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Prehistory of Alega, Tutuila Island, American Samoa:
A Small Residential and Basalt-industrial Valley

Jeffrey T. Clark[1]

ABSTRACT

As a result of archaeological research over the last few years, it has become clear that the island of Tutuila, American Samoa, was a major producer of basalt artefacts. Several basalt quarry sites, most of which are quite small, are now known on the island. Three of these quarries have been found at Alega Valley, where survey and excavation have revealed evidence of residential and industrial activities since the fourteenth century, or slightly earlier. The presence at Alega of good quality basalt in readily exploitable form made this small valley a seat of prehistoric small industry.

Keywords: POLYNESIA, SAMOA, TUTUILA, BASALT, QUARRY, PREHISTORIC INDUSTRY, TRADE.

INTRODUCTION

Basalt was one of the most valued raw materials in prehistoric Oceania. Despite its importance, basalt quarries are rare in the central Pacific. The only documented examples in the Fiji-West Polynesia region are on Tutuila Island, American Samoa. Until recently, only one quarry site was known on the island: the large complex at Tataga-matau, near Leone in the Western District of Tutuila. As a result of investigations by Leach, Witter, and Best at Tataga-matau, we are beginning to get a picture both of the nature and extent of activities at that large quarry, and of Samoan adze-making technology (Leach and Witter 1987, 1990; Best *et al.* 1989). Over the last few years, research in the Eastern District of Tutuila has revealed eight additional quarry sites (Clark and Herdrich 1988, 1993; Clark 1989, 1992) and circumstantial evidence for the existence of two or three others (unreported data in author's possession). Furthermore, given the large area of the island yet to be surveyed, there is no doubt that many other quarry sites remain to be discovered. It is increasingly clear that Tutuila was a major supplier of basalt to many islands, extending even beyond the Fiji-West Polynesia region (Best *et al.* 1992).

Only one of the Eastern Tutuila quarries (Fagasa) is large and reasonably comparable with Tataga-matau; the others are quite small, as probably will be the case with most or all quarries found in the future. Thus, while Tataga-matau is a critically important site, it is atypical. To improve our understanding of quarry sites and activities in the central Pacific, it is important to examine the small sites as well as the large.

Three of the Eastern Tutuila quarries reported are from the small valley of Alega on the south coast. Evidence from those quarries as well as other sites in the valley suggests that basalt exploitation and tool manufacturing were focal activities at Alega, which appears to

[1]Department of Sociology-Anthropology, North Dakota State University, P.O. Box 5075, Fargo, North Dakota 58105, U.S.A.

have been a centre of prehistoric small industry. This paper presents a descriptive summary of the sites and artefacts of Alega and discusses the implications and significance of those archaeological remains. Archaeological data from Alega, though limited, complement the data from Tataga-matau to illuminate the range of quarry operations in Samoa.

ENVIRONMENTAL SETTING

Modern habitation at Alega occurs in a few houses, all occupied by members of one *'aiga* (family). The shoreline has a thin sandy beach, particularly on the east side, and there is a well developed reef in the bay. Alega Stream is the principal surface flow in the valley and in its middle section is within a gorge beginning at a small waterfall at the rear of the valley. Two small unnamed streams are also present, one to the east and one to the west of Alega Stream (the former flowing into Alega Stream).

The valley floor at Alega is very small, roughly corresponding to the area under 7.6 m (25 ft) in elevation, and is bounded by steep ridge slopes (Fig. 1). Geologically, Alega is in the midst of the ancient Pago Volcanics (extracaldera) (McDougall 1985). The surrounding ridge slopes are steep, falling between 30 and 40 degrees (or from just under 60% to just over 80%) (Atlas 1981). Topsoil is comparatively thin on the slopes, which have occasional basalt outcrops and areas of boulder cover. Soils are broadly classified as Aua Very Stony Clay Loam, which is very deep, well drained soil of talus slopes, formed in colluvium and alluvium derived from igneous rock (USDA 1984: 10, Plate 3). The valley and surrounding ridge slopes were at one time or another cleared and planted, but there has been little cultivation in recent years. Most of the area is now forested, although yards are maintained around the houses.

ARCHAEOLOGICAL RESEARCH

In a listing of archaeological sites in American Samoa, Kikuchi (1963: 27) assigned one site number (T-4) to Alega. However, that assignation was based on the presence of modern residential remains and the assumption that areas of modern occupation also were occupied prehistorically. In a subsequent compilation of cultural resources for the Historic Preservation Office of American Samoa, Clark (1980) rejected that reasoning and did not list any archaeological sites at Alega.

Early in 1990, an application for a permit to open a commercial quarry at Alega was submitted to the American Samoa Government. As part of the impact assessment of the proposed quarry, David Herdrich, the Territorial Archaeologist, conducted a reconnaissance survey and located a series of archaeological features within and in proximity to the area of impact. Subsequently, the author was contracted by the developer to carry out limited additional study, including test excavations. That work was restricted to several days in July 1990. The archaeological features found by Herdrich fall into four functionally distinct groups, which were later subdivided on the basis of geographic separation, resulting in seven site numbers.

In 1991, on a separate visit to Alega, the author, accompanied by David Herdrich and Todd Clark, found another set of features to the east of the previously investigated impact area during two brief reconnaissance surveys. One survey excursion went up the south slope of the western ridge spur, between Alega Stream and the far western unnamed stream, and

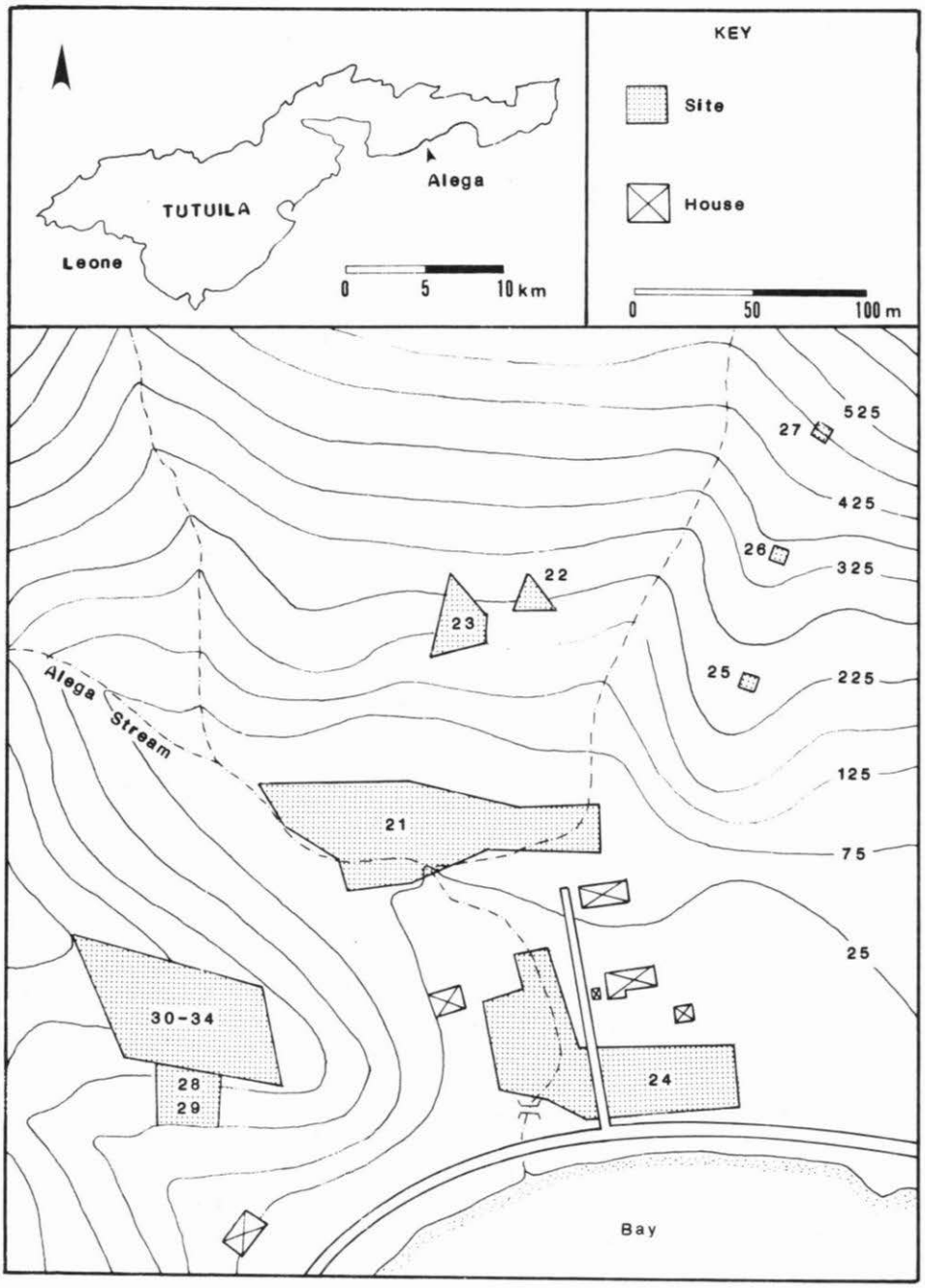

Figure 1: Tutuila Island and Alega Valley, showing site locations.

the other went up Alega Stream from the coast to the waterfall. As a result of these surveys, seven new sites and two new localities of a previously known site were found. Because of the restricted nature of the surveys, relatively little information was recorded about these sites.

Fourteen site numbers have now been reported for Alega (AS-23-21 to AS-23-35) (Fig. 1). Archaeological investigations in the valley were focused on the portion of one site slated for destruction (site AS-23-21), with secondary attention given to the one quarry site (AS-23-22) that was initially scheduled for destruction but subsequently spared.

SITE AS-23-21

This site is located near the base of the ridge slope bounding the valley to the north. It consists of 19 surface features and a large scattering of basalt artefacts (Fig. 2). These features include terraces, house floors, activity areas, walls and a roadway, representing both prehistoric and historic activities, most lying between 14 and 17 m above sea level. The main portion of the site covers an area of about 4900 square metres, with two small extensions (not shown on Fig. 2) of approximately 100 to 200 square metres each.

Features 1–4 are prehistoric in age. Feature 1 is a terrace that constitutes the primary work surface at the site. It appears to be a partially, perhaps predominantly, natural feature, formed by the stream channels and the northern ridge slope. The feature is divided into two sections, one eastern (Feature 1a) and one western (Feature 1b), by a stone wall (Feature 8) that encloses the eastern section. Feature 1a is smaller than Feature 1b, and only the former falls within the original project area. The vegetation cover was cleared completely from most of Feature 1a to reveal a surface covered with pebbles, cobbles, boulders, numerous basalt tools, concentrations of basalt flakes, some recent trash, and a set of surface features. The locations of all tools and preforms were recorded during site mapping (Clark 1992). While ground-surface visibility of Feature 1b was highly variable, and very poor in places, it was apparent that surface artefacts were comparatively rare. Features 2, 3, and 4 are flaking-activity areas marked by concentrations of basalt flakes. Within and near Feature 2, which is about five metres in diameter, were ten basalt tools and three boulders that were used as anvil stones. The flake concentration of Feature 3 is less dense than Feature 2 and only one tool was found in the immediate area. Feature 4 is in an area that was disturbed by historic housing but the concentration of flakes indicates an old area of activity.

The ages of Features 5–7 are uncertain. Feature 5 is a long, narrow terrace with a retaining wall marked by an occasional boulder and a small section of stacked boulders near the middle of the terrace. The primary function of this terrace was probably to stabilise the rear of Feature 1, but it may also have provided another work surface. Feature 6 is a small terrace down slope of Feature 1b. A traditional *fale* (house) foundation in the eastern portion of Feature 1b constitutes Feature 7. Basalt boulders form most of the perimeter of the oval foundation (7.3 by 7.0 m) and the floor is covered with waterworn pebbles and coral rubble, as is typical for *fale*. Neither historic nor traditional artefacts were found on or near the feature so the age of the structure cannot be estimated.

Features 8–19 are associated with the twentieth century occupation of the area. The stone wall of Feature 8 partially encloses Feature 1a, but an up-slope wall section could not be located among the dense vegetation and rocky talus material. This stacked-boulder wall was built as a pig retainer, reportedly in the 1940s. Related to the pig pen are a small, square, concrete-slab foundation, a short concrete wall, and a narrow concrete trough of Features

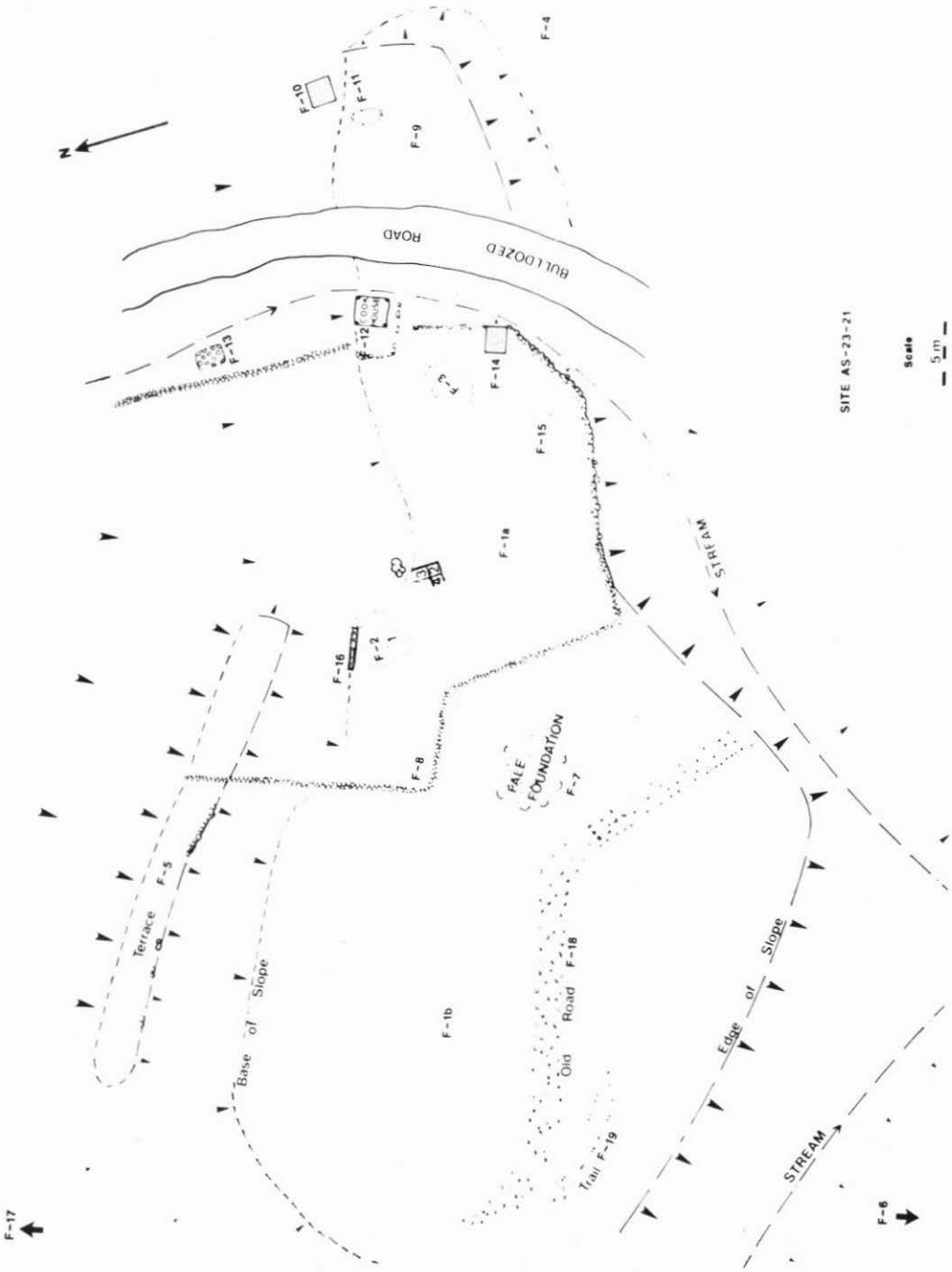

Figure 2: Site AS-23-21, with features designated by F-#s.

14, 15, and 16, respectively. Feature 9 is a terrace with the remains of a house floor that was used as late as several years ago, although the terrace may be considerably older. Feature 10 is an old, concrete septic tank, Feature 11 is an oblong, rounded alignment of boulders of unknown function, Feature 12 is the low platform of a cook house that was used until fairly recently, and Feature 13 is a low, rectangular structure of unknown function constructed of concrete and basalt boulders. An historic house foundation constitutes Feature 17 (not shown on Fig. 2), which is northwest of Features 1b and 5 and was occupied earlier this century. Leading to this house is a roadway, Feature 18, marked by a curbing of occasional boulders. Nearby is a remnant of a trail, Feature 19, which presumably used to extend from the coast road to the rear of the valley.

EXCAVATIONS

The archaeological investigation at AS-23-21 was focused on Features 1a and 2 since the other features were either beyond the construction impact area (Features 1b, 5–7, 9–19), badly disturbed (Features 4, 9), or comparatively recent (Features 8–19). Four test units were excavated in order to examine the cultural deposit, reveal the thickness of the actual terrace layer, and determine the date of terrace construction. Three of the units (1–3) were one-metre squares and the fourth (Unit 4) was one metre by a half metre.

Unit 1 was established in the midst of the flake concentration of Feature 2. Boulders were common, and in Layer II, at nearly 60 cm below surface (b.s.), excavation was restricted to the southeast quadrant. The area of excavation continued to be diminished by rocks and digging was terminated at 80 cm b.s. Five metres to the southeast, Unit 2 was opened where surface flakes were rare to provide a contrast with Feature 2. Rocks were a problem in this unit, too, ultimately leading to the restriction of excavation to the unit's west half for the last 20 cm of Layer II. Excavation was terminated at 55 cm b.s. Units 3 and 4 were contiguous with Unit 2 and established with the primary intent of collecting charcoal for a radiocarbon sample. Artefacts were fewest in Unit 3 where excavation ended 10 cm into Layer II. In Unit 4 artefacts were more abundant, per unit area, than in Units 2 and 3, and excavation again was terminated 10 cm into Layer II.

Work at each unit began by collecting all surface artefacts. Because of time constraints, only the soil of Unit 1 was subject to 100% screening. For the excavation of Unit 2, screening was reduced to 25% (one in four buckets) of Layer I and increased to 50% for Layer II, while in Units 3 and 4, 25% screening was employed throughout. The excavated soil was water screened with the use of garden hoses and 0.6 cm mesh screens. During excavation, special care was given to identifying and collecting flakes when screening was reduced.

The stratigraphy at the site was quite simple, consisting of only two layers. Although the boundary between layers was not well defined, especially in Units 2–4, both layers could be identified in each unit.

Layer I. As the upper stratum at the site, this is a cultural layer that represents the actual terrace development. It is a very dark greyish brown (10YR3/2), silty clay loam with a fairly high gravel content (approximately 30–40%) and many cobbles and small boulders. Layer thickness ranged from 22 to 36 cm. Basalt flakes were abundant, especially in Unit 1, but diminished with depth. Small pieces of charcoal were scattered through the layer but were more common near the base.

Layer II. This is the lower layer and constitutes the original subsoil at the feature. This, too, is a silty clay loam that is dark brown (10YR3/2), though slightly lighter and with less gravel (15–25%) than Layer I. Cobbles and boulders are more numerous than above, making excavation difficult and reflecting the taluvial nature of the layer. Layer thickness is not known, but was at least 50 cm in Unit 1. Bits of charcoal were scattered through the upper few centimetres only of the layer.

RADIOCARBON DATES

Two charcoal samples were submitted to Beta Analytic for radiocarbon assay (Clark 1993). Sample Beta-38438 was collected from Unit 1, the northwest quadrant, at the layer interface but primarily within Layer I. After lab pretreatment, only a very small sample of datable carbon remained so that, despite double counting time, an unusually large statistical error was produced. Sample Beta-38753 was collected from Unit 2 and into Unit 4, although the area involved was less than one square metre. Bits of charcoal came from the interface area, but were more common in the top of Layer II. Again, the size of the carbon sample after pretreatment was very small and required extended counting time (four times normal). The results of the radiocarbon assays are presented in Table 1.

TABLE 1
RADIOCARBON DATA FROM SITE AS-23-21

Corrections are according to Stuiver and Pearson (1986). $\delta^{13}C$ values were not measured.

Lab no	**Size (g)**	**Material**	**CRA**	**Calibrated Range 2σ and intercepts**
B-38753	0.42	charcoal	1590 ± 70	A.D. 1270–1440 (1322,1340,1392)
B-38438	0.16	charcoal	1,040 ± 230	A.D. 560–1395 (999)

At first glance, these dates show substantial variance. However, the standard deviation of the second is so great that at two sigma the calibrated dates overlap during the fourteenth century A.D., which is also the age indicated by the more reliable of the two dates (B-38753). The fact that the dated samples were not from fireplaces is regrettable, but, in the absence of contradicting evidence, I regard the charcoal, particularly sample B-38753, as reflecting the beginning of terrace development.

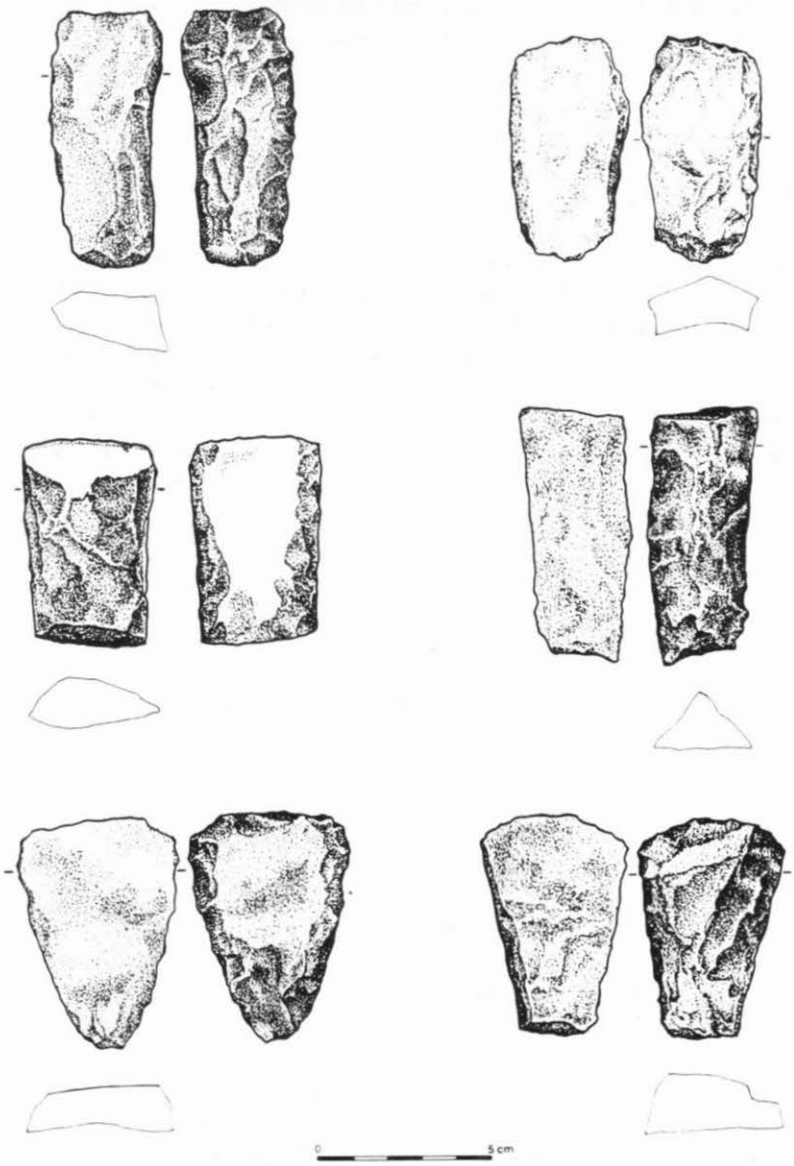

Figure 3: Selected artefacts from site AS-23-21. Preforms (top, and centre right); adze (centre left); grater/scraper flake tools (bottom), edge damage visible microscopically on flake at bottom left.

ARTEFACTS

The ground at AS-23-21 was examined for artefacts. It was only at Feature 1a, which was most intensively searched, that artefacts other than basalt waste flakes were found. All tools were collected after mapping, and representative examples of these artefacts are illustrated in Figures 3 and 4.

All five adzes recovered are Type I, which is the most common adze in American Samoa (typology of Green and Davidson 1969b) (Figs 3 centre left and 4 top right). Two adzes show a variation in the bevel angle at the edge, providing a thin secondary bevel that may indicate resharpening of the cutting edge. Both of those adzes also have chipping damage along the cutting edge attesting to use.

Fifteen of the 29 artefacts from the surface of Feature 1a are preforms (Figs 3 top left and right, centre right and 4 top left), and 9 of these are whole specimens. Blank typing, following Leach and Witter (1987, 1990), indicates a predominance of blank type B (especially B1) (eight examples), with type D possibly represented by only one specimen. Only four of the preforms were triangular in cross-section and none of those is of a form suggestive of a Type VII adze, which is consistent with the very low occurrence of Type VII adzes on Tutuila.

Of the eight flake tools, all but two are graters/scrapers (Figs 3 bottom left and right). Tools of this type were identified by Buck (1930) as *tuai ma'a*, or coconut graters. As I have argued elsewhere, however, we should not assume that all tools of this type were used exclusively for grating coconut (Clark and Herdrich 1988: 101–102). They could have served as graters or scrapers of a variety of materials. In any case, such tools are very common on Tutuila. Microscopic examination revealed edge wear on at least two of these tools. Two other tools were scraper preforms that lacked the final flaking to steepen and strengthen the edges. Scraper preforms have recently been reported from the Tataga-matau quarry (Leach and Witter 1990).

Also collected from the surface was a large hammerstone. This oval, waterworn cobble of vesicular (small) basalt is battered on the ends and along one side (Fig. 4 bottom). Three other artefacts of note from AS-23-21 are the three boulders used as anvils for basalt flaking at Feature 2. There is clear battering damage on the top of each stone (more pronounced on one) whereas other boulders in the area have neither flat surfaces nor traces of battering.

Excavations at Feature 1a produced another eight tools. One of these is an adze preform fragment of blank type C or D, with a trapezoidal cross-section. The other seven are flake tools, all identified by modified edges. Two of these are expanding flakes while the other five are elongated flakes or thick blades.

Basalt waste flakes were abundant at AS-23-21. Collected flakes were sorted into four types: primary decortication flakes, which have cortex over the entire dorsal surface and represent the initial stage of raw material preparation; secondary decortication flakes, which have cortex over some portion of the dorsal surface (ranging from just less than the entire surface to only a fraction of the surface) and represent an early to intermediate stage of flaking; reduction flakes, which have no cortex remaining; and polished flakes which have some area with a polished surface and thus indicate detachment from a finished tool, notably an adze. Size grading was done by use of a template of circles with diameter increments of 5 mm, ranging from 5 to 80 mm in diameter. The use of such fine increments did not reveal any pattern that could not be seen with larger size increments, so the data summarised in Table 2 and discussed below are by 20 mm size categories.

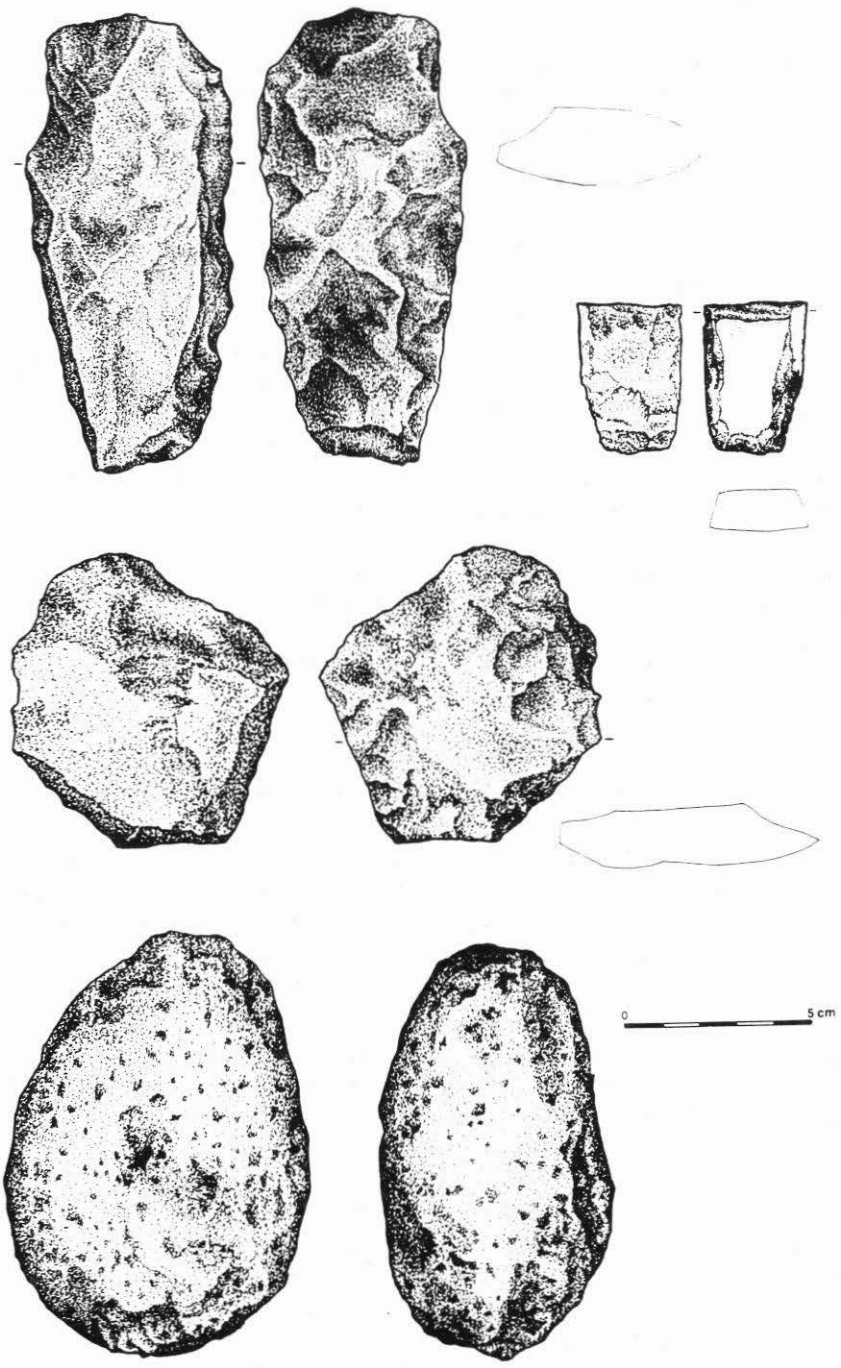

Figure 4: Selected artefacts from site AS-23-21. Preform (top left); adze (top right); flake tool (centre); hammerstone (bottom).

TABLE 2
BASALT FLAKES FROM SITE AS-23-21

TYPE	No	%	Wt(g)	%
FLAKE TOTALS	2500	100	9566.6	100
BY UNIT				
Unit 1	2152	86.1	7490.6	78.3
Unit 2	176	7.0	812.7	8.5
Unit 3	57	2.3	321.2	3.4
Unit 4	115	4.6	942.1	9.8
BY LAYER				
Layer I	2300	92.0	9220.8	96.4
Layer II	200	8.0	345.8	3.6
BY FLAKE TYPE				
Reduction flakes	2250	90.0	8248.0	86.2
Primary decortication	89	3.6	367.8	3.9
Secondary decortication	159	6.4	949.1	9.9
Polished flakes	2	-	1.6	>0.1
BY FLAKE SIZE				
0–20 mm	1270	50.8	965.4	10.1
21–40 mm	993	39.7	3768.6	39.4
41–60 mm	205	8.2	3283.1	34.3
> 60 mm	32	1.3	1549.5	16.2

As noted above, the quantity of soil screened at the units varied from 100% to 50% to 25%. In Units 3 and 4, artefacts collected from screening were bagged separately from those found during trowelling in order to assess the value of the time-consuming screening process of such clay-rich soil. The data show that screening was many times more productive for the recovery of flakes under 20 mm in maximum dimension. For flakes between 21 and 40 mm, screening improved recovery by double or more. The majority of flakes between 41 and 60 mm were recovered from trowelling, and all flakes over 60 mm were found during trowelling. Consequently, even where screening was reduced to 25%, the largest flakes are very well represented, middle sized flakes are probably well over 50% of the total actually present, and small flakes are very under represented.

Unit 1 produced by far the greatest number of flakes. This is hardly surprising given the differences observed in surface materials: 174 flakes were collected from the surface of Unit 1 while Units 2, 3, and 4 produced one, three, and two flakes, respectively. Even though 100% of the soil from this unit was screened, the quantities of flakes (by both number and weight) are far greater relative to the other units than can be accounted for by differential screening.

Within each unit, the quantity of flakes dropped substantially from Layer I to Layer II, with 92% of the flake number recovered from the upper layer (Table 2). Within layers, flake quantities also diminished with depth. In Unit 1, for example, the upper half (*c.* 15 cm) of Layer I produced 89.5% of the flakes (87.9% of the weight) from the layer. Within Layer II, quantities also diminished with depth, and the vast majority of recovered flakes were very small. Many of the small flakes from the lowest 20 cm in Unit 1 could be natural spalls. The basalt being utilised in Layer II was often of a poorer quality—coarser grained—than that in Layer I and at the nearby quarry sites, and the cortex, where present, is commonly from weathered cobbles. These conditions suggest use of raw materials available in the immediate area rather than from the quarry areas of the slope above.

Also recovered from the excavations were several recent artefacts (e.g., items of metal and glass), all from the top few centimetres in Unit 1. The small number of historic artefacts recovered indicates that Feature 1a, although utilised during the historic period, was not a residential terrace at that time.

SITE AS-23-22

This site is a prehistoric basalt quarry on the steep slope bounding Alega to the north, at an elevation range of 64 to 76 m above sea level. The angle of the slope is about 35 degrees, making the ascent to the scree arduous and the working area somewhat precarious. The quarry is marked by basalt flakes and shatter, preforms, core pieces, and a few hammerstones scattered over a roughly truncated triangular-shaped area, with the apex about four metres below a basalt outcrop. There are no signs that the outcrop itself was directly quarried but it was undoubtedly the source of basalt chunks that were exploited. These chunks were produced by natural fracturing along cleavage planes.

An alpha-numeric grid system of one-metre squares was laid out over the site with a theodolite (Fig. 5). The squares were marked by strings and the actual square sizes adjusted for the slope so that the squares were truly one metre on a side on the sloping ground. The artefactual content of each square was described and a sample of artefacts from every other square, in a checkerboard pattern, was collected at the site.

The collection of flakes from AS-23-22 was designed to provide a general sample, not a statistically representative sample of the material present. Thus, the sample size for each square, relative to the total quantity of flakes present, varies considerably. Furthermore, there was a bias against collecting the very largest and very smallest of debris. Nevertheless, the range of materials collected, together with the recorded observations made of each unit, allows for a reliable characterisation of the site.

The flakes collected were classified according to type and size as described above (site AS-23-21). Most of the 260 flakes collected are reduction (74.9%) rather than decortication (65, or 25.1%) flakes. The number of decortication flakes is lower than one might expect for a quarry site, which probably can be accounted for by two factors. First, much of the decortication material at the site consisted of very large flakes and chunks, comparatively little of which was collected. Thus, decortication debris is under represented in the collection. Second, relatively large pieces of naturally fractured rock were used so that the ratio of cortical to non-cortical flakes per piece of raw material is very heavily weighted to the latter category.

The data on flake sizes clearly illustrate a predominance of larger flakes. The majority of flakes were greater than 60 mm in size, with that category accounting for 53.5% (139) of

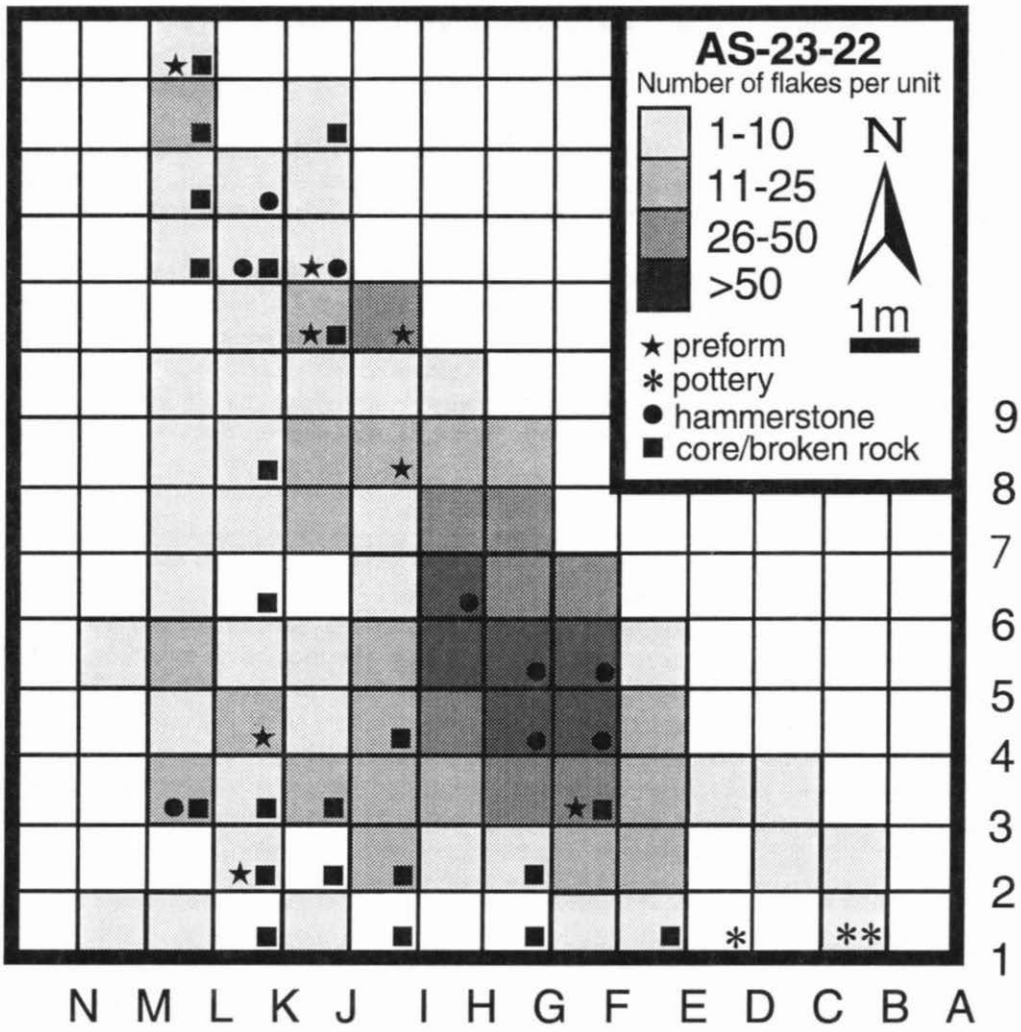

Figure 5: Grid pattern, flake densities, and artefact distribution at site AS-32-22.

the total. When flakes over 40 mm are included, the total increases to 80% (208). Smaller flakes are, of course, present at the site, particularly at units where debitage is densest. Nevertheless, this predominance of large flakes in the sample supports the general observation made at the site.

Figure 5 illustrates the non-uniform distribution of artefacts at the site. This graphic representation reveals a primary flaking-activity area of particularly dense artefacts, where flakes were piled up to 30 cm thick, centered in the area of G4-G5-F4-F5. Three much smaller concentrations lie to the northwest (up slope) and another is a short distance to the southwest (down slope). Beyond these concentrations, flakes are few and scattered.

Cores/core fragments (broken chunks) are a little more common in the down-slope portion of the site, probably because as larger pieces they would roll farther down the slope. At the same time, the chunks are also found at the flaking-activity areas.

Other than flakes, 12 basalt artefacts were found at the site. Eight of these are preforms, only one of which was not a fragment. Four specimens have trapezoidal cross-sections, while rectangular and triangular cross-sections are represented by two each. The blank types used are one A, one B1, two B2, two C2, one Tabular, and one unidentifiable. A single grater/scraper flake tool was also recovered. Three or four hammerstones (whole and fragments) were found, all of very coarse-grained basalt and with battering at one or more spots.

Three pottery sherds came from the southeast periphery of the grid. All three are undecorated body sherds: two are thick (12.0 and 13.4 mm), coarse-tempered sherds and the other is thin (8.5 mm) and fine-tempered (see Green 1974a). The presence of these sherds at the quarry seems odd, especially given the absence of sherds at site AS-23-21. However, a parallel can be seen at Tataga-matau quarry where a few sherds have been found even though pottery has not been recovered from sites in Leone valley below.

SITE AS-23-23

This is another quarry scree and is less than 15 m west of AS-23-22. Although the two sites are quite close to one another, there is a clear and distinct separation of the screes. This site is the largest of the three quarry areas found at Alega. Modified basalt materials cover a trapezoidal-shaped area up to 20.5 m wide and 36.3 m long. The scree falls between about 46 and 73 m in elevation and its upper limit reaches the base of the outcrop that also lies above AS-23-22. The lithic materials at this site are essentially the same as at AS-23-22: the basalt at the two sites is visually indistinguishable; the flakes appear to be predominantly large; and flakes and chunks are differentially scattered over the surface with some spots marked by very thick accumulations and other areas with very little material.

SITE AS-23-24

This site number has been assigned to the prehistoric cultural remains on the Alega valley floor, which is to say the area below 7.6 m (25 ft) in elevation. Surface scatters of basalt flakes and tools were found among the coral and stone rubble at the front of the modern houses. Five preforms were collected, four with trapezoidal and one with irregular cross-sections; identifiable blank types were two C2 and one A. Flake tools consist of one grater/scraper and one generalised scraper (steeply reworked edge). The only adze found was a small Type II specimen that was broken and modified to form a steep-edged scraper. West of the stream the artefacts were not quite as numerous as in the east. The site includes the lower portion of Alega Stream bed and banks where two boulders with grinding facets, presumably from the manufacture of adzes, were found along with a few basalt flakes. Occasional flakes were also observed along the stream-side trail (west bank) inland of the locality.

The area of site AS-23-24 almost certainly constitutes the primary residential zone of the valley. Presumably, additional artefacts could be found over a much larger area, but the grass obscures the view of most of the surface. At the same time, the quantity of artefacts,

the high number of preforms, and the grinding stones indicate that this, too, was an area where basalt tools were being finished. Should future excavations be carried out at this site, deeper deposits may be found that represent the initial occupation at Alega.

SITES AS-23-25, AS-23-26, AS-23-27

These three sites are small terraces on the steep slope of the ridge spur immediately east of the eastern stream. The terraces have some boulders in parts of the outer edges, but none has a well formed retaining wall. It appears that naturally flattened spots on the spur were modified and enlarged to form arcing terraces. These sites probably served as resting/working bases for people working at plantations on the ridge slope.

SITES AS-23-28, AS-23-29

Site AS-23-29 is a basalt quarry marked by a dense surface scatter of flakes on a steep slope, at an elevation of approximately 46 m. Large and small angular boulders are common in this area and undoubtedly constitute the raw material source. The site covers an area about 11 m east-west by 23 m north-south. The heaviest concentration of lithic debris is in the middle to lower area of the scree with the upper 14 m or so showing a relatively light density. At the top of the scree is a small terrace, about four metres square, that probably served as a small work station. The only collected preform fragment has a trapezoidal cross-section, some remaining cortex, and a blank type B2 form. The debitage at the site appears little different from that at the other two quarry sites. Site AS-23-28 is a large terrace a short distance down slope from AS-23-29 that probably served as an associated work area.

SITES AS-23-30 TO AS-23-34

Site AS-23-30 is a large residential terrace (*c.* 30 by 12 m) approximately 30 m up slope from site AS-23-29. On the terrace is a *fale* foundation with boulder curbing and a floor of waterworn pebbles, and two small pits that may have served as food-storage pits for the residents of the terrace. Some waterworn pebbles—probably representing a general work surface—were scattered over the surface and a few basalt flakes were observed. East and slightly up slope of AS-23-30 are four additional terraces that are generally comparable in size to AS-23-30, although no foundations or other features were observed. Ground cover and time limitations, however, did not permit a thorough inspection of the sites. They could represent frequented encampment sites for people on resource exploitation or pigeon catching ventures. On the basis of the terrain, a small number of similar features could be located on the slope below these terraces, but very few, if any, are likely to be found up-slope.

DISCUSSION AND CONCLUSION

The archaeological investigations at Alega revealed 14 sites, many surface features, and an abundance of artefacts, covering a range of prehistoric and historic residential and industrial activities. Although the artefacts from Alega are not especially varied, they are numerous. A breakdown of collected artefacts by site, type, and quantity is presented in Table 3. A comparison of artefact recovery from other sites in the archipelago clearly demonstrates that the Alega sites are consistent with the emerging picture of intensive basalt utilisation on Tutuila as contrasted with the rest of Samoa (e.g., Ayres and Eisler 1987; Clark and Herdrich 1988, 1993; Clark 1989; Frost 1978; Gould *et al.* 1985; Green and Davidson 1969a, 1974; Hunt and Kirch 1988; Jennings *et al.* 1976; Jennings and Holmer 1980). The archaeological data from Alega, together with data from other archaeological studies in Samoa, allow the construction of a general, descriptive model of past life at this small valley.

TABLE 3
SUMMARY OF ARTEFACTS FROM SITES AT ALEGA

SITE	**AS-23-21**	**AS-23-22**	**AS-23-24**	**AS-23-29**	**TOTALS**
Adzes	5	-	1*	-	6
Preforms	16	8	5	1	30
Flake tools	15	1	2	-	18
Flakes	2500	260	-	4	2764
Hammerstones	1	3	-	-	4
Pottery	-	3	-	-	3
Totals	**2537**	**275**	**8**	**5**	**2825**

*An adze later modified to form a scraper

Permanent occupation at Alega probably began sometime before the fourteenth century A.D. That occupation was almost certainly focused on the coast in an area that is now badly disturbed by the modern road and the construction of historic houses (site AS-23-24). While there is no way of knowing from current evidence just how early that occupation was, there is no reason to claim that it was particularly early.

Given the small size of the valley, the earliest archaeological remains inland are probably not widely separated in time from those of initial coastal settlement. The oldest known remains at Alega are the flakes from Layer II at AS-23-21, which are pre-fourteenth century A.D., though probably not by a lot. A reasonable inference is that permanent occupation of Alega began just a little before that time.

The comparatively small number of basalt flakes from Layer II—particularly the upper portion of the layer—reflect the early, though limited, use of the area for tool making. The comparatively poor quality of much of the basalt and the apparent use of local cobbles suggest that this was a time before the exploitation of basalts from the quarry areas of the slope above. The surface of Layer II indicates that the area of the terrace was somewhat flattened naturally, relative to the talus slope, and therefore provided a good work or residential surface.

Some time in the fourteenth century A.D., activity at the location increased substantially, as marked by Layer I. It is not clear whether that also marked the formal construction of

the terrace or if the retaining wall was added later, or even piecemeal as needed to inhibit slumping. Whenever the retaining wall was constructed, relatively little levelling and infilling probably took place, owing to the natural conditions. With the beginning of Layer I, the quantity of basalt flakes started to increase, and the basalt being utilised was predominantly of a comparatively fine-grained type, similar to that exploited at the quarries. The development of Layer I appears to reflect the exploitation of the quarries and the onset of industrial activities, which intensified over time, as indicated by the substantial increase in flakes in the upper portion of Layer I.

The primary shaping of basalt tools took place at a set of quarries (at least three) on the slopes around Alega. These areas were selected because of the presence of pieces of basalt with flat surfaces and angular edges produced by natural weathering and cleavage planes. Furthermore, these basalts are comparatively fine-grained and probably have good flaking and polishing qualities. Blanks were being roughed out at the quarries with finish flaking and grinding taking place at other sites, which is hardly surprising given the steep working surfaces at the quarry sites. This situation is indicated at AS-23-22 by flake sizes, the low number of preforms, the comparatively crude level of preform manufacture, the rarity of small flakes with multiple, dorsal, flake scars, the absence of flakes showing more than one flaked side (tool edge angles), and the absence of grinding stones. These conditions appear to hold for the other two quarry sites, as well.

Final flaking took place at flaking stations on artificially (terraces) and/or naturally flattened ground surfaces below the quarries. The remains at sites AS-23-21 (Features 1a–4) and AS-23-24 indicate that at least parts of these sites were related to the manufacturing of basalt tools. Adzes were the predominant tool of intent, although some flake tools, especially graters/scrapers, were also produced. The fact that only two grinding stones have been found at Alega may indicate that preforms rather than completed adzes were the principal products of the basalt industry. This may further suggest—though weakly—that those products were intended for export rather than local use.

In their study of adze blanks at Tataga-matau Quarry, Leach and Witter (1990) identified a major production area for large preforms of type D and some type C blanks in Layer II of the Rubble Terrace. They dated this industrial area to the fourteenth to fifteenth centuries A.D. They also observed that on the surface of that terrace and in other upper layers marking more recent working floors, preforms were usually of blank types A, B1, and small C1. Both the Alega quarry (AS-23-22) and industrial terrace (AS-23-21) show a predominance of smaller preforms, with blank types A, B, small C, and few if any type D. The radiocarbon dates for AS-23-21 suggest terrace use—and imply quarry use—in the fourteenth century. This would support the suggestion of Leach and Witter (1990: 76) that the type D production at Tataga-matau at that time was not a reflection of general production around the island, but of specialised production at that quarry.

This does not mean, however, that Tataga-matau was the only quarry producing basalt tools for export. The fact that basalts from other areas of Tutuila were traded to other islands in the central Pacific has recently been documented by Best *et al.* (1992). The number of quarries and the extent of production at Alega would seem to be excessive for the comparatively small population resident in the small valley. Thus, one can reasonably hypothesise that Alega was an 'industrial' valley, supplying basalt preforms and/or tools to other areas. Comparisons of the geochemical characterisations of basalt samples from quarry sites AS-21-22 and AS-21-29 with data from other areas and islands is now underway and will provide a test of this hypothesis. Furthermore, on the basis of their geochemical data, Best *et al.* (1992: 70) observed that while Tutuila quarries supplied basalt tools to other

archipelagoes, all of the dated early artefacts came from the Leone area and none from the quarries in eastern Tutuila. The suggested age of the Alega quarries is consistent with that observation.

The presence of pottery sherds at AS-23-22 is of special interest. Ceramic sites have been known in Samoa for more than three decades, but they are not common in the archipelago and are rare in American Samoa. The standard view of pottery use in Samoa has been presented by Green, who based his observations on data from Upolu. According to Green (1974b), the earliest occupants of Samoa used Lapita pottery, with its distinctive decorative pattern. Samoan Plain Ware developed out of Lapita Ware in the first millennium B.C., and changed slowly over time. Early assemblages were dominated by thin-walled, fine-tempered vessels while in later assemblages thick-walled, coarse-tempered vessels were predominant. Eventually, pottery manufacture and use ceased in Samoa, disappearing sometime between A.D. 200 and A.D. 600.

Recently, however, pottery has been found at a site in Aoa on the northeast coast of Tutuila that dates to as late as A.D. 1400–1600 (Clark 1989, 1993). Thus, pottery may have been part of the Samoan material culture, if only in small amounts, for a thousand years longer than previously thought. As noted above, the quarry at AS-23-22 probably dates to sometime around the fourteenth century, possibly later. The pottery from Alega may provide some inferential support for the suggestion that pottery use in Samoa continued until just a few centuries ago (Clark 1989: 134).

A thorough survey of Alega and surrounding slopes undoubtedly would reveal more sites, though probably not many. Such sites may include other flaking activity areas and perhaps even another quarry. There are probably a few other residential terraces on the valley slopes, as well. Of the known terraces, only one (AS-23-30) has residential features, so comparatively few terraces were for permanent residence as opposed to specialised or seasonal utilisation. It is quite likely that the prehistoric population of Alega was larger than that of the twentieth century, although the population would never have been as large as at an average *nu'u* (community/village).

Occupation of Alega in the historic period is well represented, although most—perhaps all—of the known historic remains are from the twentieth century. With the ultimate abandonment of the basalt quarries, which probably occurred in the early to mid nineteenth century, Alega may have been depopulated, or nearly so, until the twentieth century. The area today is again one of limited residence and industry focused on the local basalts. Ironically, it is the recent basalt industry that brought to light the prehistoric basalt industry.

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