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ON A SURFACE COLLECTION OF
WESTERN SAMOAN STONE TOOLS

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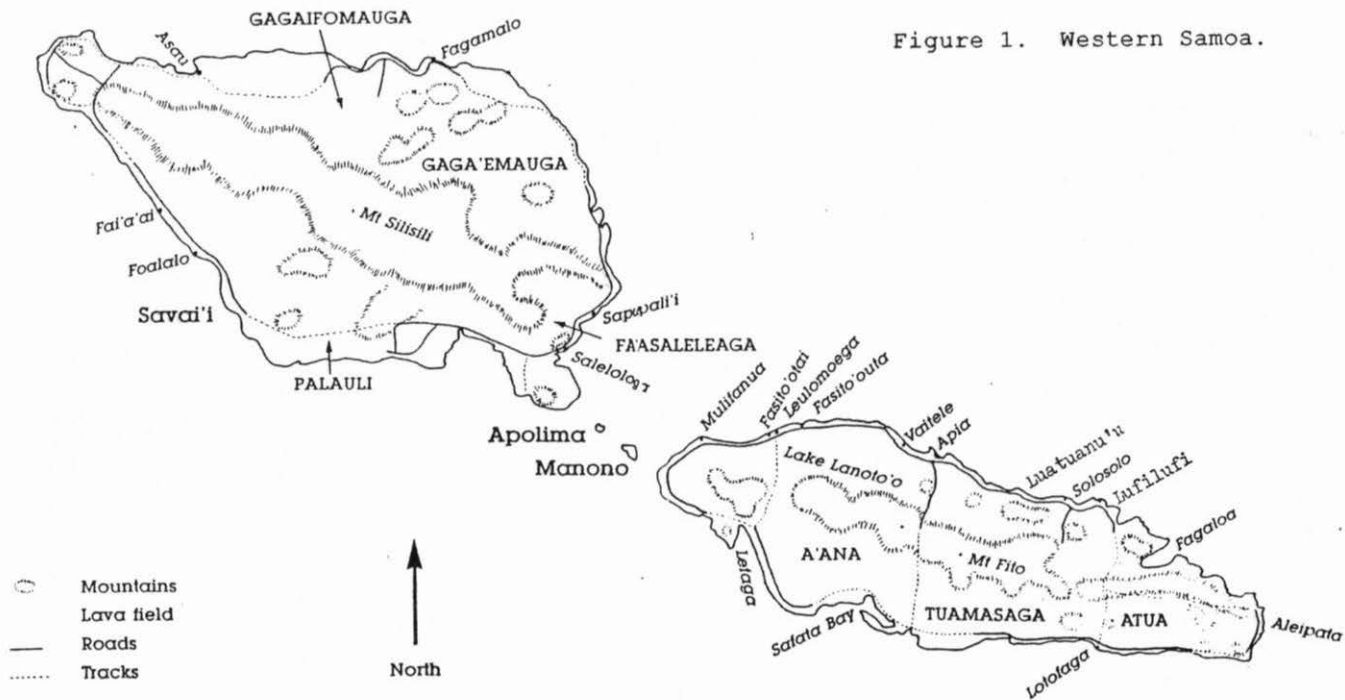
"With our stone axes we must dub, dub, dub day after day before we can cut down a single tree." A *matai* of Sapapali'i in 1832.

During twelve months 716 *to'i ma'a*, the stone tools of the pre-European Samoans, were collected to assist further research. This new collection, much of which comes from the three villages of Solosolo, Luatuanu'u and Lufilufi (Fig. 1), will almost double the number available in museum collections. In the following discussion a number of questions are raised about the function of these stone tools, and the new collection is compared with that of Green and Davidson (Green and Davidson 1969, Green 1974). This review notes that the present classification based mainly on shape does little to advance understanding of tool functions which, while it is a difficult subject to address, clearly merits further attention.

On Collecting the *To'i Ma'a*: Field Techniques

Metal adzes are still widely in use in Western Samoa, often as simple metal blades made from old car springs and hafted with more or less traditional sennit lashings (Neich 1985:15). Many Samoans are familiar with the older stone tools but their use is not widely understood: when hafted for display they are almost invariably set back to front as if bevelled like an iron or steel adze. Several *matai* and old men offered 'traditional' information about stone adzes and particular methods of sharpening them, but overall this was found to be too contradictory to be reliable. Familiarity with *to'i ma'a* varied greatly from place to place: they are well known in some villages and almost unknown in others. It seemed as if, despite protestations to the contrary, many villages are of relatively recent origin, and therefore devoid of *to'i ma'a*. This accords well with demographic conclusions that the pre-European population was much smaller, and less dispersed, than nowadays.

It is noteworthy that the three villages that yielded almost 80% of the *to'i ma'a* are all mentioned in old traditions and have extensive areas on the *malae* (marae) and around the *fale* (whare) that are kept bare and swept daily, and may well have been swept daily for hundred of years. Far fewer *to'i ma'a* were found in villages that are now extensively grassed and paved.



Collecting began more or less as an excuse to enter unfamiliar villages without formality. Once an initial curiosity was satisfied about the odd *palagi* who walked around head down "as if praying", and a few good natured jokes were shared around, usually at the expense of the *palagi*, village hospitality could be overwhelming. Very soon a team of unsolicited small children would be "helping" especially if free chewing gum or sweets were available for the more devoted and more efficient. In the three main villages of Solosolo, Luatuanu'u, and Lufilufi, a local friend and interpreter soon emerged to explain the *palagi's* collecting game and later to suggest that odd stones (*ma'a*) could also be collected for him between his visits.

Inevitably this innocent game became degraded however with expectations first of something similar to a helper's search fee, and then a finder's fee, and still later a *mealofa* gift, or payment in food or in cash, in exchange for each *to'i ma'a*. As soon as collecting took on tones of incipient commercialism the *mealofa* or price was dropped sharply and progressively to find a level at which children would continue to help but the adults would not get them to collect for the fee. When collecting ceased altogether in October 1988, the *mealofa* in all three villages had been stabilised for some time at the equivalent of one large bottle of beer. It is to be hoped that at this level, the future generation in these three villages will begin to consider *to'i ma'a* as worth saving rather than being used as at present like any other rock for any immediate task in hand, such as knocking down mangoes, sharpening knives, scaring away dogs and pigs or as fill while concreting.

Whether attitudes that *to'i ma'a* are "worth saving" have been generated in these three villages is not yet clear but it is possible to be fairly confident that old sites will not be destroyed by these locals as commercial *to'i ma'a* hunters. Few adults were involved and strict attention was paid to ensure that all were genuine surface finds with no digging. At any hint of that, collecting would have stopped immediately.

The importance of recording the provenance of each item cannot be overstressed. Every *to'i ma'a* was labelled in soft pencil with the village name before leaving the site or very shortly after that. A sustained effort was made to extract more local place names from the children, but this was not often successful, though a good number have been given secondary labels of *uta* for inland (eg from garden "plantations") and *tai* for shore localities (eg from *fale* floors and their "cobbled" surroundings.) As virtually all modern settlement is close to the coast, and as the young children do not often walk very far inland, the collections for all three main villages are predominantly coastal, with almost all *to'i ma'a* found within half a mile or so from the sea.

While subjective and not testable under the often rather disorganised collecting regime, the distribution of *to'i ma'a* today is clearly related to the traditional pattern of most Samoan villages. *To'i ma'a* may be found anywhere but they are not normally found close to the high tide mark despite the presence there in every traditional village of ancient earth and rock mounds, on which were, and often still are, those visitors' *fale* known as *fale ta'i malo*. None were found among the gravestone piles known as *kia*, nor among graves elsewhere. Nor were *to'i ma'a* common on the *malae*, or around the highest earth mounds on the landward side of the *malae* that mark the *fale* of high chiefs and the formal meeting houses.

Many were found a few more metres inland in and around the common *fale* and their modern semi-walled equivalents, which are still usually surrounded by gravel and spread stones called *'ili 'ili*. This was the area easiest for children to search. Many more were found a few metres behind the various *fale* and around the outdoor cooking shelters, further back in the areas where fire-wood is still cut, and in the small enclosures fenced with stone walls as pig pens. After the children, the *to'i ma'a* hunter's best friends are pigs for in their rootings, particularly in damp weather, grey stone tools stand out in marked contrast with the wet black earth.

Similarly, though as yet only improperly tested, there seems to be a marked differences in the size of *to'i ma'a* from different areas. Almost invariably the largest ones were found in or near inland taro gardens, while all the smallest ones were found among the *fale* close to the *malae*. It is as if the big ones suited to rough tree felling and land clearing were used mostly inland; while the smaller, less coarse, tools suited to woodworking for houses and canoes were used in the coastal villages; and the smallest tools suitable for the finer crafts were concentrated in the village centres. Unfortunately it is unlikely that small and very small *to'i ma'a* would be seen in the gardens and bush in the interior. It may be hard therefore to devise an effective test of this distribution however reasonable this pattern seems as simple common sense.

Some other local variations were noted though only in passing: the *to'i ma'a* on Apolima Island were unusually well polished, and there was a higher proportion of very small *to'i ma'a* at Lufilufi, while Luatuanu'u provided a disproportionate number of fragments.

During the first six months *to'i ma'a* were not kept if they were badly broken or lacked a blade end. It was only later, between July and October 1988, that a few more broken pieces were collected if they looked clearly likely to be classifiable. What qualifies as a *to'i ma'a* rather than as a fragment, depends not entirely on the object itself but also to

a degree on the views of the collector or classifier, which adds a further element of subjectivity to their study.

In addition to visiting villages, some time was spent looking for workable stone. On Upolu and Savaii, both of which have huge quantities of angular basalt, there are surprisingly few rocks that fracture readily into useful shapes and hold a sharp edge. Not all the *to'i ma'a* are made from the same stone, but a very high proportion of about two thirds or perhaps even 80%, seem to be from a single type of fine grained, very dark black basalt. This stone weathers to ash grey when in prolonged contact with saltwater, to a darker grey when exposed to sun and rain, and it can sometimes take on a brown exterior after burial in drier soil. Its distinctive dark black interior is unmistakable when exposed at recent chips, but nothing very like it has been found during this preliminary reconnaissance survey of Western Samoan's common most surface rocks. Perhaps the closest match to it occurs at Ti'avea but surprisingly no worked stone or chips were found in the village there now.

This very dark basalt seems identical however with a rock well known in American Samoa at the recently partially excavated quarry site at Tataga Matau, near Leone on Tutuila (Leach and Witter 1987). Two large *to'i ma'a* apparently of this same distinctive deep black basalt were found by the writer on Nukunonu on Tokelau just above the old high tide mark shortly after the disastrous storm waves in February 1988. The implications for Upolu and Savaii, and for islands further afield such as Nukunonu, of this widespread and frequent use of a stone from Tutuila, invites further research both of ancient inter-island trade and trade routes, and of the scale of specialisation that would have been needed at Tataga Matau to produce and distribute so many *to'i ma'a* to Upolu, Savaii and elsewhere.

The three villages that provided almost 80% of the *to'i ma'a* are clustered in a small area on the central north coast of Upolu (Fig. 1). This is where the oldest Fagaloa basalts reach the coast to form one of the very few places in Western Samoa where readily defensible, and readily inhabitable, hill forts could be built close to the sea. As Wright (1963:91) noted during his excellent soil survey, "only where Fagaloa volcanics form the actual coastline could coastal fortified villages be possible. Elsewhere the long smooth lava slopes of the younger lava flows could offer but little refuge to a harried coastal population. It is also logical that in retreat, the people should go far inland, because on the terrains formed from younger volcanic rocks, the only source of permanent water after leaving the regions of fresh water springs at the coast, is found high in the coastal ranges".

The number of hill forts and defensive sites, and the quantity of *to'i ma'a* found by surface collecting, both suggest strongly that these three villages are among the older villages on Upolu and that *to'i ma'a* found there will come from a broad time span. While Lufilufi is considered today to be the oldest, a further indication of considerable age came from the discovery in Luatuanu'u of an early Lapita adze/axe that has been reported separately (Green, Best and Richards 1988). Most of the 566 *to'i ma'a* collected from these three villages have come from the narrow coastal fringe that is all that is inhabited today, but some came from interior gardens and only a very few have come from the interior hill forts that were the centres of refuge in former times. Given the relatively short distances involved, and the value of the coast for sea foods, some of those earlier inhabitants would probably have visited almost daily the areas in which almost all the *to'i ma'a* were found for this new collection.

No archaeological work has been conducted at Lufilufi and Solosolo, but Luatuanu'u was studied extensively in the 1960s (Davidson 1969, Peters 1969, Scott and Green 1969). These studies included both the coastal village and the inland ridges many of which are permanently bald tula with second growth seral vegetation after generations of clearing and burning each dry season. As far as is known, the new collection includes only a few *to'i ma'a* from these inland areas south of the village of Luatuanu'u.

On Examining the *To'i ma'a*: Functions and Terminology

Despite an awareness that previous researchers have already established a good workable classification based on shape, it was felt that some attempt should be made to consider the collection on a functional basis. The development of a more function-orientated classification for these tools deserves some priority.

It is often a matter of personal judgement when deciding whether a worked stone is an adze or some other tool. The literature refers to *to'i ma'a* as if all, or almost all, were adzes but, remarkably, this is not correct in strictly functional terms. Only a few could have been hafted and used with an adze-like, planing, follow-through stroke. In fact, from their shape and from what is known of their hafting, most *to'i ma'a* were used hardly at all as adzes but more as hafted choppers. And then again at least some types which have been called adzes can only have functioned like chisels, while still others could have functioned like axes. Clearly there is a need for a more function-orientated terminology than that used at present.

Samoa's early literature is sparse in helping to link stone

tool forms to tool functions and woodworking (see Buck 1930:256). In Samoa, as elsewhere, the biggest trees were probably ringbarked and allowed to die and dry out for a year or more before being attacked and felled. The most effective felling would have begun with small deep initial cuts requiring nearly horizontal blows from a tool with a narrow front to penetrate as deeply as possible through the outer soft wood and into the interior hardwood. With such a tool it would be more efficient to make two scarfs, more or less horizontally across the standing tree trunk, and to then chip out the space between them, preferably using a chopping tool.

Whether heavy chisel-fronted tools were hafted to bent handles, or lashed to battering-ram-like spears and swung against the tree trunks on ropes or vines, may not be clear now, but certainly several different types of heavy single bevelled tools would have been needed to completely cut down, and to cut up, large trees. Two functionally complementary tools - one with a chisel action and one allowing a chopping action as when removing big chips between two scarf grooves - would seem the minimum needed. Once a tree had been felled, and with even the best stone tools this would have had to be a protracted exercise, it could be cut up into shorter lengths, or split lengthwise with an axe or with wedges, or worked with a hewing adze to make flat-sided timber. Further woodworking would require different tools, particularly for forming and carving traditional items like canoes, *fale* or bowls (though Buck thought some adzes may have been hafted with the bevel surface in front for special purposes such as working concave surfaces (Buck 1930:363)).

In the collection, two common *to'i ma'a* stand out as a functional, working pair. The big and heavy, long and narrow-fronted tools (called by Green and Davidson Types VI and VII) have a bevel that is chisel-like in functional terms, and well suited to beginning a horizontal scarf cut deep into the trunk of a standing tree. It is obvious however from the number of broken butt ends, that the main stress on this class of tools was at right angles to its line of travel, and that it had only a minimal capacity to be used as a lever, for example to lever open its initial narrow cut to release the tool after it had sunk deep into the wood. Almost all of the 'adzes' in this first group, those called by Green and Davidson Types VI, VII and VIII, were found in bush areas. Another class of tools (called by Green and Davidson Type I, II and IX "adzes") would have been prevented by the angle of their traditional haftings from making a good horizontal cut or scarf across a standing tree trunk, but were well suited to hacking out, chip by chip, the wood between parallel scarfs.

On looking further at the collection, it can be seen as divided into two or three broad functional groups: the big and

heavy but narrow fronted, chisel-like, tools (called by Green and Davidson Types VI and VII) which obviously complement the chopper like tools (called by them Types I, II, and IX); while there are smaller planing, adze like, tools (their Types III and IV) for undertaking finer work and for making smooth surfaces. Only these latter with their capacity to enter wood at a low angle, to hew the wood and to plane off smooth shavings, not chips, would be considered to be "adzes" by an experienced carpenter (Fig. 2).

Another feature of the collection is the functional similarity of the two most common types, those called by Green and Davidson Types I and II. These are differently made for while Type I has a flat back below the bevel, Type II has there an almost triangular median ridge lengthwise down the back, which is usually partially removed in order to facilitate a simpler, flatter, fit in a flat haft socket (see Buck 1930:357). Though differently made, the intention was clearly to achieve not only much the same final shape but also much the same final function.

Can these two predominant quadrangular tools, "Type I and II", be correctly be described as "adzes"? Adze is a name which can only be given correctly to a tool used with a sweeping cutting stroke and a flowing follow-through. When samples of these two tools were hafted correctly using traditional lashings, it was clear that their function was that of a "chopper" used to penetrate wood at close to a right angle. An adze proper, when used correctly, bites at a low angle close to the medium it cuts. The true adze is functionally akin to a plane and to a spokeshave, and has little in common functionally with a mattock, a dutch hoe or with Samoan Type I and II *to'i ma'a*.

It is proposed therefore that in future the term "adze" be regarded as inappropriate for Type I and II *to'i ma'a* unless prefixed with a qualifier eg "chopper adze". Although 716 *to'i ma'a* were collected that have "chopper adze", "adze" and "chisel-nosed adze" functions, two other functional tool groups were almost entirely absent. Only two double-bevelled "axes" were found, one of Lapita vintage, and another in an uncharacteristic soft tuff that was excluded as a modern fake. One small, narrow traditional 'Polynesian chisel' was found, though three other small ones are in the private collection of Harry Paul. Evidently small chisels and double bevelled axes were uncommon, or rare, in old Samoa. Buck (1930:364) referred to "long narrow implements" which were "probably hafted as adzes ...with some probably used with pressure without hafting", but he does not indicate whether they were common. No worked stone items classifiable as knives, scrapers and graters were collected which may indicate either that bamboo, coral and volcanic tuffs fulfilled these functions (Buck

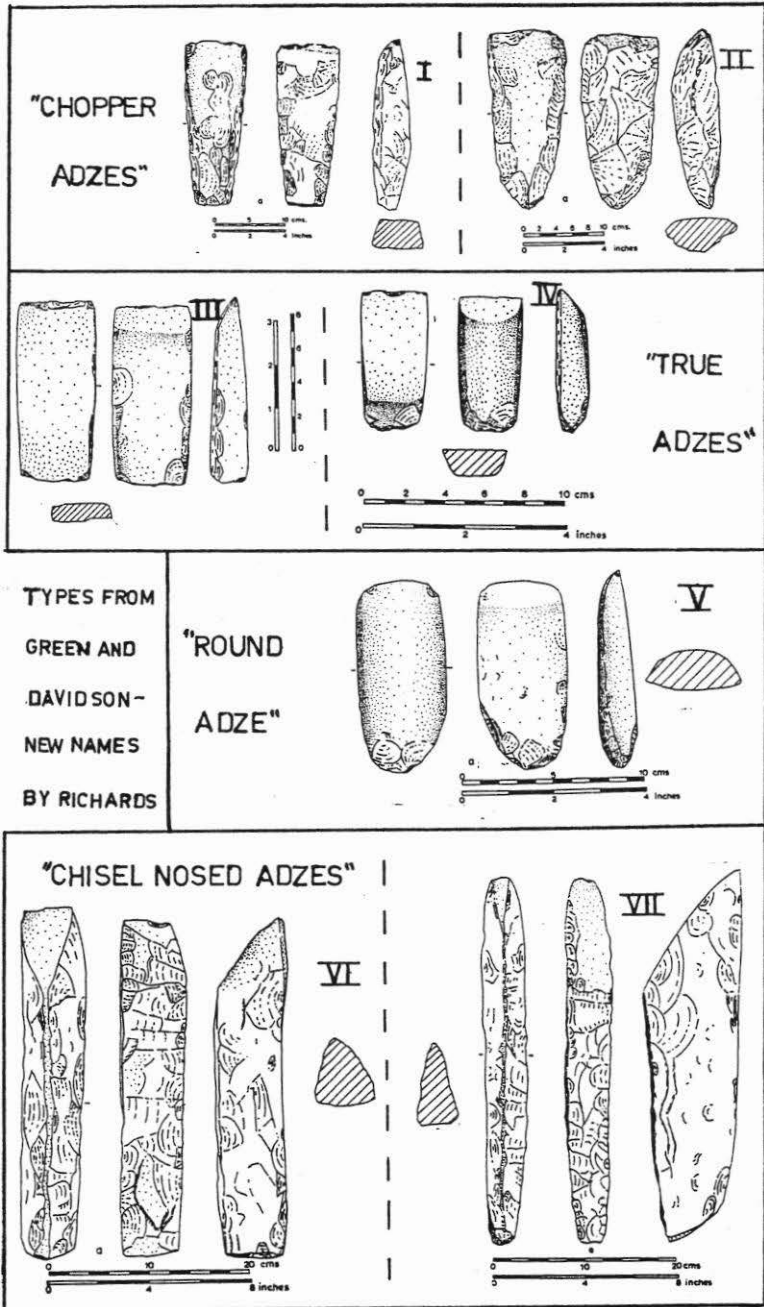


Figure 2.

1930:369) or that the inexperienced collectors limited their attention to more readily recognisable types of *to'i ma'a*.

Studies of function cannot proceed effectively without considering in some detail how in the hands of a skilled craftsman, variations in cutting edges and bevels could transform a hard stone into a precision tool. More study is also needed of hafting wear marks, or bevel damage, of other stress damage and other breakages.

On Examining the "Adze" Collection: Classification

A ten-category classification, based primarily on cross-section shapes rather than on tool functions, was proposed by Green and Davidson 1969 and revised by Green in 1974. This classification was followed and found to be workable, although as noted above it did not match very well functional distinctions between axes, adzes and chisels. Each *to'i ma'a* was given a locality number and assigned to one (predominant) category in their classification. A cross check on some of the initial classifications was made independently by Helen Leach who kindly spent two days in Apia in July 1988 examining about a quarter of the total collection, and another day when the collection reached Wellington. Comparisons of her classifications with those made independently before her visits proved invaluable for showing that some minor errors of classification had been made, but the divergence was slight on the main broad groupings, namely Types I, II and IX compared as one group against the remaining Types III, IV, V, VI, VII, VIII and X. (This latter group, though more diverse, is less in overall numbers.)

The most obvious characteristic of the collection is that over 85% of all the "adzes" have a quadrangular cross-section, with less than 4% rounded, and 10% triangular in cross-section. Moreover two very similar "adzes", Type I and II, "quadrangular sectioned adzes without grip, with the front narrower than the back and a short bevel", account for 60% of the total collection.

These Type I and II adzes predominate in the surface collections through being either the most commonly desired form when adze making ceased, or else through being a part of the adze kit from the earliest to the most recent times, or both (Green 1974:258). The new collection, being entirely surface finds, can be expected to have more recent than ancient adzes, and the high proportion of Type I and II adzes accords with Green's chronology, but he did not go on from there to consider a functional basis for the shift away from the use of several different types to almost only one type.

The same shape of adze but called Type 2B covers probably

80% of all adzes in the North Island of New Zealand, though made there from gabbro, sandstone and coarse grained sedimentary rocks rather than from basalt as in Samoa (Duff 1956:165-169). In New Zealand it has been argued convincingly that the predominance of this form was a late or 'Classic' phenomenon: "It would seem that from the beginning of [New Zealand's] prehistory, one set of adzes in one kind or rock were being made, which by the time of [foreign] contact had completely disappeared to be replaced by a different adze [2B] in a different kind of rock" (Best 1977:310).

The latter change of tool material did not occur in Samoa which lacks suitable sedimentary rocks, and Type I, which is otherwise very similar to New Zealand's Type 2B, is found overwhelmingly (and perhaps solely) in basalt.

Using both surface and excavated materials, Green has demonstrated a similar time change in adzes at Samoa, with the earliest adze kit containing several types, including a rounded Type V, while in later periods, the adze kit became dominated by Types I and II and the other types became uncommon or quite rare.

It is now suggested that a reason for the predominance in Samoa of these Type I and II 'chopper adzes' over other early forms was their versatility. What emerged, over time, was a preference for a single shape, multipurpose, tool suitable for wood chopping, grubbing and ditch digging. There was a price to be paid of course for such versatility in that the multifunctional tool could not do everything as well as a full kit of specialised adze tools. Nevertheless in later times the preference was clearly for the most versatile tool, which was made with the same shape and function but with sizes ranging from only 4 cm to 290 cm. (In the absence of chisels, it is possible that some short Type I 'blade ends' or fragments were not hafted normally but as if chisels (see Wallace 1982)).

In New Zealand Best has formulated a long held view that "the early adze kit was primarily connected with the building of canoes, the later adzes were mainly employed in wood working, where the removal of quantities of wood quickly was the prime importance" (Best 1977:331). He suggested that shaping and trimming a canoe hull required a variety of adze tools, while house posts or timbers would have been achieved with faster working tools with a high angle of attack. That may be so, but more would seem to be needed to explain why two late Polynesian groups, using almost identical type 2B chopper adzes in New Zealand and Type I and II chopper adzes in Samoa, produced such different standards of woodwork. While the North Island Maori was producing some of the finest woodwork in the neolithic world, apparently the Samoans' wood-working was of a lower quality for they had almost abandoned canoe making in

favour of obtaining them from their Tongan cousins, and their most esteemed house posts were not carved but were decorated elaborately with sennit lashings and there were few other decorative arts using wood. Perhaps one key to considering this long term divergence may lie in that the Samoans lacked the opportunity seized by the Maoris to shift the rock of their multipurpose chopper adzes away from fine grained basalts into stronger, "less brittle", rocks. It would be interesting to know in this context whether there is a higher proportion of broken butt ends of Type I and II in basalt in Samoa, than broken butt ends of Type 2B in New Zealand.

Similarly Best's suggestion that the original varied adze kit diminished as later settlers in New Zealand shifted away from their initial maritime focus to become more land orientated, with a need to undertake forest or scrub clearance for agriculture, invites testing with comparisons from elsewhere in Polynesia. His thesis seems to hold generally for the Chathams where a varied adze kit was retained while agriculture was not developed on a large scale (Richards 1972), and for Murihiku (Leach 1984). It also holds for Samoa where by the time of contact, distant maritime voyaging, canoe making and food gathering beyond the reef seem to have declined, and some agricultural pursuits had been developed well inland. Moreover during the endemic warfare well recorded in late traditions, so few coastal sites could be securely defended that the Samoans lived predominantly inland, which is where it is now thought multipurpose chopper adzes would have been most use.

Many more such possibilities need to be tested, both within Samoan contexts and with recourse to comparisons and contrasts elsewhere in Polynesia, but obviously they cannot be examined still further on this preliminary review.

On Comparing the New Collection with Existing Collections

The 716 "adzes" collected were allocated into the ten (non functional) categories used by Green and Davidson based primarily on their quadrangular, rounded or triangular cross sections (Fig. 3). After several other forms of comparison were considered, a simple graph was chosen as in Fig. 4 to compare the new collection with the 710 adzes classified from museum and other collections by Green and Davidson (1969), Green (1974), and Green and Dessaint (1978).

The two collections are remarkably similar both overall and in the percentage profiles for each of the ten categories as shown in Fig. 4. Both show a preponderance of quadrangular forms, 85.6% in the new collection and 82% in Green's composite collection, while rounded forms (Type V) are rare, 3.9% and 4.1% respectively, and the triangular forms (Types VI, VII, and

Figure 3. CLASSIFICATION OF TO'I MA'A COLLECTED

	Quadrangular						Rounded	Triangular			Totals
	I	II	IX	III	X	IV	V	VI	VII	VIII	
Luatuanu'u	86	26	14	22	1	13	10	14	1	9	196
Solosolo	66	27	24	13	9	16	9	26	1	2	193
Lufilufi	94	35	10	14	1	13	2	5	nil	3	177
Other places	74	23	10	12	2	7	7	14	nil	3	150
Totals	<u>320</u>	<u>111</u>	<u>58</u>	<u>61</u>	<u>13</u>	<u>49</u>	<u>28</u>	<u>59</u>	<u>2</u>	<u>17</u>	<u>716</u>

<u>Percentage of each type</u>	Quadrangular						Rounded	Triangular		
	I	II	IX	III	X	IV	V	VI	VII	VIII
Luatuanu'u	43.9	13.3	7.1	11.2	0.5	6.6	5.1	7.1	0.5	4.6
Solosolo	34.2	14.0	12.4	6.7	4.7	8.3	4.7	13.5	0.5	1.0
Lufilufi	53.1	19.8	5.6	7.9	0.6	7.3	1.1	2.8	nil	1.7
Other places	49.3	15.3	6.6	8.0	1.3	4.7	4.7	9.3	nil	0.7
Average %	<u>45.1</u>	<u>15.6</u>	<u>7.9</u>	<u>8.5</u>	<u>1.8</u>	<u>6.7</u>	<u>3.9</u>	<u>8.2</u>	<u>0.2</u>	<u>2.0</u>

% Green & Davidson	36.1	16.9	13.4	8.5	4.2	2.8	4.1	9.6	1.8	2.5
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VIII) account for 10.4% of the new collection and 14% of Green's composite collection. The close concordance between the two collections over all ten categories is made very clear in Fig. 4.

In effect the new collection supports Green's findings and will allow a statistical check on whether the proportions of Types I to X stay constant when the sample is doubled. Meanwhile some comments can be made on the apparent similarities between the two collections.

By far the largest categories are Types I and II which as already noted, are very similar forms apparently made by different techniques to achieve a very similar result. In 1974 Green noted that the Type I adze form "owes its overwhelming predominance to its position as a common type throughout the last 2000 years of the sequence" (Green 1974:258) or, as he had suggested earlier, that at the surface end of the sequence, Type I was the most common form immediately before stone tool making ceased around 1830 or 1840. There is a greater predominance of Type I adzes in the new collection - some 45.1% compared with 36.2% which may be because all the new collection are surface finds (or just possibly because 5% more of the new collection have been classified as Type IX rather than I or II.) When taken together, the proportions the three main quadrangular groups, Types I, II and IX, are 66.5% in Green's collection and 68.6% in the new collection. The proportions in the new collection are in accord with Green's findings, and would also accord with the suggestion that Type I and II multi-purpose 'chopper adzes' had become much more popular in recent times.

Comparisons between the two collections with regard to the rounded and triangular forms are less readily made, in part because of the much smaller numbers involved with only 29 type V adzes in Green's composite collection and only 28 in the new surface collection, while the totals for Type VI, VII and VIII adzes are only 51 and 76 respectively. While these seem to be the most interesting parts of both collections for diagnostic purposes, they are also the parts most open to personal classification differences and sampling errors or both. They merit special attention in any subsequent review including the conclusions Green reached about chronological changes in adze assemblages in Western Samoa.

Green noted that large surface collections in the order of 600 or more items could be used to examine variations in much smaller samples and to assess the likelihood that these variations were, or were not, likely to be chance results or significant variations from the norm (Green 1974:256)

Some preliminary regional intra-island comparisons can now

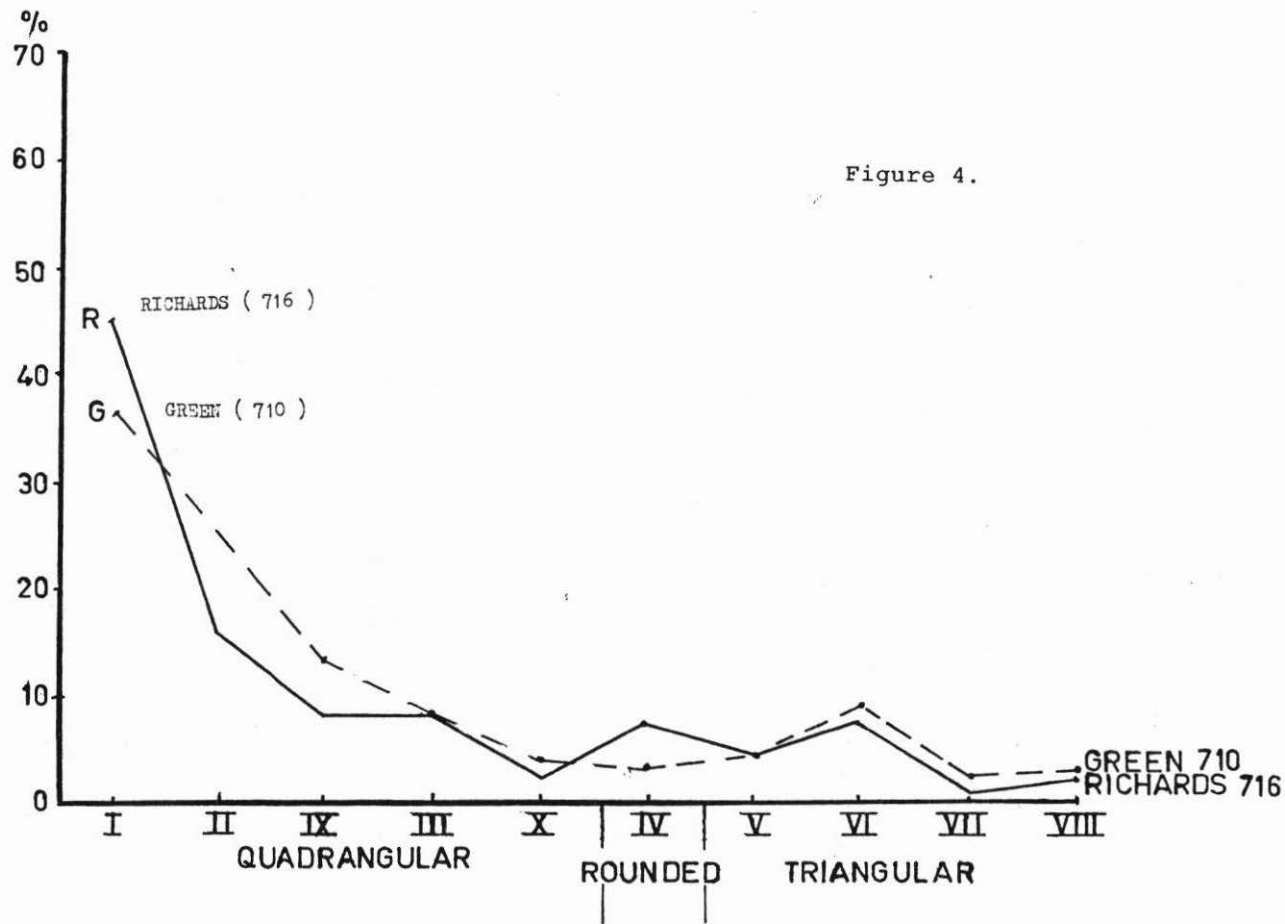


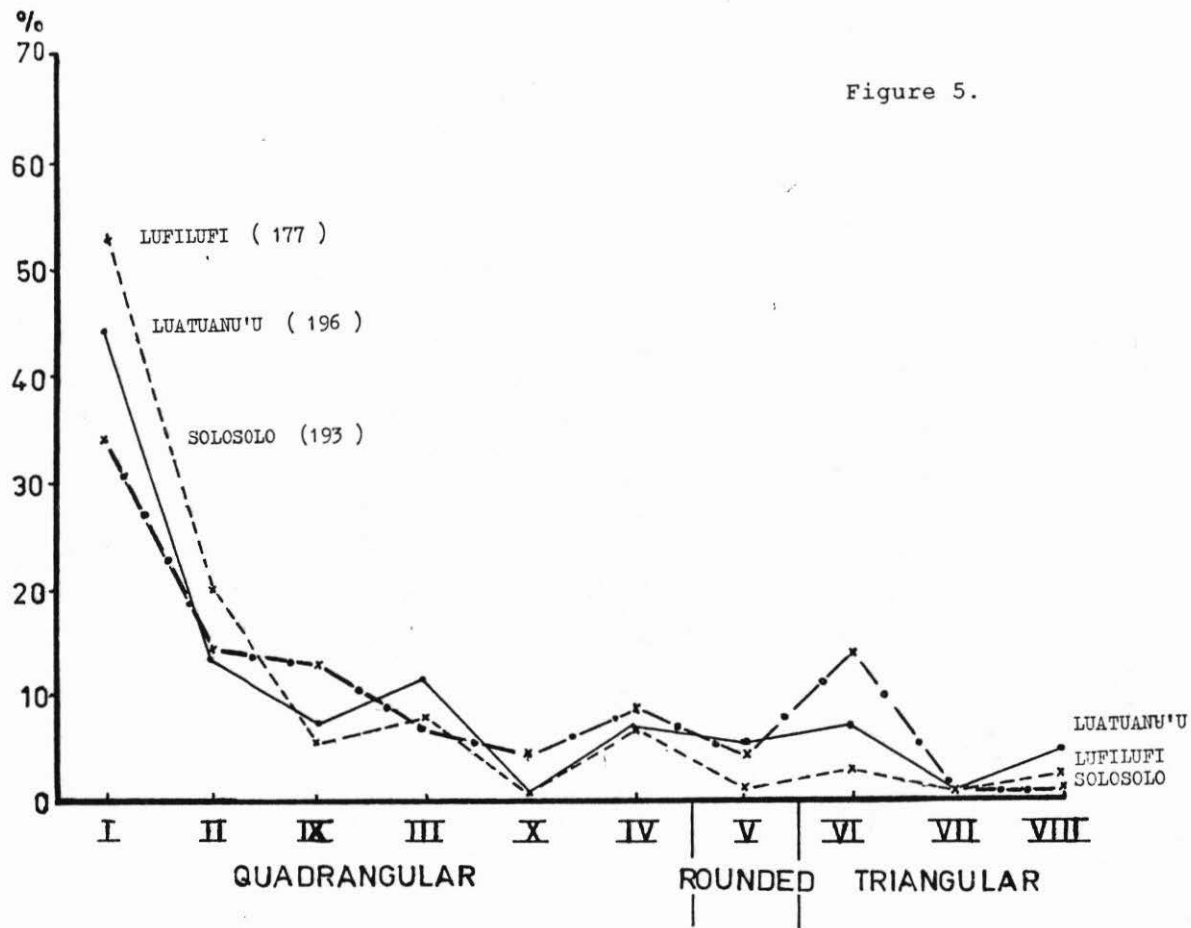
Figure 4.

be made between the three villages of Solosolo, Luatuanu'u and Lufilufi on Upolu. The number of each of the ten adze forms were calculated and are shown as percentages in Fig. 5. All three villages have remarkably similar percentage profiles. The proportion of quadrangular adzes is 88% for Lufilufi, 82.7% for Luatuanu'u and 80.3% for Solosolo. In the three villages Type I adzes were 53%, 44% and 34% respectively. Among the less common types, namely the other quadrangular types and the rounded and triangular types, there were some variations but none seem very marked except perhaps the high 13.5% figure for Type VI at Solosolo (which has an extensive, forested, hinterland.)

To see whether there was any major difference between the profiles of the three villages, each profile was compared with the average for the whole collection. On each of the ten types, the collection from Luatuanu'u did not deviate from the norm by more than 3.5%. The only major deviations were in the proportions of Type I adzes where Lufilufi had 8.0% more than the three village average and Solosolo had 10.9% more than that norm. Similarly Solosolo had 5.3% more Type VI adzes, and Lufilufi 5.3% less. The homogeneity of the three village collection was thus very striking.

Moreover this homogeneity between collections continued when the proportions of each of the ten types in the three villages were compared with the percentages of each of the ten types in Green's composite collection. There were 16.9% more Type I adzes in the Lufilufi sub-collection than in Green's, and 7.7% more Type I adzes in the Luatuanu'u group than in Green's, though this was counterbalanced to some degree by Lufilufi having 7.9% less Type IX adzes than Green and Luatuanu'u having 6.3% less than Green. When the proportion of all quadrangular adzes was calculated, however, the very close similarity was again obvious. It would seem that this striking similarity in the proportion of the ten types over the two main collections, totalling 1426 adzes, should provide a useful benchmark when smaller assemblages emerge from further stratigraphic excavations.

A further area that deserves attention is whether the new collection provides any insights into sub-regional and inter-island variations in adze distributions. The pioneer work on Samoan adzes by Peter Buck (Te Rangi Hiroa) and A.F. Judd in 1924 and 1927 was based on their joint collection of some 162 adzes of which 119 (74%) were from Tutuila and Manua in American Samoa, 33 were from Savaii in Western Samoa and only 10, or 6%, were from Upolu (Buck 1930:334). A brief examination of the collection of the Bishop Museum and their accession records up to 1970, was made in October 1988. This confirmed that almost all of the 227 Samoan adzes now held there are from American Samoa. (The accessions list shows that



224 items collected in 1927 by Buck and catalogued from C2016 to C2260 were all from Tutuila.) Here too the predominant rock type was that of the various adze fragments and hammer stones Buck found from "the quarry at Tataga Matau near Leone", and more simply "Leone" and "the Ripley paepae at Leone." Interestingly Buck's collection includes four Type V rounded adzes, which type has been considered diagnostically to be very 'early', with two from Tau (Manua), one from Fagamalo on Savaii (which has pre-European connections with Fiji), and one "picked up in the village of Afono on Tutuila" and "bought for 50 cents". Two at least seem to be from Tataga Matau, as does one of the two adzes in the Bishop Museum from Atafu in Tokelau.

Unfortunately many adzes in Buck's pioneer collection, and those in the Auckland Museum which were also seen briefly, are not provenanced more specifically than to an island and very few have been recorded to show in what village they were found.

The new collection having no adzes from Tutuila or Manua and only 27, or 4.6% from Savaii, would seem therefore to provide a new and useful base for comparing adze types and their frequencies. The museum collections in New Zealand are also mainly from Western Samoa. Since it has been postulated that the Manua Islands may have had various local cultural differences from the remainder of the Samoan group, some regional studies, island by island and village by village on Upolu and Tutuila, and also on Manua and Savaii, may now be worth pursuing.

In the new collection, the preponderance of Type I adzes in surface collections seems confirmed in the case of Savaii too, but with only 27 adzes and five of the ten types unrepresented, the sample is probably too small for confident generalisation. It is likely however that among the collections in New Zealand a reasonably large sample of adzes from Savaii could be assembled. This may also be the case for the two small islands of Manono and Apolima which are closely associated with Upolu in the old traditions and in land and title claims.

Furthermore, in the new collection a very high proportion of all adzes from all locations seem to be made from a distinctive fine grained basalt the same or similar to that once quarried at Tataga Matau at Leone in Tutuila (Leach pers. comm. 1988). If the localised adzes in the other collections can be added to the localised adzes in the new collection, it may well be possible to identify whether some villages had better "trade" contacts with Tutuila than others.

Many questions remain unanswered. It is hoped that this new collection, which is to be donated to the National Museum of New Zealand, will assist and encourage further research on *to'i ma'a* which have had little attention since the pioneer

work of Green and Davidson in the 1960s.

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