cutting edge would have been hampered.

Archaeologists have given only limited consideration to the use of hafting and its implications for flake tool studies. However, a recent discussion of Palaeo-Indian evidence is worth quoting here:

> A stone flake is surprisingly efficient as long as it is kept sharp and as free as possible of grease or body fluids. Animal grease increases the gripping pressure necessary to hold a tool properly during intense use .... this immediately raises the question of tool hafting and why the prehistoric butcher did not simply use a hafted tool .... the stone knife is rapidly dulled in some butchering operations so that the attrition rate through use and continued sharpening and breakage is extremely rapid. The butcher soon has a hafted tool that is no longer of any use, but one in which he has a large investment in terms of time, effort, and materials. *It is better for him to use a large hand-held flake or blade tool that is functional for intensive butchering and to discard it when it is broken or worn out.* (Frison 1978:317–318)

Few mataa show signs of intensive use, and it is suggested, following Frison's argument, that the "investment" of making a haft would not be warranted. Furthermore, the butts of most mataa fit readily into the palm of the hand and it is here suggested that mataa are hand-held (cf. Knapp 1928), with a grip being quickly manufactured when the flake is chosen for use. Butt widths as measured in this study are suitable for hand grips (mean width, 3.7cm). Not all flakes need have a prominent grip, and some mataa (as defined in this study, e.g. see Fig. 2c) are blunted along some edges in the way that "backed knives" are modified (q.v. Binford and Binford 1969:81).

Mataa may also have been hafted as adzes. Some specimens have unifacially altered distal edges transverse to the main axis, and it is possible that these were used as adzes (Fig. 7) or were rejected adze preforms. Mataa with distal edges at acute angles to the main axis could have been preforms in which the bevelled cutting edge had yet to be manufactured.

TRADITION, ENVIRONMENT, FUNCTION?

Museum collections indicate that mataa are a distinctive and relatively numerous item in Chatham Islands material culture and infrequent in mainland New Zealand. Adzes similar in form to mataa are known from Pitcairn Island and Easter Island (Figueroa and Sanchez 1961: Fig. 39c, d; Fig. 49g, h). Apart from these, no specimens are reported from central or marginal Polynesia, although the literature on flake tools is scanty. An explanation of the apparent flourishing of this tool in the Chatham Islands is therefore of some interest. Among matters that should be considered are (1) the Polynesian stone flaking tradition, particularly of adzes, and its development in the Chatham Islands, (2) the environment of the Chatham Islands, especially the availability of stone materials, (3) the uses which were unique to the Chatham Islands or for which a special response was needed.

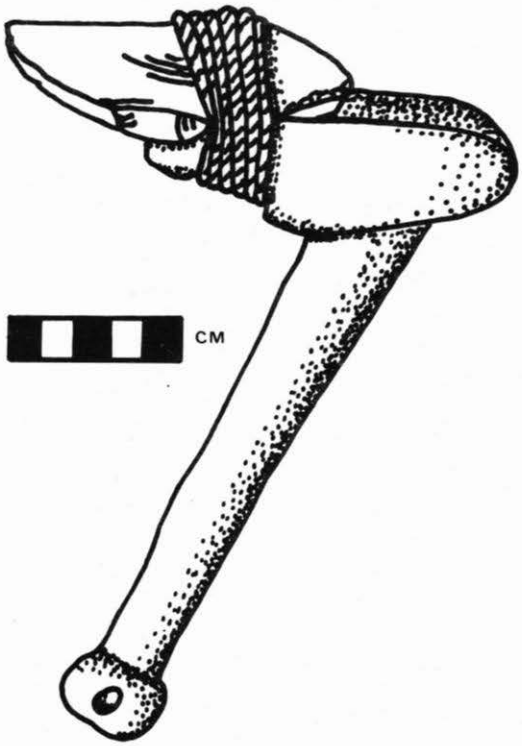

Figure 7: Mataa hafted as an adze (ME 10886) (NM). A reconstruction to illustrate a possible method of hafting. The stone bit is genuine (see Fig. 5c).

The tanging or gripping of adzes in Polynesia is well known and need not be described here. In addition, there are occasional records of reduction of the butts of blades, e.g. at Shag River Mouth (Skinner 1924). Polynesians were therefore familiar with certain methods of hafting and the shaping of grips and tangs on stone tools. It would appear a small step from this practice to the butt modification of the mataa.

Another possibility is that mataa are not functional tools, that they are in fact preforms, perhaps rejected, of tools such as adzes. The definition of mataa used in this paper specifically excludes recognisable flake adzes. Nevertheless, there seems to be a prima facie case for regarding mataa as part of a continuum of preforms, some of which would have been carried through to finished adzes. The mataa studied here are not from controlled assemblages. Where controlled assemblages are available, it appears that reduction to form a tang is not usually done at the preform stage (Leach and Leach 1980:131). However, this practice may not have been followed in the Chatham Islands, especially if a roughly finished adze was desired. Published studies of the sources and availability of stone in the Chatham Islands suitable for flaking are limited. However, it is possible that chert was adopted for a wider range of functions, e.g. adzes, than it was on the mainland. If so, variations in the morphology of adze preforms in some way related to the properties of chert are a distinct possibility.

The range of mataa functions includes cutting of wood and fibres, butchering and possibly adzing (when hafted). Mataa used as weapons have been described for Easter Island (Forster 1777:563, Heyerdahl 1961:52 et passim). Chatham Islands' mataa are

conventionally described as "blubber knives", i.e. used for skinning and butchering sea mammals. An association between sea mammal hunting and the use of mataa for butchering the creatures is not secure. At Waihora, Chatham Islands, considerable numbers of sea mammals were found in middens (Sutton 1979:222–225), yet mataa were infrequent in comparison with other flakes and flake tools (about 1:10,000) (Sutton 1979:158, 253).

MATAA AS A TOOL "TYPE"

The definition of mataa used in this study creates a class of flake tools which includes ulu, backed knives, flakes modified for gripping by hand, and flakes whose proximal edges have probably been used for scraping. In addition it is suggested that some are either flake adze preforms or have been used as hammers in the pecking of adzes. It is argued that the definition used provides a satisfactory repeatable criterion with which membership of the class may be decided. No attempt has been made to search out and examine all possible mainland New Zealand flake tools which fit this definition.

It may be argued that by adopting this approach, the study has failed to define a supposedly homogeneous population of flake tools that would constitute a "type". Hence a potentially important marker of the material culture of the Chatham Islands has been ignored. There are indeed some very general features held in common by Chatham Island mataa, principally some form of marked butt reduction and edges usable for cutting, but the examination of specimens of the "type" suggests that a number of functions, manufacturing procedures and purposes have been followed in the creation of the tools widely known as mataa. Ethnologists keen to find typological parallels have in the past isolated flakes of superficially similar morphology and, as a result, drawn quite misleading parallels with other parts of Polynesia.

This is not to imply that the term mataa has no value in the description of New Zealand and, in particular, Chatham Islands Polynesian material culture. Mataa are simply an extremely variable group of tools, the predominant characteristic of which is deliberate modification to blunt some edges and form a tang so that they can be more readily held in the hand. The explanation of how the tools were used, or for what purpose they were made, need not be a simple one.

CONCLUSIONS

1. Applied strictly, the definition of mataa used in this paper includes a range of flaked stone tools including ulu, backed knives and flakes in other ways modified for gripping. In practice a clear distinction cannot be made between mataa and some flake adze preforms.
2. Mataa are numerically more frequent in the Chatham Islands than in mainland New Zealand, where specimens are apparently rare but known from the Nelson/Marlborough area.
3. Most mataa were probably used for a range of cutting tasks, including butchering and the cutting of wood and fibres. No mataa show signs of long and intensive use.
4. The distinctive butt reduction of the Chatham Islands mataa was in most cases undertaken to make holding the tool in the hand easier, rather than for hafting. Examples of hafted mataa in museums are considered to be spurious. Some butt reduction may be the result of using flakes as hammers for pecking adzes.
5. Butt reduction is most plausibly explained as part of a generalised early East Polynesian adze manufacturing tradition. Tanged adzes are a feature of this tradition and the technique is probably borrowed from adze manufacture. Further work on prehistoric sources of stone in the Chathams, and the use of this in adze manufacture may illuminate this relationship.
6. It is misleading to associate New Zealand mataa with those of Easter Island on any grounds other than a common parent East Polynesian stone working tradition.

ACKNOWLEDGEMENTS

The following people arranged for the loan of mataa: Dr G. Hamel, Otago Museum; Mr M. M. Trotter, Canterbury Museum; Mr S. Bagley, Nelson Provincial Museum; Mrs B. I. McFadgen, National Museum; Mr J. M. McEwen. Mr H. Campbell, New Zealand Geological Survey, kindly identified lithology of the various mataa.

APPENDIX 1

DESCRIPTION OF SELECTED EXAMPLES OF MATAA

These examples have been selected to show the range of variation. Material is arranged as follows:
Figure no.; museum accession no.; museum (NM, National Museum; CM, Canterbury Museum; OM, Otago Museum), lithology.
Specimens are from the Chatham Islands unless otherwise indicated. If the striking platform was distinguishable, this has been used to orient subsequent description; otherwise the butt has been used. Butt alteration technique is followed by a description of edge alteration. Interpretation covers possible grip and use of tool.

Figure 2(a) E38.118 CM Wishart chert
Platform distinguishable, heavily altered. Butt formed by massive (up to 3cm deep) bifacial alteration, followed by pecking. Part of platform pecked. Light (up to 1mm deep) bifacial alteration on distal margin.
Length 11.6cm; butt width 5.1cm.
Interpretation Hand-held, since butt is too attenuated for effective hafting. Distal margin used for light cutting.

Figure 2(b) D63.878 OM Tioriori chert
Platform distinguishable but heavily altered. Massive alteration (greater than 1cm) on to ventral surface about butt; alteration (less than 5mm) on to dorsal surface. Bifacial alteration on short edges on left and right margins at distal end. Unifacial alteration (up to 5mm deep) on distal margins on to dorsal surface.
Length 5.9cm; butt width 2.0cm.
Interpretation Hand-held; notching on butt margins probably used for scraping; distal margin used for scraping. Lateral edges at distal end used for cutting/incising.

Figure 2(c) D19.261 OM Maipito chert
Platform distinguishable. Right ventral margin broad and cortex-covered; ventral edge unifacially altered on to ventral surface. Left ventral margin bifacially altered and pecked. Distal margin bifacially altered (up to 2mm deep).
Length 6.7cm, no discrete butt.
Interpretation Hand-held, distal margins used for heavy cutting.

Figure 3(a) D62.137 OM Tioriori chert
Platform distinct. Left proximal margin unifacially altered on to ventral surface. Right ventral proximal bifacially altered. Feathered distal margin bifacially altered up to 3mm deep.
Interpretation Hand-held; distal margins used for light to medium cutting.

Figure 3(b) 1383 (Wairau Bar) CM Argillite or basalt
Platform distinct. Butt formed by deep unifacial alteration on to dorsal surface; possibly some bifacial alteration preceded this on the left ventral margin. Light (up to 2mm) unifacial alteration on to dorsal surface on distal margin.
Length 8.8cm; butt width 3.6cm.
Interpretation Hand-held, probably used for heavy cutting. Proximal margins could have been used for scraping. Original flake probably a by-product of adze manufacture. The item could be regarded as a roughout of adze type 3E (regarded as rare).

Figure 3(c) 5001 (Greville Harbour) NM Nelson argillite
Platform distinct. Steep unifacial alteration on both proximal margins; left dorsal margin, alteration on to dorsal surface, right dorsal margin, alteration on to ventral surface. Specimen has been exposed and sand-blasted on dorsal surface. Minute (up to 1mm deep) bifacial alteration on distal margins.
Length 9.3cm; butt width 3.4cm.
Interpretation Original flake is a by-product of adze manufacture. Hand-held. Proximal margins possibly used for scraping shafts; distal margin used for cutting.

Figure 4(a) D72.144 OM Chatham schist
Schist friable. Split along natural cleavage planes. Butt formed by the heavy reduction of one margin; opposite margin at same end lightly reduced.
Length 17.5cm; butt width 4.2cm.
Interpretation Probably hand-held, tang possibly broken. Used for cutting. Similar to an ulu.

Figure 4(b) E145.213 CM Wishart chert
Platform distinct. Butt formed by deep (up to 15mm) unifacial flaking on to ventral surface; subsequent pecking and rubbing. Left and right distal margins minutely (up to 2mm deep) bifacially altered; edges approximately straight, acute angled.
Length 12.7cm; butt width 4.6cm.
Interpretation Hand-held, distal margins used for heavy cutting.

Figure 5(a) 566 Vanvioni CM Chatham schist
Split along natural cleavage planes. Butt formed by hammering of margins and some pecking. Butt possibly broken. Irregular bifacial alteration (up to 3mm deep) of margin opposite butt.
Length 11.1cm; butt width 4.9cm.
Interpretation Probably hand-held and used for heavy cutting, possibly light chopping. Similar to an ulu.

Figure 5(b) E176.57 CM Obsidian
Platform distinguishable. Bifacial alteration up to 1cm deep on proximal margins; subsequent unifacial alteration on left ventral margin on to dorsal surface. Notches formed at distal margins of reduced butt.
Distal margins bifacially altered (up to 2mm deep) with striation on dorsal surface of right distal margin and on the distal margin; 80% of striations are parallel to the edge; some striation at about 50° to the edge.
Length 9.9cm; butt width 2.3cm.
Interpretation The item would probably be hand-held, although the tang with distal notches could be hafted. Distal edges could have been used for heavy cutting; proximal edges could possibly have been used for scraping a shaft.

Figure 5(c) ME10886 NM Wishart chert
Platform distinguishable. Tang formed by massive unifacial alteration (up to 3cm deep) on to dorsal surface; followed by bifacial alteration and pecking. Pecking also on platform. Unifacial alteration on to dorsal surface on left ventral and distal margins.
Length 10.0cm; butt width 4.5cm.
Interpretation Hand-held, distal and left ventral margins used for cutting or light scraping. Possibly hafted and used as an adze; possibly a flake hammer.

SUMMARY

1. Distal edges have been predominantly used for cutting.
2. Both proximal and distal margins have occasionally been used for scraping.
3. Most butts have probably been manufactured as a hand-grip.
4. Some items (a) may have been hafted and used as an adze, or (b) are adze preforms.

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Received 3 September 1980