THE EASTERN TUTUILA ARCHAEOLOGICAL PROJECT
1986, FINAL REPORT

By

Jeffrey T. Clark
Department of Sociology-Anthropology
North Dakota State University
Fargo, North Dakota 58105

and

David J. Herdrich
Department of Anthropology
University of Illinois at Urbana-Champaign
Urbana, Illinois 61801

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PREFACE

For nine weeks in 1986, from June 1 to July 31, the authors carried out the Eastern Tutuila Archaeological Project. That work was funded primarily by the Historic Preservation Office of the Government of American Samoa, with in-kind and cash contributions by North Dakota State University and the University of Illinois at Urbana-Champaign. The cooperation between these institutions made possible a highly productive research investigation. The results of that investigation are the subject of this report.

Different portions of this report were written by each author. David Herdrich prepared the section on star mound analysis, the survey descriptions of the star mounds, the survey descriptions of many of the slope and ridge-top sites (excluding the artifact descriptions), and the section on excavations at AS-21-49. All other portions of the report were written by Jeffrey Clark who also did the editing and assembled the report.

Jeffrey T. Clark
Fargo, North Dakota
Many people have contributed in various ways to this project. We would like to thank all who, in one way or another, provided assistance, encouragement, and support. A number of people must be specifically thanked for their role in this project. For allowing this project to take place we thank Governor A. P. Lutali and Lieutenant Governor Eni Hunkin. We sincerely thank Stan Sorensen, Historic Preservation Officer, for his efforts in project planning, during our stay, and since our departure.

To High Talking Chief Taua Olomua, High Chief Soli Auemovaluigo, Pule Nu'u Tuivaifanua Solo Mapu, and the people of 'Aoa and Fa'alepe we extend our thanks for their hospitality while we lived and worked in their communities. A special thank you must go to High Talking Chief Taua Olomua. Not only did he play a critical role in smoothing our way, but he remained open to us for assistance if ever needed. For allowing us to excavate on land under their control we thank Togiola Sefo and, again, High Talking Chief Taua Olomua. For sharing their knowledge of the island and Samoan culture with us we thank Fia Tiapula, Moafana Paleso'o, Aga Aoa Toga, Epī Suafo'a, and John Kneubuhl.

A very special thank you must go to our field assistants who worked with us tirelessly, and without whom this project could not have been completed. They are Richard Stevens, Siapai Enosa, Francis Su'a, and Aleta Fata'iasinailei. Richard and Siapai were our assistants—and more importantly our friends—during the entire project and their contributions to the study were enormous. Olomoana Elementary School is fortunate to have them as teachers. And a particular acknowledgment goes to Aleta Fata'iasinailei and Siapai Enosa for encouraging us to consider the star mounds from a Samoan point of view.

We are deeply grateful to those people who volunteered their help at different stages of the project: Darlene Chimman and Mark Holsapple deserve special recognition for their extended work, and for more limited but very helpful assistance we also thank Patrick Donahue, Peter Van Zandt, Elizabeth Loeb, and David Steiner.

For their most gracious hospitality we thank John and Dorothy Kneubuhl, and Stan and Tulie Sorensen. We are especially grateful to Richard Stevens, Aleta Fata'iasinailei, and their children, Naomi, Sa, and Tausali, for sharing their home with us.

We also thank those people who assisted us in the preparation of this report. Dr. Thomas Riley assisted in getting the project off the ground. Troy Geist carried out most of the cataloging of the artifacts and prepared most of the artifact drawings that appear in the report. David Rosberg drew many of the maps, including the large base map of 'Aoa and surrounding ridges, and he was given technical assistance by Dr. Warren Kress. Inne Choi drew the final versions of many of the star mound sites. Dr. Thomas Freeman and Jay Bjerke offered their expertise in our attempts to identify the organic residue adhering to stone tools. Jody Solem carried out a preliminary petrographic analysis of several pieces of basalt and obsidian. Kate Ulmer typed tables and took care of the budget. And continued support was given by Anna Marie Clark and Julie Y. Collins.

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ERRATA

Page 15: First paragraph, line 1. Reads "1975": should read "1976".

Page 15: Last line. Reads "1987": should read "1979".

Page 15: First sentence. Reads "1987": should read "1979".

Page 31: Paragraph. Reads "Fig. 10a": should read "Fig. 10b.

Page 31: Paragraph. Reads "Fig. 11a": should read "Fig. 11b".

Page 51: Paragraph. Reads "Fig. 11c": should read "Fig. 11d".

Page 52: Paragraph. Reads "Fig. 12a": should read "Fig. 12b".

Page 52: Paragraph. Reads "Fig. 13a": should read "Fig. 13b".

Page 53: Paragraph. Reads "Fig. 14a": should read "Fig. 14b".

Page 54: Paragraph. Reads "Fig. 15a": should read "Fig. 15b".

Page 55: Paragraph. Reads "Fig. 16a": should read "Fig. 16b".

Page 56: Paragraph. Reads "Fig. 17a": should read "Fig. 17b".

Page 57: Paragraph. Reads "Fig. 18a": should read "Fig. 18b".

Page 101: All instances. Reads "Frost (1976)"; should read "Frost (1976)".

Page 102: All instances. Reads "Frost (1976)"; should read "Frost (1978)".

Page 103: Third paragraph, first line. Reads "1976": should read "1978".

Page 107: Chart, under LOCATION. Reads "Tafaga Matanu"; should read "Tafaga Matau". Under SOURCE. Reads "Frost 1975"; should read "Frost 1973".


Page 121: Fourth paragraph, seventeenth line. Reads "(1976)"; should read "(1978)".

Page 122: First paragraph, second line. Reads "1976": should read "1978".

Page 139: Map. Missing scale; should read "700 ft". Soil Conservation Core (SCS) 1 missing: see correction sheet.

Page 146: Second line. Reads "1965": should read "1967".

Page 154: Last paragraph. Reads "Sina": should read "Masei" in all instances.

Page 155: First paragraph. Reads "Sina": should read "Masei".
Page 186: First paragraph. Reads "Sina"; should read "Masei".

Page 150: Second paragraph. Penultimate line. Reads "Pritchard"; should read "Pritchard".

Page 152: First full paragraph (beneath quote), second line (only). Reads "Sina"; should read "Masei".

Page 155: Second full paragraph, third line. Reads "Pritchard's tutu"; should read "Pritchard's tutu".


Bibliography: Missing references; should include the following:


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INTRODUCTION

Prior to 1985, archaeological research in American Samoa had been scant, and those projects that had been carried out generally lacked a systematic approach and/or a problem-oriented research design. In addition, the Historic Preservation Program in the territory had been severely neglected. With the recent revitalization of the program, however, the opportunity arose for significant archaeological research addressing both program needs and general research questions. The Eastern Tutuila Archaeological Project (ETAP) was thus conceived and carried out with two primary concerns in mind—one focused on historic preservation needs and the other on scholarly research.

The aspect of the project that relates directly to the historic preservation program involved the survey of selected areas of the island to expand the territorial site inventory. Furthermore, the survey, and subsequent test excavations, would be used to locate sites that may be eligible for nomination to the National Register of Historic Places. And, the survey results could enhance efforts to predict the likelihood of sites being located in specified environmental settings.

The overriding research interest was in early Samoan settlement patterns. The investigations were directed at reaching a preliminary understanding of how prehistoric populations distributed themselves over the landscape, how that pattern of distribution changed over time, and the ways in which human behavior and natural environment have acted upon each other.

The two aspects of the project are, of course, related. As data from systematic surveys in the territory accumulate, the better able we will be to address a variety of research questions, such as those involving settlement pattern. Furthermore, the more we learn about the past of American Samoa through problem-oriented research, the more valid will be the determinations of archaeological site significance and the more effective will be the nominations of sites to the National Register of Historic Places. While the ETAP was designed to stand alone as a contribution in both the historic preservation effort in American Samoa and to Oceanic prehistory, we nevertheless regard it as as the first step in a longer commitment to historic preservation and scholarly research in the territory.

ENVIRONMENTAL SETTING

In the heart of the South Pacific, some 4,192 km (2,604 miles) SSW of Hawaii, lie the islands of Samoa (Fig. 1). The islands of the archipelago are divided into two political entities: the nation of Western Samoa and the islands of American Samoa, the latter constituting a territory of the United States. American Samoa comprises the islands of Tutuila, Ta'u, Ofu, Olosega, Swains, and Rose Atoll. Our study took place on the island of Tutuila, so the following discussion of environmental conditions applies primarily, though not exclusively, to that island.
Figure 1. Map of the central Pacific and the Samoan Islands.
Geography

Tutuila is the largest of the islands and supports the largest population. Pago Pago, Tutuila, which constitutes the administrative and commercial center of American Samoa, lies at about 14° 18' S latitude and 170° 41' W longitude. Tutuila and Aunu'u together are divided into ten counties (taking eastern and western Vaifanua as separate units), which are grouped into two districts, Eastern and Western (Fig. 2). Some geopolitical maps of the island illustrate three districts by identifying the eastern two counties (Itu'al and Ma'oputasi) of the Eastern District as composing a Central District. We will follow the more common convention, however, of recognizing only the Eastern District and Western District.

Topography

Tutuila is a high volcanic island and is the largest island in American Samoa with an area of about 142 sq. km (54 sq. mi). It is long and narrow with a high rugged ridge running down the central length of the island. According to the Atlas of American Samoa (Atlas 1981), Tutuila is 31.9 km (19.8 mi) long and ranges from 9.8 km (6.1 mi) to less than 1.6 km (1 mi) in width. The most remote point from any coastline is only 3.36 km (2.1 mi) from the shore. The island has 125.2 linear kilometers (77.8 linear mi) of coastline, 60% of which has an offshore coral reef.

Tutuila is very rugged and marked by numerous peaks, ridges, and old volcanic caldera. The highest point on the island is Matafa'ao peak at 653 m (2,142 ft). Only 34% of the island has less than 30% slope (Atlas 1981). Slump and landslides, especially after deforestation, are major factors in the slope formation process. The north coast of the island is more rugged, the valleys smaller, and the bays smaller and fewer in number than along the south coast.

Despite the heavy rains, even the largest water flows are mere streams and many are intermittent. The longest stream is Fuafua which is 4.7 km (2.9 mi) in length (Atlas 1981). But streams are numerous and cut their way from the interior highlands to the coast. In many cases the streams have created steep-sided valleys and empty into well-formed, if often small, embayments. At other locations, small streams etch the rugged landscape in narrow passages to the ocean. These small streams may enter the ocean where there are small coves, small coastal plains, or both. Each of the major valleys is drained by at least one stream.

The largest of the bays is Pago Pago Bay which is located roughly in the middle of the south coast of Tutuila. It is a large caldera that has been breached by the sea on its southern edge. Pago Pago Bay provides one of the largest and most protective harbors in the Pacific. Indeed, its presence, and the safety it afforded vessels in the Pacific Ocean, was a major reason for the desire of the United States to secure control of Tutuila.

Climate

In the Koppen climatic classification system, American Samoa falls in the Tropical Rain Forest subclassification of the Tropical Climate Zone. There
Figure 2. Map of Tutuila Island showing district and county boundaries.
are two main seasons, wet (usually from November to March) and dry (actually better termed less-wet, from June through September). Extended periods of rain are more common during the wet season but can come at any time. Some rainfall occurs on 300 days of the year, although on many of those days the amount is small (less than 1/10 of an inch) (Atlas 1981). The mean annual rainfall is high but varies with topography and location in relation to wind patterns. At the airport, for example, the rainfall is 125 inches per year while at the harbor, a short distance away, the figure is around 200 inches. The high for the island is on 'Alava Mountain where the mean annual rainfall is 250 inches (Patterson 1981). Actual rainfall, of course, varies from year to year, and that variance can be quite large. Over the last ten years the annual rainfall at Cape Matatula on the extreme eastern end of the island (near 'Aoa Valley) has ranged from 74.48 inches to 129.17 inches (statistics provided by Steven Ryan of the Samoa CMCC Observatory, Cape Matatula). Since the prevailing winds are from the east-southeast, the northwest sides of the mountains show some rainshadow effect, but it is slight.

In the dry season the temperature tends to be slightly cooler, although the actual monthly temperature variation between seasons is only about 3 degrees Fahrenheit. Daily temperatures usually are in the upper 80s F and nighttime temperatures in the mid to low 70s, so the diurnal temperature range is about 15 degrees, or less. Relative humidity is high with a daily average at 72 to 77 percent and evening averages at 87 to 93 percent (Atlas 1981: Statistical Tables). Periodic decline in tradewind activity can make the humidity seem oppressive, especially to nonlocals.

The wetter months are when most of the tropical storms and hurricanes blow in. These storms occur, on average, every 2.5 years and the majority blow in from the north or east (Patterson 1981). Between 1966 and 1976 there were four occurrences (1966, 1968, 1973, 1976) (Atlas 1981), and in January of 1987, Hurricane Tusi hit Manu'a with terrible destructive force. Thunderstorms occur, on average, 25 to 30 times a year, mostly during the summer. Tsunamis strike periodically, but of the 18 that have hit the islands since 1917, few have caused severe damage (Patterson 1981).

**Vegetation**

Natural vegetation in American Samoa broadly falls into the category of tropical rain forest. With Polynesian and later European colonizations, the vegetation community was substantially altered. Nevertheless, "almost 93% of the 490 plant species found in undisturbed habitats in American Samoa are indigenous or native" (Amerson et al., 1982:20). Amerson and colleagues have described the natural tropical rain forests as follows:

Natural forest is characterized by tall, broadleaf evergreen trees with several crown layers, abundant woody vines called lianas, and ubiquitous epiphytes such as ferns, orchids, mosses, and lichens. Within this broad classification [sic] exists a mosaic of plant communities made up of assemblages of plant species reflecting differences in conditions of slope, elevation, microclimate, soil type, and exposure to sea water [Amerson et al., 1982:20].
Today, in the valleys and over much of the slopes the vegetation pattern is one of managed lands. That is, the lands are either in "plantation" (small swidden or arboriculture plots) or various stages of secondary growth. Even the high ridges and peaks are largely in disturbed forest (Whistler 1981). Away from the villages and farmed areas the vegetation can be quite dense. The major crops in the islands today are still those introduced by the early Oceanic settlers—i.e., coconut, taro, breadfruit, and banana. While coconut, breadfruit, and banana can be grown for protracted periods, taro can be raised for only 2 or 3 years before depleted soil fertility leads to diminished yields (Amerson et al. 1982:20).

**Geology**

The Samoan archipelago is situated along a submarine ridge that runs roughly east-west. This puts the islands roughly perpendicular to and at the north end of the Kermadec-Tonga Trench, which marks the interface of the Australian and Pacific Plates. According to Amerson et al. (1982:8), "the Samoan Ridge is apparently the surface expression of a large, regional sea-floor fault along which volcanoes have erupted, forming various island groups."

A recent series of potassium-argon dates reported for Tutuila by McDougall (1985) have shown that the emerged volcanics of Tutuila date back to the early Pleistocene. Prior to McDougall's investigation, the island was geologically described as being formed by four primary shield volcanoes that sequentially formed from west to east (i.e., Taputapu, Pago, Alofa, and Olomoana Volcanics) during the Pleistocene, and the more recent cinder-cones, ash, tuff, and lava of the Tafuna Plain (Leona Volcanics) that formed during the Holocene (e.g., Stearns 1944; MacDonald 1968; Stice 1981). On the basis of the new suite of dates, however, McDougall argues that the Alofa Volcanics are actually only an eastern-flank formation of the Pago Volcano rather than a distinct volcano. Also, while the Pago volcanism may have begun slightly earlier, the satelliteic Taputapu and Olomoana Volcanoes were active at the same time as Pago, even though Olomoana was a little earlier than Taputapu. Activity at these three volcanoes ceased around a million years ago. The Leona Volcanics developed during the Holocene, but no eruptions have been reported for Tutuila during the historic period, which effectively began in the early 19th century. Lying off the eastern tip of Tutuila is the small island Aunu'u. This is a young landform that appears to date to the Holocene and to have been formed by a shallow submarine explosion (Stearns 1944:1313).

The portion of Eastern Tutuila where our research took place is composed of Olomoana and eastern Pago Volcanics (or Alofa Volcanics in most characterizations). The Olomoana Volcanics form the far eastern end of the island. These are thin-bedded olivine basalts capped with andesites, and with associated cinder cones, vitric tuff beds, and plugs, including a trachyte plug at Lefufulufiuia (Stearns 1944:1266-88). To the west are the eastern Pago (Alofa) Volcanics. According to Stearns (1944:1289-90), these are thin bedded, chiefly olivine-bearing basalts with one trachyte plug (Leilani Plug), cinder cones, vitric tuff beds, and several hundred basaltic dikes. The transition line between Pago (Alofa) and Olomoana Volcanics runs across the interior of the island from the middle of 'Aoa valley to the middle of Aumuli. The highest point in the eastern Pago section is Le'aano peak at 295.5 m (969 ft) above sea level, while the highest point in the Olomoana section is
Clomoana peak at 327.4 m (1074 ft). Detailed petrographic and geochemical data for Samoa have recently been obtained by Wright (1986), and those data, together with that of others (e.g., Hawkins and Natland 1975; Wright and White 1987) will be extremely useful for future investigations of the source of basalt artifacts in Samoa.

Surrounding Tutuila is a submerged shelf that indicates a formerly much larger island. This shelf averages 4 km (2.5 mi) in width and is generally less than 50 fathoms beneath the sea, although in some areas it is over 60 fathoms deep (Chamberlin 1924:148). Aunu'u also rises from this shelf.

Soils

Most of Eastern Tutuila consists of Fagasa Family-Lithic Hapludolls-Rock Outcrop association soils. This association is found on ridges and mountain-sides with slopes of 70 to 130 percent (USDA 1984:11, Soils plate 3). There are also large patches of Fagasa-Ofu silty clays in interior areas with 30 to 60 percent slopes.

Along most of the eastern end of the island and at each of the valleys are bands of Ngadebus complex sand. The slope is 0 to 15 percent in these areas and the elevation range is from sea level to 5 m (15 ft). It is on these lands that the majority of houses are situated today.

The floors of the larger valleys are of either Leafu silty clay with 0 to 3 percent slopes, or Leafu stony silty clay with comparable slopes. The latter is stonier, but the two groups are otherwise very similar. Both are "very deep, somewhat poorly drained" and "formed in fine textured alluvium derived dominantly from basic igneous rock" (USDA 1984:13).

Bounding most of the valleys, at least partially, are bands and pockets of Aua very stony clay loam, ranging from 15 to 60 percent slopes. This soil "formed in colluvium and alluvium derived dominantly from basic igneous rock" (USDA 1984:10).

PREVIOUS RESEARCH

As summarized by Clark (1980, 1981a), previous archaeological research in American Samoa has been relatively scant and generally unsystematic in nature. With the exception of Buck's (1930:321-370) mention of a few archaeological sites in his early volume on Samoan Material Culture, archaeological investigations in American Samoa did not effectively begin until the early 1960s. In 1961 and 1962, William Kikuchi (1963, 1964) carried out general site surveys on Tutuila, Aunu'u, and in Manu'a. Kikuchi gathered information from local informants on the existence and location of known sites in a given area and then visited as many of them as time and conditions would allow. Consequently, a large number of the sites listed by Kikuchi were never visited or even precisely located by him. Nevertheless, his early inventory provided a good foundation for all subsequent work.
Systematic surveys in American Samoa have been few in number and quite limited in scope. The first of these was conducted by Edmund Ladd (Ladd and Morris 1970) in the area of 'Olovalu Crater near the village of Futiga, Tutuila. Five years later, Kikuchi returned to Ta'u with Stephen Palama and Thomas Silva. They carried out a reconnaissance survey of the proposed sites of the Ta'u boat harbor at Fusi and the associated quarry located between Fusi and Fagamalo (Kikuchi, Palama, and Silva 1975). Later that same year, Silva and Palama (1975) went to Tutuila where they did small surveys for shoreline and beach improvements from Nu'uo'oasegi Cove to Mulinu'u Point, road improvements on sections from Nu'uo'oasegi to Faga'alu, and a coastal strip for the Aunu'u boat harbor. In 1977, Patrick McCoy conducted a survey of a narrow strip of beach at 'Au'asi, Tutuila, for the then proposed boat harbor. All of these surveys were systematic in nature, but the overall area covered was quite small and few sites were reported. In addition, they were all focused on the identification of sites with surface remains.

Research projects involving subsurface testing have been even fewer in number than surveys. In 1962, Kikuchi and Yoshihiko Sinoto (Kikuchi 1963; Emory and Sinoto 1965) expanded archaeological investigations in American Samoa to include limited subsurface testing. Through the digging of seven one-meter square units and thirteen post-hole borings (totaling approximately 7.25 sq. m. or 10.7 sq. ft. in area), they tested twelve sites—nine on Tutuila and three on Ta'u. All of the cultural material recovered from the tests on Tutuila was post-European contact in age, as was that from one of the Ta'u sites (Mata'ana Cave). Only two of the Ta'u sites (the Faleasao cookhouses) produced possible pre-contact remains, which were sparse. In short, those test excavations contributed little to our knowledge of Samoan prehistory.

More extensive excavations were carried out in 1972 by Janet Frost (1976, 1978). After limited survey, Frost selected seven sites, all on Tutuila, for test excavations. Pre-contact occupation remains were recovered from all of the village sites tested, and a radiocarbon age determination from one of her sites (Tulotu, or Tulauta) yielded the earliest date for occupation in the territory—i.e., the 9th century B.C. Frost's work contributed valuable information to our understanding of Samoan prehistory.

In 1980, Jeffrey Clark (1980, 1981a) carried out a very limited investigation of cultural resources in American Samoa. The primary goal of that work was the compilation of a territory-wide inventory of cultural resource sites—archaeological, historical, cultural, and architectural. Following an initial literature search and site listing, a short reconnaissance survey of selected sites—several not previously reported—in Tutuila and Manu'a was done to assess their potential significance. An expanded site inventory was then prepared listing all sites reported by all investigators as of 1980. That survey covered a large geographic area in a short period of time and was too general in scope and spotty in coverage to be considered either intensive or systematic. It did provide, however, a needed synthesis of two decades of archaeological investigations.

In 1985, the government of American Samoa began a concerted effort to revive the dormant Historic Preservation Program in the territory. Since then, several new projects have been carried out and others are scheduled to follow. Although there is still an absence of extensively excavated sites, our knowledge of American Samoan prehistory is expanding rapidly. In 1985,
Helen Leach and Daniel Witter (n.d.) carried out a detailed survey of the Tataga-Matau basalt quarry complex near Leone. Later that year, William Ayres and David Eisler conducted survey and test excavations in Maloata, along the northwest coast of Tutuila (a report on that work is not yet available). In another 1985 project, Richard Gould, Kim Honor, and Kirsten Reinhardt (later Brophy) (Gould et al. 1986; Brophy 1986) briefly visited and described the sites of Tulauta, Fagatele Bay, and the Leone Bay petroglyphs, and did some limited test excavations at Tulauta. Also in that year, Joseph Kennedy (1985) conducted a very brief surface survey of selected areas in Leone.

A new flurry of work was carried out in 1986. During the summer the authors conducted the Eastern Tutuila Archaeological Project reported on here. At the same time, Terry Hunt and Patrick Kirch (1987) initiated a program of survey and test excavation in Manu’a. In the fall of 1986, Ayres returned to Tutuila with Robert Bryson who did additional work in the western region (a report of that work is not yet available).


PROJECT OBJECTIVES

In the initial proposal, four research objectives were established. The first was to initiate a systematic site survey. The research area was restricted to the Eastern District of Tutuila, with a focus on the valleys of the north shore. The survey was to involve (a) reconnaissance survey of some areas, (b) a more intensive survey of areas selected on the basis of reconnaissance results, and (c) limited subsurface testing. The second objective was to collect data relevant to a set of research questions (outlined below) about the prehistory of American Samoa. The third objective was to evaluate the sites located for significance and eligibility for nomination to the National Register. The fourth objective of the project was to provide a sound basis for the preparation of a proposal for a later research project.

RESEARCH DESIGN

The overriding research focus of the Eastern Tutuila Archaeological Project was on the prehistoric settlement system in American Samoa. Such a focus raises several important questions. Where and when did initial settlement take place? How did the early colonists distribute themselves over the landscape? How did the pattern of settlement change over time in response to changing ecological and social conditions? What impact did human occupation have on the environment and how did the resultant environmental changes influence human behavior? As a first step in addressing these and other questions, we began with a preliminary descriptive model of American Samoan prehistory.
Model building is an important tool for archaeological research (Clark and Terrell 1979). Model building allows—indeed forces—one to synthesize and clarify available information and predictions on the study area. Models also help to clarify critical questions and the sorts of data that are necessary to answer those questions. We therefore began with a simplistic model of the prehistoric settlement system on Tutuila. This model constituted a conceptual tool and not our version of Samoan prehistory. A critical assumption for the model is that the colonization and settlement processes that developed on Tutuila generally paralleled those of Western Samoa. We therefore used what is known of prehistory in Western Samoa in conjunction with what is known of American Samoa to construct a first-round model, which is restated below.

The Model

Initial settlement of Tutuila took place in the early part of the second millennium or latter part of the first millennium B.C. The colonizing population(s) came from islands in Fiji, Tonga, or elsewhere in Samoa. These people used a distinctive type of pottery known as Lapita Ware. Their subsistence was based on both marine resource exploitation—particularly of near-shore waters with developed reef formations, but involved pelagic fishing as well—and agricultural production focused on taro, breadfruit, coconut, yam, and banana. Therefore, preferred environments for settlement were large, well-watered, stream-fed valleys with good alluvial deposits. These were located at protected bays with developed reefs, easy access to open water, and rich marine resources.

Over time, the population expanded both farther inland and to other valleys along the coast. So, while occupation began with a coastal focus, a dispersed settlement pattern soon developed with households scattered up the valleys. This pattern did not change significantly until the early historic period when settlement emphasis shifted back to coastal villages.

As a result of expanding population and agricultural activities, the rate of soil erosion accelerated, particularly on the slopes. The sedimentation rate in the valley bottoms likewise accelerated. In conjunction with the increasing sedimentation, geologic tilting was taking place so that the western end of the island was subsiding while the eastern end was undergoing slight uplift. As a result of these geologic and sedimentation processes, early sites in eastern Tutuila are likely to be located some distance back from the existing shoreline and/or be buried under sand and alluvium. In western Tutuila the earliest sites are likely to now be underwater.

As the environment was undergoing change, so, too, was the sociocultural system of the colonizers. The generalized West Polynesian cultural base and ultimately the distinctive Samoan (and more specifically eastern Samoan) culture developed as outgrowths of the contrasting yet simultaneous processes of inter-island interactions throughout West Polynesia and Fiji, on the one hand, and isolation of islands and populations, on the other. A few centuries after initial colonization, for example, people stopped decorating their pottery with the distinctive Lapita motifs, and undecorated Polynesian Plain Ware came to be widely used. Over the next few millennia, the Plain Ware, which utilized much less variety in vessel shape and size than Lapita Ware, shifted from a predominantly thin fine ware to predominantly thick coarse
ware. By the second century A.D., or slightly later, pottery making had stopped altogether. Other changes in housing, subsistence, and so on undoubtedly occurred as well.

With European contact and influence, the processes of cultural change accelerated, but along different lines and in response to different conditions.

**Methodology**

On the basis of this model, it is clear that there are three critical areas of data collection: (1) settlement pattern, (2) geomorphology, and (3) chronology. To address the issue of settlement pattern, it was important to initiate a systematic survey program. As stressed earlier, the initiation of such a survey is a very important aspect of the developing Historic Preservation Program in American Samoa. Given the size of the islands and the limitations of this project, it was necessary to focus our work on a specific study area. The area selected was the Eastern District of the island of Tutuila. More specifically, we were interested in limiting our investigations to the counties of Vaifanua, Sa'Ola, and Sua. This region was selected because we believed it provides the best potential for addressing the research questions.

The appropriateness of the eastern end of Tutuila for the study is indicated by the evidence—although weak—for geologic tilting. In Western Samoa, the earliest known site, Ferry Berth (a Lapita site dated at earlier than ca. 940 B.C.), is located on the far western end of Upolu and is now submerged. This indicates subsidence of at least the western end of that island. On Tutuila, archaeological test excavations in the area of Leone on the southwest coast have yielded only late (generally post-contact) cultural materials, while on the eastern end of the island, excavations at Tulauta (or Tuletu) yielded the earliest cultural deposits in the territory, which reportedly were dated to the first millennium B.C. Furthermore, Tulauta is not located along the shoreline, but, instead, is half a kilometer inland. When considered together, these data suggest the possibility of geologic tilting, with the western and subsiding and the eastern end undergoing slight uplift.

The project fieldwork comprised four phases: reconnaissance survey, intensive survey, test excavations, and soil coring. Reconnaissance surveys are geared toward preliminary evaluation of the archaeological remains in a given area. They are carried out to provide quickly a determination of the presence, type, and distribution of archaeological features in selected areas. The primary goal of those surveys was to identify one of the north coast valleys for more intensive investigation on the basis of assessed potential for yielding data relevant to the research questions. Our efforts were concentrated on the north shore valleys because they meet the criteria established in the model for early occupation but are virtually unknown archaeologically. The specific valleys to be considered were selected following a review of the environmental variables and the size and distribution of the present population. In some cases the reconnaissance surveys constituted little more than spot checks for evidence of cultural deposit. Such surveys were made at stream mouths all along the coast in our
study area to check for signs of cultural materials eroded from inland deposits.

The valley at 'Aoa Bay was selected for survey because it was judged to hold the best potential for addressing our research questions. A critical factor in the selection of 'Aoa was the presence of a small stretch of mangrove and of a small marsh near the rear of the valley. Very early in the project we found that the archaeological remains in 'Aoa suited our needs quite well, so, while other areas were investigated, our attention was focused on 'Aoa.

Additional reconnaissance survey was carried out at a few sections of the slope surrounding 'Aoa, an area where vegetation and terrain made intensive survey extremely difficult. In addition, a survey was made of an inland site located high on a ridge-top east of Vatia Bay.

Once 'Aoa was selected as the center of our investigation, intensive survey of the valley and surrounding ridges began. This phase of survey consisted of systematic pedestrian coverage of an area to locate and describe the surface remains. Our ability to find sites was hindered at times by vegetation cover. Another problem was in precisely locating features on our maps. When away from the coast and other identifiable landmarks, and in the midst of tall trees, we could only approximate our position on the available maps. The goal of the intensive survey was to provide an overview of the distribution of surface features in and around the valley, and thus begin to collect data on valley settlement pattern. Intensive surveys were also made at the small coastal plains of Onenoa, Fagaitale, and Fagaitiiti.

The results of the intensive survey were used to determine the location of test excavations. Our initial intent was to dig three to five units along a coast-inland transect in an attempt to (1) locate an early ceramic site, (2) examine soil profiles for data on geomorphology, and (3) to collect data—from artifact typologies or radiocarbon samples—that would allow for chronological placement of the site. The discovery of a pottery site (AS-21-5, Locality 2) fairly early in the survey, together with the decision to employ soil coring for geomorphological data, lead us to restrict excavations largely to the pottery site, with brief work at one of the ridge sites (AS-21-49).

The fourth phase of the project involved soil coring to examine soil stratigraphy. Coring can be done much more quickly than unit excavation and thus allowed us to examine a much larger area. We established two major coring transects through the valley and two small transects. The goal of the coring operation was to check for evidence of changing geomorphology, particularly indications of change in the sea stand over time.

Site Designations

Archaeological sites were numbered according to the numbering system outlined by Clark (1980:13-14) and adopted by subsequent researchers. This is a modified version of the system established by the Smithsonian Institution and uses a tripartite code. The first two-character element designates the state, or in this case territory. At the time of Clark's report a formal numerical code for American Samoa had not been established by the Smithsonian or the Keeper of the National Register, so the alphabetic code AS was used.
We have since found out that the number 66 has been assigned to American Samoa, but in this report we continue to use the AS designation. In the second two-digit element the first number designates the district (Manu‘a, 1, Eastern Tutuila, 2, and Western Tutuila, 3) and the second number indicates the county (county numbers were assigned by Clark, numbering from east to west). Most of our work was carried out in Vaipanaa County (#21), but we also examined sites in Sa‘ole (#22), Sua (#23), and West Vaipanaa (#24). The third numerical element in the code designates the individual site within the county.

The assignment of site numbers was not always a clear-cut and easy task. Over much of the lower and middle valley floor we found a fairly continuous scatter of habitation debris (artifacts, midden, ‘ili‘ili scatters, and paepae). While in some cases we could define individual house foundations, over much of the area we could not, on the basis of surface materials only, precisely define houses or larger residential units (consisting of houses and associated domestic activity areas and structures). Furthermore, we know that there are older, buried, cultural deposits that bear no direct relationship with the observable surface features. Consequently, for each named village area, a single site number was used. In small valleys this number also applies to the entire valley floor associated with that village. In the valley at Aoa Bay there are actually two villages, Aoa and Fa‘alefu. Archaeological remains in the lands of Aoa have been designated AS-21-5, and remains in Fa‘alefu compose site AS-21-6. For conceptual and descriptive convenience, such large sites were subdivided into "Localities" on the basis of spatial and archaeological considerations. At site AS-21-5, for example, pottery sherds were found at three separate locations, although they probably represent broadly contemporaneous settlement. These recovery areas were designated as AS-21-5, Localities 2, 3, and 4.

On the valley slopes and the inland ridges, cultural remains tend to consist of discrete and comparatively isolated structural remains (e.g., terraces, star mounds, and walls), and the probability of buried deposit stretching over a large area is very low indeed. In such cases, individual site numbers were assigned. At complexes of associated structures, however, the entire complex was assigned a single number—e.g., the ridge-top village of Old Vatia (AS-24-2).

**PROJECT RESULTS**

In the pages that follow we will summarize the results of our investigations in Eastern Tutuila. The discussion is organized according to the type of investigation carried out. We begin by presenting the results of the reconnaissance and intensive surveys. This is followed by summaries of the excavation and coring findings. Discussions of artifacts collected and chronological assessments for both the survey and excavation phases are then given. The report closes with a summary of the project results and a presentation of interpretations and conclusions drawn from the Eastern Tutuila Archaeological Project.
Survey Results

The results of the reconnaissance and intensive surveys are reported together rather than as separate phases. The findings are presented by county, and by valley and village within counties. A brief discussion of the type of investigation conducted is given even for areas where sites were not found. It must be kept in mind that the absence of surface remains does not mean that sites do not exist at those localities. Our findings at site AS-21-5, in 'Aoa, demonstrate that early sites are likely to be buried and not indicated by surface materials. In many areas, only through subsurface testing—by excavation or coring—can buried deposit be ruled out. At the same time, on the basis of geomorphological conditions together with survey results, the probability of buried early deposit may be exceedingly low. Such areas are so noted in the discussions.

In the site descriptions that follow, references are made to various artifact types and classes. The reader is referred to the Artifacts section of the report for definitions and descriptions of the types cited. The general locations of the areas discussed below are indicated in Figures 3 and 4.

Before proceeding, it will be useful to summarize the landscape of the survey area. Closely spaced around the shoreline are several small to medium sized valleys, and a number of small coastal plains. These are separated by stretches of high basalt coasts (over 3 m), although areas of low basalt coasts (less than 3 m) and rubble foreshore are also present (Atlas 1981). Typically, the valleys are bounded by steep ridges with taluvial and colluvial build-up at the foot of the valley walls. The valley floors consist of alluvium, and loose calcareous beach sand forms a band along the coast. Fringing reef is found around nearly the entire coastline. Where streams enter the ocean, channels, or 'ava, through the reef have been created by the freshwater discharge. The cold freshwater together with the transported alluvium impede coral growth. 'Ava are important to local residents because they provide a route for canoes to pass beyond the reef. The rugged interior of the island consists of vegetation-clad ridges and peaks.

WEST VAIFANUA COUNTY

West Vaifanua lay outside our primary study area, so we spent very little time there. Four sites have previously been reported for this county (Clark 1980:57): an old village site reported for Amalau (AS-24-1), an old village site located on the west ridge above Vatia (AS-24-2), a commemorative rock (or tupua) between Afono and Vatia (AS-24-3), and a spring in Vatia (AS-24-4). Our investigations in this county were limited to a reconnaissance survey of the ridge-top west of Vatia that we carried out when a resident of that village informed us that he could guide us to the location of an extensive set of old house foundations.

Vatia

A single site was located on the western ridge bounding Vatia Valley as result of the reconnaissance survey. No investigations were made of the valley floor, although the potential for early occupation at Vatia is extremely high. How so?
Figure 3. Map of the eastern end of Tutuila Island.
This is the site of Old Vatia that previously was reported by Kikuchi (1963:43) and Clark (1980:57), neither of whom visited the site. It is located on Fa'iga Ridge to the west of Vatia Valley. The site consists of at least thirty surface features, most of which appear to be old fale foundations. This appears to be the largest ridge-top site in the territory.

We were unable to survey the full extent of the site and hence only twenty-six features will be described. Access to the site is by way of a trail along Leafu Stream. Just before reaching Fa'iga Ridge proper, we encountered four faintly visible foundation areas marked by boulder outlines. These were in comparatively dense bush, however, and were not noticed until the trip back from the site. Consequently, no descriptions of those features can be provided. The features listed below are scattered across the top of Fa'iga Ridge—seldom if ever more than two or three deep—forming a long, linear residential complex. There was insufficient time for precise measurements and mapping of site features, so all dimensions given below are approximations based on pacing.

**Feature 1.** This feature is a roughly oval fale foundation. It is bordered by waterworn boulders one course high. The floor consists of waterworn pebbles. The foundation runs roughly north-south and is about 13 m long. The width at the north end, before it begins to taper, is about 10 m, while at the south end it is about 6 m wide. The vegetation at this location is very dense and there are a number of large trees on the feature that may be as much as one hundred years old.

**Feature 2.** This oval foundation is about 1.5 m southwest of Feature 1. It is bordered by waterworn boulders and has a floor of waterworn pebbles. The structure runs roughly north-south and the east side is on the edge of the ridge and is beginning to slump down the slope. It is about 10 m in length and 8 m wide at the south end and 9 m at the north end before it begins to taper. There is a tree growing on this feature that measures 0.5 m in diameter, indicating great age. A highly weathered quadrangular adze butt was found at the south end of the structure, but it was not collected.

**Feature 3.** Farther up the ridge, 2 to 3 m from the first two foundations, is another oval foundation. It has a wall, which is beginning to collapse, running along the east edge of the ridge. This feature has an inner row of rocks at the north end. Down from the east edge about 2 to 3 m is a flat terrace-like area just before the ridge drops off completely. No artifacts or structures were apparent on this terrace.

**Feature 4.** A short distance up the ridge is the ill-defined outline of another foundation. On the east side of the structure is a line of waterworn boulders. In addition, there is an inner row of boulders in the center of the feature.

**Feature 5.** This feature is a short distance up the ridge from Feature 4. It is a very ill-defined foundation with no boulders marking the perimeter. The feature is composed of waterworn stones and is roughly oval in shape.

**Feature 6.** This is a foundation located a short distance from Feature 5. It is on the east side of the ridge and is well-defined by waterworn boulders. It is roughly square and measures 6 m on each side.
Feature 7. This foundation is southwest of the above feature. It measures about 4.5 by 5 m.

Feature 8. Directly to the west of Feature 7 is an ill-defined foundation with a pebble floor and an occasional boulder at its edge.

Feature 9. Feature 9 is up the ridge from Feature 8, but on a slightly higher and comparatively broad point of the ridge. It is a roughly oval foundation about 7.5 m long by 6 m wide. The feature is not well defined on all sides but does have very large boulders bounding the northeastern side. One of the boulders measures about 1 m long by 0.25 wide. Some of the boulders have a rectangular appearance, as if they had been cut, but that may be the way they naturally weathered.

Feature 10. About 10 m across the ridge (roughly east) from Feature 9, close to the edge of the ridge, is a unique feature. It consists of a paving of flat pieces of coral, and measures roughly 5 m north-south by 3 m east-west. A small piece of the coral was collected but it was too weathered to be identified by a coral specialist, beyond noting that it is probably one of the plate corals. There are two small areas of scattered waterworn pebbles, one about 2 m to the south and the other 3 m to the north of the coral paving. The function of these scatters is unclear. This coral-paved feature is unique for Samoa and may have some religious associations. In Hawaii, coral is not uncommonly found at religious or chiefly sites. A Samoan myth recorded by Nelson (1925:140) tells of a culture hero, Samoanagalalo (who later become known as Lesanalala), who made a house with broad flat coral in western Upolu.

Feature 11. This a foundation located about 5.5 m to the south of Feature 10. It is roughly oval, 6 m north-south by 6.5 m east-west. It has large boulders forming the foundation border. These curb stones and the ones at Feature 9 appear to be much more massive than the boulders bordering any of the other foundations at this site.

Features 9, 10, and 11 appear to constitute a small complex. To the south of this complex (about 12 m south of Feature 9 and just a few meters south of Feature 11) the ridge drops about 2.5 m and turns more westerly. Near the edge of this drop is a scatter of waterworn pebbles that probably marks another feature, but this area is badly disturbed by root activity so a positive identification was not possible. This set of features is located on a prominent and relatively broad point of the ridge. Based on the size of the boulders used in the construction of Features 9 and 11, the unusual rectangular shapes of many of those boulders, the topographic location of the features on the ridge, the roughly central location of the complex in relation to the total site, and the proximity of those structures to Feature 10, which is probably a religious feature, it seems likely that Features 9 and 11 were the foundations for the houses of high ranking chiefs.

Feature 12. Along the westward running ridge, below the feature complex discussed above, is another foundation. It is about 8 by 7 m, and the foundation curb is two courses high.

Feature 13. Farther along the ridge is another foundation. This one is ill defined, being heavily disturbed by root activity. No measurements were taken.
Feature 14. This foundation feature is farther along the ridge and in proximity to Feature 15. It is roughly 9 by 6.5 m and has a wide curbed area about 1.5 m in width. The actual shape is difficult to determine because of a tree fall and root disturbance.

Feature 15. This feature is about 7.5 m by 6.6 m in size. It, like Feature 14, is highly disturbed by root activity. The trees in this area are more than 0.5 m in diameter, suggesting that the structures at this and nearby foundations have long been abandoned.

Feature 16. This foundation is located farther up the ridge. It measures 9 by 13 m, and butts up against Feature 17.

Feature 17. The foundation of Feature 17 is right next to Feature 16. It is relatively large, but very ill-defined. No measurements were made.

Feature 18. Farther along the ridge is a large terrace with a wall that has several courses of boulders stacked up about one meter high. There is nothing on the terrace except a few light scatterings of what appear to be waterworn pebbles. It could not be determined if these represent old house floors on the terrace.

Feature 19. To the east of the terrace wall is an ill-defined scatter of stones that may indicate a floor area. Two hammerstones were observed at this location but not collected. There is a stream near this location and an adze butt was noted nearby. This feature may represent a specialized activity area.

Feature 20. This foundation feature is farther up the ridge and above the stream. It is very ill-defined.

Feature 21. Another foundation, this feature is close to Feature 20. The two features are separated by a small channel that has cut its way to the stream. The structure is very ill defined and is disturbed by root activity and tree falls.

Feature 22. This is a foundation located a few meters up the ridge from Feature 21. It is an oval structure, 8 m by 6.5 m, on a terrace-like area that appears to have been cut out of the ridge. A large, whole Type I adze, with chips along the cutting edge from use, was collected. Nearby is a pile of boulders that is about 1.5 m by 1.7 m. It is possible that this pile marks a grave.

Feature 23. About 5 m from the boulder pile is another foundation. It is roughly oval and measures about 5.5 by 9 m, but is ill-defined.

Feature 24. This is a pit with an occasional rock along the inner edge. It is 2 m wide and 0.5 m deep, and is located 60 m from Feature 23. The function of this feature is not known.

Feature 25. To the west of the pit is a very ill-defined foundation. No measurements were taken.

Feature 26. Farther along the ridge, about 20 m from Feature 25, is a second pit. It is similar to Feature 24.
We proceeded along the ridge top for some 200-250 m beyond Feature 26 but no additional features were found. The size of the trees growing throughout the site and on the foundations indicates that these features have long been abandoned. One interesting observation about this site is that there were no visible signs of any extensive midden near any of the features. It is quite possible that this site was not occupied full-time. If this were the case, the site may have served as a temporary refuge site during hostilities. Or, it may have been an inland site that was associated with pigeon catching, as described in the DISCUSSION of Star Mounds section of this report. If the site was a defensive refuge, future surveys would be expected to find evidence of defensive fortifications. If, on the other hand, it was a temporary encampment for pigeon-catching festivals, one would expect to find star mounds on nearby ridge tops. Suuano Ridge seems a likely candidate for locating such star mounds since one of the peaks is called "Maugalula" or "mountain of decoy-pigeon perch." Only future research and surveys can resolve this question.

SUA COUNTY

Previous research produced a list of four sites for Sua County (Clark 1980:55-56). This list consists of a large boulder on Maugaalii Ridge with turtles and perhaps other petroglyphs (AS-23-1), a "temple" in Sa'ilele that no longer exists (AS-23-2), a reported burial area for high chiefs located on Maugaalii Ridge (AS-23-3), and a cave site (AS-23-4) on the south coast that was by the marines during World War II but for which no Samoan deposit has been reported.

Our efforts in Sua County were rather limited. Reconnaissance survey was made at Sa'ilele by the authors, and a brief reconnaissance check was made at Fagaitua and Masausi by Hunt and Kirch. In addition, the small coastal plains (the term valley hardly seems appropriate) at Fagaititi and Fagatele Coves were selected for intensive survey (Fig. 3). These areas were selected for three principal reasons. First, they are quite small and could therefore be completely examined in a relatively short time. Second, the absence of modern occupation meant that the plains were entirely open to investigation, and old house sites—should they be present—would be readily identifiable. And third, in seeking to understand general settlement pattern, it was useful to determine if and when Samoans inhabited such comparatively marginal coastal locations.

With the guidance of Mr. Pat Donahue, we walked from Masausi to the small cove of Fagaititi, and then on to Fagatele Cove (not to be confused with Fagatele Bay on the south coast). On the trail from Masausi to near Puputagi Point we encountered a few areas of scattered coral fragments suggestive of old house floors, but no artifacts were found. Beyond Puputagi Point no such remains were noticed.

**Fagaititi Cove**

At Fagaititi a small stream flows down from the interior, crosses the tiny plain, and empties into the ocean. The current landowner has bulldozed a path down to the cove, and apparently has bulldozed at least part of beach area. The extent of disturbance could not be fully assessed due to the cover of vines and other vegetation. Large chunks of coral rubble are situated
surprising far inland. We found no indication of prehistoric occupation, although the bulldozer disturbance together with the vegetation cover may have simply obscured surface evidence. Given the small size of the plain, any occupation would have been restricted to only one or two families, and that, if it ever occurred, would quite probably have been late in time. In short, it is highly unlikely that any significant archaeological resources are located at Fagaititi.

**Fagatele Cove**

The cove and plain at Fagatele, though still small, are larger than those at Fagaititi. The plain measures about 130-135 m across, by a maximum of 105 m deep (most of the plain is considerably less than that). A small stream runs along the eastern margin of the plain and to the ocean. Nearly the entire plain (everything to the west of the stream) is covered by a thick layer of coral rubble (primarily large coral slabs) and scattered basalt boulders that extends to the base of the bounding ridge. This distribution of coral suggests a higher sea stand at some time in the past. The entire plain was surveyed. The presence of a set of structural features lead to the asignation of site number AS-23-8.

**AS-23-8**. The principal features at the site are a roughly trapezoidal-shaped enclosure and an associated wall located at the rear of the plain. The enclosure is formed by three walls of stacked coral slabs and basalt boulders and the fourth wall is formed by a vertical basalt face that constitutes the base of the Inland ridge. The long axis of the structure runs roughly northwest-southeast and measures 12.7 m. The width ranges from 4.3 m in the north to 10.6 m in the south. The structure wall is not high, at 0.5 to 0.7 m, but rather wide, at nearly 2 m for most of its length although narrowing to 1 m along its shortest dimension. At each of the corners formed by wall junctures is a large tree; one of these is about 2 m in diameter at its base and the other not too much less. The stacked coral and basalt chunks do not appear to have been displaced by subsequent tree growth, indicating that the trees were incorporated into the wall construction and, consequently, that the structure is not of great age. At the same time, the largest of the trees is rotting away on one side and wall rocks are absent from the old trunk area; this suggests that use of the structure was abandoned prior to the decay. Consequently, we conclude that the structure was constructed some time in this century and abandoned perhaps a decade or more ago.

In the rear basalt face, within the confines of the enclosure, is a small cavity (the term cave seems inappropriate), just large enough to permit a single individual to sit for shelter. Attempts at coring into the soil at the mouth of the opening could not go beyond 20 to 30 cm before hitting rock, and the soil revealed no traces of cultural deposit.

At 2.9 m northwest of the enclosure is a free-standing wall of similar construction that extends out from the basalt outcrop for 14.1 m, is 2 m wide, and is 0.7 to 0.8 m high.

Scattered about the vicinity of the enclosure are a few depressions. Two of these (approximately 20 m from the enclosure) are quite large and unmistakably man made. The oval opening of one measures 5 m by 7.2 m and the hole is 1.9 m deep. The other is 5.9 m by 6.5 m and is about 1.5 m deep. Two or three smaller depressions, with diameters of 2 m or so and depths of 1 m or
less, are also in the area. These small depressions—and some other possible examples—may be the result of displacement from tree growth and decay or uprooting.

To the east of the stream is a small section of ground (an area of about 140 sq. m) that lies at a higher elevation than the western, coral-covered plain. This is an area of soil that lacks trees and is covered with a thick growth of vines and grasses. We attempted coring at several locations but were unable to get deeper than 15 to 30 cm. The soil cores yielded no trace of cultural deposit. There is little doubt, however, that this small area was once—and not too long ago—cleared, and probably planted. We tramped through the vegetation searching by feel for evidence of a terrace wall or paepae (house foundation), but none were found.

The function of the structures and the nature of the site are difficult to ascertain. It is possible that the enclosure served as a residence for a single household. However, there was no attempt to provide a flattened floor inside the structure and the rough and irregular chunks of coral and basalt would have provided a very unsatisfactory surface on which to dwell. And what function would the depressions serve? Their construction is too irregular and their walls too porous to have served as walls or ma ki pits. The enclosure is reminiscent of a pig pen, and an informant from 'Aoa told us that he knew of the structure and it was indeed a pig pen. But he did not visit the site with us and may be mistaken. One would wonder why someone would keep pigs in such an isolated location, and what function did the wall and depressions serve? A third alternative is that the features are all the product of the U.S. military. The enclosure may have been used as the foundation for a storage or other structure, and the depressions would serve admirably as foxholes. Another informant stated that he thought there once were military maneuvers in this area of the coast but could not say for certain. Naturally, a combination of these possibilities may account for the presence of the features at this site. In any case, the site is comparatively recent and there is no indication that the plain was ever permanently occupied. This site holds no archaeological significance.

**Sa’ilele**

Immediately west of 'Aoa Bay is Sa’ilele. The village is comparatively small—with a population of 117 in 1980 (USDC 1982)—and is situated on a long and narrow coastal plain that is approximately 580 m long by 130 m wide, at its maximum. Most of the houses are located in the western half of the plain, which is where it is the widest and where the Aonoi Stream cuts its way to the ocean. The houses are at the rear of the plain, and a broad, white, sandy beach stretches to the ocean. The plain is almost entirely covered with sand, and it appears as though the beach has been prograding. This beautiful sandy plain, with its small, friendly village, is one of the most enchanting spots in the islands.

While the plain is striking in appearance, it does not fully match the conditions for early settlement outlined in the model. We therefore limited our investigation to a reconnaissance survey, during which we found evidence of a buried cultural deposit and so assigned site number AS-23-5. A brief check was also made of the ridge to the southeast of Sa’ilele. One of our team encountered a large complex of walls running across the ridge, but we
were unable to return to describe and better locate this complex. So, a site number was not assigned and nothing more will be said of this complex here.

AS-23-5. At Sa'ilele, we examined the banks and discharge fans of the two streams, but only Aconoi Stream was large enough to hold much investigative potential. Rock retaining walls have been constructed along a portion of the stream, thus hiding the banks. Approximately 40 m from the shoreline, however, in a stretch of unbordered bank, we found a cultural deposit lying about 1.25 m beneath the surface. The overburden appears to consist, in part, of fill related to the construction of the house to the east. The cultural deposit is a dark gray soil layer, 15-20 cm thick, with scattered bits of charcoal, pieces of shell, and an occasional basalt flake. No pottery was found in the stream bed or in the face of the bank. A few meters seaside of the bank deposit, the butt of a basalt adze was found in the stream bed. The tool fragment has a triangular cross-section, was roughly flaked, and lacked any trace of polish. It probably represents an unfinished adze of the Type VI, or perhaps Type VIII, variety. No artifacts or other evidence of cultural deposit were found at either of the other streams or along the shoreline.

We did not carry out any coring at Sa'ilele, but we were provided with some general soil stratigraphy data by Mr. William Sullivan of the Department of Public Works. The data came from a well drilling at Sa'ilele. The well is located just up on the slope at about 10.7 m above sea level, approximately 150 m inland, about 30 m east of the Aconoi Stream, and just below a natural catchment. The drilling log records the following strata: 0-5 ft, alluvial overburden; 5-40 ft, decomposed cinder/red clay; 40-54 ft, hard basalt; 54-66 ft, gravel, and water encountered (the water was trapped below the basalt layer and once that was broken through, the water leveled at 26 ft below the surface). There was no indication of coral or beach sand at any point in the column. This is not particularly startling information given the location of the well, but does indicate that no previous sea stand ever reached this far back on the plain.

In summary, the Sa'ilele site certainly holds excavation potential and may be able to yield valuable information on Samoan prehistory. As yet, however, there is no indication of ceramic period settlement. More intensive survey of the plain may have revealed the presence of some abandoned fale foundations, but barring excavation, it is highly unlikely that additional information on early settlement would have been revealed. Without excavation the significance of the archaeological site at Sa'ilele cannot be adequately assessed.

Fagaitua and Masausi

In the early days of our work on Tutuila, Dr. Patrick Kirch and Mr. Terry Hunt, both from the University of Washington, were also on the island prior to carrying out their investigations in Manu‘a (Hunt and Kirch 1987). During that time they took a tour of Tutuila and stopped at some of the villages to inspect sections of the coast. At Fagaitua and at Masausi they picked up artifacts which they turned over to the authors for reporting. We have assigned site numbers but can provide only the following short summaries.

AS-23-6. This site is located at Fagaitua. Evidence for the site consists of a highly waterworn adze butt that was retrieved from the mouth of Siapapa Stream. Based on the cross-section and general shape of the adze, it appears
likely to be a representative of the Type II category. A few basalt flakes were observed at the same location but not collected. These artifacts represent secondary deposition at the stream fan and the location of the cultural deposit from which they came is not known, although it is undoubtedly not too far inland. These materials indicate that a site of probable prehistoric age is present in the valley. Without further investigation, the significance of the site cannot be determined.

**AS-23-7.** This site is located at Masaus1. Along the coast, between the Vaipito and Panota Streams, Kirch and Hunt collected two artifacts. One was a butt of a roughly flaked, quadrangular adze that is reminiscent of a Type I form. The other artifact was a prismatic chunk of basalt with edge modification along the side with the most acute bevel; this tool falls into the Class VII category. These materials were not in primary context but they do demonstrate that a site, probably prehistoric, is present at Masaus1. The significance of that site cannot be assessed at this time.

**SA'OLE COUNTY**

Seven sites have been listed for Sa'ole County (#22) by Clark (1980:52-54). These consist of one defensive wall on Aunu'u (AS-22-1), a well on Aunu'u (AS-22-2), two sets of two kupua (boulders representing petrified people) on Aunu'u (AS-22-3 and -4), a wall in Utumea (AS-22-5), two whetstones near Utumea (AS-22-6), and the historic period Naval dispensary (an architectural site) in Amouli that is still in use (AS-22-7). None of these has been subject to excavations and none holds any notable potential for data recovery.

In 1986, very little investigation was carried out in the lowland areas of Sa'ole County. As previously noted, our intent was to focus on the north coast valleys. Nevertheless, a quick check of 'Aoa's southern neighbors seemed worthwhile. Since no streams reach the ocean at Foga'au (in the west) and Utumea (in the east), we did not examine either of those small villages. Our uplands survey also carried into inland-most reaches of Sa'ole where we located five new sites. Since these sites are found inland of Amouli, they are discussed under that area heading.

**Amouli**

At Amouli we inspected the discharge fans at Teleiai and Fusiloa Streams, and the nearby shoreline. We found a few probable basalt flakes at the mouth of the Teleiai, but their waterworn surfaces precluded positive identification as artifacts. Further investigation of Amouli valley is certainly warranted.

While carrying out an intensive survey of the ridge tops surrounding 'Aoa Valley, we extended our coverage into the northern portion of Sa'ole, County, inland of Amouli. The precise boundary between East Vaifanua and Sa'ole is not clear (different maps show different locations), but it appears most likely that some of the sites located near the boundary are actually in Sa'ole. Of the five newly found sites, one is an enigmatic boulder alignment and the other four are "star mounds". Only the former site is described here. For descriptive and organizational convenience, the star mound sites are described below together with similar sites from 'Aoa, East Vaifanua. A lengthy discussion of star mounds in general is given in the DISCUSSION section below.
**AS-22-8.** This site consists an alignment of boulders that is several meters long. It is located on an inland ridge about halfway between the star mound sites of AS-22-12 and AS-22-13. No other features were observed nearby. The alignment may have served as a low terrace facing or to stabilize an area of the slope, but the actual purpose and significance of this isolated feature remain problematic.

**AS-22-9, AS-22-10, AS-22-11, and AS-22-12.** These four sites are all star mounds and are described below under Ridge and Slope Sites.

**'Au'asi**

The shoreline at 'Au'asi has been too greatly disturbed by the construction of the small boat harbor to allow for stream mouth survey. Prior to the harbor construction, however, McCoy (1977) carried out a survey of the strip of beach to be affected by construction, but found no historic or prehistoric sites.

**EAST VAIFANUA COUNTY**

Previous investigations have reported four sites for this county (#21) (Clark 1980:50-51) (see Fig. 4). One of these is the old village site of Tulauta located just inland of Tula and about which more will be said later (AS-21-1). A second village site is Lefutu (AS-21-2), which is located on Lefutu Ridge between Tula and Onenoa. Test excavations at Lefutu by Frost (1976) lead her to conclude that it was a fortified settlement that was probably occupied as early as the 12th century A.D., although there is historical evidence that it was occupied as late as 1840 (Kramer 1903). The Afimuao site (AS-21-3) was reported by Kikuchi (1963:43) as a "probable village" located on the cliff edge on the trail between Onenoa and 'Aoa. The site is listed by Clark (1980), but neither he nor Kikuchi attempted to locate it. The last of the previously listed sites is a commemorative stone heap located near the peak of Mt. Olomoana (AS-21-4). It was reported, but not visited, by Buck (1930:322), Kikuchi (1963:55), and Clark (1980:51), and in 1986 we located what we believe to be the referred to stone pile. More is said of this site below.

Our 1986 research efforts were concentrated in Vaifanua County, and especially in 'Aoa and surrounding lands. Other villages were also visited, although not investigated in comparable detail. Three of the valleys of this county appear, on the basis of environmental—particularly geomorphological—conditions, to hold excellent potential for yielding evidence of long-term as well as early occupation. These valleys are at Alao, Tula, and 'Aoa. Frost (1978) has demonstrated the presence of significant archaeological remains at Tula, and this report documents the extreme importance of the archaeological deposits and palaeoenvironmental indicators at 'Aoa. Future work at Alao may well show it to be a similarly important locality.

**Alao**

On the east coast of Tutuila lies Alao where we examined the discharge fan at Muliavaitale Stream and the shoreline for some 30 m either side of the stream. No non-recent artifacts were found, and there was no trace of
Figure 4. Map of eastern Tutuila showing 200 ft. contours.
cultural deposit in the banks of the sand dunes along the shore. The broad beach and low dunes reflect a greater sand build-up than at any other coastal stretch on the island. It seems likely that the beach has long been prograding, and early occupation remains may be buried well inland from the current shoreline. Future research at Alao should be a high priority.

Tula

No reconnaissance was conducted at Tula. Inland of the present village of Tula, some 500 m from the coast and at the rear of the small valley, lies the site of Tulauta (AS-21-1). Because of the potential importance of this site, additional discussion is in order.

AS-21-1. The first report of this site was given by Frost (1976, 1978) who referred to it as Tulotu, Site AmS/tu/175. Frost provided a description of surface features at the site and excavated five trenches covering 11 sq. m. The site was later visited by Clark (1980) who, based on informant usage, re-named the site Tulauta (ulu meaning inland side or inland village, and Tula referring to the present village) and assigned it site number AS-21-1. Clark reported additional features not mentioned by Frost and noted that the surface remains indicated a larger village area than recorded by Frost. It may be that at the time of Clark's visit a larger area had been cleared and planted in banana, thus substantially improving surface visibility. Recently, Gould, Honor, and Reinhardt (Gould et al. 1985; Brophy 1986) returned to Tulauta (they used Clark's designations), did some mapping of surface features, and began excavating a trench (for 2 sq. m) which they were unable to complete before having to leave the property.

In Frost's report, the site was divided into two areas, A and B, by a strip of trees less than 5 m wide. According to Frost, this division was partially reflected in the distribution of surface artifacts and structures, and in some differences in the types of structural remains. In Area A, two trenches were dug and in Area B three trenches were excavated. In both areas only one occupation layer (II) was encountered, although it differed slightly in color and was a little thicker in Area B. A single radiocarbon date came from the occupation layer in each area; the Area A determination was 2580+/−140 (1030–400 B.C., re-corrected at 95% confidence, according to Klein et al. 1982), and the Area B date was 830+/−70 (re-corrected to A.D. 1260–1405) (Frost 1976:206).

Unfortunately, information useful for evaluating Frost's findings is sparse (1978:111–17). The unit profiles are purely schematic and layer descriptions are inadequate. The report reads as if the charcoal for the Area A date was collected from throughout the layer and combined for a single sample, but the precise nature of the charcoal sample is far from clear. The reader does not know if the sample was large or small, came from the upper portion of the layer or the lower portion or throughout, whether the fire that produced the charcoal was from a fireplace or a land clearing, whether the fire was from a single event or many, and so on. In Area B we are again in the dark as to the nature of the charcoal that yielded the radiocarbon date. A comparison of the soil layers of each area shows some similarity. Layer I in both areas was only about 5 cm thick and "quite similar", differing only in a higher occurrence of stones in Area B. For the cultural layers (II) of the two areas, the soil texture was similar, but in Area A the color was "black" while in Area B the color was "reddish brown"—a difference that could be
accounted for by the noted higher charcoal content in Area A. The underlying layers were again similar.

The substantial difference in dates for the two layers is puzzling. How is it that two occupation layers, separated in time by approximately two millennia but separated in space by only 35 m, can both lie directly beneath the same layer and only 5 cm beneath the surface? One would certainly think that some deposit from the later occupation, or at least some sterile deposit, would accumulate over the earlier layer during the time corresponding to the later cultural deposit. Furthermore, the absence of pottery and obsidian from the earlier deposit is completely incongruous with what we have long known of sites from this same time period in Western Samoa as well as Tonga and Fiji, and now know even for Tutuila. Despite these facts, Frost did not see a serious problem with the date differential:

The fact that the two adjoining areas yielded quite different carbon dates is not viewed as a serious problem. The nature of the remains at the two areas were quite different... This fact, along with the differences in the stone tool assemblages as well as the radiocarbon derived dates, seems to indicate, particularly when combined with the present evidence of modern site use, that this area has had fairly intensive use over the last three millennia [sic] [Frost 1978:115].

We disagree with Frost’s conclusion and dispute each of her points. First, the radiocarbon dates cannot be used as evidence since they are in fact what we are attempting to evaluate. Second, the evidence of modern site use is irrelevant for evaluating the reliability of dates for occupations of from 600 to 2500 years ago. Furthermore, the differences in the surface remains at the site are not sufficiently pronounced to indicate such a chronological difference. In 1985, the strip of trees separating the areas was gone, and a larger area was cleared and mapped. As a result, Frost’s earlier site division was seen to be unwarranted on the basis of the distribution of surface features (Brophy 1986:16). In addition, contrary to Frost, the stone tool assemblages do not reflect a two millennia time difference.

The failure of the artifact distribution to support Frost’s contention is revealed by reviewing her artifact data. A breakdown of completed and incompletely adzes for the site is given in Table 1 and 2, respectively. Looking first at the surface tools, we see no reason to suggest on typological grounds a significant time differential. Area B produced many more adzes and higher numbers of Type II and VI specimens, but both of those types were present throughout the Samoan sequence (Green and Davidson 1969b). More importantly, however, surface differences may also indicate intra-site activity differences. Furthermore, Frost has noted that according to one informant, the village of Tula previously was located at Tulauta but shifted to its present location after the arrival of missionaries (1978:101). If this is so, then the surface artifacts at the site would have to represent that last phase of occupation and would not be representative of the earlier occupations represented by the radiocarbon dates.

When we turn to excavated artifacts, the number of specimens drops dramatically. Area B produced only one incomplete specimen, of a common type, and Area A (the proposed early component) yielded five specimens, all of which could have come from any time in the Samoan sequence although they are perhaps
TABLE 1. Distribution and occurrence of adze types at Tulauta, Tutuila
(Adapted from Frost 1978:150)

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>TYPE</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
<th>X</th>
<th>TOTAL</th>
</tr>
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<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Area B: Surface</td>
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<td></td>
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<td></td>
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<td></td>
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<td>1</td>
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<td>5</td>
</tr>
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</tr>
</tbody>
</table>

TOTALS          | 7    | 3  | 3  | 1   |    | 3  |    | 1   | 1    |    |    | 18    |

TABLE 2. Distribution and occurrence of adze fragments at Tulauta, Tutuila
(Adapted from Frost 1975:157)

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>TYPE</th>
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<th>II</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX/X</th>
<th>TOTAL</th>
</tr>
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<td>1</td>
<td>3</td>
<td></td>
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<td>7</td>
</tr>
<tr>
<td>Area A: Surface</td>
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<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Excavation</td>
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<tr>
<td>Area B: Surface</td>
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<td></td>
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<td>1</td>
</tr>
</tbody>
</table>

TOTALS          | 11   | 9    | 4  |    | 4  |    | 1   |      | 2    | 31    |
more typical of a late assemblage. A single Type IV specimen came from Area A, and while this type is often found at ceramic sites, it is also found in later deposits. The adze type most likely to indicate early settlement, Type V, was not among the specimens listed. However, some untyped fragments with the characteristic cross-section of Type V were present. Four of these were found on the surface and the only example recovered from excavation came from the later dated Area B. Regarding other basalt tools, there is a difference in the distribution of only two of Frost’s six classes of tools (I and IV, both absent from Area B excavations), but we have no indication as to any chronological meaning to these classes and the difference in distribution might well indicate differing activity areas within the site. In short, the total artifact assemblages reflect more similarity than difference—an assemblage strongly supported by the absence of pottery and obsidian from Area A as well as Area B.

On the basis of the preceding arguments, we believe that the disparity in dates between Areas A and B is a serious problem. Furthermore, we argue that the date of 1040–400 BC is in error. This issue warrants such lengthy discussion because the early date that Frost presented, in the absence of pottery, stands in contradiction to what one one expect for the artifact assemblage of a site of this age. Frost (1976:116-17, 254) concluded that the early settlements of Tutuila and Upolu differed in the differential use of pottery. If the Tutuila data is in error, as we argue, then the proposed difference between the islands does not exist.

In 1985, Richard Gould, Kim Honor, and Kirsten Reinhardt went to Tutuila to carry out additional excavations. Unfortunately, their reports are not very informative. The stratigraphic profile that they produced is much more complex (and presumably accurate) than that of Frost. Excavations at the site had to be terminated prior to the completion of excavations, but they did reach a depth in one unit that was at least as deep as Frost’s base of cultural deposit. The stratigraphic inconsistency between Frost and Gould et al. is troubling but unresolvable. Similar to Frost, Gould et al. recovered neither pottery nor obsidian. They noted that two radiocarbon dates were obtained (Brophy 1986:11), but the precise results are not given; instead, we are simply told that the “dates demonstrate that the site was inhabited at least 400 years before European contact and probably has had a long and complex sequence of habitation” (Gould et al. 1985:6). Such dates are consistent with the more recent date of Frost for Area B.

Another point of concern is the contradiction of data from the two reports regarding basalt flakes. Frost recovered very few basalt flakes, reporting only 25 for all 7 sites combined that she investigated on the island. She further states that “at no location on Tutuila was there enough chipping debris to indicate that the tools had been made near the area they were found” (1978:192). Gould and associates, on the other hand, claim that flakes were abundant. In fact, they go so far as to claim that “the sheer quantity of lithic material at Tutuila makes the site one of the largest basalt quarries and lithic or adze manufacturing sites in all of Polynesia” (1985:6). Unfortunately, they nowhere give any indication of what that quantity is, beyond asserting that they “recovered a profusion of waste flakes” (1985:6). The basis for their assertion of “quarry” status is not given in their report. In the later work by Brophy (formerly Reinhardt) (1986), however, it is reported that artifacts collected at the site represented "each stage of the adze manufacturing process" (1986:22), and that
most of the adzes were at an "early stage of manufacture" (1986:26). At least four whetstones were located, as was a suggested lithic workshop area (1986:30). However, it is clear that while Tulauta was the site of some stone tool manufacturing activity, it was not itself a quarry site.

Frost, Clark, and Gould, Honor, and Reinhardt concurred on the abundance of stone tools at Tulauta. Frost observed that the such abundance was "rather unique for a Samoan settlement" (1978:236). She states:

The frequency of adzes and adze fragments and stone flake tools is very high at this site suggesting either that they were made at or near the site; or that these tools were used in manufacture of some other product or processing food at the site; or that both conditions describe the situation at Tulauta [Frost 1978:116].

Frost's observation is well taken. Her counts of completed adzes (18), incompletely adzes (31), adze fragments (64), and other basalt tools (50) are far above that of any other known residential site. An additional 20 examples of adzes, preforms, and fragments--none of which were typologically classified--were collected in 1985 (Brophy 1986:28). The large quantity of basalt tools suggests that a quarry is probably somewhere in the vicinity. The relative absence of waste flakes reported by Frost suggests that tools were not being manufactured at Tulauta, but the contrary assertions of Gould and colleagues of abundant debitage argues for manufacturing. If the two research efforts were excavating in different activity areas of the site, this may, at least in part, account for the difference in flake counts.

Brophy (1986) reported the existence nearby of a basalt quarry, which she termed the Maupua Site. She argues that Tulauta was the site for the complex process of basalt adze manufacturing and experimentation with new technologies in that process. and that the basalt was quarried from Maupua (1986:18). Maupua is located north of Tulauta, on the slope above the north coast road, between Cape Matatula and Onenca (see Figs. 3 and 4). Unfortunately, very little is said of this potentially extremely important quarry site. The site was neither mapped nor assigned a site number, and the only site description provided is as follows.

The quarry area, consisting of huge sea cliffs with abundant talus material and a protected beach front, is located 1.1 kms from Tulauta over level ground. The talus slope area was littered with adzes, adze blanks, and cores [Brophy 1986:37].

In summary, we concur with previous investigators that Tulauta is an important site for understanding Samoan prehistory. We conclude, however, that the date of 1040-400 B.C. obtained by Frost is in error, and that the deposit she and Gould and colleagues excavated is more likely to date to post A.D. 1200, or perhaps even post 1400. The discovery of pottery in Tutuiia and Manu'a in 1986 demonstrates that ceramics should indeed be present at sites dating to the first millennia B.C. This is not to say that such early occupation is not present in the Tulauta area. Indeed, we think it quite likely that an early pottery-bearing deposit is present at Tulauta, but has not yet been located.
It also seems clear at this point that the quantity of flakes is greater than reported by Frost, but they represent the final stages of tool manufacturing rather than primary quarrying. We further suspect that many of the tools were being locally used for specialized processing of some resource. Yet the abundance of lithic materials also suggests that some were being manufactured for trade, if only to other communities in Eastern Tutuila. Careful excavations geared toward locating early cultural deposit, expanding our information on later occupation, and understanding the meaning of the lithic assemblage are desperately needed at Tulauta before we can fully assess its significance. Future edge wear analyses of tools from the site should also provide valuable information for determining whether the tools were being used at the site or simply manufactured for exchange. Brophy (1986:52) contends that the presence of two large quarry sites—Tataga Matau and Maupua—on Tutuila strongly suggests trade to other islands since the production of stone tools would undoubtedly have exceeded the needs of such a small population. This may or may not be so. We need to know much more about the actual size of Maupua and the dates of operation of both quarries. The only certain means of determining whether or not the basalts of either quarry were being traded is through petrographic and/or geochemical analyses of basalts from each quarry and from basalt artifacts found at sites throughout the island group.

Onenoa

Continuing north and west around the coast from Tula, the next village encountered is Onenoa, which is the eastern neighbor of 'Aca. It is a small village whose 1980 population stood at 140 (USDC 1982). The village is situated on a small coastal plain, with the houses strung along a small stretch of beach (ca. 250 m) that fronts a small cove. Steep ridges rise abruptly at the immediate rear of the village. From shoreline to the rear ridge, the plain is generally about 60 m in width and at its maximum is only about 110 m wide. The plain is crossed by two streams—the Afi muao in the west and the Vaisa in the east—neither of which is very large.

Given the small size of the plain, we were able to carry out an intensive survey of the entire area. There were no observable cultural deposits along the shore or in the banks of the streams. We did, however, find some surface artifacts and features and consequently assigned site number AS-21-7 to the village area (see Fig. 5).

AS-21-7. Along the base of the ridge at Onenoa, we found several foundations that no longer supported structures, but these were amongst cook houses still in use and it is difficult to say how old the abandoned structures are. Occasional basalt flakes were found in the 'ili'ili at the rear of the village.

The largest area of the plain is located in the vicinity of Vaisa Stream (the larger of the two streams). Where the stream enters the plain, and at the rear of the village, is Locality 1. In the stream bed, near the western bank, is a huge boulder on which are four faint grinding facets of the type used for grinding/polishing adzes. On the east side of a large adjacent boulder is another, even fainter, facet. On the adjacent land to the east side of the stream we found a fragment of a probable adze preform. It appears to have been in the early stages of reduction when broken. The cross-section is irregular over its length but is quadrangular at the break. This may be
only a core for small basalt flakes, but the general shape is strongly reminiscent of an adze. Also recovered from the surface were two scrapers of the Class I variety (one of these is highly water-worn). A short distance inland of these surface finds are two or three probable foundations, but they are covered with grass so that positive identifications were hindered. A short distance up the slope on the west side of the stream is a terraced foundation and a few nearby basalt flakes. Farther up the slope is a set of three or four foundations. On one of these is a crudely-built wooden house that was probably built on an older paepae. Down the stream-side slope from this complex is another foundation but it has an old, small, concrete foundation in one corner. The paepae again appears to be older than the concrete slab.

East of Vaisa Stream, behind and just east of the church, is Locality 2. There, from the scattered coral and pebble 'ili'ili, we collected an informal flake tool and an unmodified basalt flake. A few additional unmodified flakes were observed but not collected. On the slope above this area are two abandoned terraced foundations.

As evidenced by our surface finds, prehistoric cultural deposits is present at Oenoea. It does not seem likely, however, that this small plain would have been occupied early in the settlement sequence—that is, during the ceramic period—but only subsurface testing can provide a firm determination. Excavations may yield data useful for understanding Samoan prehistory, but until such work is undertaken we remain ignorant of the significance of site AS-21-7.

Aoa

As noted above, the bulk of our work was concentrated in the valley and surrounding ridges at 'Aoa Bay. The locations of sites found during the survey are given in Figure 5. The valley is circumscribed by pronounced ridges creating an amphitheater form, but with an extended eastern lobe that stands at a slightly higher elevation than most of the valley floor. The surrounding ridges range between 40 and 80 percent slope. The central part of the valley averages about 380 m deep, but the maximum is as much as 457 m. Along the shoreline, the valley measures about 715 m, although the narrow coastal shelf on either side of the valley mouth provides additional occupation area. At the rear of the central valley, the width is reduced to about 448 m.

As is typical of valleys in this region, a band of Ngadeus Series calcareous sand lies at the mouth of the valley. Inland of the sand the valley floor is classified as Leafu stony silty clay. A band of Aua very stony silty clay loam lies at the base of the surrounding ridges, which consist of Fagasa-family-Lithic hapludolls-Rock outcrop association (USDA 1984:Plate 3).

Six main streams cross the valley (Fig. 6). The western-most of these is a small one whose name is not given on any of the maps of the area. For our purposes, this will be referred to as the Fa'alafu Stream, after the village through which it runs. To the east is the Vaitolu Stream which runs out of the southwest corner of the valley and along the western margin. A branch or diversion of the Vaitolu angles to the northeast across the valley. While the lower portion of this stream is illustrated on valley maps, the link with the
Figure 5. Map of surrounding highlands showing locations of sites reported for this region.
Figure 6. Map of 'Aoa Valley showing streams and the lower, middle, and upper valley sections.
Vaitolu (illustrated in Fig. 5) is approximate and is based on field observations. No name is listed for this branch so we will refer to it as the East Vaitolu. The ground along the lower East Vaitolu is rather mucky, especially after a rainfall, and supports a stretch of mangrove. The Tapua Stream flows through the east-central portion of the valley and joins the East Vaitolu just inland of the coast. It, too, is bordered by mucky ground and mangrove in its lower region. Although not shown on maps of the region, there is a small stream that runs east-west along the ridge base at the rear of the valley and links the Vaitolu with the Tapua Stream. The next stream to the east is the Puna. It used to run through the main part of the village but many years ago it was diverted to the west and now reaches the ocean at the Tapua-East Vaitolu mouth. Where these stream mouths meet, there is a miniature estuary and a small clump of mangrove. The Laoulu Stream is found at the far eastern edge of the valley. The above summary of the streams is a simplified version. When actually working in the valley we noted other stream channels in the low ground between the East Vaitolu and the Puna, but we could not plot their precise locations.

An additional aquatic feature that must be mentioned is a small marsh that is located at the rear-center of the valley, adjacent to the ridge slope. This is an area of standing water, even if largely covered with a vegetation mat. The presence of this marsh was a critical factor in selecting 'Aoa for study because of the possibility that it is a remnant feature from a time when the valley might actually have been a bay.

The population of 'Aoa valley stood at 304 in 1980. This represents an increase of 102 people in the last two decades (USDC 1981:6). The inhabitants of the valley are actually residents of two separate villages. Occupants of the far western portion of the valley are residents of Fa'alefu village, whose titles are affiliated with Sa'ilele. Based on information supplied by a long-time resident of Fa'alefu, we are taking the boundary between 'Aoa and Fa'alefu to be at Le'iato Point (although there was some indication that it might actually fall at Vaitolu Stream). Most of the valley is part of 'Aoa village, which is concentrated on the valley lobe east of the estuary. Immediately west of the estuary is the Olomoana Elementary School, which stands on built-up ground fronted by a high breakwater of stacked basalt boulders. West of the school there are more houses strung along the coastline. A few houses are scattered through the valley and a few others are clustered in the southeast corner of the valley.

For descriptive convenience, the main valley is divided into three sections—the lower valley, the middle valley, and the upper valley (see Fig. 6). The lower valley largely corresponds to what the USDA Soil Conservation Service illustrates as "Urban land-Ngodebus complex" on their soil maps (USDA 1984: soils plate 3). It consists of a strip of sandy ground that runs across most of the mouth of the valley. This strip begins at the shoreline and extends inland for about 91 m, at which point the ground surface drops about 1 meter in elevation. Beyond the drop, the sand content of the soil is dramatically reduced and the ground is subject to flooding. The middle valley is a strip of ground that extends inland from the drop in elevation for about 182 m, or just sea-side of the inland marsh. The inland boundary of the middle valley generally corresponds to the ten-foot contour. The sediments of this area represent a transition between the sand dominated lower valley soils and the clay dominated upper valley soils. The upper valley constitutes the inland-most portion of the valley, back to the bounding ridge slope. The
soils are colluvial; they have a very high clay content and are comparatively stony.

An intensive survey was made of the entire valley floor. A variety of surface features and artifacts were located, and two site numbers were assigned—one for 'Aoa Village and the valley (AS-21-5), and another for Sa'alefu Village (AS-31-6) (Fig. 7). Additional numbers were assigned for surface remains along the narrow coastal shelf beyond the valley proper.

AS-21-5. In order to provide a convenient means for discussing the archaeological remains in the valley, specific localities have been numerically designated (Fig. 7). Individual surface features and artifact find-spots are specified by a decimal number following the locality designation. Localities 1-4 and 14 are located in the eastern lobe of valley where most of 'Aoa Village is concentrated. Cultural deposit may well lie buried throughout this portion of the plain, and the locality designations specify places where old surface features, artifacts, or both were recovered. The differentiations of Localities 5-13 are based on archaeological remains together with geographic considerations and a desire to provide a means of dividing the site into more manageable chunks. The divisions are not purely arbitrary, however, since they follow streams, and the low, rather mucky ground along the streams generally lacked surface materials. This is hardly surprising given the nature of the ground surface and the frequent flooding of those lands.

Locality 1. This locality is found at the rear of 'Aoa Village, where the Puna Stream meets the valley floor. The ground at this locality appears to be largely colluvial. Located here is a complex of features that includes 3 fale (house) foundations. The largest and best formed of the foundations is oval and, though badly disturbed, measures about 10.5 by 5.5 m. Boulders form the periphery and coral and pebble fill provide the flooring. The elderly landholder told us that one of these fale foundations is very old. He said it was the house of a very high ranking chief whom he puts at at least four generations ago. The other two foundations are smaller and their margins difficult to define. A comparatively recent umu had been built on top of one of these old foundations. Also present are two low terraces which are possibly residential but may also be horticultural. And, there is a remnant of two adjoining walls that form the corner of a large rectangle. We were told that this is the remnant of an old pig pen. One wall measures 16.9 m long and the other 33.1 m, and both are about 1.3 m wide and one to two courses high.

No artifacts were observed at this locality. These features appear to be old, yet there is no reason to believe that they extend far into the prehistoric period, if at all. Older cultural deposit, quite possibly from the ceramic period, is probably deeply buried at this locality.

Locality 2. The first traces of this locality were found in the narrow bed of the Puna Stream near the LMS Church. There we recovered 19 sherds of undecorated pottery representing both thin fine ware and thick coarse ware. Also found were the butt of a probable Type I adze, the bevel end of a probable Type V adze fragment ( plano-convex in cross-section), a small adze-like tool, and some basalt flakes. With the clearing of vegetation from along the stream bank, a buried cultural deposit, indicated by bands of dark soil, was revealed. At that point, it was decided that test units would be
dug at the site. A more complete description of the site is given in the discussion of the excavations carried out at Locality 2.

**Locality 3.** This locality lies at the mouth of the Laouliu Stream. It was identified on the basis of a small collection artifacts from the mouth of the stream. Five pottery sherds and one flake tool were collected at this spot. Two of the sherds are very thick, coarse-tempered ware, two are thin and fine tempered, and one is thick but fine tempered. Two of the sherds, one fine and one coarse, are rims from bowls. The single basalt artifact is a Class VII flake tool that has an unusual, purplish, organic residue along the cutting edges. Since all of these artifacts are surface finds, we cannot say if the flake tool is from the same cultural layer as the pottery. The pottery indicates that an old deposit lies buried somewhere nearby, probably slightly inland of the present stream mouth.

**Locality 4.** This locality was identified on the basis of a collection of body sherds made by Mr. Richard Stevens and family shortly after the end of the project. The collection consists of 6 sherds of thick coarse ware and 2 sherds of thin fine ware. The location of Locality 4 is approximately 96 m west of the mouth of Laouliu Stream. This is the spot at which the old route of the Puna Stream reached the ocean. At coring station CT2-1, a buried cultural layer was encountered some 67 cm beneath the surface (see 'Coring', below). That may be the deposit from which the sherds came. This locality certainly warrants testing.

**Locality 5.** This refers to the area of the lower valley located between the road into 'Aoa and the Tapua Stream. Scattered over the surface of the lower and middle valley are pieces of marine shell, occasional basalt flakes, pieces of coral, and waterworn pebbles. Sometimes these materials appear in concentrations that appear to mark old living floors, but the nearly continuous scatter generally makes identifications of specific surface features difficult at best. Identifications of surface features on the basis of differential distribution of surface materials is further hindered by the vegetation and the fact that at least some of this area—especially along the streams and at the joint mouth—is frequently subject to flooding. The density of surface materials begins to diminish in the central middle valley, becoming light in the inland half, and largely disappearing in the upper valley. The low remnant of a stacked boulder wall runs just a short distance back from and along the lower-most section of the Tapua Stream. It is in very poor condition and was not immediately recognized. The wall picks up again on the west side of the stream and runs through Locality 6. The Locality 5 segment appears to be more of a retaining wall that may have served to stabilize the bank of the stream and to inhibit flooding.

No artifacts were collected from the surface at this locality, although numerous basalt flakes and a couple of fragments from quadrangular adzes were observed. Excavations in this area should be productive, although flooding would undoubtedly be a problem in the lower valley.

**Locality 6.** This is the lower and middle valley section that lies between the Tapua and East Vaitolhu Streams. The East Vaitolhu Stream runs immediately behind the elementary school and forms the boundary of the locality. There is a fairly continuous—though varying in density—surface scatter of shell, bits of coral, pebbles, and basalt flakes. A number of basalt flakes and a few adze fragments were observed but no artifacts were
collected. The retaining wall (Feature 6.1) noted for Locality 5 continues, angling to the southeast, across the locality. It begins as an alignment of boulders that served as a low retaining barrier along the edge of the mud flat of the lower reaches of the East Vaitolu Stream, and roughly parallels the stream, though becoming farther removed from it. After the first 30 m or so, the feature is recognizable as a wide, free-standing wall (albeit a low remnant). About 140 m from the beginning of the wall, it turns south (directly inland) and runs for another 52 m. Near the inland end of the wall, it passes a well-formed paepae (house foundation). Coring Transect 2 crosses the wall at 4.9 m east of station 3-10, which lies 7.6 m from the northeast corner of the paepae. The paepae (Feature 5.2) is formed by one course of basalt boulders, has a soil fill topped by coral and pebble 'ili'ili, is elongated with rounded ends, and measures 6 m by 3.3 m and generally 0.25 m high. It is in such good condition that we suspect it has not been around for more than a few generations.

Only two artifacts were collected from this locality. One of these is an extensively water-worn butt from a probable Type II adze, and the other is a flake adze, or a Class XI flake tool. A number of basalt flakes, some with areas of polish, were observed on the surface but none were collected. Test excavations in Locality 6 would be worthwhile, but the frequent flooding and/or soil saturation would certainly create difficulties.

Locality 7. This is the largest locality designated. It covers the lower and middle valley from the East Vaitolu to the West Vaitolu Streams. A few modern houses stand on the western portion of this area, just back of the shoreline. Subsurface coring in the lower valley just east of the residential section revealed buried cultural deposit even though there were no surface indicators of past occupation. In the middle valley area we located at least ten surface scatter concentrations of coral and/or pebble 'ili'ili, often with pieces of marine shell included. At some of these, basalt flakes, some with polished surfaces, and shell fragments were also present. These concentrations appear to mark old house floors, although they are often rather diffuse and lack any boulder borders. In addition, the ground between these concentrations has a light scatter of coral, shell, and occasional flakes. The vegetation cover further inhibited the location and definition of surface features. Land crab holes are throughout the area and in the expelled dirt at some of these we noted pieces of marine shell indicating buried deposit. Much of this area was apparently occupied at one time, and the combination of cultural (domestic activity) and natural (flooding and crabs) transforms have made individual features and household units difficult to define.

No artifacts were collected from this locality, although a number of basalt flakes were noted. Again, excavations in this region would be informative but the muddy soils created by frequent rains would be difficult to work in, at least in the lower valley and much of the middle valley.

Locality 8. This is a small area consisting of the lower and most of the middle valley segment between Vaitolu Stream and the western ridge of the valley. We had some conflicting reports as to whether this section of land was part of 'Aoa or Sa'ilele-affiliated Fa'alefe. Our best indications were that it was affiliated with 'Aoa, so we have included it with AS-21-5.

Throughout this area there is a light surface scatter of coral and pebble 'ili'ili, bits of shell, and some basalt flakes. In short, it is similar to
what is found at localities 5-7. A particularly heavy concentration of surface materials and identifiable features is found immediately inland of the modern houses near the shore. There we found and labeled seven surface features. Three of these, Features 8.1, 8.2, and 8.3, are house floors marked by concentrations of coral and pebble 'ili ili, and bits of shell. These features measure approximately 4 by 5 m, 11 by 8 m, and 6 by 6 m, respectively. Feature 8.4 is a L-shaped alignment of boulders measuring 8 by 7 m. Feature 8.5 is a straight boulder alignment located a little inland of 8.2. Artifacts and midden were absent from both of the alignments and the landholder stated that they were both associated with old pig pens. Feature 8.6 is a rectangular outline of boulders, measuring 4 by 6 m, with a concentration of charcoal in the interior. It looks to be the remains of a comparatively recent cook house.

Occasional basalt flakes were observed on the surface throughout this area, but at Feature 8.2 there is a notable concentration of small basalt flakes. The only artifacts collected are two basalt tools. On the edge of Feature 8.2 was the butt of a Type I adze that was broken across both the long and short axes and appears to have been reworked to create a much narrower version. It may be that it initially broke longitudinally and was being reworked when it snapped in half. The other tool is a broken preform with a triangular cross-section. Based on the shoulder index, it was probably on its way to becoming a Type VI adze.

The landholder told us that no houses have stood at those foundations in the 20 years that he has lived there. Inland of this feature complex the surface materials diminish dramatically and eventually disappear, although the increasingly dense ground vegetation inhibited efforts to effectively identify an inland boundary of the scatter. Future excavations in this area would probably be productive.

Locality 9. This locality is situated in the sea-ward section of the upper valley, west of the marsh. There we found an abandoned paepae and an associated smaller foundation. Coring transect 4 (between stations 10 and 11) runs past the edge of this complex. Feature 9.1 is a crude foundation that measures about 5.9 by 5.6 m. It is in such poor condition that while there is a basalt 'ili ili floor area, there is no surrounding boulder alignment so the edges cannot be precisely defined. Feature 9.2 is a nicely-defined elongated paepae with rounded ends. It measures 5.2 by 3.8 m, and is nearly 0.25 m high. The foundation is defined by large boulders, and the fill is soil with a pebble surface. The village water pipe runs over the west edge of the structure and stones have been displaced to accommodate the pipe. Feature 9.3 lies a short distance sea-side of Feature 9.2. It is nearly rectangular, 6.9 m wide by approximately 9 m long (roughly east-west), with a small projection on the inland (south) side. A water spicket projects up at the northwest corner of the foundation, undoubtedly diverted from the main water line, and a piece of wood with a nail is implanted in the foundation. These facts indicate that the house that stood atop the foundation was occupied in the not-too-distant past. Indeed, the aerial photo maps from the 1950s indicate a house of the proper shape at the proper location, and we believe Feature 9.3 to be the foundation of that house. A couple of other small foundations could be made out nearby but the vegetation in that area was too dense for accurate measurements. These are probably the foundations for structures associated with the house of 9.3.
The structural remains at Locality 9 represent the residences of two or three households. Beyond the board and nail, no portable artifacts were found in the area. None of the features appears to be notably old, although 9.1 and 9.2 may well be older than 9.3. Feature 9.2 holds the best excavation potential.

**Locality 10.** This locality is about 68.5 m to the southwest of Locality 9. It consists of single household unit and an associated stone wall. The main structure (Feature 10.1) is a fale foundation bounded by large boulders and with an 'ili'ili surface. It is rectangular in shape but has a small rectangular room projection on the sea side. At its maximum it measures 17 by 11 m. The west wall of the structure extends as a low alignment for 5 m. On top of the room projection is a concrete slab and a larger concrete slab (7 by 5 m) was poured over half of the rest of the foundation. A house at this location is illustrated on the 1950s aerial-based maps. The 'ili'ili foundation base may well be older than the concrete slab modification, but the structure shape indicates that even is not very old, probably dating to this century. A portion of a free-standing wall of stacked boulders (Feature 10.2) runs a short distance inland of the foundation and probably served as a boundary marker. This locality is unlikely to hold great potential for understanding Samoan prehistory.

**Locality 11.** This locality is in the far southwest corner of the upper valley and was defined on the basis of a scattering of structural remains. It is separated from Localities 9 and 10 by stretches of land where no surface remains were found. Five types of features are found in this area. One type is represented by at least four piles of rocks (Features 11.1-11.4) that range between 0.9 and 1.6 m in diameter and 0.3 and 0.4 m in height. We were informed by some young men working in the area that the rock piles were made in preparation for building a fale foundation that was never completed; they do appear to be comparatively recent. However, these piles are also reminiscent of prehistoric Hawaiian planting mounds and may have been used for planting yams, the piles being used to support and keep off the ground the plant vines. In this same area are two small circular alignments of rock, about 1 m in diameter (Features 11.5 and 11.6). Their function is unknown but they are similar to planting features found in Hawaii. The second feature type is a single example of what appears to be a small house platform (Feature 11.7). It is built of crudely stacked boulders and cobbles and measures 2.5 by 5.5 m. This platform is likely to have been the foundation of a plantation house, or fale o'lo', used when working in the plantation. Another feature (11.8) is a large stone-lined pit. It is about 2 m in diameter, a meter or so deep, and stacked boulders line the walls. Its function and age are unknown. A short distance to the south (inland) of the stone piles and platform is another set of features. This set consists of a series of at least seven low terraces formed by retaining walls of crudely stacked boulders (Features 11.9-11.23). These terrace walls run one behind the other, roughly parallel, and separated by distances of 2 to 4 m. Most are about 9 m long, with the shortest at 5.5 m and the longest at 11.2 m. The vegetation in the area of the terraces is quite dense, consisting largely of ground vines, and extensive clearing was required to define these terraces. The north ends of some of the terraces appear to have been disturbed when the village water pipe, which runs through this part of the valley, was put in. These terraces are undoubtedly long-abandoned farming features.
No artifacts or midden remains were found at this locality. It is clearly the site of agricultural activities. While none of the features is still used, and some have long been abandoned, they are unlikely to be prehistoric.

**Locality 12.** Just west of the marsh and at the rear of the valley is Locality 12. This locality consists of a complex of features, not all of which are unquestionably real. One feature (12.1) consists of a small concentration of coral pieces and basalt pebbles. No artifacts were present, but this may mark an old house floor. A possible foundation (Feature 12.2) is situated not too far away, but it is very badly disturbed. There is a light scattering of coral and pebble 'ili'ili but no artifacts. A second probable foundation (Feature 12.3) was found but it too is very badly disturbed by trees and there is no identifiable floor paving. A small concentration of basalt pebbles and cobbles is located next to the feature. The only artifacts in the vicinity were some old pcp bottles. Another very light scatter of pieces of coral was located but does not appear to mark an actual floor area. Two pits were found in the area (Features 12.4 and 12.5), both about 1.5 m in diameter, a meter or so deep, and with basalt boulders around a portion of the sides. These features are similar to the pit found at Locality 11, but their function is unknown. At the very base of the slope are two possible crude terraces formed by large boulders (Features 12.6 and 12.7). These may be natural features formed by a build-up of the slumping slope. They may also be small man-made terraces, and if so, they probably were for fale o'o. The final feature (12.8) observed is a stone wall remnant. It is difficult to identify its precise beginning point, but it appears to extend for several meters before reaching a small dry stream bed, then picks up again on the other side and extends for another 10 m.

None of the features of this locality appear to be of any great antiquity. There may have been two or three house sites in this locality earlier in this century, or perhaps even in the last century, but the surface remains described are unlikely to be any older. It may also be that the features found represent fale o'o rather than actual houses. It is doubtful that additional investigation of this locality would prove very productive.

**Locality 13.** This locality is also at the rear of the valley, but is on the east side of the marsh. It centers on the Tapua Stream, just sea-side of where the stream enters the valley floor. There we found coral and pebble 'ili'ili indicative of house floors. At least two such concentrations, and possibly four, were observed. Also scattered about were pieces of shell and occasional basalt flakes.

**Locality 14.** This locality is found at the rear of the valley, on the east side of the Lao'iu Stream near where it enters the plain. It is just inland of Locality 3 and consists of a set of surface features. Feature 14.1 is a deep, rectangular depression that measures roughly 5.2 by 3.4 m, with 1.2 m wide entranceways at each end. The depression walls are lined with coral chunks and basalt boulders. This structure is reminiscent of a military feature, but it may also have served as a domestic storage structure. About 15 m away is Feature 14.2, which is a smaller depression that is 2.4 by 2.4 m across and nearly 1.5 m deep. A few boulders line the downslope side, and a pile of boulders is just outside the downslope edge. Some 9 m or so to the west of the depression is Feature 14.3, a one-course high boulder retaining
wall that extends for approximately 10.4 m along the base of the slope and probably served to inhibit slumping. On the flat adjacent to the retainer there are two or three small terraced areas that probably served as bases for structures, and a scatter of pebbles, cobbles, and some coral. This set of features (14.4, 14.5, 14.6, and 14.7) probably constitutes the remains of a single household. The only artifact observed was a single basalt flake. A small rivulet runs between this feature complex and the stream, and on the intervening piece of land is another crude terrace with a spotty boulder retaining wall. The structure (Feature 14.8) measures at least 5.2 m by 4.3 m, but the full size could not be determined since the floor area extends into dense vegetation. Pieces of coral, pebbles, bits of shell, and a fragment of a probable Type I adze were observed on the terrace surface. A second terraced area (Feature 14.9) appeared to be located just inland of the first, but it too was in an area of dense vegetation so the dimensions could not be determined. The final feature (14.10) found at this locality is a stacked-boulder, rectangular enclosure set at the base of the slope. It appears to have been an old pig pen, half of which has been removed in order to use the boulders elsewhere.

Over all, these features do not appear to be extremely old, although older deposit may well lie buried beneath the surface. After all, Locality 14 is situated a short distance inland of Locality 3 which produced pottery that may have been washed down the stream from a more inland location. While the ground at Locality 14 is largely colluvial and would present difficulties for excavation, additional work at this location may prove rewarding.

Summary. Though very few houses are present today, the lower and middle valleys were clearly areas of residential activity in the past. comparatively few paepae were found, but scattered over much of the ground surface were cultural materials such as coral and basalt 'ilili, basalt flakes, occasional basalt tools, and pieces of marine shell. At several spots the density of these materials—especially the 'ilili—was such that old house floors were strongly suggested. In other areas the scatters were too diffuse to identify discrete residential units. At some places, even where there was little general surface scatter, there were bits of coral, shell, and, sometimes, flakes in the dirt at the mouths of land crab holes, indicating the presence of buried deposit. Vegetative ground cover presented some difficulties in locating surface remains (structural and non-structural) and for defining the full dimensions of surface scatters. Enough could be seen, however, to indicate that, with a few exceptions, the bounding of discrete residential units would not be possible.

The upper valley saw sparse occupation, although the area near the base of the slopes on either side of the marsh did see some agricultural and residential activities. Nevertheless, compared to the lower and middle valley section, it was thinly occupied.

AS-21-9. This site, together with sites AS-21-10 and -11, is not located in the valley proper, but on a narrow ledge of land on the far eastern arm of land forming the bay (see Fig. 5). Since the remains at these locations are clearly separated from those of the valley and 'Aoa Village, we have not included them as part of AS-21-5.
About 50 m south of Palau Pt. and some 20 m from the bay shore is a
well-made paepae that is situated on a somewhat terraced area near the base
of the slope (Fig. 8). The paepae has a wide curb and a floor that is composed
of pebble and coral 'ili. The terraced area lies at approximately 10 m
above sea level. Downslope and some 8 m to the southwest of the paepae is a 7
m long wall of stacked boulders. Approximately 15 m to the south-southwest of
the paepae is another partially terraced area, but no foundation is present.
Several artifacts, however, were collected from the basalt rubble strewn over
the ground surface. This area is probably associated with the other two
features as part of a single residential unit.

A total of eight artifacts were collected from this site, and most of
those came from the southern terraced area. The artifacts are varied and
include four adzes or adze fragments. There is one small Type III adze, the
butt of a completely polished, plano-convex adze that is almost certainly a
Type V specimen, an adze butt with a triangular cross-section and a shoulder
index of 91 which strongly suggests that it is a Type VI adze, and a small
mid-section piece of a quadrangular adze or preform. Also collected were two
probable chisels, a Class Ib flake tool (made on a secondary decortication
flake), and an unmodified secondary decortication flake.

It is difficult to assess the significance of this site. The artifacts,
particularly the probable Type V adze fragment, suggest that the site may be
fairly old, but the good condition of the paepae would seem to argue against
great antiquity. Future excavations at this site may well prove rewarding.

AS-21-10. This site is located about 100 m south of AS-21-9 and consists of
three house foundations (Fig. 9). Two low foundations are situated on the
narrow coastal ledge, directly along the coastal trail. The northern paepae
(Feature 1) has a broad curbing of cobbles and boulders on the sea side, and
a cobble and coral flooring. This feature, which measures 8 by 4 m, is
unusual in that it is divided into north and south sections by an alignment of
boulders running perpendicular to the long axis. The southern paepae (Feature
2) lies close to the cliff wall. It is oval, has boulders forming the curb,
and measures about 8 by 4 m. The fill consists of sand and sandy soil. The
third foundation (Feature 3) actually lies on a terrace about 20 m up the
slope from the first one. The foundation is roughly oval and measures 9 by 5
m. There is a bounding curb of boulders and a floor of waterworn pebbles and
coral. Immediately west of the foundation curb the slope drops markedly,
while to the east there is a more gentle slope up the side of the ridge. No
artifacts were found at any of features. Excavations at these features may
yield useful information about the past of the 'Aoa area.

AS-21-11. About 116 m to the south of AS-21-10 is a set of recent features.
Two of these are concrete pillboxes built by the U.S. military as part of the
island fortifications during World War II. Two others are found on the
opposite side of the bay. These are 13.1 m across and the walls are 0.5 m
thick. They are situated on a large terraced area that is about 8 m wide and
formed by a boulder retaining wall 0.3 to 0.45 m high. Also present are two
rectangular, well-built terraces with boulder retaining walls and 'ili
floors. These are located just to the south of the pillboxes. They were
identified by local informants as the abandoned foundations for tourist fale.
One map of the islands indicates "camping fales" at this location ("Islands of
Samoa" by James A. Bier, The University of Hawaii Press). The last feature of
Figure 9. Plan map of site AS-21-10: (a) Features 1 and 2, (b) Feature 3. Distances between (a) and (b) not to scale.
the group lies between the pillboxes and is a two-tiered platform. The bottom platform measures 3.3 by 3.4 m and is 0.4 m high, while the top tier is slightly smaller and about 0.45 m tall. Both platform components have stacked-boulder walls and sand and pebble fill. While this feature has the general appearance of a grave, a local informant told us that it was actually the covering over a septic tank constructed to service the tourist fa'ale. This site is, in all likelihood, entirely recent, although of different decades, and holds no promise for further investigation.

Fa'alefu

As noted above, Fa'alefu is a small village that is politically affiliated with Sa'i'alea even though it is spatially closer to 'Aoa. The houses of this village are strung along the small coastal shelf of the western arm of the bay.

AS-21–6. This site was defined on the basis of surface artifacts and was divided into three localities. In addition to the localities described below, two concrete World War II pillboxes are located along the narrow bench at the base of the slope to the north of the main residential area, but nothing more will be said of them.

**Locality 1.** At the discharge fan at the mouth of the Fa'alefu Stream we found several basalt artifacts. Along with one large waste flake we collected 7 flake tools—1 Class I, 1 Class III, 2 Class IV, 2 Class VI, and 1 Class VII implements. The Class VII flake tool has a purplish stain, apparently organic, along the cutting edges. In addition, the butt end of a trapezoidal, highly polished adze was found. This could have been from either a Type III or a Type IV adze, but the shoulder index (33.6) and the pronounced trapezoidal shape suggest the Type IV category. These artifacts probably had eroded out of a deposit a short distance inland—perhaps from Locality 2—and been carried down by the stream; there was no indication of an eroding coastal deposit. This locality holds no potential for excavation but may continue to yield occasional artifacts.

**Locality 2.** About 23 m inland of Locality 1, near a modern pig pen, a Class V flake tool and a fragment of a probable Type III adze were found. Test excavations in this area probably would yield additional artifacts, but the upper portion of soil has been badly disturbed by modern residential activity, and the talavial nature of the ground suggests that old deposits, if present, would be deeply buried.

**Locality 3.** At the western end of the village, along the trail, is a huge boulder with one or two grinding facets of the type used to grind adzes. There is no other indication of cultural deposit at this location, and it is not even certain that the boulder has not been moved to this position since the time of actual use. This locality holds little potential for future investigation.

**Ridge and Slope Sites**

Archaeological survey was carried out on sections of the slope and along the ridge tops surrounding 'Aoa Valley and extending into Sa'i'ole County. The areas covered are indicated in Figure 10. Due to the nature of the terrain and the vegetation, survey of the slope was very difficult and time consuming.
Figure 10. Map of 'Aoa area showing areas of intensive and reconnaissance survey.
Consequently, the slope investigation was limited to some sample areas that were determined more by the existence of trails to the ridge tops than any true sampling procedure. The ridge tops themselves, which are generally quite narrow, were surveyed more intensively, although vegetation still presented something of a problem.

The slopes and ridge tops around 'Aoa valley were not the focus of heavy occupation. Nevertheless, we did find a surprisingly large number of sites, the locations of which are given in Figure 5. For many of these, especially the terraces, the locations are approximations since the nature of the terrain and the vegetation made precise determinations impossible. Furthermore, the elevations given for these sites are based on orthophoto maps (at 1 inch equals 200 ft) from the Department of Public Works (DPW), but the illustrated elevations of these maps are not always in complete agreement with those of the USGS topographic map of Tutuila. We have used the DPW maps for elevation determinations since we do not know which maps are most accurate, and the DPW maps are much more detailed and they were used for our field maps.

The sites listed are of four types: terraces for structures or agriculture, star mounds, walls and wall complexes, and military features. Some slope sections and stretches of ridge top are devoid of recognizable cultural features, but in other areas we encountered numerous features. On the slopes, the most common features are old terraces formed by arcing rows of boulders. While most of these lack clear evidence of residential activity, a few have some scattered coral and basalt 'ili'iili and occasional artifacts, which suggests that they served as old house floors. On the ridge tops the sites most frequently found are star mounds.

The remainder of this section of the report provides descriptions of the slope and ridge-top sites. We begin with the star mounds. Because of the enigmatic nature of star mounds, we will present a lengthy analysis of those features in the DISCUSSION section below. Here, the star mound descriptions are followed by descriptions of the remaining features, which, for convenience of presentation, are grouped according to geographic area.

**STAR MOUNDS.** Prior to this survey, nine star mounds, or tik 'ave, had been reported for American Samoa, all from the Tafuna Plain of Tutuila (Frost 1978; Clark 1980). As a result of our survey, an additional sixteen mounds have been located. (Three additional mounds were found inland of Sa'ilele on a weekend hike, but time did not allow us to return to these sites for mapping and precise locations, so no further discussion of them will be given.) The vegetation found on the mounds was very dense making visibility poor. When a mound was discovered it was cleared and, if time permitted, mapped and photographed. Unfortunately, no totally unobscured vantage point was ever available for a photograph that would encompass an entire mound. The majority of the star mounds were located on prominent points of the ridges. The most important defining characteristic of the star mounds is that they have at least one and usually several projections, or arms (defining criteria are discussed in detail below). In general, the star mounds in Eastern Tutuila are comparatively low, have stacked boulder retaining walls, and appear to be largely of earthen fill. The mounds were assigned site numbers following the ridge arc from the northwest to the northeast.

Four of the star mound sites described are actually located in Sa'ole County. They are described here in order to maintain a descriptive continuity
for these fascinating structures. The actual border between counties is not indicated on the detailed maps, and on larger scale maps where the borders are indicated the border placements differ slightly. It is also more difficult to precisely locate the sites on the larger scale maps. For consistency, we have selected for use the border configurations illustrated in Figure 2. Even so, some sites—i.e., AS-22-12, AS-21-18, and AS-21-19—appear to lie on, or at least very near to, the border. The implications of these conditions are that (1) it is conceivable that any of the three sites noted actually may be in the other county, (2) one of the purposes of the star mounds, or at least some of them, may have been to serve as boundary markers for land units, and/or (3) the location of these sites according to modern county lines may have been of no significance for their construction and use.

We begin this section of site descriptions with the star mound sites from Sa'ole County (22), then shift our attention to the East Vaifanue (21) sites.

**AS-22-9.** This mound is located on an inland peak some 7,655 m to the southwest of Leilia Mountain, at an elevation of 263 m (863 ft). This peak is not named on any of the available maps, but is the high point from which Patupatu Ridge descends. The site is the best defined star mound we encountered. It has a circular shape and has ten arms with rock facing (Fig. 13b). The arms vary from 0.6 to 1.6 m in height. The mound is situated on a relatively broad, flat area, which may account for its not having an elongated or oval shape. It is roughly 21.5 m in diameter. The arms are 3 m wide and 4 m long and have a squared-to-rounded appearance.

**AS-22-10.** This mound is located on a very prominent peak—237 m (779 ft) in elevation—of an inland ridge to the south of site AS-22-9. The structure is oval, conforming to the shape of the ridge. It has eight arms, all faced with basalt, three each on the east and west sides and one each on the north and south ends (Fig 11b). A trail running along the ridge crosses the mound just above the three eastern arms. This mound is comparatively large, with dimensions of 23.4 by 16.9 m, and two arms as much as 0.8 and 1.1 m in height (although this height is in large part due to the fact that the arms extend to where the slope begins to drop).

**AS-22-11.** This mound is located on a high point of a roughly east-west running ridge that is southeast of site AS-22-10. The elevation of the site is 188 m (617 ft). The mound is roughly circular and is very low and ill-defined. Only seven arms could be positively identified (Fig. 14b). There is no apparent basalt rock facing on any of the arms. It is roughly 18 m in diameter and the arms have heights ranging from 0.3 to 0.5 m.

**AS-22-12.** As best we can determine from available maps, this site appears to lie immediately south (by some 60 m or less) of the border between Sa'ole and East Vaifanua. If the county border follows the ridge top in this region, however, which seems quite reasonable, then the site falls on the border.

This star mound is situated on the east end of a prominent point at 133 m (436 ft) in elevation. The mound is oval in shape, composed of earthen fill, and has 10 arms—four arms on both the north and south sides and one each on the east and west sides (Fig. 11d). Eight of the arms clearly exhibit stone facing and range in height from 1.0 to 1.5 m. The mound is approximately 35.2 m long and 23.5 m wide.
Adjacent to the east edge of the mound is a deep ditch that runs the length of the ridge. It measures 15 m wide and at least 3 m deep. About 60 m farther to the east is another deep ditch that cuts across the ridge and is of about the same width but only 2 m in depth. These ditches are reminiscent of the ditches found near a pigeon-catching mound in Uvea described by Kirch (1975:393) and may have been the source of fill for the mound. They also bring to mind what have been interpreted as fortification features of ridge-top sites elsewhere in Samoa (e.g., Green 1969a:101; Scott and Green 1969:205-09; Frost 1978:77-79, 90-93).

AS-21-12. This star mound is located on the west ridge, immediately south of a small peak that lies 218 m north of Leila Mountain peak. The elevation of the site is 195 m (639 ft). The small peak itself consists of a huge outcrop of basalt. On the southern side of the summit there is what appears to be a wall of stacked boulders. The wall is about 2 m in length and has a slight arc to it, with the concave portion facing south toward the star mound. The mound itself has six, possibly seven, arms and is elongated in shape to conform to the ridge (Fig. 12a). The mound appears to consist of dirt fill, but it was difficult to discern to what extent the mound consisted of fill, and how much of it was merely the ridge with arms added on. The arms themselves are made of basalt boulders. The mound drops off sharply on the south, east, and west. The dimensions of the mound are 14 by 24 m with the arms varying in height from 0.68 to 1.35 m. The arms extend out from the mound about 3 m and are between 3 and 4 m wide. The arms do not come to a point, but, rather, are rounded or squared-off. There is a slight depression that is slightly off center in the middle of the mound. At the rear of the mound (i.e., the north side, nearest to the mountain summit) there is what appears to be a shallow ditch that crosses the ridge in an east-west direction. Also at the back is a crude ring of stones, just in front of the ditch. In the center of the ring were numerous white feathers (possibly pigeon feathers) and nearby a stick stuck in the ground with a shotgun shell cartridge on it. No other artifacts were found. When a frequent hunter from 'Aoa was asked about the feathers and cartridge, he merely laughed, never revealing the subject of his humor. But we did learn that some men hunt pigeons along the ridge tops.

AS-21-13. This structure is located atop Leila peak at an elevation of 214 m (702 ft). The mound is elongated and has ten, possibly eleven, arms and a possible ramp (Fig. 12b). It has a soil fill and is faced with basalt boulders that are most common along the edges of the arms. The arms vary in height from 0.2 to 1.65 m. The mound is roughly 12 by 30 m and the arms are 3 m in length and 3 to 4 m wide. At the western end of the mound is a slight depression that is surrounded by a few basalt rocks. At the east end of the structure is an arc of boulders with a concave opening facing west. The general orientation of the mound is east-west.

AS-21-14. This structure is located on a topographic high point (169 m, or 550 ft) of the ridge that extends to the southeast from Leila Mountain. It has seven, possibly eight, arms and is constructed with soil fill (Fig. 12c). No rocks are apparent around the arms. This mound is one of the lowest that we encountered, its arms ranging between 0.5 and 0.75 m in height. The arms have a rounded rather than pointed form. The mound, which measures 17 by 16 m, is closer to being circular in shape than the mounds thus far described. This may be because the ridge at this location is very wide and the structure
did not need to conform to a narrow ridge shape as at other locations. A small circular enclosure is found near the center of the mound.

AS-21-15. This structure is located on a spur of Patupatu Ridge—at an elevation of 147 m (482 ft)—some 488 m to the northeast of site AS-22-9. Only a rough sketch of this mound was made (Fig. 13a). The mound is of soil fill, roughly oval, and has ten arms (although the structure was ill-defined). It is 23 m in length and 15.5 m in width, has limited stone facing around the arms, and has a soil fill. The mound is very low with heights of the arms ranging from 0.2 to 0.7 m.

AS-21-16. This star mound is located down-ridge of site AS-21-15 and at 152 m (499 ft) in elevation. It has eight arms and there is stone facing around much of the mound (Fig. 124). It consists of a soil fill and is roughly oval in shape, measuring 22 by 15 m. The heights of the arms varied from 0.2 to 0.95 m.

AS-21-17. This site is the third and last mound on Patupatu Ridge. It is located on the last prominent point of the ridge, a point that can be seen from 'Aoa village. This point is separated from that at AS-21-16 by a small saddle area, and it is at about 132 m (434 ft) in elevation. The structure is more circular than oval and is about 19 m in diameter (Fig 11a). It has eight arms with heights of from 0.5 to 0.7 m. It is a rather low mound and is composed of soil fill with indications of rock facing around some of arms. About 20 to 40 m down the ridge is a wall of basalt which may have been placed there to stabilize the ridge.

AS-21-18. This ill-defined mound is located atop a small peak, 137.5 m (451 ft) in elevation, immediately west of Lemafa Saddle. It has seven probable arms with a possible eighth arm that is part of a lower terrace-like area on the south side of the mound (Fig 13c). Also on the south side is a depression where it was particularly difficult to define the extent of the mound. The mound is roughly circular with a diameter of about 17 m. Most of the arms are faced with boulders. In the center of the mound are two shallow, rock-lined depressions. On the north-to-central part of the mound is a roughly square, rock-lined pit that is 1.1 m deep and contains a large amount of sand. It is probable that this was part of a military emplacement from World War II.

AS-21-19. This mound is located on the west end of an elongated prominent point of the ridge southwest of Olomoana Mountain, at 178 m (574 ft) in elevation. The mound has seven or eight arms, is roughly oval, and is oriented along the east-west axis of the ridge (Fig. 13d). Three of the arms are distinctly lined with boulders while the others, especially along the edge of the ridge, are heavily eroded. At the east end of the mound, a shallow ditch cuts across the ridge, apparently defining the boundary of the mound. The height of measurable arms ranges from 0.7 to 1.25 m. The mound consists of a soil fill and, to some extent, the ridge itself.

AS-21-20. This mound is located on Afimua Ridge—on the east side of the valley—at 205 m (672 ft) in elevation. The mound is distinctive in that it has only four rock-lined arms that do not complete an oval or circle (Fig. 14a). This mound is low with heights of about 0.3 to 0.7 m. It is similar to what has been described as a specialized site by Davidson (1974b:209). More will be said below about what is meant by this and whether or not such a site should be considered to be a star mound.
Figure 11. Star mounds: (a) AS-21-17, (b) AS-22-10, (c) AS-21-23, (d) AS-22-12.
Figure 12. Star mounds: (a) AS-21-12, (b) AS-21-13, (c) AS-21-14, (d) AS-21-16.
Figure 13. Star mounds: (a) AS-21-15, (b) AS-21-9, (c) AS-21-18, (d) AS-21-19.
Figure 14. Star mounds: (a) AS-21-20, (b) AS-23-II.
AS-21-21. This mound is northwest of site AS-21-20 and is located on a prominent point of Afimuao Ridge, at an elevation of 196 m (643 ft). It has eight arms, some of which are faced with boulders, and consists of an earthen fill. Its dimensions were not taken.

AS-21-22. Located on a peak of Afimuao Ridge, at an elevation of 184 m (603 ft), this mound is made of earthen fill and has eight arms with stone facing. A small, north-south linear mound is also found between sites AS-21-22 and AS-21-23 and has been included in the former. This small mound appears to have been only about a meter wide and about 2 to 3 m long.

AS-21-23. This mound is situated on a prominent point of Afimuao Ridge and at an elevation of 177 m (581 ft). It is heavily disturbed and only a rough sketch was possible. The mound has six, possibly seven, arms (Fig. 11c), three of which are clearly faced with boulders. The dimensions of the mound are 24.7 by 18.6 m and the heights of the arms are from 0.2 to 0.9 m.

WEST RIDGE SITES. The “west ridge” is here taken to lie on the west side of ‘Aoa Bay and Valley, between the coast in the north and the Vaitele Stream in the south and east. Two sets of sites were found there in this area, one set on the ridge top and the other on the ridge slope.

An intensive survey was made of the ridge tops of these western uplands. The main ridge begins at Motusaga Point and runs roughly northeast-southwest to Leila Mountain. From there, one ridge runs a short distance to the southwest before melting into the slope, and another runs to the east-southeast to Le'aeno Mountain, although our survey did not reach the top of Le'aeno peak. On the ridge tops we found a scattering of terraces, house remains, and military sites. Unlike the survey along the tops of the ridges, time did not allow us to do more than a reconnaissance survey of the ridge slope. The slope sites can be grouped into two sets of terraces. One group of terraces was found along an old trail that is just north of Fa'alefu Stream. Another set of terraces was found along the trail that runs along the west ridge slope and eventually crosses the ridge and continues into Sa'ilalea. Additional sites undoubtedly exit on the slope but they are quite probably of the same type as those described below.

AS-21-24. This site was found early in the slope investigation. It consists of a rectangular terrace that measures about 16 by 8 m, and is bounded by very large boulders. No artifacts or 'ili'iili were seen but a single marine shell was present. The grass cover was very dense, however, so other materials may be present. The rectangular shape of this terrace is unusual since all others along the slope are arced. We suspect that it may be fairly recent.

AS-21-24. The first site consists of two house (fala) foundations and three features that appear to have been military in nature. Starting at the northern-most point of the ridge there is an irregular pit that is 5 m by 2.8 m across. It has some type of molded concrete in it similar to the concrete found in the pits at the end of Afimuao Ridge. Just to the south of this feature is a rectangular pit that is cut into the slope of the ridge facing 'Aoa Bay. There is some basalt rubble on the floor. The feature measures 5.3 by 3.4 m and is 0.5 m deep as measured from its back wall. It is similar to the rectangular pits at sites AS-21-51 and AS-21-52. A third pit was found 11.6 m to the west of the rectangular pit. It is roughly circular, 3.5 m in diameter, and 0.5 m deep. Again, there are chunks of molded concrete along
its edges. The concrete chunks appear to have burlap impressions, possibly indicating that it had been poured over bags of soil, as appears to have been the case with at least one pit at site AS-21-52.

To the north of the above pit are two fale foundations. The first one is 11.2 m north of the pit. A high caliper cartridge was seen between the pit and this fale. The shell provides more evidence that this site had a military function, at least in part. The first fale foundation has a curb made of basalt boulders that range from 0.5 to 1 m in length. The fale is roughly oval and measures 9.1 by 6 m. The curb is about two courses high. The fale floor consists primarily of coral rubble with some waterworn cobbles. A few meters southwest of this structure a Type II adze with chips along the cutting edge indicating use was found.

The second fale foundation is 7.3 m north of the first. The foundation has a curb made of boulders and the floor consists of a light scattering of coral and cobbles. The structure is roughly oval and measures 10 m by 6.5 m.

This site appears to represent two very different time periods and activities. Residential occupation, probably prehistoric in age, is evidenced by the remains of traditional house floors and aboriginal artifacts. Recent (this century) military-related activity is represented by other features and artifacts. It seems quite likely that the presence at this location of the older terraced surface was at least a consideration in the selection of this site for the military activity. While these later activities obviously brought about some disturbance of the earlier remains, the site still holds potential for excavation.

**AS-21-25.** About 20-25 m up the ridge is a very light scatter of coral and basalt flakes that covers an area about 1.5 m in diameter. This scatter is located on a relatively flat terrace area that extends east-west across most of the ridge. A Type II adze was found and collected. It has no polish, so it may be a preform.

**AS-21-26.** Up the ridge we found another terrace area where there are what appear to be two distinct fale foundations. In addition, there are about five foxhole-like pits located above an old trail that crosses the ridge leading from 'Aoa to Sa'ilele. The features are located directly below the trail. The trail is indicated on the 1963 USGS topographic map of Tutuila Island. As we moved up the ridge to this location we noticed that coral and basalt flakes were scattered along the way. It is possible that the scatter at the terrace of AS-21-25 was the result of wash from this site.

The two fale floors were next to each other and oriented roughly east-west. It is possible that the two features were actually one at some time since the west edge of the east fale and the east wall of the west fale are separated by an erosional ditch about 3 m wide. They will be described, however, as separate features because the east fale floor has a much denser concentration of coral and is better defined than the western one.

The eastern feature is roughly rectangular and measures 6 m east-west by 4.9 m. The floor consists of a heavy concentration of coral rubble. No basalt curbing is apparent. The second structure is directly west of the first and is much larger, measuring 16.8 by 6.7 m. The longest axis runs east-west and the northern or down slope side is roughly defined by boulders.
The floor area is divided into two areas that are generally defined by two different combinations of material. The first area, which extends for 9.1 m, begins at the eastern end and is composed of a light scatter of coral and basalt. The second floor area is marked only by a light scattering of basalt flakes. It is just west of the first feature and extends about 6.9 meters.

In the far western quarter of the second fale floor a number of modern artifacts are present. In the back portion of this area a steel drum (probably 55 gals) had been dug into the ground. To the north of the steel drum and along the northern edge of the floor is a piece of window screen and directly to the east of the screen is a metal door hinge. To the west of the steel drum is a spring from a cist. One of the Samoan workers said he was told that this used to be a place where the marines lived during World War II.

Also found in this western section of the floor, and slightly beyond, were a number of basalt tools and flakes. Eight tools were collected. One probable Type I adze—indicated by the quadrangular to slightly trapezoidal cross-section and partial grinding—was found. We also found a preform butt fragment with a thin trapezoidal cross-section. It could be a preform for Type I, III, or IV, but with a shoulder index of 43, Type IV seems the most likely of the alternatives. One whole preform of a Type I or III variety—quadrangular to trapezoidal in cross-section—was recovered along with one small whole Type I adze. One chisel and one enormous Class Ib flake tool were also recovered (the latter is actually so large that it appears at first glance to be a core or a core tool, but the edge modification on three sides is clearly in the fashion of the Class Ib scraper). Two unique specimens were collected that do not match any of the established adze types; one has partial polishing, the other lacks polish. The first has a front larger than the back, a trait found only with Type IV adzes, but unlike Type IV, there is only a partial polish (which is restricted to a portion of the back and one of the sides), and the shape (expanding from poll to cutting edge and only marginal trapezoidal form) is not consistent with typical Type IV adzes. This may represent a broken Type I adze that was reworked to create a new tool, possibly a chisel (flaking on the back at the cutting edge gives it a slightly bifacially bevelled edge). The second specimen is slightly larger, lacks any indication of polish, is more crudely flaked, and lacks the bifacial bevel, though it is of similar form; that is, the blade expands from the poll to the cutting edge, it is only slightly trapezoidal in cross-section, and the front is greater than the back.

Finally, just above the road are about five foxhole-like pits a little less than a meter deep and roughly 2 m in diameter. Two similar pits are also found farther up the slope between this site and AS-21-27.

Again we have evidence of two components, one recent and one prehistoric. The residential features together with the abundance of aboriginal artifacts indicate a prehistoric house site that holds good potential for future excavation. The recent debris is probably from the military who merely utilized the previously terraced location.

AS-21-27. This site is a broad flat terrace that is covered with basalt cobbles and rubble. There are also boulders lining the northeast edge of the terrace, which measures 25.6 by 8.4 m. There are two pits located on the west portion of the terrace. They are 4 m apart, one to the north and the other to the south. The north pit is closest to the northern edge of the terrace and
is 3.1 m in diameter, 0.25 m deep, and has a number of boulders in it as well as lining its edge. The second pit backs up against the south edge of the terrace and measures 3.5 m in diameter. It has boulders along the edge and some in the bottom, and it is about 0.5 m deep. A number of flakes are scattered across the terrace. A Class Ia flake tool was collected.

AS-21-29. This site is a medium-size terrace located 10.5 m directly west of and slightly higher than AS-21-27. This terrace runs east-west and measures 4 by 12.1 m. It had a pit located in the southeast corner. A Class VII flake tool was collected from the terrace.

AS-21-29. Up the ridge above AS-21-27 and AS-21-28 is a large terrace oriented east-west across the width of the ridge. The floor of the terrace has a pebble and cobble scatter. Two pits are located on each end of the terrace. These pits and the others previously described could be either ma‘i pits or umu ti. There is a scatter of flakes over the surface of the terrace and an adze fragment was noted but not collected.

AS-21-30. This site is a small terrace just upslope from AS-21-29 on the western half of the ridge. The terrace measures about 5.5 m by 15 m. A butt fragment of a quadrangular adze preform, of a Type I or III shape, was found near the downslope edge of the terrace but was not collected.

AS-21-31. This terrace is about 11.1 m to the east of AS-21-30. It measures 7.7 by 11.5 m. This terrace has basalt rubble on the surface and is largely covered with fa‘au tree branches. The slope behind it has a large outcropping of basalt.

AS-21-32. This small terrace is located a short distance upslope from site AS-21-30. It has the remains of a retaining wall on its downslope edge and measures 7 by 8 m. No artifacts were seen but the surface was obscured by a cover of woodchips produced by a recent vegetation clearing. The terrace is about 20 m downslope from a banana plantation.

AS-21-33. This terrace is farther upslope and slightly to the east of the previous terrace. It is located in the midst of a banana plantation and measures 16.1 by 15.3 m. The surface of the terrace has a very light scattering of pebbles. A quadrangular, partially polished, Type I adze butt was found but left in place, while another Type I adze butt was collected. Above this terrace is the small peak that is north of Leila Mt. Just south of the peak and on the other side is the star mound site AS-21-12.

AS-21-34. This site consists of a set of boulder alignments that extend across the ridge and are located between Leila peak and the small peak to the north. This also places the site between the star mounds of AS-21-12 and AS-21-13. A short distance south of AS-21-12 are two boulder alignments, about 2 m apart, that cross the ridge in a roughly east-west direction. Farther south is a saddle, or flat and relatively low area, between Leila and the small northern peak, and at an elevation of about 182 m above sea level. There is a very shallow ditch or depression crossing the ridge (perpendicular to it) at about the center of the saddle. Another boulder alignment crosses the ridge at the south end of the saddle, where the slope up to Leila Peak (and the star mound of AS-21-13) begins to rise. The area of the saddle to the north of the trench is about 33 m long and 15 wide, and the area to the south is slightly smaller. Basalt boulders and cobbles are scattered over the
surface of both areas, and some of the basalt is comparatively fine-grained. An adze butt (untyped) as well as a small number of flakes were observed in the northern half of the saddle, but nothing was collected.

Because of the location of the site in relation to the two peaks as well as the star mound, and the presence of the fine-grained basalt, we thought that a quarry area might be somewhere in the vicinity. A brief check did not reveal any such site, but a more thorough investigation of the nearby slopes, especially immediately around the peaks, is recommended for a future investigation.

AS-21-35. This site was found west of star mound site AS-21-13 on a ridge that leads to the peak of Le‘æeno Mt. The site begins on a saddle between Le‘ila peak and Le‘æeno Mt., where there is a long, low, linear mounding of soil running roughly east-west. This linear mound is similar to the walk-ways that have been described for Western Samoa (Green and Davidson 1969a, 1974; Jennings et al. 1980). This "walk-way" leads to the corner of a terrace enclosure which is defined by a boulder wall running east-west and north-south. This wall encloses three terraces, each bounded by bolder walls, and the last of which is backed by a wall that appears to made of boulders piled up against the slope that leads to the top of Le‘æeno Mt. Figure 15 provides a rough sketch of the three terrace area. Time did not allow for a complete survey of the terrace area, which was heavily overgrown, so it was not possible to determine if the walls exhibit closure at the northern end. This site is very large with the combined terrace area of at least 90 by 30 m. This site may represent a maloloa site (a temporary encampment associated with pigeon-catching activities) as described by Buck (1930) (see star mound DISCUSSION) or it may represent inland agricultural terraces or some other type of site with an as of yet unknown function. Only more research and a more complete survey can provide evidence to decide between these hypotheses or any others that may be offered.

AS-21-36. This terrace is the first one located on the trail leading up to the top of the peak north of Le‘ila Mt. It is a sizable terrace with a boulder alignment on the downslope side. There are a few gaps in the alignment, apparently the result of erosion. The terrace measures 10.3 m by 17.2 m. In the center of the terrace is a small foundation with dimensions of 3.8 m by 2.3 m. It has a boulder curb with a rubble fill. One of our Samoan workers identified it as the remains of a small fale o‘o that his neighbors had built to use when working on their plantations. Several flakes were seen scattered about and one triangular preform fragment for a Type VI or perhaps Type VIII adze was noted, but nothing was collected.

AS-21-37. This terrace is quite crude and badly disturbed by pig rooting. There appear to be some rock pilings near large boulders and rock outcrop areas, but these may be natural. A few flakes were found scattered about and an unpolished adze butt was found; none of these artifacts was collected.

AS-21-38. Farther up the ridge slope is a very large terrace measuring about 20 m by 11 m. Though the ferns are very dense and it is difficult to see the ground, a few flakes are present and there is a large amount of basalt rubble scattered on the surface. A core of fine-grained, dark gray basalt was found.
Figure 15. Plan map of AS-21-35. Sketch map only.
AS-21-39. This terrace is just above site AS-21-38. It is a large terrace with a fairly well-intact retaining wall along the stream side and a boulder alignment along the rear (slope side). No tools or flakes were seen.

AS-21-40. This terrace is 15 to 20 m from, and along the same contour as, AS-21-39. Its edges do not appear to be as well made or intact as the previous terrace.

AS-21-41. This site consists of two nearby terraces. The first terrace is smaller than those of the previous two sites. Located on the terrace is a large boulder with three whetstone facets. A number of portable artifacts were collected from the terrace: one Type I or III adze preform, one Class Ia flake tool, one Class III flake tool, and one unusual looking tool, possibly a hand-held chisel. The second terrace is very close, being separated by only a few meters. Two artifacts were found on opposite sides of the terrace but not collected—one thin bifacial tool, possibly a chisel, and one Class I flake tool.

AS-21-42. Farther along the trail is a large terrace with a boulder retaining wall that has collapsed down the slope in places (Fig. 16). Two artifacts were found but not collected—one adze preform butt with a triangular cross-section and one adze measuring 9.5 cm long, 5 cm wide and 3 cm high.

AS-21-43. Located above and southeast of AS-21-42 is a large terrace that measures 17 m north-south by 10.5 m. It has large boulders along the rear, but they are heavily disturbed and it is not possible to tell if they were placed there purposefully or came to that location due to slumping. The terrace is heavily overgrown and has dead trees lying across it, but it is possible to see a general scatter of basalt rubble over the surface.

AS-21-44. This terrace is upslope from and to the south of the terrace at AS-21-43. It is similar to the other terraces, being a roughly arc-shaped feature with an ill-defined rock retaining wall across the front, yet enough of the retaining wall remains to indicate that it was well-made at one time. The terrace measures 16.4 m by 9.3 m.

AS-21-45. Farther upslope is a well-defined terrace that measures 14.8 m long by approximately 9 m wide. Three artifacts were observed but not collected. These are one whole Type I adze, one Type I adze butt, and one chisel.

AS-21-46. This terrace was found a short distance up the trail from AS-21-45, and is similar to but a little larger than that terrace. It measures 20 m by 7.5 m. Lying about the surface are some chunks and flakes of very dark, fine-grained basalt, but nothing was collected.

AS-21-47. This terrace was found on the ridge top between star mound sites AS-21-13 and AS-21-14. It was a medium size terrace with a low retaining wall. A little below that and farther along the ridge top closer to AS-21-14 there are two low, wide walls (really little more than linear piles of basalt) running down the slope for about 20 m, and then arcing to link with each other. What their function was is not at all clear.

AS-21-48. This terrace is located along the slope trail that leads from 'Aca to Sa'iilele. It is just to the west of the trail and is dug into the side of the slope. It is roughly rectangular and measures 5.5 by 4.2 m. The floor
Figure 16. Plan map of site AS-21-42.
consists of a scatter of coral and basalt 'ili'ili. The rear edge of the
coral and basalt floor extends to the slope, which appears to have slumped
onto it. In addition, the back area is heavily disturbed by pig and root
activity. This terrace is likely to have been for a fale o'g'o.

AS-21-49. Also located along the slope trail, this terrace has the remains of
a small fale floor on it. The terrace is 18.5 by 9 m, while the floor
measures about 4.5 by 6.6 m. A boulder alignment bounds the terrace and
another marks the edge of the fale. The floor is primarily defined by a coral
scatter. The terrace's longest axis runs roughly north-south, the front of the
terrace faces east, and the back is to the west, against the slope. The
trail runs across the terrace. Finally, just to the northwest of the floor
and on the northern end of the terrace is a roughly circular outline of rocks
around a slight depression. Two test units were excavated at this terrace;
the results are described below.

AS-21-50. This is a small terrace just to the north of AS-21-49 and along the
trail. It is just to the west of the trail and has a coral scatter indicating
the presence of a fale floor.

Discussion. The excavation potential of these sites is variable. Some
structures are unlikely to be very revealing. Sites where there are
indications of old house floors, and especially where artifacts were found on
the surface, on the other hand, do hold potential for the retrieval of
significant archaeological data. One of these terraces (AS-21-49) was
examined through very limited test excavation (see below).

EAST RIDGE SITES. The "east ridge" designates the slopes and ridge tops
bounding 'Aoe Bay and Valley on the east, and, farther inland, the upland area
lying to the east of Lemafa Saddle. Intensive survey was conducted on the
ridge tops from Lemafa Saddle to the top of Olomoana Mountain, then on a small
ridge extension to the northwest, and on the ridge that extends a short
distance to the north before meeting Afimuao Ridge, which runs to the
northwest until it terminates at Solo Point on the coast. Along with a
scattering of star mounds, there were two sets of sites; a series of terraces
centered on Olomoana, and a series of residential and recent military features
on lower Afimuao Ridge. Very little survey was carried out on the slopes. We
did briefly examine an area of slope in the southeast corner of the
valley—above AS-21-5, Locality 14—where we were shown a set of terraces by
Mr. Fia Tiapula. We did not have time to record these (AS-21-54 through -60)
in detail, and the locations shown (Fig. 5) and measurements given are
approximations. These features were not part of an identifiable cluster, so
separate site numbers have been assigned. Another area of the lower east
slope—south of Puna Stream—was examined but no archaeological sites were
found.

AS-21-4. This site was initially reported by Buck (1930:322), later recorded
by Kikuchi (1963:55), and assigned a site number by Clark (1980:51). Buck
wrote that at some unspecified time in the past, a local chief frequently
climbed Olomoana Mountain because of the magnificent view that it offers.
Each trip, the chief had an accompanying guard bring stones that were then
piled at the summit. These stones represented the mementos of the trips and
at the same time provided a supply of sling stones in case of attack. Kikuchi
(who reported this site as T-85) added that his informants identified the
chief as Tui-sa-ona or Tu-sa-ole, and said that he lived on Tapepe Ridge, inland of Aalo.

During our survey of Olomona Mountain and associated ridges, we located a pile of stones near the peak. It is located on a terrace (Feature 7) of site AS-21-51, just on the slope edge, and appears to be slightly collapsed. The pile measures 2.7 m by 2.2 m and is about 0.15 m high. While we cannot be absolutely certain, we believe this pile to be the reported commemorative heap. First, while it is not located at the very summit of Olomona, where Buck places it, it is very near the summit. Furthermore, there is no pile of stones located at the summit or anywhere else on the nearby ridge tops. Second, the stones have clearly been in place for a long time, as indicated by the moss growth on them. Third, the stones are generally of a size that could have been used for sling stones, and they appear to be highly weathered if not waterworn. And finally, this pile does not appear to be related to any of the other features in this vicinity (see site AS-21-50), and we know of no function that it could have served. While this is an interesting cultural feature, it is not likely to yield important historic or prehistoric data.

AS-21-51. This site consists of a complex of features situated immediately around Olomona peak. These features of this Olomona Complex consist of a series of twelve terraces and two probable military features. Site AS-21-4 is also situated in the midst of this complex.

The first terrace (Feature 1) that we encountered was on the west side of Olomona peak. It is about 18 m in length and 9 m wide. There are a few boulders at the rear, which may indicate the floor edge. The surface of the terrace is relatively flat and there is a scatter of basalt pebbles and cobbles on the surface; roughly 5% to 10% of these stones appear to be waterworn. No artifacts were found. There is a possible entrance-way with boulders on both sides and downsloping at the west side. It measures 0.8 m wide by 12 m long. It may be an entrance from an old trail along the ridge. There are two depressions on the north side of this terrace and another on the south side. It was not possible to determine their nature.

The actual peak of Olomona Mountain constitutes the second terrace (Feature 2). No cultural remains were found on the peak (other than a survey marker), but the top was relatively flat, almost as if it had been leveled. Directly to the east of the peak are a total of nine additional terraces. Three of the terraces (Features 3, 4, and 5) run down the slope from the peak until one reaches a secondary peak, which also appears to have a terrace (Feature 6) on it.

Below the secondary peak (Feature 6) is a seventh terrace (Feature 7). On the northeast corner of the terrace is AS-21-4. On the southeast corner of Feature 7 (opposite AS-21-4) is a rectangular area that is cut into the bottom of the secondary peak (Feature 8). It is about 1.6 by 0.8 m, and from the top of the back wall it measures about 1 m deep. The bottom is filled with decaying vegetation, while the back is a rock outcrop. It is very similar to rectangular features at what are clearly World War II military sites (see sites AS-21-24 and AS-21-52). It is also very similar to a rectangular feature found on Feature 12 (described below). A tentative identification would be that they were somehow part of military emplacements on the mountain during World War II.
The next terrace (Feature 9) is just below Feature 7. It is a flattened area with a scatter of pebbles and cobbles—some of the pebbles appear to be waterworn. A worked cobbler with damage on the end was found and collected. This artifact is a cobbler hammerstone/chisel and is unlike any other tool found thus far in eastern Tutuila. The terrace measures 11 m by 7.5 m. The slope angles down for about 2 m before meeting the level ground of the Feature 10 terrace. Feature 10 is about 9 by 4 m in size. Continuing down the slope there were two additional terraces—Features 11 and 12—both of which are slightly smaller than Feature 10.

The terrace of Feature 13 is found on the north ridge of OloMoana mountain, just north of and below the terraces of Features 3, 4, 5, and 6. This is also the location of a second rectangular cut into the slope side. It measures 3.5 by 1.2 m, and the depth at the back is 1.3 m. As noted above, this rectangular feature and a similar one at Feature 8 are most likely some type of World War II military emplacements.

The military features aside, the function of the terraces at this complex is not known. They may have served as agricultural features, the residential terraces of a refuge site, or the bases for the temporary habitation of a malolona (see the star mound DISCUSSION below). Since agricultural terracing was not a common custom, the latter two alternatives seem the most likely. It is quite possible that the same set of features served both functions. Differentiating these functions through excavation will be difficult, but it would be an important undertaking if we are to fully understand prehistoric Samoan settlement pattern.

AS-21-52. This site is located at the northern end of Afiimuao Ridge, overlooking Solo Point. The site consists of 9 features. The first is an oval to kidney-shaped pit located at the farthest end of the ridge just before it drops off to Solo Point. The pit was dug into the ridge and built up with soil and concrete. It appears that the concrete walls were constructed by stacking burlap bags filled with soil and then pouring concrete over them. The crumbing south wall had the appearance of a honeycomb-like pattern. In addition, on the southeast portion of the wall there was a piece of concrete with the letters "G.W.S. USMC", which quite probably stand for the initials of an individual and United States Marine Corps. This pit is 4 m long and 2.3 m wide at the widest point. A trail leads to the "entrance" on the east, which is 1.4 m wide, but the end at the west side is about 0.9 m wide. The slope drops steeply on the north and west sides while rising sharply to the south.

Behind this feature and on the east side of the ridge about 4.9 m away is a rectangular pit that is cut into the ridge (Feature 2). It is 3 m long by 2.6 m wide. It is very similar to the rectangular features found at sites AS-21-24 and AS-21-51.

Another group of associated features is just up the ridge to the south, on a topographic high point that is roughly oval and measures 12.7 by 20.7 m. At the northeast corner of this physiographic feature is a second pit (Feature 3) that is roughly rectangular, 2.6 m long, 2.3 m wide at the south end, and 0.8 m wide at the north end. At the northwest corner of the ridge-top area is a second pit-like structure (Feature 4) that is roughly square and about 0.9 m deep. This pit is lined with concrete and has a descending ramp-like entrance at the south end. The pit measures 2.4 by 2.4 m with the entrance extending an additional 1.2 m out to the south.
Two other features on this ridge top are two narrow L-shaped trenches (Features 5 and 6). One of them is at the southeast corner of the ridge top, 6.1 m from the rectangular pit. The north-south leg is 2 m long, and the east-west extension is 2.1 m long. The second trench is kitty-corner to the first and 11.9 m to the southwest. The north-south segment is 2.3 m long while the east-west arm is 2 m long. To the northeast of this trench is a small piece of window screen. Both trenches are roughly 0.35 m wide and 0.4 m deep.

Off of the topographic high point and down the slope about 10 m south of the second L-shaped trench is a well-like pit (Feature 7). It is circular, 1.5 m in diameter, and about 2.4 m deep. There is a large piece of non-descript metal at the bottom.

About 50 m down the ridge to the south are two pits. One (Feature 8) is located on the west side of the ridge, is nearly circular in shape, and is about 1.5 m in diameter and 0.6 m deep. The other (Feature 9) is on the east side of the ridge, roughly oval, and measures 2.7 by 3.4 m, and is 1.5 m deep. No artifacts or concrete were seen.

This site appears to be entirely military in origin. The pits are likely to be defensive emplacements or storage features. The L-shaped trenches are too narrow for people and material storage. The presence of screen suggests that these trenches may have been dug to secure gravel for making concrete. This digging and screening for concrete mixing at construction sites is common in the islands. This site holds no potential for providing information on traditional Samoan culture, but made be informative on matters of military history.

**AS-21-53.** This site is located on Afimuaq ridge. It begins just above a saddle area at 74.4 m (244 ft) in elevation and continues up the ridge to approximately 95 m (312 ft) in elevation. A trail runs across the saddle and we were told that it is an old trail that runs between 'Aoa and Onoae. The trail is shown on the USGS topographic map (1963). The site consists of four features.

The first feature is a wide, irregularly shaped paepae with a fale foundation on the top (Fig. 17). It is located on the north side of the trail that runs across the saddle. The paepae has an arm-like projection, partitioned by a rock alignment, on the northwest corner. One of the Samoan workers suggested that it may have been a shower area. The structure is fairly recent. This is indicated by the near absence of vegetation growing on the paepae, and the presence of a large number of fruit tree growing nearby (limes, mango, a guava, and coconut trees). Also, modern artifacts (beer bottles, a comb, old slippers, and a rusted tin cup) were found scattered about, but no stone or shell artifacts were present. And, there are still obvious depressions in the fale foundation where the posts of the structure had been located.

The second feature is just across the saddle and trail. It appears to be a fale floor but there is no accompanying paepae. It is roughly oval and measures 8.1 m east-west by 4.5 m. The bevel end of a Type VI adze was collected from this feature.
Figure 17. Plan map of site AS-21-53.
Just up the ridge to the south of Feature 2 is the outline of an umu structure (Feature 3). It is oval in shape and measures 4.5 (east-west) by 2.4 m. In the west half of the structure is a depression with burnt and cracked rock as well as charcoal. The surface presence of charcoal indicates that it is a relatively recent structure.

Farther upslope is a very flat area where Feature 4 is located. It is a heavily disturbed fale foundation located on top of a roughly rectangular paepae. The fale floor measures 6.4 by 5.5 m while the paepae measures 7.4 by 7.6 m. The longest axis of both the fale and paepae is roughly east-west. This structure appears to be older than the other structures at the site. This assessment is based on the fact that the structure is both heavily overgrown with vegetation and badly disturbed.

AS-21-54. Located on the lower east slope, this is a small terrace with a comparatively well-made retaining wall. It is located on the talus where the slope is not very steep. The terrace is roughly 15 m by 4 m in size and was probably used as a fale o'o. No artifacts were present.

AS-21-55. As the Laaulu Stream cuts into the east slope, a small waterfall is created at the point at which the slope starts to become steep. On the east side of the stream, at the base of the waterfall, is a small terrace. A very large and very old tree is growing on, and has partially disturbed, the terrace. This may have been a house terrace, but may also have been for a fale o'o. No artifacts were seen at the site.

AS-21-56. The grass and other vegetation on this section of the lower east slope was quite thick and prevented definitive identifications and measurements of features. This site is a probable terrace that appears to be similar in shape and general size to the terraces found on the west slope of the valley. The ground at this point arcs out and provides a flat surface. Whether this provided the basis for a house, a fale o'o, or a planting area could not be determined.

AS-21-57. This feature is similar to and near AS-21-56. It is marked by a projection out from the slope and a flatten ground surface.

AS-21-58. This is very similar to and in the vicinity of the two features just noted. Again, vegetation cover made it difficult to precisely define the edges of the feature.

AS-21-59. On a prominent point of a small ridge that projects into the eastern lobe of the valley sits another terrace. This one is identifiable as a foundation feature and may well have been for a house. No surface scatter of artifacts or midden was present, although the vegetation cover largely obscured our view of the surface.

AS-21-60. Located on the ridge a short distance downslope from AS-21-59 is another clearly identifiable terrace. This one is in a plantation area so the visibility was much improved, yet no artifacts or midden were observed. At its maximum, the flatten area of the terrace measures 13.4 m by 8.8 m. This provided the base for a house site. Of all the terraces on this portion of the valley slope, this site is the most promising for excavation.
AS-21-61. This site is found on Afimuao Ridge. It is over 50 m up the ridge from AS-21-53 and at an elevation of 139 m (456 ft). This structure is heavily overgrown and consists of a fale foundation on top of a paepae. The fale floor is oval and measures 8.2 by 5.4 m. The outside paepae wall is 11.1 m by 10.9 m. No artifacts were found.

The features at this site were constructed at different points in time, as indicated by the differential disturbances, vegetation covers, and associated artifacts. Yet none of them appears to be extremely old. Indeed, we suspect that at the earliest, the oldest features may date to the late prehistoric period. Excavations at Features 2, 4, and 5 may yield important data on the time and nature of the occupation of this area.

Discussion. Excavations at many of the features described above are necessary before we can reasonably assess their nature and significance. The purpose of most of the features at the Olomana Complex is unknown; a determination of the function of these features would contribute significantly to our understanding of past inland land use in Samoa. Some of the ridge and slope features are clearly residential and probably prehistoric, although late prehistoric. Excavations at such features may prove rewarding. Other terraces could be either agricultural or residential—only through excavations will their functions be determined. The military features are of little value for historic preservation, as is the recent house site.

Excavations

Test excavations were carried out at two sites, both in the 'Aoa area. One site (AS-21-49) is a ridge slope terrace, which, of all the sites of this type, provided the best indications of residential function. The other site (AS-21-5, Locality 2) is on the valley floor and yielded pottery. In each case, our efforts were generally directed at better understanding the nature of the site, at ascertaining its age, and at determining the potential for expanded excavation. The greatest effort was expended at site AS-21-5 since it, on the basis of surface artifacts, clearly was quite early, and it also held the best potential for providing data on geomorphological change in the valley. Detailed discussions of both sites are given below, beginning with AS-21-5.

AS-21-5, LOCALITY 2

A strategy used in our survey was to closely examine stream banks for cultural deposits, and stream beds and mouths for artifacts eroded from buried deposits. In the early days of our survey we found a scattering of pottery sherds and a few basalt artifacts in the inland portion of Puna Stream. From the stream bed we collected 19 sherds, 2 adze fragments (a Type I and a probable Type V), and 1 flake tool (Class X), and later, from a cleaning of the the bank, 2 more sherds, 1 informal flake tool, and 19 basalt waste flakes were added. This was clearly a site of early occupation, and was designated Locality 2 of site AS-21-5.
Locality 2 is situated on land controlled by High Talking Chief Tana Olohuwa, who graciously permitted us to excavate there (see Fig. 6). The land is largely in banana plantation. Immediately to the west of the site area is a patch of low ground that supports a luxuriant cover of elephant grass. This and much of the area to the northwest and southwest had previously been even lower but was subject to bulldozing for infilling some 20-30 years ago. Many of the modern structures in this vicinity—some of the houses, the road, and the LMS church—were built on the filled land surface.

It was at about the same time as the infilling that the present stream channel was cut. According to local residents, from shortly beyond where the Puna Stream enters the valley floor, the system is actually an artificial channel that was dug in order to divert water from its old route through the center of the village to its new path behind and then west of the village. Even today, during periods of heavy rain, the surface runoff tends to follow the old, original route (see Fig. 6).

To the east of the elephant grass patch, the ground rises slowly for the first 42 m or so, then the slope quickly rises before nearly leveling off some 12 m beyond. The base of the valley-forming ridge is met nearly 80 m farther to the east. Approximately 54 m to the south of the stream is a dirt drive and a few houses that stand at the base of the ridge. While no houses are currently at the center of the site, there is an old concrete slab in the east-central area that once provided the foundation for a house. This structure is shown on aerial-photo maps from the 1950s. The large house of the LMS minister stands about 10.5 m to the north of the stream.

Excavation at this site was directed by Jeffrey Clark. The specific goals for the test excavations at this site were quite simple. First, we sought to recover in situ ceramics to conclusively demonstrate that at least one of the dark soil layers revealed in the stream bank profile were pottery bearing. Second, we wished to collect a larger sample of sherds and other artifacts, from a controlled context, so as to better assess the nature of the site. And third, we hoped to recover charcoal samples adequate for radiocarbon dating.

A datum point was established in the west-central area of the site at a previously marked coring station (CT3-0). From there, we used a grid system to establish three test units. These units were all situated in the western portion of the site because there the overburden of soil is only 20 to 30 cm thick. Given the slope to the east, however, the overburden quickly increases to over 1 m in thickness. Since the abandonment of the site, therefore, the colluvium build-up has been quite extensive over most of the area.

Excavations were carried out in one meter squares that were designated according to their southwest corners. Two units were located south of the stream (1S,1E; 7S,2E), and one to the north (12N,4E). Excavations were carried out in arbitrary 10 cm levels within larger soil layers. When a new layer was encountered, the level was terminated, regardless of its thickness. Soil layers, marked primarily by color change, were designated by Roman numerals and levels with Arabic numbers. Subsurface features were numbered sequentially throughout the site. Soil was screened through one-quarter inch mesh hardware cloth. Due to the high clay content of the soil, dry screening was a very slow process. Consequently, after the first day we secured water
hoses, attached them to spickets at nearby houses, and water screened thereafter. Water screening was an immense time-saver and greatly improved visibility in sorting screen contents. A tabulation of all artifacts collected from the locality is provided by Table 3, below. A summary of artifacts is given with the discussion of each unit layer, while typological definitions and general artifact summaries are provided in the Artifacts section below.

**Stream Cut Profile**

The cross-section revealed in the stream bank was far more complex than seen in the excavation units. Profile views were drawn of an eastern (complex) and a western (simple) section, which are separated by some 6.5 m (Fig. 18).

**STRATIGRAPHY.** The following soil descriptions are based on field assessments only; no detailed lab analyses were carried out.

**Layer I.** This is overburden that increases in thickness to the east, toward the ridge. It is a very dark grayish brown (10YR3/2) loam to clay loam, with abundant gravel inclusions. Other than some recent garbage in the upper several centimeters, there is no clear indication of cultural deposit. Since this layer appears not to contain prehistoric deposit, and because sublayers were difficult to precisely distinguish, Layer I lumps as a single unit some internal layering that is not illustrated in Figure 18. Since these sublayers represent depositional processes that took place after the abandonment of the prehistoric occupation at the site, we did not devote much time to sorting out these layers. The subdivisions that are described below were defined from a single vertical column (point A on Fig. 18).

Ia—This is essentially the A horizon. It is a dark brown (10YR3/3) loam with a gravel content at around 25% but which diminishes markedly to the west to around 5-10% at the beginning of the profile.

Ib—This is lighter in color (10YR4/3) but the gravel percentage is very high at about 30-50%. At vertical point A, the layer is about 30 cm thick, but it narrows to the west and eventually lenses out.

Ic—This sublayer is darker in color (10YR3/2), the gravel content is dramatically reduced to less than 10%, the gravel is smaller, and the silt content seems to be greater. It is generally about 15-20 cm thick.

Id—This sublayer is very similar to Ib in color and gravel content but not quite as thick at 15 to 20 cm.

Ie—This is comparable to Ic but gets slightly thicker to the west.

If—Similar to Ib and Id, this sublayer is found only west of the 19 m mark of the profile.

**Layer II.** This layer contains cultural materials. It is discontinuous, with the eastern portion separated from the western portion. The eastern segment begins at about 13 m from the west end of the profile section and expands to the east. The layer varies considerably in thickness, ranging from 30 cm to not present at all. The loam of this layer is darkly stained by charcoal, making it black (10YR2/1) in color. Gravel is present at about 15%. Five features (Features 1-5) are associated with this layer.

**Layer III.** The soil of this layer is a very dark grayish brown (10YR3/2) loam. The thickness is generally 10-20 cm, but reaches an extreme of 45 cm. A heavy gravel content (ca. 30%) is characteristic of this layer, although the
Figure 18. Profile of Puna Stream bank at AS-21-5, Locality 2: (a) full view of bank with stipple cultural layer, (b) detail of two portions of the eastern section, (c) detail of the western section.
area designated as IIIb has a reduced amount (ca. 20%). Only one feature (#6) is associated with this layer. No other indicators of cultural activity were present, suggesting that human activity was minimal during the formation of this layer.

Layer IV. This is a very dark grayish brown (10YR3/2), fine-grained loam to silt loam. It is distinguishable largely on the basis of the near absence (ca. 1%) of gravel. Also, there is no charcoal staining or other obvious indicators of cultural activity. The layer is thin (2 to 8 cm), averaging only about 5 cm in thickness.

Layer V. This is an easily identifiable cultural layer because of the charcoal staining and scattered bits of charcoal. It is very dark brown (10YR2/2) loam that is generally about 10 cm thick. Gravel is rare, occurring at a proportion of only about 1%. This layer fades to the west, eventually becoming indistinguishable. To the east, however, it continues for many more meters before we lost it in the stream bed. One pottery sherd was found in the wall. Four features (7-10) are associated with this layer. In the vicinity of Feature 8, there are a couple of small patches of dark grayish brown (10YR4/2) ashy soil and several pieces of charcoal.

Layer VI. This is a very dark grayish brown (10YR3/2) to dark brown (7.5YR3/2) clay loam. Tiny bits of charcoal are present in the upper, darker portion of the layer, which is designated VIa. The lower portion of the layer, VIB, contains little trace of charcoal, is slightly lighter in color, but otherwise the same as the upper; no distinct interface separates the two sublayers. Concentrations of charcoal bits occurred at a couple of locations, identified as VIC, but the lack of distinct boundaries prohibited the assignment of a feature designation. The base of this layer could not be determined because of the frequent stream flow, but at one location the thickness was found to be at least 50 cm. A pottery sherd was recovered from the wall near the bed of the stream (VIB).

FEATURES. A total of 10 features were observed in the wall profile. Determinations of feature dimensions and functions are based solely on their cross-section appearances.

Feature 1: This is a fire pit that begins at or near the top of Layer II. It measures nearly 1 m across and is distinguished by black (7.5YR2/0) soil with scattered bits of charcoal. A burned rock lies at the base of the pit.

Feature 2: This is an apparent postmold that measures 17 cm across and at least 18 cm deep. The feature soil is the same as that of Layer II, and the feature extends from the base of Layer II into Layer V, at which point its bottom cannot be clearly distinguished.

Feature 3: This is a large apparent postmold that is 36 cm across at the top and 42 cm deep. The fill is similar to Layer II and gravel occurs at about 30%. The feature begins in Layer II, cuts through Feature 4, Layer V, and into Layer VI.

Feature 4: This appears to be the remnant of a small basin that probably served as a fire pit. The soil is very dark gray (10YR3/1) and appears to
have a high ash content. The feature begins at the base of Layer II and is
disturbed by Feature 3 which cuts through it.

**Feature 5:** This pit looks to be the remains of a small earth oven. It
measures 79 cm across the top by 35 cm at its maximum depth. The soil fill is
very dark gray (10YR3/1) and several stones are located along the base of the
pit. A few scattered bits of charcoal were observed in the fill. The top of
the feature lies at the base of Layer II.

**Feature 6:** This is a small basin-shaped fire pit located in the lower
portion of Layer III. It is 53 cm long by more than 15 cm deep. The soil is
slightly darker than the surrounding matrix due to charcoal staining.

**Feature 7:** This is a small (or perhaps end portion) earth oven with
vertical side-walls. It measures 63 cm across by 40 cm deep. The fill is
very dark gray (10YR3/1) loam that includes many stones that range from 4 to
nearly 20 cm across. Several of the stones show clear signs of having been
heated, and a few pieces of charcoal could be seen in the fill. The top of
the feature lies in the lower portion of Layer V. Eighteen basalt flakes were
recovered from this feature while cleaning the wall face.

**Feature 8:** This is a small pit of unknown function that begins at the
base of Layer V. The soil fill is lighter in color and contains less charcoal
than the Layer V soil, but is darker than the surrounding Layer VI soil. It
measures 34 cm across by 17 cm deep.

**Feature 9:** This is a fireplace. The eastern edge is disturbed by
Feature 7 and the western end is cut off by Feature 8. What remains measures
70 cm long by 14 cm deep. The fill consists largely of fire-reddened (dark
brown, 7.5YR3/2) loam to clay loam, with several lenses of ash and many small
pieces of charcoal. The basal lens is an oxidized, dark reddish brown
(5YR3/3) clay loam, that grades into the underlying Layer VI.

**Feature 10:** This fireplace is 140 cm long and 22 cm thick. The fill
contains multiple lenses of oxidized soil, ash, and charcoal, indicating that
the feature was used repeatedly. The top of the feature is found in the lower
portion of Layer V.

**INTERPRETATION.** While Layer I has no direct bearing on the cultural
deposit, it may be instructive for understanding local soil formation
processes. The sublayers with abundant large gravel would appear to represent
rapid deposition, probably of colluvium from the nearby valley ridges.
Whether each of those layers was formed by a single slumping event or from a
series of smaller events over a short period of time is not known.

Sublayers 1c and 1d represent a very different formation process. The
low proportion of gravel, the small gravel particle size, the fine sediments,
and the darker soil color all suggest that these may be buried A horizons. If
that is the case, they represent periods of time during which geomorphological
conditions were relatively stable.

From Layer IV down, gravel is comparatively sparse and sediments are
medium to fine grained. This may well represent a long period of
geomorphological stability and slow soil deposition. The onset of colluvial
buildup evidenced in upper layers may be the result of intensified alteration of the environment. Vegetation clearing along the slopes would lead to accelerated slope wash and periodic slumping.

Turning to the cultural layers and features, the postmolds of Layer II indicate that a structure stood there, and the size of Feature 3 suggests that the structure was of considerable size. The dark staining, two fireplaces, and one oven of Layer V in the far east end of the profile indicate that this area was a focus of cooking activities. The light color, absence of features, and apparent scarcity of artifacts and midden in Layers III and IV suggest that the residential focus at the site was elsewhere. Abandonment of the site during the time of the deposition of these layers is possible but seems unlikely. Human habitation is indicated for Layer VI, but again the center of residential activity may have been elsewhere. Layers V and VI date to the ceramic period of Samoan prehistory; some of the upper layers may also date to that time but that has not been demonstrated.

**Unit 12N.4F**

This unit—located north of the stream—was established to determine how far to the north the cultural deposit extended. The results of our work in this unit were not very rewarding.

**Stratigraphy.** Only two layers were encountered and the interface between them was not very distinct.

**Layer I.** This is a very dark gray (10YR3/1), slightly sandy loam that ranges in thickness from 10 to 14 cm. Very pale brown (10YR8/3) sand particles are visible in the soil and are more common in the upper portion of the layer. Bits of charcoal are common in the layer, but more so in the upper several centimeters.

Cultural materials collected from this layer consist of recent trash, including numerous pieces of metal (ring pull-tabs, nails, bottle tops, etc.), glass (mostly bottle), pieces of plastic, ribbon, marine shells, and assorted other recent items.

**Layer II.** While this very dark-grayish brown (10YR3/2) soil is generally lighter in color than Layer I, the change is rather gradual. The more distinctive characteristics of the layer are the absence of sand, the noticeable diminution of charcoal bits, and the pronounced increase in the occurrence of gravel (about 10-15%). Because of the scarcity of artifacts, at 60 cm below surface (or, bs) excavations were restricted to the southeast quadrant. At 145 cm, the soil is very compact and rocky, but by that point in our excavations there was several centimeters of standing water from ground seepage so we could not precisely determine the nature of this new layer.

The only artifacts recovered are 6 basalt waste flakes, all with striking platforms and bulbs of percussion. Four of these came from the upper portion of the layer (15 to 60 cm bs) and two flakes came from between 60 and 80 cm bs.

**Interpretations.** It now appears that there was some disturbance at this location by the same bulldozing that took place in preparation for the construction of the nearby LMS Church. Layer I in particular is probably the
result of that recent activity. This disturbance does not appear to have extended across the stream. The cultural layers observed in the other units and the stream profile are not identifiable in this unit. The few flakes and occasional piece of charcoal indicate some human activity, but that activity was focused elsewhere. The fact that the area to the west and north was low and required in-filling for church construction, and the absence of a clear cultural layer comparable to that found several meters to the south, suggest that the area of 12N,4E was on the northern margin of the occupation zone. If that is indeed the case, then it seems likely that the old shoreline was not too much farther to the north (see the Coring section below).

Unit 1S,1E

This unit was established in an area of flat ground and where, on the basis of the stream profile, the overburden was likely to be comparatively thin. The stratigraphy was more complex here than in the other units and interpretations were further hindered by several land crab holes.

**Stratigraphy.** The stratigraphy of 1S,1E was the most complex of three units (Fig. 19, below). Five layers and three features were encountered.

**Layer I.** This layer consists of relatively recent overburden. It is a very dark grayish brown (10YR 3/2) loam. Gravel, at approximately 5%, is less common than in Layer I of unit 7S,2E, and the sand seen in unit 12N,4E is not present. The layer is generally about 20 cm thick, but ranges between 14 and 25 cm. Below the top 10 cm, the soil is slightly more compact and slightly darker in color. Charcoal bits are common in the upper few centimeters, then scarce, and then more common in the lowest few centimeters.

The only artifacts recovered were items of recent garbage (various metal objects, glass, and plastic) that were scattered on the surface and in the top few centimeters.

**Layer II.** The soil of this layer is black (7.5YR 2/0) loam that ranges from 8 to 20 cm in thickness, but most commonly falls between 10 and 15 cm. The gravel content is about the same as above, but a few large cobbles are also present. This is clearly a layer associated with burning, as evidenced by the dark staining, abundant bits of charcoal, and numerous pieces of fire-cracked basalt (all quite small and probably from pebbles and cobbles). There are also several concentrations of charcoal. Charcoal samples for radiocarbon dating were collected at 26, 30, and 37 cm below the surface, but the age determinations are not yet available. Disturbance from land crabs is evident. Whether the burning represented by this layer was simply of vegetation from land clearing, the burning of a structure, or the fires associated with a cook house could not be firmly established, although we find the latter to be most likely.

Cultural activity is represented by the indigenous artifacts collected from the layer. A broken Type I adze was found near the top of the layer and a possible informal flake tool was also recovered. Small pieces of plastic and metal were recovered that suggest that this layer may date to the historic period, but we think it far more likely that these materials were brought down by crab disturbances and that the layer is prehistoric in age. At the same time, the absence of pottery and obsidian suggests that the layer dates to the
post-ceramic period. The only midden material recovered consists of a single fragment of sea urchin shell.

Layer III. This layer is a very dark grayish brown to dark brown (10YR3/2-3/3) clay loam. The gravel content is about 5% and occasional charcoal flecks are present. The thickness of the layer is generally between 20 and 25 cm, although it narrows to only 10 cm in some spots. Land crab disturbances created some difficulty in following out this layer.

Artifacts collected in the layer are limited to 1 pottery sherd and 35 basalt flakes. Four of the flakes are decortication flakes and the remainder are simple reduction flakes (see Artifacts, below). We suspect that the single sherd may be the result of disturbance, and that this layer is likely to date to the post-ceramic period.

Layer IV. The soil of this layer is dark brown (7.5YR3/2) silty clay loam with a gravel content of approximately 5%. Land crab disturbance was again clearly evident. The thickness of this layer ranged from 25 to 40 cm.

Artifacts are noticeably fewer, being limited to 2 sherds and 4 basalt reduction flakes. The low sherd count may again be a reflection of disturbance rather than pottery use—compare with Layer V and with unit 7S,2E, Layer III—especially given the absence of obsidian. Our suspicion, however, is that Layer IV is a ceramic period deposit even though ceramics are not well represented.

Layer V. This layer consists of very dark brown (10YR2/2) clay loam with a gravel content of around 3% or less. Beginning at about 90 cm bs, the layer was initially differentiated from Layer IV on the basis of the darker color, decreased gravel content, and higher occurrence of bits of charcoal. With excavation, it was also seen that artifacts were more abundant as well. Due to time limitations, we restricted our excavation of this layer to the east half of the unit for the first 20 cm, then had to further restrict digging to the southeast quad below 110 cm bs. The last 20 cm dug were below the water line. Obsidian and pottery were still being recovered, but due to water seepage and the close of the project, we were forced to terminate excavations at 140 cm bs. The layer thickness stands at something greater than 45 cm.

Artifacts recovered from Layer V include 1 adze fragment, 17 basalt flakes, and 9 flakes and 2 possible cores (one questionable) of obsidian. The adze fragment has triangular cross-section and the shoulder index (111) suggests that it was of the Type VI variety. Also recovered were 9 pottery sherds. Seven of these are thin and fine tempered, one is thick and coarse tempered, and one is only moderately thick and coarse tempered. This was the only layer of unit 15,1E that produced obsidian, and it also yielded the highest pottery count.

FEATURES. Three features were identified in this unit, all in the southeast corner. The fills of these are generally similar in appearance and the overlapping nature of the features made their differentiation difficult during excavation. Furthermore, an apparent land crab disturbance in the midst of the features further complicated interpretation.

Feature 11. This feature was excavated as part of Feature 13 and only distinguished as a separate feature when seen in the east wall profile. It
consists of a lens of black (10YR2/1), gravelly loam with a noticeable ash content, and includes a probable post-mold indicated by very dark soil containing a few pebbles. The post depression cuts through the northern edge of the earlier pit of Feature 13. It was differentiated from Feature 13 on the basis of darker color and finer textured soil. The feature lies at the top of and cuts through Layer III. The darkness of the soil, the ash, and the scattered bits of charcoal (all very small) provide evidence of a fire. This may have been the area of a cookhouse or perhaps the location of a structure that burned. The absence of reddened soil and large pieces of charcoal argue against the latter alternative.

**Feature 12.** This feature is a shallow basin that extends some 25 cm into the unit from the south. It lies between Layers III and IV, and cuts into the top of Layer IV. Although difficult to discern, it appears that the eastern edge is cut by Feature 13. The soil is black (10YR2/1) clay loam with bits of charcoal scattered throughout. A sample of charcoal was collected from one concentration for radiocarbon dating but the result is not yet available. A single basalt flake was recovered from the feature fill.

**Feature 13.** This is a fire-pit or earth oven that extends nearly 50 cm into the unit from the east wall. The fill is very similar to the other two features, although not quite as dark in color and more gravelly. A few rocks were located at or near the bottom of the basin. Some of these were noticeably reddened from fire and pieces of fire-cracked, waterworn stones were noted during screening. Small bits of charcoal are scattered throughout the fill. Two basalt flakes and a pottery sherd were recovered from the feature.

**INTERPRETATION.** The stratigraphy of this unit was the most difficult to follow in excavation and to interpret. Not only were there more layers to contend with, but the presence of features and land crab disturbances, in an area of only one square meter, added further complications. The features, charcoal staining, scattered bits of charcoal, and comparatively abundant pieces of fire-cracked stone scattered through the layers suggest that this was an area of cooking activity during the times of the deposition of Layers II and III. Layers IV and V provide clear evidence of occupation in the immediate vicinity, but they do not constitute deposits of any discrete house floors.

The total of 109 artifacts produced by this unit is well above that for 12N,4E, but substantially below the total for 7S,2E. The 13 pottery sherds from this unit constitute only 12.4% of the total from the site. Layers II and III both yielded basalt debitage quantities substantially below what was found in 7S,2E, but higher than in Layers I and V. In Layer V, however, the presence of pottery and obsidian more than compensates for the drop in basalt, so that Layer V produced more artifacts than any other layer of the unit. A breakdown of basalt debitage by type and size is presented in the Artifacts section.

**Unit 7S,2E**

This unit was located where the ground surface sloped slightly upward to the east. As expected, the layer of overburden was slightly thicker than at 18,1E.
STRATIGRAPHY. The stratigraphy in this unit was rather straightforward (Fig. 20). While the cultural layers were not as dark in color and lacked features, they yielded higher artifact counts than 1S, 1E.

Layer I. This layer of gravelly loam consists of two sublayers. The distinction between these sublayers was not easily made and could best be seen in the wall section in all but the north wall.

Ia--This is a very dark grayish brown (10YR3/2) gravelly loam with a gravel proportion at about 20%. It ranges in thickness from 15 to 40 cm. In order to save time, we began this layer by screening only 25% of the soil. In the third level (20-30 cm bs) we recovered a basalt flake and from thereafter screened 100% of the soil. Several pieces of metal and plastic were recovered from the top few centimeters and a piece of glass came from level 3. Small pieces of carbonized organic matter were scattered through the sublayer.

Ib--This sublayer is similar to Ia but is slightly lighter in color (tending toward dark grayish brown, 10YR4/2) and has a higher gravel content (ca. 30%). The gravel is also larger in particle size. The thickness varies from 9 to 16 cm. In this portion of Layer I, we collected 13 basalt flakes, 4 of which had multiple dorsal flake scars indicating that they were from the late stages of tool reduction, or from tool reworking.

Layer II. This is a very dark gray (10YR3/1) clay loam that ranges in thickness from 21 to 38 cm. Gravel is present at about 10-15%, but is noticeably less common than in the upper layer. A lens of very dark grayish brown (10YR3/2) soil, 8 cm thick at maximum, extends into into the middle of the layer, but its meaning is not known. Bits and pieces of charcoal are lightly scattered through the layer, and we also recovered a couple of small pieces of carbonized organic material that appear to be coconut shell.

This layer is comparatively rich in artifacts, yielding 28 pottery sherds, 5 obsidian flakes, 2 basalt flake tools (both Class IX), and 227 basalt waste flakes. Of this latter group, 12 (5.3%) are primary decortication flakes, 5 (2.2%) are secondary decortication flakes, and 198 (87.2%) are reduction flakes. An additional 12 (5.3%) flakes have areas of polish indicating that they were detached from tools. Furthermore, at least 43 (18.9%) of the reduction flakes have multiple flake scars on the dorsal surface, which suggests detachment late in the tool making process or during the reworking of a tool.

Layer III. This is a very dark grayish brown (10YR3/2) clay loam. The gravel proportion is further reduced to around 3%, and the size of the particles is reduced as well. A large lens--sublayer IIIa--protrudes into the unit from the southeast. It is a clay loam, but the clay content is higher than in the surrounding soil. The gravel content is also higher (about 7-10%) and the particles larger. The dark brown (7.5YR3/2) soil also has a slightly redder tint than the surrounding matrix. This intrusion is thick, but lenses out approximately half-way into the unit.

Because of time limitations, we were forced to restrict our excavation to the northwest quad once we reached 100 cm bs. By so doing, we had hoped to be able to reach the base of the cultural deposit. Although the last 10 cm level dug did not produce any artifacts, we cannot say that we did indeed reach sterile soil. Periodic unit flooding from ground water seepage inhibited excavation of the lower 20 cm or so of this layer.
Figure 19. Wall profiles for Unit 1S,1E.

Figure 20. Wall profiles for Unit 2S,7E.
The quantity of basalt flakes is much reduced from Layer II, with 27 specimens. Of these, only 2 (7.4%) are primary decortication flakes and the rest are reduction flakes. Obsidian, on the other hand, increases to 11 flakes and 1 possible core. Pottery sherds are also more numerous at 43 specimens, 4 of which came from IIIa. A single piece of bottle glass was recovered but it undoubtedly was out of context.

**INTERPRETATION.** This unit is quite different from the other two. It lacks the very dark soil layers and features found in 15,1E and the stream bank, which suggests that this was not a locus of cooking activity. At the same time, it yielded more artifacts than the other two units combined (69.4% of the total). This unit produced 57.6% of all of the pottery, 57.1% of the obsidian, 45.6% of the basalt tools, and 71.9% of all debitage. Artifacts were clearly densest in Layer II with 262 items (over 72.6% of the unit total). Below about 70 cm bs, the artifact count dropped dramatically and Layer III yielded only 80 items. This drop in the layer total, however, was only in the basalt debitage; obsidian, on the other hand, more than doubled (from 5 to 11 pieces) and pottery increased from 28 to 43 sherds. Whereas pottery constitutes only 10.7% of the Layer II artifacts, it accounts for 51.2% of the Layer III artifacts. This area may have been more into the residential section of the settlement.

**Discussion**

Investigations at this site were hampered by environmental conditions. The combination of frequent rains and daily high tides brought periodic flooding of the units by raising the water table and producing seepage. A substantial amount of time was spent in trying to control water flow in the stream to allow us to dig deeper into the stream bed and reveal more of the bank profile. Whenever water flow subsided enough to allow us to make some headway and begin to reveal more of the cross-section, new rains would wash out our efforts and again create a heavy stream flow. The last 15 to 30 cm of each unit were dug through standing water, thus obscuring the soil context. On the last day of our field work, when final cross-section interpretations were to be made and soil samples taken, we found that very heavy rain during the night left some 80 cm of standing water in the units, drowning hopes of last-day work.

Since the units and stream bank were not linked, it is difficult to precisely relate strata between them. Layer I throughout the site is the same. Layer II of unit 1E,1S probably corresponds to Layer II of the stream bank, but is not found in either of the other two units. Consequently, it appears that this layer is localized and undoubtedly related to a particular activity—i.e. cooking. Layers III-V of the bank somehow correspond to the depositions of Layers III and IV of 15,1E and Layer II of 75,2E. Layer V of the bank also appears to be related to heavy cooking activity. Bank Layer VI, 1S,1E Layer V, and 75,2E Layer III appear to be the same.

A tabulation of aboriginal artifacts collected from AS-21-5, Locality 2, is presented in Table 3. Of the 517 items, 105 (about 20.3%) are pottery sherds. Ten of these are rim sherds and 95 are body sherds. None show any decoration but some have possible slip and floating treatments of the surface. Most of the sherds are thin to moderately thick and have a fine temper, but thick and coarse tempered sherds are also represented. Eight items (1.6%) are adze fragments or preforms, and another 5 items (1%) are flake tools (formal
TABLE 3. Aboriginal artifacts recovered from AS-21-5, Locality 2.

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<th>POTTERY</th>
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<th>FLAKE TOOLS</th>
<th>DEBITAGE</th>
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1Whole and Fragments
and informal). Three of the adze fragments are identifiable as Type I specimens (one identification is less certain than the others) and another is Type VI. The fifth specimen is represented only by the bevel portion, but it displays the characteristic plano-convex shape and is fully ground (see Fig. 24b, below), so we have classified it as a Type V adze. By far the largest portion of the assemblage consists of basalt waste flakes, of which there are 371 specimens (71.8%). There are also 28 (5.4%) flakes and cores of obsidian. More information on the artifact assemblage is provided in the Artifacts section below.

It is interesting to note that in 18,1E and 7S,2E, the basalt debitage counts drop significantly in the lowest layers even though the pottery and obsidian counts go up. It would seem that while basalt working was part of the early occupation, it increased substantially in importance in later years. This may reflect the diminished use of obsidian, or the discovery and increased exploitation, perhaps for trade, of a good basalt quarry, or both. The small size of the basalt flakes (Tables 8–14, below), the low counts of decortication flakes, and the somewhat high percentage of flakes with polish or multiple dorsal flake scars all indicate that the initial stage of raw material preparation was carried out elsewhere, and most of the basalt working at the site was either the final stage of tool reduction and shaping or tool reworking.

Portable artifacts clearly increase to the south, or inland. Unit 7S,2E yielded 69.6% of all of the aboriginal artifact collected from the site, while unit 12N,4E produced only 1.2%. We suggest that the old shoreline lay not too distant to the west and north of the excavation area, and the main area of occupation probably lies to the east and a little to the south. This would place the area of unit 18,1E and the stream bank, with their indications of cook-house activity, on the sea side of the residential area at this locality. Such a placement would correspond to the normal layout of a Samoan settlement (see, for example, Shore 1982:48–51).

The site is not well-placed chronologically. Radiocarbon dates are not yet available, and the charcoal samples submitted will not provide dates for the primary pottery-bearing layers. Based on pottery typology, however, we tentatively propose that Locality 2 of AS-21-5 was initially occupied in the first half of the first millennium BC (see Chronology section, below).

The excavations probably reached very near the bottom of the cultural deposit in both 18,1E and 7S,2E before unit flooding and time forced the end of work. It seems quite unlikely that a deeper layer with decorated sherds exists at this locality, although such a deposit may exist elsewhere in the valley.

SITE AS-21-49

Test excavations were undertaken on this terrace for a number of reasons. First, we hoped to find charcoal that would allow us to date at least one terrace site so as to get some idea of when the terraces were occupied. This terrace seemed a likely candidate for gaining charcoal samples since it had the remains of a small fale floor. Second, we hoped to recover a larger sample of artifacts and faunal remains from a terrace site than had been possible from surface surveys alone. The presence of a Type VI adze fragment, a Class IV flake tool, and a large secondary decortication flake on the
surface suggested that excavations might be productive. Finally, it was hoped that the fa'ae outline could be better defined and that we would find postmolds that would give us supporting evidence that this was indeed the location of a small fa'ae structure.

Excavations at this site were under the direction of David Herdrich. Two one meter square units, labeled Unit 1 and Unit 2, were excavated on the terrace (Fig. 21). Cultural layers were difficult to distinguish during excavation so both units were taken down in arbitrary 10 cm levels. Levels were measured from an arbitrary point above the surface using a line level to maintain consistency across the unit floor. All soil was screened through one-quarter inch mesh hardware cloth. Because of the high clay content, the screening was a very slow process. All features were excavated separately.

Unit 1

This unit was placed at the edge of the visible coral scatter, at the southwest end of the apparent fa'ae floor, in order to see if the floor edge could be clearly defined and if any postmolds could be located.

STRATIGRAPHY. The stratigraphy was not particularly complex, but the nature of the soil made the differentiation of cultural layers difficult until a cross-section view was available. Four levels were dug for a total depth of 36 to 43 cm below the surface (Fig. 22).

Level 1. The first level was taken down approximately 10 cm. The fill consists primarily of coral with scattered bits of weathering, decomposing, basalt. The coral is especially concentrated in the eastern third of the unit and is very light at the western end. Two large rocks were found in the northwest corner of the unit. A few waterworn pebbles were scattered throughout and some charcoal flecks were present. Artifacts consisted of only of basalt flakes, one of which was quite large. There also were whole and broken pieces of shell. The shell is all highly weathered and waterworn indicating that it was almost certainly brought up from the beach for surfacing and does not represent midden.

Level 2. The second level was composed primarily of basalt and coral in the eastern third of the unit, but as the level was taken down the coral expanded to the northwest forming a diagonal bisecting the unit from the southeast corner to near the northwest corner. Coral was found in the northeastern side of the unit while the southwestern portion was composed of brown clay loam. By the bottom of this level the coral had given out through the entire unit. The bottom of the level was composed of brown clay loam with bits of weathering volcanic rock scattered near the west and the center of the unit. In addition, a postmold (Feature 1) was located in the southwest quadrant of the unit. A large rock, 30 cm long and up to 10 cm wide, had been placed vertically at about a 45 degree angle next to the postmold. It may have been placed there in order to hold the post securely in place. Numerous basalt flakes were also found throughout this level. One of these was a very large piece from an adze (it had two polished surfaces), another was a primary decortication flake, and the others were reduction flakes. Numerous pieces of weathered shell were found also, but again, the shell does not appear to have been midden.

Level 3. The soil at this level seems to be slightly grayer than that of the above level. There are stones and small pieces of reddish, weathering
Figure 21. Plan map of AS-21-49.
Unit 1, north wall profile.

Unit 2, south wall profile.

Figure 22. Wall profiles, site AS-21-49.
rock throughout. No coral or shell is present. A few flakes of charcoal were present in the northeast corner of the unit. As the level went down the amount of the soft, vescicular, weathering rock increased. The breakdown of this rock tends to stain the soil red. Eleven basalt reduction flakes were found but their numbers decreased with depth. Also, a possible fish spine was found. No features were present.

**Level 4.** The soil continues to be a reddish gray clay with small pieces of weathering, reddish-gray rock throughout. The majority of this rock, however, was in the western half of the unit. Ten basalt reduction flakes were found but none was recovered in the last few centimeters of the level. The soil at the bottom of this level appears to be sterile. A soil probe was used to check for evidence of buried cultural deposit, but no indications of such a deposit were seen.

**Interpretation.** The excavation of this unit was successful in defining the edge of the old floor. As seen in Figure 22, the coral floor of the fale extends about 70 cm to the west from the east wall, and its general thickness is about 13 cm. In the north, about 40 cm of the floor had been covered by soil eroded from the slope, and the western side of the floor was slightly lower than the eastern side. Also, the western edge of the coral was not as thickly deposited as the eastern side.

**Unit 2**

Unit 2 was established 2.65 m to the north and 1 m to the west of Unit 1. It was placed so that it would bisect a slight depression (that was hoped would represent an umu, or fire place), thereby providing us with charcoal for dating and a profile of the suspected feature. Unfortunately, it did not turn out to be a feature and no charcoal was recovered.

**Stratigraphy.** Three levels were dug to a maximum depth of 30 cm below the surface. The heavy concentration of coral and shell marking the old floor was not well represented at this location.

**Level 1.** The first level cut only into the western two-thirds of the unit only because the circular depression to the east is deeper than 10 cm. Pebbles and occasional coral fragments are found along with some weathering bits of reddish rock and a few waterworn pebbles. A few large rocks were found in the northwest corner of the unit. A semi-circular concentration of coral pieces was found at the center of the southern edge of the unit. This was the first evidence of a second postmold (Feature 2). No artifacts were recovered from this level.

**Level 2.** The west half of the unit changes from clay to a moderate/heavy scattering of rock mixed with clay. There were occasional flecks of charcoal but no concentration. Reddish rock fragments were found in the southwest quarter of the unit, and bits of coral were exposed near the southern wall. The Feature 2 postmold was revealed, indicated by a clear concentration of coral. Scattered bits of rock are restricted to the west half of the unit while the depression in the eastern half of the unit was relatively free of rock. The southeast corner of the unit appeared to be darker than the rest of the unit. This area was labeled Feature 3. A Type VI adze fragment was found in the northeast quadrant of the unit. Four basalt reduction flakes and one flake with a polished surface were recovered, also.
Level 3. The top of this level has stones and brown clay loam in the west half of the unit while the east half had very few stones and the soil was slightly darker. With depth, the soil became a lighter brown clay loam and the stones were fewer. The clay has an abundance of decomposing volcanic rock and appears to be culturally sterile.

INTERPRETATION. Excavation made it clear that the depression we had hoped would be a hearth of some kind was the result of a tree fall, as indicated by tree-root molds at the bottom of the depressed area. No charcoal lens was found in this unit.

FEATURES. Three subsurface features were identified. Two of these appear to be the casts of somewhat shallow-set posts that were not very substantial. The third feature my not be cultural, but it was decided to include it on the chance that it may be a product of human activity.

Feature 1. This was a probable postmold located in Unit 1. It measured 12 cm in diameter and 7 cm deep, with the top at about 20 cm below the surface. The fill was composed of coral mixed with brown clay loam.

Feature 2. This postmold was found in Unit 2. Like Feature 1, it consisted primarily of coral fill with some brown clay loam. At the top, the concentration of coral was nearly 30 cm across, but in the lower portion it narrowed to about 7 cm. It measured about 20 cm in depth.

Feature 3. In the southeast corner of Unit 2 was a lens of dark brown silty clay loam with numerous pebbles and cobbles. Neither artifacts nor charcoal were apparent. It is not at all clear what this feature represents, and it is conceivably a natural feature.

Discussion
The large terrace, internal curbing, and prepared floor all indicate residential activity at this site. The test excavations were successful in showing that the floor area extends at least 40 cm beyond where the surface manifestation of coral ended. The effort taken to carry coral and shell up from the coast to provide a floor surface further suggests more than just a fales’ o’o at this site. Two postmolds were revealed which provide supporting evidence that the flooring was at one time part of a structure and not merely an open coral floor. Yet the small size of the posts suggests that the structure may not have been very substantial.

The goal of collecting a larger sample of artifacts and faunal remains than is possible from surface surveys alone was partially successful. While a larger number (87) of basalt flakes were collected, no additional tools were found. It is interesting to note that nearly all of these flakes were of course-grained, "poor quality," basalt, but a couple were of noticeably different, fine-grained material. The abundance of the "poor quality" basalt, which is similar to that found locally, and the presence of a few decortication flakes suggest a reliance on immediately available raw material. Perhaps most informative from the artifact collection was the absence of certain items—i.e., pottery, obsidian, and non-aboriginal materials. While a good deal of shell was recovered, it was all highly weathered and appears to have been from the floor rather than midden.

The most disappointing aspect of the excavation was that neither of the units provided sufficient charcoal for radiocarbon dating. The absence of pottery and volcanic glass, however, indicate that the site probably was
occupied sometime after about AD 500. At the same time, presence of lithic artifacts together with the absence of non-aboriginal materials suggest that the site was abandoned prior to extensive Western influence. Given the above information, and the comparatively good condition of the terrace and inner curbing, we suspect that the site was probably established sometime in the last few centuries prior to AD 1800.

Artifacts

During the course of our investigations in eastern Tutuila, a variety of artifacts were collected. During survey, adzes, large fragments of adzes, and pottery shards were normally collected from the surface. Flake tools also were usually collected and occasionally a few waste flakes were picked up. All artifacts recovered during excavation were saved for analysis.

BASALT ARTIFACTS

Basalt was obviously an important resource for prehistoric Samoans. It was most important for adze manufacturing, but a variety of other tools were made from basalt as well. While basalt was an important resource, there are very few known quarry sites. The only documented quarries in American Samoa are at Tataga Matau, near Leone (see Leach and Witter n.d.), and at the Maupua Quarry, northeast of Tula (Brophy 1985).

Most of the basalt artifacts were made from a medium to dark gray, fine-grained material. Some of the darker pieces are reminiscent of basalt from the Tataga Matau quarry, but that is purely a subjective assessment. Most of the tools were made from a lighter gray, fine- to medium-grained basalt. A few pieces of basalt are very light in color and comparatively soft. On many pieces the exterior of the artifact is light gray (weathered) but the interior, as seen in relatively fresh breaks, is considerably darker.

Six basalt samples—including a hard, dark sample and a piece of light gray, soft rock, as well as some pieces of more common materials—were submitted to Jody Solem, a geochemistry graduate student at North Dakota State University, for petrographic analysis. Five of the specimens were from site AS-21-5, Locality 2, and the sixth was from site AS-21-5, Locality 8. The intent of that study was (1) to verify that all of the materials were in fact basaltic (the 'soft' stone was a particular question), and (2) to determine if any were andesitic, which would mean that they were imported from Tonga, Fiji, or some other island west of the Andesite Line. The results of the petrographic study are still preliminary but it is clear at this point that all of the samples are basalt and none appears to be andesitic. A detailed petrographic and geochemistry report will be submitted when it is completed.

Adzes

The standard typology for Samoan adzes is that worked out by Green and Davidson (1969b). This typology is based heavily on Buck's (1930) early classification, but with modifications derived from the larger archaeological sample made available by their field research. That typology will be employed in this report. In brief, we found 24 classifiable adzes and adze fragments along with 19 unclassifiable fragments and preforms (incomplete implements,
lacking any grinding and sometimes still in the early stages of shaping). The distributions of classifiable and unclassifiable adzes by site are given in Tables 4 and 5, respectively. Illustrations of selected examples of the adzes collected are provided in Figures 23, 24, 25, and 26.

As can be seen in the tables, adzes representing Types I, II, III, V, and VI, were found. Type I adzes are clearly the most common at nearly 46% of the collection, and are especially notable at the slope terrace sites. Type VI is the next most common form at just over 20%. Types II, III, and V are represented by only a few examples. The two Type V adzes are both fragments, but exhibit the characteristic fully ground surfaces and plano-convex cross-sections.

In the unclassifiable category, the possible types represented can be narrowed somewhat. The quadrangular/trapezoidal adze butt from site AS-21-6, Locality 2, is highly waterworn and could not be typed, but it has a shoulder index of 33.6, which suggests that it falls into the Type IV category. At the same time, it appears unlikely to have been completely polished, which argues more for a Type I classification. The two quadrangular/trapezoidal whole preforms were intended to be either Type I or Type III adzes, but since the differentiation between these categories is degree of grinding, we cannot precisely classify them. Preform fragments consist of quadrangular to trapezoidal items (indicated simply as quadrangular) which could have been intended for Type I, III, IV, IX, or X. The triangular forms could have gone into Type VI, VIII, or, conceivably, VII, although none of specimens had the narrow, high form of a Type VII adze. The pieces with irregular cross-sections could have been modified to just about any Type.

Two other specimens, both from site AS-21-26, do not fit any of the established types (Fig. 25). These were of the same form, although only one had some areas of polish. With both of these specimens the blade expands from the poll to the cutting edge, the cross-section is slightly trapezoidal and thick, and the front is larger than the back. While the latter feature is characteristic only of Type IV adzes, the general shape and the absence of full polish rule out that classification. Should more examples of this adze form be recovered in the future, a new Type will need to be established. At this point, however, with only two examples, we may be dealing with idiosyncrasy rather than a formal adze type.

The adze collection from Eastern Tutuila compares quite closely with Frost's (1978) collection from Tufuata. It is also generally consistent with the collections from Western Samoa (Green and Davidson 1969b; Hewitt 1980b). It contrasts, however, with the Manu'a collection, which stands out as somewhat anomalous relative to the other areas, as well. The Manu'a adze assemblage has a low representation of Types I and II, a high occurrence of Type III, and a slightly high number of Type IX adzes (Hunt and Kirch 1987:41).

**Chisels**

The stone chisel was identified by Buck (1930:364-67) as an implement in the traditional Samoan woodworking tool kit. He reported that "long narrow implements are termed tofi by the Samoans, but no accurate information could be obtained as to how they were hafted, or whether a mallet was used" (Buck 1930:364). Buck also noted that Samoan woodworkers of his time used metal chisels hafted as adzes. He therefore suggested the following:
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<th>TYPE</th>
<th>TOTALS</th>
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* Only one was collected
** Noted but not collected
TABLE 5. Unclassifiable adzes, adze fragments, preforms, and preform fragments.

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</table>

*Noted but not collected.
Figure 24. Adzes: (a) Type V, AS-21-9, (b) Type V, AS-21-5, Locality 2, (c) Type II, AS-21-26, (d) quadrangular preform, AS-21-40, (e) Type I, AS-21-39, (f) Type III.
Figure 26. Adzes: (a) irregular preform (probably for Type II), AS-21-25, (b) Type II, AS-21-24.
Failing a true Samoan word for mallet, the inference is that the mallet was not used in Samoan woodcraft. The Samoan tool were therefore probably hafted as adzes, and such as might have been hafted in the same axis as the haft were used with pressure and not with a mallet. Some of the longer ones were probably used with pressure without hafting [Buck 1930:364].

When adapting and expanding Buck's stone tool typology, Green and Davidson and colleagues (1969a, 1974) eliminated the category of chisel. They noted that two tools in their collection fit Buck's chisel category, but they did not use the term since they did not know how the tools were actually used (Green and Davidson 1969b:32).

We understand the reluctance of Green and Davidson to employ a functional term in the absence of positive identification of function. Nevertheless, we have decided to use the term since it seems to best describe a set of tools that were collected from eastern Tutuila. We define chisel, however, a bit differently from Buck. Morphologically, tools of this type are comparatively narrow and only slightly wider than they are narrow. Buck reported both quadrangular and triangular cross-sections. Chisels tend to be comparatively crudely made and may or may not have areas of polish. The diagnostic feature in our classification is a bevelled cutting edge. Both bevelled surfaces are relatively short, but one more so than the other. The bevels tend to be crudely flaked and not polished. As for use, Buck's linguistic argument against mallet use seems a bit weak. We noted that Pratt's dictionary gives samala to'au for mallet but also equates samala with hammer. To therefore conclude that mallets were not used is questionable. Furthermore, Milner's (1968) Samoan dictionary lists sa'a'a as the Samoan term for mallet. In short, we employ the traditional definition of a chisel as a tool whose working power was supplied by a mallet, or soft hammer, or simply pressure. If the tool was used with an adze-like blow, then it should be classified as an adze.

Chisels have not been reported for Samoa beyond those mentioned by Buck. As mentioned above, Green and Davidson reported two tools that fit Buck's category but they, and presumably similar items found subsequently, were lumped with unclassifiable adze specimens. Hewitt illustrates what appears to be a bevelled tool that she lists as a Type VI adze (1980b:134, Fig. 47e). (Hewitt does report a "chisel" but it is a fully ground, rounded cross-section tool fragment lacking the cutting edge, so her rationale for this classification is unknown.) And we can only wonder if any of the "other stone items" reported by Frost (1978:193) as resembling adzes in size and shape but with only minimal flaking might fit our chisel category. ETAP recovered four implements that we classify as chisels (see Table 6 for locations and Fig. 27 for illustrations). These all have quadrangular cross-sections and one is fairly well made. All but one of these tools shows some microscopic evidence of wear. One chisel (Fig. 27a) also showed smoothing at the butt which may signal that it was hand held. A fifth item is probably a quadrangular adze preform (listed as such) but may have been intended for use as a chisel.

**Flake Tools**

According to Green (1974b:266-68), ethnographic data tell us that most often, those tools that could have been made from stone flakes—i.e., scrapers, peelers, graters, cutters, and drills—were manufactured from perishable materials such as shell, wood, and bamboo. It is not surprising,
Figure 27. Basalt tools: (a) chisel, AS-21-9, (b) chisel AS-21-9, (c) quadrangular preform or chisel, AS-21-26, (d) chisel, AS-21-39.
therefore, that basalt flake tools have not commonly been reported for Samoa. Reports of cores are even rarer (e.g., Davidson 1969a:254; Green 1969a:123; Davidson and Fagan 1974:88; Green and De Naeve 1974:96; Green 1974a:145; Frost 1978:185-87), although in some instances it can be difficult to distinguish cores from "adze preforms." Buck (1930:367-69) implies that flake tools were seldom made (with the so-called "coconut grater" the only formal tool type), and Green (1974b:266) concluded that "the purposeful reduction of fine-grained basalt stones to yield flakes destined for primary use as tools seems never to have been a feature of Samoan technology." Artifact collections from eastern Tutuila, however, suggest that flake tools may have been a more important category of artifacts than either Buck or Green suspected, although this may yet prove to be a somewhat localized phenomenon.

Identification of flake tools is based on edge modification from retouch and/or use wear. A retouched edge is easiest to identify since the edge has been intentionally flaked or chipped, but flakes with minimal retouch can still present identification problems. Utilization damage generally requires microscopic examination (see below). On the basis of both macroscopic and microscopic examinations, we have divided those flakes with verified edge damage into two broad categories, formal and informal tools. The former category consists of flakes that presumably have been modified to conform to a formal pattern or class of tool. The latter do not conform to any particular pattern but, instead, represent ad hoc use of a waste flake.

FORMAL TOOLS. Frost (1978:172-92) differentiated the non-adze basalt tools that she recovered from Tutuila into Classes on the basis of form--shape and size--and, to a lesser degree, the nature of the edge modification. While Frost provided a beginning, we have substantially modified her classification scheme in light of new data. First, we think it more useful to restrict this classification system to flake tools, so we have dropped her Class V, which consists of core tools, and Class VI, which as a group is defined on the basis of ground surface rather than status as a tool. Second, we have split 2 of her classes (III and IV) to create two new classes (V and VI). And third, we have created entirely new classes of VII, VIII, IX, and X. Some of these classes are not well represented and failure to find additional examples may lead to the abandonment of the category. Other classes, however, are already firmly established. The new flake tool classification scheme is summarized below and the distribution of flake tools collected by ETAP is given in Table 6, below.

Class I. Specimens in this category correspond to what lithic analysts generally refer to as scrapers. They are roughly horseshoe or U-shaped and trapezoidal to rectangular in cross-section. The dorsal surface is flaked but the ventral surface rarely shows any flake scars. The working end is generally thickest, usually slightly convex, and flaked to create a comparatively steep-angled, unifacial edge. We have divided this class into two subclasses on the basis of shape. Subclass Ia consists of specimens that expand from butt to scraper end, while Ib is made up of implements with roughly parallel sides along the long axis.

Tools of this type from Western Samoa have usually been referred to as coconut graters, an identification drawn from Peter Buck. Buck reported that tools of this type, although no longer used, were shown to informants with the "Samoans diagnosing them as coconut graters (Tuai mafa)" (1930:367). It reads to us as if the Samoans were themselves engaging in conjecture rather than
expressing knowledge. Consequently, while such tools may have served as graters, there is still too little information for archaeologists to make such precise functional identifications. The nature of the edge working suggests that Class I flake tools are indeed likely to have been scrapers or graters, but the type of material that they were used on remains unknown.

Tools of this class have been reported for several sites in Western Samoa (Buck 1930:167-68; Davidson 1965a:193; 1969d:246) and American Samoa (Buck 1930:368; Kikuchi 1963; Emory and Sinoto 1965:46, Table 2; Frost 1970:172-77; Clark 1980:86; Gould et al. 1985). In some cases, broken adzes were reflaked to produce scrapers of the proper shape and size to be included in this class (Buck 1930:368; Emory and Sinoto 1965; Ishizuki 1974:54). We recovered ten tools of this type, five in the Ia subdivision and five in Ib. These tools came from sites AS-21-6, -7, -9, -26, -27, -41, and -49. For examples of each subclass see Figure 28.

**Class II.** This class was defined by Frost (1970:177-79) as similar to Class I artifacts but differing in cross-section and end shape. The flaking pattern results in a median ridge on the dorsal surface which sometimes produces a triangular shape at the flaked scraping edge. There is no evidence to suggest that these tools were functionally different from those in Class I, which is to say that they were probably used as scrapers/graters.

The only representatives of this class have been reported by Frost (1970:177-78). We are not certain that this group warrants separation into a separate class, but since Frost found nine examples on Tutuila we have retained the category.

**Class III.** We have modified somewhat Frost's initial description of this class. These are tools made on elongated flakes, with straight (roughly parallel or expanding) or perhaps very slightly convex sides, and have low rectangular, trapezoidal, or triangular cross-sections. The lateral sides are the primary cutting edges, along which the dorsal surfaces have been chipped to produce a low, or obtuse, angle from the perpendicular. Some modification of the ventral surface is found on some of the specimens yielding bifacial cutting edges. In Frost's examples these flakes often end at a point (though sometimes rather blunt), but in only two cases was there evidence that the point was used. We would set these latter tools--where the point was an intended tool--apart as a distinct class that we have designated as Class VI. Some of the specimens in this class have small areas that have been ground. Frost suggests that Class III tools were used as knives or knife-scrapers, an interpretation that is in accord with the angle and placement of the cutting edge and with the presence of some ventral chipping or flaking.

We have divided this category into two subclasses. The first, IIIa, consists of flake tools that are made simply from elongated flakes. The dorsal surface reveals flake scars in no particular pattern. Tools of subclass IIIb, however, are basalt blades with lamellar ridges on the dorsal surface and low triangular or trapezoidal cross-sections.

The only possible examples of this type of tool reported in other sources are Green's (1974a:146) two "blade-like" flakes with secondary flaking along the lateral edges, but even these are not clearly members. Frost (1970:180:83) collected five specimens of the IIIa variety. One example of
each subclass was noted in our collections, both from site AS-21-6, Locality 1 (Fig. 29).

Class IV. As defined by Frost, tools in this category have rounded or oval outlines. In Frost's classification, this grouping includes implements whose edges are entirely rounded, along with examples with one straight side unmodified for use. This later group we would move to a separate category that we designate Class V. This leaves only fully rounded or oval flakes to constitute Class IV. These tools have rectangular to plano-convex to nearly triangular cross-sections. Edge modification chipping occurs on the dorsal surface and the ventral surface sometimes shows edge damage that is probably from use rather than modification. Frost suggests use as graters or scrapers, which seems a reasonable interpretation although slicing is also quite possible.

Frost (1970:183-85) reported several examples from Tutuila, although some of her Class IV implements fall into our Class V category. Davidson and Fagan (1974:88) reported a "large flat leaf-shaped" flake with use and/or retouch damage along both of the lateral edges. Presumably, the leaf-shape refers to curving sides, which would place this item in Class IV. Two examples of this tool class were found in the ETAP collection, one from AS-21-6, Locality 1 (Fig. 29), and the other from AS-21-7, Locality 2.

Class V. This is a new category of flake tool that comprises tools with a curved cutting edge and a straight back that is either unmodified or flaked to create a blunt back. In the terms of lithic technology, these are "backed" tools. The cutting edge has been created by chipping along the dorsal surface to form an obtuse cutting angle. The ventral surface may have some flake scars as well, but they are not common. Flake tools of this type could have been used for slicing, scraping, or light chopping.

This type of tool was not differentiated by Frost and has not been specifically reported by other researchers in Samoa. In eastern Tutuila, however, we found two tools of this class, one at AS-21-6, Locality 1, and another at AS-21-7, Locality 2 (Fig. 29).

Class VI. In form, these flakes could fit into either Class III or IV, or conceivably V. They differ, however, in that they have been modified to create a burin or graver point. That is, a small chunk has been removed from one side to produce a point that can be used for boring, engraving, or slitting. The other edges may also have been used for cutting but the burin feature is diagnostic.

This, too, is a type of flake tool not differentiated by Frost but, instead, were included in her Class III category. Nevertheless, at least two examples appear to be present in her collection. It has not been described by other researchers. We recovered only two examples—both from site AS-21-6, Locality 1 (Fig. 29)—but the apparent intentionality in creating the form suggests that it is a formal, though perhaps uncommon, tool type.

Class VII. These were made on large, elongated, prismatic flakes that are trapezoidal or triangular in cross-section. The lateral edges and sometimes the distal end were the working edges. Modification may not extend along the entire edge, but when found is on the dorsal surface. Edge damage from use can be seen (but may require magnification) on the ventral surface of
these specimens. While scraping cannot be ruled out, heavy duty slicing or perhaps light chopping was the probable use for these tools.

Flake tools of this type cannot be positively identified from other reports, although Green (1974a:146) describes a utilized flake that may fit into the category. We found four examples in eastern Tutuila (Fig. 29): one from AS-21-5, Locality 3, two from AS-21-6, Locality 1, and one from AS-21-28. Clark also observed tools of this type at Tutuauta.

Class VIII. This category consists of flakes with notches in the sides that probably served as shaft scrapers. These notches may have been created by flaking or simply by wear.

Tools of this type have been collected only from Upolu where Green and De Nave (1974:96) reported one example and Green (1974a:146) noted five examples. No tools of this class have been recovered from American Samoa.

Class IX. These are flakes that have been modified so as to create a point suitable for boring or punching. We would include here formal drills as well flakes that have been only slightly modified to create boring points, and differentiate them from the burin-type tools of Class VI.

Davidson (1969d:247) reported a flaked drill and Green (1974a:145-46) described four flakes with points suitable for boring, although some of these may better fall into Class VI. Two examples of flakes with boring points were recovered from excavated layers at AS-21-5, Locality 2 (Fig. 29).

Class X. This category consists of flake adzes. That is, they are flakes that have been flaked and ground to form small, thin adzes, or adelets. Items of this type may be best classified as a new adze type, but we have followed Green and Davidson (1969b) in not doing so. Instead, we have brought it into the flake tool classification.

Artifacts of this type have been reported for Western Samoa by Davidson (1969d:247), who notes that "adzes of this kind seem to occur in various parts of Samoa from time to time," although they have not been given recognition as a formal tool type. Davidson (1969d:247) describes an example from a coastal midden deposit that has a polished cutting edge and some polish on the front, back, and sides. She also reports and illustrates a flake with a polished bevelled edge from a surface collection at Sinamoga, Upolu (1969a:261-62), and an edge ground flake from Sala'ilua, Savai'i (1969b:93), both of which I would place in this class. A small edge-ground flake was recovered from Luatuanu'u, Upolu, by Peters (1969:218) who noted that it "could have been used as a small chisel (tattooing?)." It, too, may fit into this class, although the small size suggests a different categorization may be in order. From eastern Tutuila we recovered one from AS-21-5, Locality 2, one from AS-21-6, Locality 06, one from AS-21-41, and one from AS-21-49 (Fig. 28). Artifacts of this class have also been reported from the island of Ulawa in the southeastern Solomons, although there they were made of chert (Ward 1976:163, 178). We would not be surprised to find similar implements on other islands in the central Pacific with adequate rock sources.

Summary. We regard the classification system for flake tools described above as a working typological model. It is a second round construction, the first being that of Frost. With additional work in Samoa, refinements in the
system can be made. Some designated classes may be dropped or merged with others, or new classes may be created as new tools are recovered. Regardless of specific modifications that may come about due to an expanding data base, we are convinced that there was a greater degree of formality in stone flake-tools than has previously been granted for the prehistoric Samoan tool assemblages. Formalized flake tools did exist, and recognition of this fact is overdue.

As indicated in Table 6, representatives of all but Classes II and VIII were recovered during our investigations. The most common of the flake tools are Class I implements. This abundance is even more pronounced if Class II scrapers are added, as is illustrated in Table 7 which gives the number and distribution of gratters/scrapers that fall into Classes I and II combined. These classes were grouped because only Frost made the distinction between these, and other authors are likely to have lumped all varieties into a single category of grater. Three points emerge from this listing. First, these tools are quite common in tool assemblages of Samoa. In fact, when these numbers are compared with the examples of other classes of flake tools, it becomes abundantly clear that these implements are far and away the most common. Second, the vast majority of these tools come from American Samoa. It is also interesting to note that three site areas in particular have been unusually productive. These areas are Leone and Tufauta, on Tutuila, and Fitiuta, on Ta'u. When the tools of nearby 'Aoa and Oenuoa are added to those of Tutuila, the abundance of such tools in that area is even more pronounced. These three areas have yielded very large numbers of adzes--whole, broken, and incomplete. It is probably not pure coincidence that Leone and Tufauta are both situated very near large basalt quarry sites. We would suggest that a basalt quarry probably is located not too distant from Fitiuta. The third point of interest is the low numbers reported for Western Samoa, despite comparatively extensive investigations there. Buck does not give a count of gratters/scrapers collected, the Green and Davidson investigations reported only three examples (all from Upolu), and no examples were noted by the Jennings team. This marked differential in distribution may well be related to the availability of good quality basalt from the Tutuila quarries, and may also reflect a comparative scarcity of adequate quarry areas on Upolu.

An additional question that arises regarding the distribution of Class I (and II) scrapers is whether they were being produced in such large numbers for exchange, for local use in some specialized activity, or for local use in ordinary activities. We suspect that the latter reason may have been the primary one, although some combination of the three is not unlikely. The scrapers from 'Aoa that were examined microscopically showed use wear, suggesting that they were not manufactured for export. We know of no specialized processing activity that could be carried out at these locations more effectively than at other sites in the islands. Consequently, we suspect that the abundance of stone gratters/scrapers relates more to the fact that good quality basalt was available in large quantities and was used for tools that elsewhere would have been made from other materials. Edge wear analysis of scrapers from Tufauta, Leone, and Fitiuta may help resolve this issue.

INFORMAL TOOLS. These are flakes that have been utilized but were not fashioned into formal tools. They are not common in Samoan lithic assemblages but have been reported from several sites. In some cases the modified flakes had polished surfaces and generally have been interpreted as flakes detached from adzes (Green, in Terrell 1969:167; Green 1969c:156; Hougaard 1969:256;
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*Collected during excavation.
TABLE 7. Occurrence of Class I and II flake tools in the Samoan Islands. Since only Frost made a distinction between Classes I and II, they are lumped as a single category of scrapers.

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<td>3*</td>
<td>Leone</td>
<td>Frost 1978:173, 178</td>
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<td>Tualua</td>
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<td>Buck 1930:368</td>
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</table>

*2 of these are Class I, the other one is Class II
**20 of these are Class I, 8 are Class II
***It is not clear from Brophy whether all 12 "scrapers" were indeed of the Class I and II varieties.
Figure 28. Flake tools: (c) Class Ia, AS-21-40, (b) Class Ia, AS-21-27, (c) Class Ia, AS-21-6, Locality 2, (d) Class Ib, AS-21-6, Loc. 1, (e) Class Ib, AS-21-9, (f) Class Ib, AS-21-7, Loc. 1, (g) Class X, AS-21-40, (h) Class X, AS-21-5, Loc. 5, (i) Class X, AS-21-5, Loc. 2.
Figure 29. Flake Tools: (a) Class IIIa, AS-21-6, Locality 1, (b) Class IIIb, AS-21-6, Loc. 1, (c) Class IV, AS-21-6, Loc. 1, (d) Class V, AS-21-7, Loc. 2, (e) Class V, AS-21-6, Loc. 1, (f) Class VI, AS-21-6, Loc. 1, (g) Class VI, AS-21-6, Loc. 1, (h) Class VII, AS-21-5, Loc. 3, (i) Class VII, AS-21-6, Loc. 1, (j) Class IX, AS-21-5, Loc. 2, (k) Class IX, AS-21-5, Loc. 2.
Green 1974a:145; Frost 1978:187). In other instances the modified flakes lacked polish (Green 1969a:133; Green 1969c:156; Green 1974a:146). It is quite possible—even likely—that some of the examples from these two groups fit into one of the classes of formal flake tools, but lacking detailed descriptions we cannot make positive assignments. In most cases the identification of informal flake tools will require microscopic examination (see below). Even with such examination, however, short-term use of unretouched flakes may not leave clear evidence of wear.

From the ETAP collection only two flakes, both with slight macroscopic indications, showed microscopic evidence of edge wear. Neither flake had polished surfaces, and both were collected from site AS-21-5, Locality 2. No flakes lacking macroscopic indications that were examined showed microscopic evidence of wear.

In summary, informal flake tools are not common in Samoa, but they do exist. They have been reported from several sites in Western and American Samoa. Actual use of such implements may have been more common than indicated but other examples either lacked identifiable indicators or have gone unnoticed.

Pebble/Cobble Chopping Tools

Green (1969a:134) reported several examples of this tool type for Western Samoa. Since most of the examples are actually larger than true pebbles, we have modified the category by adding the more appropriate term cobble.

One implement of this type was recovered from site AS-21-51, and is slightly different from those described by Green. It is perhaps best termed a crude chopping tool/chisel. It is an elongated waterworn cobble with modifications at both ends. It is 10.3 cm long by 5.8 cm wide and 4.1 cm thick. On one end, three flakes have been removed to create a crude bifacial edge, and the other end has been extensively battered, apparently from hammering. This chisel-type character has not been reported for any other specimens.

Other Basalt Tools

A variety of other basalt tools, although not common, have been reported for Samoa (see Green and Davidson 1969a, 1974; Frost 1978; Jennings et al. 1976, Jennings et al. 1980; Hunt and Kirch 1986; Brophy 1986). These tool types are core tools, hammerstones and pounding stones, anvil stones, sling stones, octopus lure sinkers, net sinkers, anchors, stone files, abraders, grindstones, pottery burnishing stones, and some items whose function is not entirely clear. No such tools were found by our research team.

Basalt Waste Flakes

Flakes constituting debitage (the residue of stone tool making) have not been reported in large numbers at residential sites in Samoa. At many sites, basalt debitage is not mentioned at all. We wonder, however, if this always reflects the actual occurrence in the cultural deposits, or if in fact it is, at least in part, a result of the artifact recovery strategies. That is, the lack of soil screening certainly would influence flake recovery, especially since so many of the flakes are quite small (this issue is dealt with below in
the section on obsidian). Furthermore, if the investigator is not concerned with debitage or does not properly train the excavators, many flakes will go uncollected. The investigations at Tulauta discussed earlier provide an excellent case in point; Frost reported only seven flakes for the site while Gould and colleagues observed an "impressive abundance" of debitage. If we are to fully understand the range of activities that took place at sites, excavators must recover and report all cultural materials.

In 'Aoa valley, basalt flakes were occasionally observed on the surface where there was a scatter of ili'ili, pieces of coral, and/or tools. Flakes were less common at slope and upland sites, however. The excavations at AS-21-5 yielded a total of 371 flakes while excavations at AS-21-49 produced only 84 flakes. For analytical purposes, flakes were divided into four categories: primary decortication, secondary decortication, reduction, and polished. Since debitage was rarely picked up during survey, the following discussion is based only on the excavation sites. Tables 8-13 show the breakdown of basalt debitage by location (site, unit, and layer) and flake size while Table 14 provides a summaries of these data.

Decortication flakes display cortex on the dorsal surface. Primary decortication flakes have cortex on the entire surface while secondary decortication flakes have cortex on only part of the surface. Both of these categories (but especially the first) represent early stages in the tool manufacturing process. The relatively small percentages of such flakes suggest that the initial shaping stage in basalt tool manufacturing was not a common occurrence at either site, or that weathered outcrops and boulders were not often used for raw material sources, or both.

The majority of flakes (87.6% of the total from both sites) fall into the category of reduction flakes. These represent flakes detached during some stage of the post-decortication reduction process, or during reworking of previously completed tools. In the absence of polished surfaces, reworking flakes are not easily distinguished. In some cases, however, the presence of striking platforms and small bulbs on flakes clearly removed from the corner juncture of quadrangular shaped, flaked objects (evidenced by the multiple flake scars on the dorsal surface of the flakes) strongly suggests either finishing work or the reworking of a tool.

Polished flakes—those with a ground surface on some portion of the flake—were distinguished from the remainder. Such flakes are certainly from formalized tools, particularly adzes. Six of the flakes (four from AS-21-5 and two from AS-21-49) had two polished surfaces: on two of these (both from 21-5) the angle of those surfaces indicated that they came from bevelled edges and thus were probably the result of chipping due to tool use, while the other four flakes were from the sides of polished tools, suggesting detachment due to reworking a tool. There are 9 flakes (all but one from 21-5) with polish on only one surface.

While general size data on flakes can be informative, precise measurements—a time consuming process—are generally not of great value. Consequently, we employed a process for speedy size sorting by modifying a technique described by Patterson (1981). Using a drafting compass, circles were drawn on a sheet of paper with diameters beginning at 10 mm and increasing at 5 mm intervals up to 80 mm. Flakes were then sorted by size as determined by which circle they most nearly filled without extending beyond
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TABLE 9. Basalt flakes recovered from AS-21-5, Locality 2, Unit 7S, 2E.
Size refers to millimeters in diameter. Type abbreviations: Pr = Primary
decortication; Se = Secondary decortication; Re = Reduction; Po = Polish.

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decortication; Se = Secondary decortication; Re = Reduction; Po = Polish.

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decortication; Se = Secondary decortication; Re = Reduction; Po = Polish.

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<td>0</td>
<td>0</td>
<td>16</td>
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TABLE 14. Summary of basalt flake distribution by size.
Size refers to millimeters in diameter. Type abbreviations: Pr = Primary
decortication; Se = Secondary decortication; Re = Reduction; Po = Polish.

<table>
<thead>
<tr>
<th>SITE</th>
<th>TYPE</th>
<th>SIZE</th>
<th>TOTAL</th>
<th>PERCENT</th>
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<td></td>
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<td>15</td>
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<td>1</td>
<td>1</td>
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<tr>
<td>21-5</td>
<td>Pr</td>
<td>2</td>
<td>7</td>
<td>3</td>
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<tr>
<td></td>
<td>Se</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td>Re</td>
<td>62</td>
<td>111</td>
<td>60</td>
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<tr>
<td></td>
<td>Po</td>
<td>4</td>
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<td>TOTAL</td>
<td></td>
<td>69</td>
<td>125</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>18.6</td>
<td>33.7</td>
<td>17.8</td>
</tr>
</tbody>
</table>

| 21-49 | Pr   | -    | -     | -      | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -      |
|       | Se   | -    | -     | -      | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -      |
|       | Re   | 6    | 15    | 13     | 18      | 9       | 6       | 5       | 1       | 1       | 1       | 1       | 1       | -       | -       | -       | 3      |
|       | Po   | -    | -     | -      | -       | 1       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | 3      |
| TOTAL |      | 6    | 15    | 13     | 19      | 11      | 6       | 6       | 1       | 1       | 1       | 1       | 0       | 3       | 0       | 0       | 2      |
| Percent|      | 7.1  | 17.9  | 15.5   | 22.6    | 13.1    | 7.1     | 1.2     | 1.2     | 1.2     | 1.2     | 1.2     | 3.6     | 0       | 0       | 2.4     |       |

| TOTAL | Pr   | 2    | 7     | 3      | 2       | 2       | 0       | 1       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0      |
|       | Se   | 1    | 1     | 0      | 2       | 7       | 2       | 2       | 0       | 0       | 0       | 0       | 2       | 0       | 0       | 0       | 1      |
|       | Re   | 68   | 126   | 73     | 55      | 31      | 23      | 9       | 4       | 2       | 2       | 1       | 1       | 0       | 1       | 1       | 1      |
|       | Po   | 4    | 6     | 3      | 1       | 2       | 0       | 1       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 1      |
| TOTAL |      | 75   | 140   | 79     | 63      | 42      | 27      | 12      | 5       | 2       | 2       | 1       | 3       | 0       | 1       | 3       | 4      |
| Percent|      | 16.5 | 30.8  | 17.4   | 13.9    | 9.2     | 5.9     | 2.6     | 1.1     | 0.4     | 0.4     | 0.2     | 0.7     | 0       | 0.2     | 0.7     |       |
the limits of the circle. The results of the size categorization are presented in Tables 8-14. Of the collection from AS-21-5, 70% are 20 mm or smaller and only 4% are larger than 40 mm. From AS-21-49, only 40% of the flakes are 20 mm or less while nearly 17% are larger than 40 mm.

On the basis of the ETAP data on basalt debitage, we can make several generalizations. Three factors are informative regarding activities at residential sites, especially AS-21-5, Locality 2. These are (1) the small size of the flakes recovered, (2) the low occurrence of decortication flakes, especially primary decortication, (3) the occurrence of flakes with polished surfaces, and (4) flakes with dorsal flake-scar patterns suggesting detachment from larger tools. These factors indicate that reworking of broken or damaged adzes was carried out at the site. The predominance of very small flakes together with the high number of flakes with multiple dorsal scars and flakes with polish may indicate that much of the debitage was produced by reworking adzes rather than chipping due to use at the site. It seems reasonable that much of the work in which adzes are used would not take place in the midst of the residential area, but resharpening or modification of tools might well take place around the houses. The debitage also show that the final shaping of adzes probably took place to some degree, but there was little in the way of initial shaping. In other words, adze preforms were probably shaped near the quarry area although finishing work may well have occurred at residential sites. A similar conclusion was reached by Green (1974b:266-67) on the basis of debitage from sites in Western Samoa. The generally larger flakes at the slope site (AS-21-49) may indicate a higher occurrence of early stage reduction at that site. Undoubtedly, some of the debitage was produced by the manufacture of flake tools.

Green (1974b:266) has concluded that in Western Samoa the majority of flakes were the product of adze manufacturing and reworking rather than flake tool manufacturing. But far more flake tools have been recovered in eastern Tutuila (including Tulauta) than elsewhere. And if, as we have argued above, there was formality and patterning in the manufacture flake tools rather than simply selecting a piece of debitage and using it, then a larger quantity of debitage must be attributable to flake tool manufacturing and a smaller percentage to adze working than previously suspected.

**Microscopic Edge Analysis**

All of the basalt flakes collected during our field investigation were macroscopically examined for indications of edge damage. All flakes that showed even the slightest suggestion of retouch--including the formal flake tools--or use were examined under low power magnification (up to 40X) for indications of wear. For comparison, a randomly selected collection of flakes that showed no macroscopic signs of edge damage was also examined. A retouched edge has been intentionally flaked or chipped in order to better suit it for utilization. Edge damage owing strictly to utilization is difficult to identify in general, and especially on basalt (this is particularly true on the basis of macroscopic examination alone). Striations are unlikely to occur on rock as hard and coarse as basalt, and small chipping along the edges may occur with initial flake detachment or due to post-depositional factors. Consequently, the best evidence of use wear on basalt flakes is the occurrence of patterned chipping scars and smoothing of the lithic grains along the working edge. The scars of minute chips along the edge are particularly informative, as wear can show up by smoothing or rounding of the scar surface and edges. This type of smoothing should not be
present on flake edges that were not utilized. In some cases, extensive tool use can result in spots of sheen along the working edge.

The examination of the formal flake tools revealed that twenty had identifiable evidence of use wear, three had probable indications of wear, and on the remaining ten tools no good indication was observed, although in some instances there was questionable wear evidence. The two informal tools were identified on the basis of verified edge wear. A spot check of several of the adzes showed signs of use wear.

The most interesting finding is the presence of an organic residue on the edges of eight tools. The residue is purplish in color in most areas, but a slightly greenish residue is also present on at least three of the tools. This residue appears macroscopically--as a purplish stain--on three tools, and the microscopic examination revealed the residue on the other five artifacts. The artifacts on which the residue was found are one Class IA tool, the Class IIB tool, one Class V tool, both Class VI tools (on the lateral edges rather than the points), and all three Class VII tools. This residue was not found on the chisels or any of the adzes examined. Attempts to identify the residue were made by Dr. Thomas Freeman, a botanist, and Mr. Jay Bjerke of the Electron Microscopy Laboratory at North Dakota State University. Bits of both types of residue were removed from the edges of two of the tools and was then examined with a scanning electron microscope. That work indicated that the residue is definitely organic and almost certainly botanical. The possibility that the purplish residue is blood can be ruled out. We have not, however, been able to identify the specific plants from which the organic residue came.

OBSIDIAN

Obsidian use is characteristic of Lapita populations and carried into the early part of the cultural sequences of Tonga and Samoa. In both archipelagoes, however, the utilization of obsidian (a type of volcanic glass) eventually ceased. On the basis of collections from Western Samoa, Green (in Terrell 1969:168) has reported that obsidian in appreciable quantities occurs only in association with pottery. Furthermore, obsidian use appears to decline over time as indicated by the larger quantities associated with predominantly thin-walled, fine-tempered pottery assemblages and smaller quantities where thick, coarse-tempered pottery is most common (Green 1974a:148). A few pieces of obsidian have been reported from ceramic contexts, as well, but they appear to have come from disturbed contexts (e.g., Davidson 1969d:250; McKinlay 1974:33; Davidson and Fagan 1974:89).

Prior to 1986, no obsidian previously had been found in American Samoa. A total of 28 pieces of obsidian, accounting for 8.8% of the total lithic collection, was recovered from AS-21-5, Locality 2 (see Table 3). Of these, 25 were flakes and 3 were probable cores (Table 15). Green reports evidence of the bipolar flaking technique on Upolu materials which provides, he contends, yet another link with the Melanesian pottery sites of approximately the same time period. We found no indication of the bipolar technique in the 'Aoa collection, but given the small size of the sample, one cannot yet state whether or not that technique was used. Given the widespread use of the bipolar technique, and the difficulty of working small cores with the hand-held method, it would be more surprising if bipolar was not used.
TABLE 15. Distribution and sizes of obsidian flakes and cores from AS-21-5, Locality 2.
Size refers to millimeters in diameter.

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<thead>
<tr>
<th>LOCATION</th>
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<td></td>
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<td>10</td>
<td>15</td>
</tr>
<tr>
<td>1S, 1E</td>
<td>Flake</td>
<td>9</td>
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<tr>
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<td>Core</td>
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<td>1</td>
</tr>
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<td>2S, 7E</td>
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<tr>
<td></td>
<td>Core</td>
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<tr>
<td>III</td>
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<tr>
<td></td>
<td>Core</td>
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<td>-</td>
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<tr>
<td>TOTAL</td>
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<td>21</td>
<td>6</td>
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Flakes and cores from sites in Samoa are uniformly small. This is true of both the Upolu and the Tutuila collections. Data presented in Table 15 show that none of the volcanic glass specimens from 'Aoa is larger than 20 mm, and 75% are 10 mm or less. No edge damage from use or retouch can be seen on the 'Aoa specimens. The precise function of obsidian flakes in Samoa remains uncertain.

The surfaces of the 'Aoa flakes have a dull black gloss from weathering, but where fresh breaks occur the surface has a more glassy appearance. The obsidian is opaque when held to the light, even around the thin edges of the flakes. This material is probably quite similar to that described by Green for Upolu (in Terrell 1969:169). Trace element analysis was carried out on a sample of the obsidian from Upolu (Ward 1974). The results indicate that all of the obsidian came from a single source of unknown location; Ward can only rule out Tafani Island, Tonga, as the source. My suspicion is that the 'Aoa obsidian is local to Tutuila, and probably the eastern end of the island. The volcanics of Tutuila make it "a possible source of obsidian" even though an adequate deposit for quarrying has not been located (see Ward 1974:167). The occurrence of tiny natural pebbles at 'Aoa illustrates that obsidian is locally available.

The 'Aoa obsidian is clearly associated with pottery-bearing layers. At more recent sites, obsidian flakes were not found scattered amongst the other surface artifacts (they would, of course, be the most difficult items to find). In short, the pattern of association of pottery and obsidian characteristic of Upolu appears to hold for Tutuila. It is also interesting to note that the number of obsidian specimens is highest in the lowest levels. In AS-21-5, unit 75.2E, for example, obsidian constitutes 2.1% of the total lithic collection in Layer II, but constitutes 26.8% in Layer III. The pottery occurrence is also higher in Layer III, constituting 51.2% of the total artifact assemblage versus 10.7% in Layer II. There is clearly a strong association between pottery, obsidian, and early cultural deposits. The drop in obsidian use over time coupled with the increase in basalt debitage may indicate a changing pattern of resource use and valuation.

The full significance of the distribution of obsidian in Samoa cannot be precisely determined. It is difficult to make much of the presence and quantities of very small artifacts at sites in Samoa because of the lack of truly comparative data. Unfortunately, soil screening was not commonly practiced at sites in Samoa, especially prior to 1985. Excavations by the New Zealand team led by Green and Davidson (1969a, 1974) generally did not use screens because the muddy clay-rich soils precluded effective screening (Green 1974a:148; pers. comm.). For only two sites, both coastal, was it specified that screening (with one-quarter inch mesh) was carried out (Davidson 1969:15:225; Peters 1974:164). The excavations of the Utah projects of Jennings and colleagues (1976, 1980) also seldom used screens. Of the 15 excavation reports, only 3 specify screening, one with one-quarter inch mesh (Lohse 1980:24), one with one-half inch or three-sixteenths inch mesh (Smith 1976:62), and one with the size unspecified (Janetski 1976b:57). In another report, it is stated that no screening took place (Janetski 1976a:33). For all other sites, screening was not specified, and probably was not employed (Jesse Jennings, pers. comm.). Frost's (1978) excavations in Tutuila also did not utilize soil screening, although she believes that the careful excavation procedure would have lead to the recovery of obsidian had it been present.
(Frost, pers. comm.). Yet the differences in basalt flake recovery reported by Frost (1976) and Gould et al. (1985) suggest that more may have been missed than Frost suspects.

The lack of comparable recovery methods hinders interpretations of general patterns of obsidian use in the archipelago. The use of screens could have a significant impact on the recovery of small items, especially given the nature of the soils, the sometimes low level of experience of excavation crews, and the variability of crew expertise from one site to another. Obsidian flakes are particularly vulnerable because of their small size and dark color. Given the small numbers of flakes that are recovered at sites in Samoa even when screening is used, the absence of obsidian from excavated but unscreened deposits cannot be regarded as demonstrating that obsidian was not present in the deposit. Along with obsidian, small basalt flakes (especially tiny adze chips produced by use) and pottery (particularly very small sherds of the more delicate pottery) are also likely not to have been recovered when soils were not screened, or recovered in smaller numbers when one-half inch versus one-quarter inch mesh screens were used. The majority of the obsidian at 'Aca, for example, could have been passed through one-half inch mesh. It is interesting to note that only one site excavated by the Utah team yielded obsidian, and it was the ceramic site at which soils were sieved through one-quarter inch mesh screens. Frost's lack of screening might account for the apparent near absence of basalt debitage at Tulauta that was mentioned earlier, especially if the field crew was not alerted to the difference between human-produced flakes and natural spalls.

We would add here that we fully understand the difficulty of screening the Samoan clays, especially with mesh smaller than one-half inch. Our screening at site AS-21-49 went slowly, and at AS-21-5 we were able to progress without too much delay by using waterscreening for most of our soils. Nevertheless, the effort is important, and even when screening is simply precluded, that fact ought to be reported.

POTTERY

Analyses of ceramic collections from several sites in Western Samoa lead Green (1974b:250) to propose that decorated Lapita Ware gave rise to Samoan Plain Ware (a variety of the inclusive Polynesian Plain Ware) as the latter developed "by differentiation out of" the former. That development was marked by two trends—a disappearance of body decoration and a restriction of vessel form to simple bowls of various sizes (Green 1974b:249). The Plain Ware shows its own internal development "from a predominantly thin, fine ware variety of pottery with minimal decoration to a thick, coarse ware pottery with almost no decoration" (Green 1974b:250). The transition from thin-walled, fine-tempered pottery to thick-walled, coarse-tempered pottery took place slowly, and by the first century AD was largely complete. By around AD 200 or 300 (and perhaps as late as AD 500 to 600), pottery in Samoa had completely disappeared (Green 1974b:248). While Green views the differentiation of Polynesian Plain Ware from Lapita Ware as sufficiently marked to see the two as distinct though related, others follow Golson (1971) in stressing the continuity between the two, often by referring to Plain Ware as Lapitoid (e.g., Jennings 1980; Kirch 1982; Hunt and Kirch 1987). We would only add the observation that it has been nearly a decade and a half since Green argued for the distinction and
there are still no Samoan sites documenting the process of change from one pottery type to the other.

Although Green's initial distinctions between wares have been informative, they have not been easy to use beyond a largely subjective assessment. Certainly the decorated Lapita ceramics can easily be sorted out, but even at demonstrably Lapita sites the vast majority of sherds are, in fact, plain. At Mulifanua, for example, only 7.8% of the sherds were decorated (Green 1974c). Given such small percentages of decorated sherds, and a small sample of sherds from what might be a Lapita layer, an absence of decorated sherds may simply be a factor of sample bias. Consequently, with the absence of decorated sherds in a small pottery collection the only potential means by which one can suggest Lapita Ware rather than Plain Ware is by a high occurrence of very thin, fine-tempered sherds, and even that would be a tenuous means of assessment.

Similarly, within the Plain Ware one must ask how thin is thin and how coarse is coarse? No one has yet proposed a thickness range for thin versus thick, or a particle size range for fine versus coarse temper. Our analysis of the 'Aoa sherds showed that there are some sherds that cannot be easily classified and are what we would call "medium thick" and "medium tempered."

The complete sherd collection from 'Aoa has yet to be subjected to a detailed compositional analysis, but it is our hope that such an analysis will be carried out in the near future. In the absence of a detailed analysis, we will limit our comments to a few observations. A total of 119 pottery sherds were recovered, from site AS-21-5 in 'Aoa. Most of those (105) came from Locality 2, but others were collected at Localities 3 (5 sherds) and 4 (9 sherds). Only 11 rim sherds were recovered, but they, together with the shape of the body sherds, indicate that vessel forms were limited to simple bowls of various sizes (Fig. 30). None of the sherds had any surface decoration and none of the rims had any decorative treatment. Unfortunately, all of the sherds had been exposed to water (either in a stream, along the shore, or from the high water table), so many of them have weathered surfaces and some are very badly eroded. As a result, actual surface treatment is often difficult to discern. Nevertheless, a slip appears to be present on at least two sherds and probably several others. The slips are close to the color of the clay and thinly applied, so their presence is difficult to positively determine. Clay floating or wet smoothing of the surface is also indicated for several sherds. The difference between this treatment and slipping is difficult to make without microscopic analysis of thin sections, so we will only say here that as many 19 may have one form or the other of surface treatment.

In most cases the differentiation of fine versus coarse temper was easily made, but for some sherds the temper was somewhat in between. Some sherds of this intermediate type could be lumped with the coarse tempers and others with the fine tempers, but in both groups they would clearly constitute the limits of the range, and might be classified by someone else as belonging to the other group. Consequently, we have tentatively grouped those sherds that do not easily fit into one group or the other as "medium" temper. We have used this categorization sparingly so that only 5 examples have been noted. The differentiation of thin versus thick sherds is even more difficult to make for many of the sherds. Figure 31 presents a graph of mean sherd thickness for all of those sherd for which a mean could be reasonably acquired. That is,
Figure 30. Rim sherds: a and f, AS-21-5, Locality 3, b-e and g-i, AS-21-5, Locality 2. Drawn to scale.
rim sherds with varying thicknesses and sherds that are highly eroded were not included. Also indicated on this graph are the temper of the sherds. Figure 32 is adopted from a graph of mean sherd thickness of pottery from Manu'a presented by Hunt and Kirch (1987:Figure 22), although temper size is not indicated.

Several observations can be on the basis of Figures 31 and 32. First, in the 'Aoa collection most sherds are comparatively thin and fine tempered, and a small number are thick and coarse tempered. But a few sherds are thin and coarse-tempered while a few others are thick and fine- to medium-tempered. Second, the "thin fine ware" grades into the "thick coarse ware" rather than being distinctly separate. The very thick sherds were from very large vessels and that, rather than diminishing quality of manufacture, probably accounts for their size. Third, the clear majority of sherds are comparatively thin. For example, 20.5% of the sherds are smaller than 6.1 mm, 44.6% are between 6.0 and 7.5 mm in thickness, 25.3% are between 7.6 and 10.5 mm, and only 9.6% of the sherds are greater than 10.5 mm thick. Fourth, a comparison of Figures 31 and 32 illustrates quite clearly that the 'Aoa assemblage is a thinner ware than that from Manu'a. Whereas 65% of the 'Aoa sherds are smaller than 7.5 mm, none of the Manu'a sherds fall into this size range. Given Green's argument for a transition over time from predominantly thin fine ware to thick coarse ware, the 'Aoa assemblage would appear to be earlier in time than the Manu'a assemblage. In addition, the presence of a number of very thin-walled (less than 6.1 mm), fine-tempered sherds strengthens the assessment of an early age for the assemblage.

In 'Aoa there was no pattern of stratigraphic differentiation of thin and thick wares; both ends of the range were found throughout. Jennings (1980:144) has reported that the Western Samoa ceramic sites excavated by the University of Utah show that there is an early occurrence of coarse sherds and the two sherd types co-occur with the coarse sherds "increasing only slightly toward the tops of the deposits." We see no reason to doubt that on the whole, assemblages dominated by thin-walled, fine-tempered sherds tend to be earlier in time than assemblages in which thick-walled, coarse-tempered sherds predominate. Yet we would stress that the transition is probably a gradual one reflecting changing attitudes, values, and skills. The ends of the continuum aside, assemblages may not neatly fall into one "ware" or the other. Upolu site SU-SA-3, Layers 4 and 5, may be somewhat unusual in this regard, unless the two layers are more widely separated in time than the radiocarbon dates suggest (see Green 1974a). (We would note here that the dates are few and the layer 5 date is particularly troublesome given the nature of the charcoal dated.) The use of the terms "thin fine ware" and "thick coarse ware" runs the risk of portraying these groupings as distinct types rather than as variations differentially represented over time in a single changing ware, Polynesian Plain Ware.

OTHER MATERIALS

Artifacts of shell, bone, coral, and sea urchin spine have been reported for some sites in Samoa, but are rare everywhere. It is of these materials that items of fishing gear are most likely to have been manufactured. Such items are notoriously few in Samoa. Only a few sites—where sand rather than clay or clay loam is the matrix—have produced any fishing-related artifacts.
Figure 31. Frequency distribution of mean sherd thickness with temper sizes indicated. Sherd collection for site AS-21-5, Localities 2, 3, and 4.

Figure 32. Frequency distribution of mean sherd thickness without specification of temper size. Sherd collection from Manu'a. (Adopted from Hunt and Kirch 1987:Fig. 22).
and even those sites have yielded only a handful of artifacts each. It is not surprising, therefore, that we found no fishing-related or other artifacts made of shell, bone, coral, or sea urchin spine.

**Chronology**

Four charcoal samples from excavations at AS-21-5 were sent to the radiocarbon laboratory at the University of Illinois, but results are not yet available. Three of the samples came from unit IS1E, Layer II. Unfortunately, these were all from above the pottery-bearing layer in the unit. We were unable to collect sufficient charcoal for dating from the ceramic layer of either of the units. The fourth sample submitted was collected from a charcoal band of a ceramic layer in the stream bank. The problem there, however, is that the sample was extremely small and may not be large enough to provide a good measurement.

Pottery types constitute a second source of chronological information. By comparing the 'Aoa assemblage with reported pottery collections from Western Samoa and Manu'a, we tentatively propose that the beginning of the ceramic period occupation of site AS-21-5 is likely to date to the first half of the first millennium BC. That assessment is based on the high occurrence of comparatively thin-walled fine-tempered sherds, together with the presence of some thick-walled coarse-tempered sherds. As noted in the Artifacts discussion above, the 'Aoa assemblage is likely to be earlier in time than the assemblage from Manu'a. Since the Manu'a assemblage dates to the first century AD (Hunt and Kirch 1987:39), this would suggest an initial date for 'Aoa sometime prior to AD 1. Such an assessment is also in line with expectations based on data from Western Samoa (Green 1974b, Jennings et al. 1980). Two additional points of interest are the occurrence of very thin, fine-tempered sherds, and the fact that the number of coarse-tempered sherds from AS-21-5 drops from 17 (14.3% of the total) to only 9 (7.8%) when we consider only Locality 2, which was where the excavations took place. Both of these points suggest the earlier end of the Plain Ware phase for the earliest cultural deposits at the site.

The absence of pottery (and obsidian) from the terrace site of AS-21-49 indicates that that site was not occupied until after the abandonment of ceramics in Samoa. Our failure to find sherds on the surface at all other terrace and ridge-top sites suggests that the occupation of these areas in general was in the post-ceramic period. Similarly, despite a directed effort to find pottery in surface collections and in the small sediment samples retrieved from coring in the valley bottom, only the Localities in the eastern lobe of the valley yielded any evidence of pottery. Consequently, we tentatively propose that the major part of the valley—that is, the valley area to the west of Puna Stream—was not occupied until the post-ceramic period, or after AD 300-600.
Coring

The importance of geomorphology for adequately understanding human settlement and the human-environment interaction in a given region has recently been established for Oceanic prehistory. Investigations by Clark and geologist John C. Kraft (Kelly and Clark 1980; Clark 1981b) at Kawaihi in Hawaii, Spriggs (1981) at Anetuyum in Vanuatu, Kirch and Yen (1982) on Tikopia, and others have indicated significant modifications of the landscape as a result of human activities. Studies of geomorphology can potentially address questions regarding the nature of soil deposition and the rate of sedimentation in valleys in response to soil erosion stemming from agricultural practices. They can also contribute to an assessment of the possibility of geological and eustatic processes which would have impacts on human settlement patterns.

To collect data on geomorphology, we carried out a soil coring program. Four coring transects (designated CT1 through CT4) were established through the valley to provide systematic data collection. Cores were taken at coring stations that were located at set intervals and sequentially numbered. If more than one core was taken in the vicinity of a station, it was distinguished by a decimal number (e.g., CT1-6.2). Occasionally a transect line had to be altered in order to avoid a house, dense vegetation, or marshy ground. In addition to the transects, three other cores were taken (designated miscellaneous coring stations, or MCS-X) at selected locations in order to give a quick view of soil stratigraphy, with the intent of checking for buried marine sand and cultural deposit. Each of the transects, as well as the MCSs, are summarized below, and their locations are illustrated in Figure 33.

The soil descriptions given are based entirely on field observations. Detailed pedological characterizations (e.g., particle size analyses, soil structure characterizations, organic matter content, etc.) would undoubtedly be valuable for better understanding of the changing geomorphology evidenced by the coring. Hydrochloric acid was used to test for the presence of calcareous sands.

Coring Transect 1

This transect roughly corresponded to a true north-south line that runs from the shore to the ridge at the rear of the valley. The coring stations were established at 15.25 m (50 ft) intervals, although in a couple of instances cores could not be taken because of the rocky or compressed ground. In general, the ground surface over which the transect ran rose almost imperceptibly to the ridge slope, giving an elevation range of from sea level to 4.6 m (ca. 15 ft).

The first core, CT1-0, was established at the shoreline, a meter or so from the water's edge. The second coring station, CT1-1, was located just inland of the beach crest, at the 1.5 m (5 ft) contour line. The next station, CT1-2, fell in the middle of the coastal auto track where the ground was too compacted for coring deeper than a few centimeters. From CT1-2 to a point 10.7 m (35 ft) beyond CT1-5, the ground surface rises very slightly. At the point referred to, however, there is an abrupt drop of nearly a meter, beyond which the ground surface rises very gradually. At CT1-7, the transect
line had to be shifted 15.25 m (ca. 50 ft) to the west in order to bypass a
grove of dense pandanus. At CT1-11.0 the coring could not penetrate deeper
than a few centimeters due to buried rocks (perhaps from an old house
foundation), so CT1-11.1 was established at 9.75 m (32 ft) inland of CT1-10.
CT1-12 was put in at its proper transect station (i.e., 30.5 m inland of
CT1-10), and the 15.25 m interval was continued. CT1-16 was located
approximately at the 3 m (10 ft) contour. From CT1-16 to CT1-20, a distance
of 106.7 m (350 ft), the ground rises to 4.6 m (15 ft) above sea level, at
which point the valley floor meets the ridge slope. The 'Aoa marsh, with its
inland boundary formed by the valley ridge, covers the inland two-thirds of
this last stretch. We were able to establish CT1-19 just into the marsh, but
we could not move farther into the marsh for coring. Coring (CT1-20) was
attempted on the far side of the marsh, at the base of the slope, but the
ground was too rocky to get deeper than several centimeters.

The results of the coring were extremely enlightening. The core
characterizations are illustrated in Figures 34. For descriptive convenience,
the cores are divided into three sets: the lower valley set, the middle valley
set, and the upper valley set.

The lower valley set of cores, CT1-0 through 1-6, run from the shoreline
to just before a slight drop in elevation (ca. 1 m). The cores of CT1-0 to
1-4 were all relatively shallow. These cores contained sand, although a loam
content comes in and increases as one progresses inland along the transect.
CT1-0 hit coral, but it could not be determined if the coral was a large chunk
or an old reef. The first three attempts at CT1-3 (3.0-3.2) hit a solid
material that seemed to be rock at 25, 75, and 58 cm below surface (bs), but
the fourth attempt (3.3) penetrated to 139 cm before hitting basalt. CT1-4
hit what appeared to be basalt at about 80 cm. At CT1-5, bedrock was not
reached and coring stopped at 202 cm because of difficulty in penetrating the
compact sand at that depth. In cores 3, 4, and 5, cultural deposit—indicated
by dark sand to sandy loam containing charcoal bits and ash—overlay sterile
sand or rock.

Three interesting points emerge from the lower valley cores. The first
is that the sediments were predominantly sand although silt and clay particles
make their appearance in the more inland sediments. In all cores the sands
present were calcareous 'beach sands,' which is to say that they were medium
to fine sands nearly identical to the sands along the beach at 'Aoa. These
sediments fall into the Ngemebus Series soils, and the Soil Conservation
Service (SCS) type-location for this series is at 'Aoa, 15.25 m inland and
approximately 122 m (400 ft) west of CT1 (USDA 1984:50) (see Fig. 33). The
SCS describes the typical pedon as 0-12 inches mucky sand overlying 12-60
inches of sand. The term 'loam sand' is used here rather than 'mucky sand'
since it better expresses the actual character of the soil, which lacks
significant organic material. The second point is the presence of buried
cultural deposit, evidenced by charcoal and ash, in CT1-3, -4, and -5.0. It
seems likely that this cultural residue contributed to the SCS attribution of
'mucky' to the sands. The third point of interest is that comparatively
shallow basalt and/or coral was encountered in many of the cores (CT1-0, -3.0,
-3.1, -3.2, -3.3, -4), including the SCS effort which reports bedrock at 60 cm
or more.

The middle valley cores, CT1-6 through 1-11, extend from just beyond the
elevation drop to just sea-side of the East Vaitolu Stream. These cores
KEY FOR FIGURES 34 and 35

SOILS

s -- sand
ls -- loamy sand
si -- sandy loam
scl -- sandy clay loam

l -- loam
cl -- clay loam
lt -- silt loam
to -- silty clay
tol -- silty clay loam

OTHER

ch -- charcoal

o -- organic matter

sh -- shell

quit. -- cultural deposit

Co -- coral
R -- rock
LS -- lost sediment

SCALE

Depths given on verticle scale are in centimeters below surface. One verticle inch equals 40 cm.
Figure 34. Core characterizations of Coring Transect 1.
Figure 34 continued. Coring transect 1.
Figure 35. Core characterizations of Coring Transect 3.
Figure 35 continued. Coring Transect 3.
represent a transition from lower to upper valley sediments. The coring station of CT1-6 fell on the low side of a slight drop in elevation. Four cores were taken in the vicinity of CT1-6. The first, 6.0 came at the normal interval, 6.3 was placed 5.5 m (18 ft) farther south, 6.1 was put in the midst of a surface scatter of artifacts and midden 15.25 m to the east of 6.3, and 6.2 was shifted 8.5 m (28 ft) north of 6.1. CT1-6.3 had the deepest penetration and its sediments give a glimpse of what would become a new pattern in the cores. The silt and clay content of the upper sediments increased and the sand component decreased. In the lower sediments (below a depth of 1.40 m) the sand content increased, some organic matter was present, and abruptly (at 1.87 m) the silt loam constituent all but disappeared. The new layer was fine to very fine sand that was so compacted that penetration beyond the first few centimeters was very difficult and could be accomplished only with an auger bit. This sand is quite similar to sands of bay floors.

It is also interesting to note that from CT1-6 onward the water table created some problems in coring. In each core, the sediments would eventually become moist, then very wet, then moist again. In some instances, the underground water washed out cores completely, but subsequent attempts usually resulted in successful core retrieval. The depth at which water was encountered and the degree of wetness varied with location in the valley (the farther inland, the deeper the water table), the time of day that coring took place, and the amount of rain that had recently fallen. In general, moisture was often encountered around 0.5 m (+/- 10 cm) below the surface, but washed-out cores were always more than a meter deep.

The core at CT1-7 hit rock or very dense clay loam at 1.06 m, but deep penetration was again achieved at CT1-8. At CT1-8, the upper sediments were loamy sand. From 1.26 to 1.61 m bs there were alternating bands of loamy sand and sandy loam tending toward silt loam. Small bits of organic matter, some of which were possibly charcoal, were present in small amounts. Below 1.61 m there was compact fine sand. In CT1-9, loam to sandy loam overlay a band of sandy loam, which overlay loamy sand. Bits of organic matter were found in the upper few decimeters of the core, and then again in the sandy loam and loamy sand. The core was terminated at 1.56 m where a piece of coral was hit. The cores at CT1-10 and -11 were fairly similar: sandy clay loam overlay loamy sand, which was above sand/loamy sand, that overlay sand/fine sand.

To summarize, the cores of the middle valley showed a transition from sand, through sandy soils, to clay loam. Evidence of human occupation was often present at or near the surface, but buried cultural deposits are not clearly indicated. However, as the coring at CT3-1 (below) indicated, cultural deposits will clearly be indicated only when the deposit is very darkly stained and/or there is abundant charcoal and ash.

The upper valley cores of CT1-12 through -17 showed a new pattern. The sand component of the upper sediments was greatly diminished. In general, clay loam overlay siltly clay loam to silt clay loam/clay loam that was very compact and usually required augering for penetration. This soil was often gritty, and contained pieces of reddish orange, decomposing volcanic material. The next layer encountered was a wet, sludge-like silt loam. Bits of charcoal and organic matter were usually present, although seldom abundant. This is, or is very similar to, a lagoonal mud. In most cores there was a band of mixed mud and sand that usually graded from sandy loam to loamy sand, and contained charcoal and/or other organic matter. Underlying that, or the silt
loam directly, was sand. This was a very compact, fine to very fine sand of 
the bay floor variety. In some cases, much less compact, medium to fine sand 
graded into or overlay the finer sands.

The coring at CT1-18 could not penetrate more than a few centimeters due 
to excessively stony ground. This core fell in the midst of what may have 
been an old, shallow stream bed. CT1-19 was established a short distance into 
the marsh. The sediments were wet throughout and had a higher silt content 
than in previous cores. Buried sand was not reached, but seems likely to lie 
Deeper than the 2.24 m maximum extent of our probe. We were unable to advance 
further into the marsh for additional coring. A final core, at CT1-20, was 
attempted on the far side of the marsh, near the base of the ridge talus. 
Several cores were attempted but none was able to penetrate more than 15-25 cm 
before hitting rock.

CORING TRANSECT 2

This is a short transect of four cores that was established to run 
 inland, across the malae, to site AS-21-5, Locality 2. We found, however, 
that the sand of the malae was too compact to allow penetration. In addition, 
with one exception, the ground inland of the malae was too stony for deep 
coring. No cores were attempted between CT2-4 and CT3 because of the 
stoniness encountered in CT2-3 and 2-4, and because we were informed by 
residents that the area up to or near the Puna Stream channel had been 
bulldozed at the time of the construction of the LMS Church and minister’s 
house.

CT2-1 was located some 38 m (125.5 ft) from the shoreline. The entire 2 
m of the coring was through calcareous sand. At 67 to 98 cm bs, a dark sand 
layer was encountered that looked like a cultural deposit. At 1.82 m, 
compacted very fine sand was encountered. No other stratum differentiation 
could be discerned.

Because of the malae compactness, the next coring station, CT2-2, was 
located on the inland side of the malae, some 87 m (286.5 ft) from the shore. 
The soil profile was quite different from that seen at CT2-1. The calcareous 
sand layer was only 7 cm thick and overlay a layer of sandy loam. Next came a 
layer of silty clay/clay loam. At 65 cm bs there was an abrupt transition to 
calcareous sand, but at 88 cm bs another clear boundary marked the beginning 
of sandy loam that graded into loamy sand before abruptly changing again to 
clay loam. This latter layer contained abundant organic matter and was very 
stony and gritty (basaltic). The grit and sand content increased below about 
1.7 m bs. Coring was terminated at 2.07 m when rock was encountered.

CT2-3 was located 55 m (180.5 ft) inland of 2-2, in the midst of houses 
on the inland side of the malae. Despite several coring attempts, the deepest 
the probe could get before hitting rock was 51 cm. In all cases, a layer of 
loamy sand overlay a cultural layer of very dark loam with abundant charcoal 
bits. Below that was a clay loam layer that was lighter in color, lacking 
charcoal, and quite stony, including pieces of decomposing stone.

A fourth core was attempted 10.7 m (35 ft) beyond 2-3. The sediments 
encountered were thin layers of loam, then sand, then loam, all overlying a
thick layer of clay loam. The latter layer was compact and stony, and charcoal flecks were seen in the lower 35 cm. Rock was hit at 72 cm bs.

CORING TRANSECT 3

This transect ran across the valley, roughly perpendicular to CT1 and parallel to the coast. Coring stations were placed at 30.5 m (100 ft) intervals except where ground or vegetation conditions forced deviation. The transect began at CT3-1, which was located in the midst of site AS-21-5, Locality 2, at about 4.6 m (15 ft) above sea level. About 23 m (75.5 ft) to the east, the ground drops to 3 m in elevation, and most of the transect crosses land that lies between 1 m and 3 m above sea level. CT3-15, -18, and -17 fall at 3.0 m or slightly higher, and 3-17 is within 18.3 m (60 ft) of the western ridge of the valley. CT3-12 and CT3-13 were separated by 61 m (200 ft) since CT1-14 fell very close to this line and only 23.8 m (78 ft) west of CT3-12. The CT3 core characterizations are illustrated in Figure 35.

CT3-1 was located at the datum point for site AS-21-5, Locality 2. The core revealed a profile that corresponded to the general stratigraphy seen in the excavation units—i.e., overburden of stony clay loam, then dark cultural deposit in clay loam, and then clay loam down to 218 cm bs. Excavation at the site demonstrated that while the third layer of clay loam lacked the dark color and other indications of cultural deposit seen in the layer above, it too was an artifact producing layer. Consequently, coring is of limited value in identifying buried cultural deposits in clay loam of silt loams—in light-colored sands cultural deposit is much more easily seen. No buried marine sand or sludge-like silt loam layers were encountered. Neither was a buried sand layer seen in the stream bank. Consequently, the old embayment did not extend to this area. Coring was attempted farther east along the transect but the ground was too rocky for more than shallow penetration.

At CT3-2, the coring could not get deeper than 25 cm before hitting rock. We were informed that this area was previously low and subject to flooding but was filled in many years ago. We had hoped to penetrate the fill to undisturbed soil but were unsuccessful despite several attempts.

CT3-3 fell west of the village road and in land unaffected by infilling, although the top 19 cm of sandy loam may have been disturbed by the construction of a house that lies just 3 m to the west. A very loamy sand/sandy loam came next and appeared to be undisturbed. By 37 cm bs, the silt and clay substantially diminished, and by 55 cm they were largely absent. Below about 35 cm, the sediments are very wet and only partial cores were retrievable. At 120 cm there was a transition to moderately compacted very fine/fine sand. The sands that began at 37 cm bs were marine formed and represent an old beach deposit.

From CT3-3 westward a clear pattern can be seen in the soil sediments—a pattern that is very similar to that seen in CT1. Although the particulars differed from core to core, the sequence of sediments was fairly consistent. First, the calcareous sand component in the soil diminished then disappeared in the upper layers as the clay and silt composition increased. The upper sediments consisted of some combination of loam, clay loam, sandy clay loam, and/or silty clay layers. The differences are due largely to the location of the cores with regard to the coast, the ridge, and the valley flats. Much of
the middle section of the transect is over low ground that is subject to frequent flooding. Some of the difference, however, may be due to the fact that these characterizations are based solely on field observations that were often separated by many days. These layers overlay wet silt loam, similar to lagoonal mud or muck with some charcoal and other organic material. Next came burned calcareous sands that appeared progressively deeper to the west until they could no longer be reached by our coring probe. These sands usually graded from sandy loam to loamy sand to medium sand to compact very fine to fine sand. In CT3-15 the silt loam layer was reached but not the sand layer. In CT3-16 and CT3-17, neither the silt loam nor the sand layer was reached, both layers apparently lying deeper than our probe could reach.

CORING TRANSECT 4

This transect angled into the southwestern corner of the valley. Five cores were taken; the first four were at 30.5 m intervals but the last, CT4-5, was only 19.8 m (65 ft) from CT4-4. The terrain over which the transect ran ranged in elevation from just under 3 m above sea level to about 7.25 m. CT4 was established in order to check for evidence of the old embayment and for buried cultural deposit.

CT4-1 was located about 33.5 m (110 ft) north of the CT3 line. The soil sediments revealed were quite similar to those seen in the western section of CT3 and in the upper valley cores of CT1. That is, the layers encountered were loam, clay loam, silt loam (with organic matter and charcoal), silty clay loam/silt loam, and loamy calcareous sand. The latter layer was reached at a depth of 2.02 m.

Two cores were taken at CT4-2, with 2.1 situated 5.5 m east of 2.0. Both cores were similar to 4-1, but were terminated by buried rock when still into silt loam/silty clay loam and thus did not reach loamy sand or sand. While CT4-3 reached the maximum probe depth of 2.24 m, sand was still not reached. Nor was sand reached in CT4-4 or CT4-5. In CT4-4 rock was hit at 1.02 m, and CT4-5 was stopped at 1.70 m when we hit what felt like gravel.

Attempts were made to core at CT4-4 plus 27.5 m and 30.5 m but the ground was too rocky to get deeper than several centimeters. Since those points were on the ridge talus, our inability to penetrate the stony ground was not unexpected. No further coring attempts were made in this area.

MISCELLANEOUS CORING STATIONS

Three isolated cores were taken to check for buried cultural deposit and buried calcareous sand. Miscellaneous Coring Station #1 (MSC1) was located 15.25 m east of the western edge of the marsh and about 60 m north of the southern ridge. In the deepest core, the sediments went from sandy loam to loam to clay before hitting rock at 127 cm bs. Bits of charcoal and some other organic matter were found in the clay loam. Other coring attempts in the vicinity could not get very deep due to the stony ground. Given the proximity to the slope and the colluvium, the stony soil was not surprising and no further coring was attempted.
MCS2 was situated at about the 4.5 m contour, approximately 80 m (262.5 ft) north of the south ridge base and 84 m (275.5 ft) from the base of the east ridge. Again, stony colluvial deposits prevented deep penetration. After a few attempts we were able to get to 62 cm bs before hitting rock. Only loam and clay loam were revealed.

Coring was attempted at MCS3, located roughly 9.5 m (31 ft) north of the south slope, and 33.5 m (110 ft) east of the valley road. We were unable to core deeper than about 30 cm before hitting rock.

SUMMARY

The sediments of the coring transects revealed a picture of dramatic geomorphological change in 'Aoa. The buried calcareous sands indicate that an embayment once stood over most of 'Aoa valley. The actual bay shoreline cannot be precisely determined on the basis of available data, but a suggested outline is given in Figure 36. This postulated shoreline is based on current geomorphological conditions as well as coring data. As indicated in Figure 39, a partial barrier probably extended across the western side of the bay. The lower valley cores of CT1 and the Soil Conservation Service profile, indicate comparatively shallow bedrock. This may be a buried projection of the basalt spur forming Le'ile 'Kau Point. This basalt projection acted as a barrier that promoted the accretion of calcareous sand around it. How far eastward the accretion barrier extended can only be guessed. The land protected by the breakwater (which now provides foundation support for the Olomana Elementary School) has undergone some intentional infilling. The area of the small estuary was probably the center of a bay opening that may have extended some 100 m on either side. The bay was shallow in the east and gradually deepened to the west. Waters along the accretion barrier were somewhat deeper than in the east, and the depth increased toward the rear valley ridge. The deepest part of the bay was in the southwest corner.

The coring sediments show that the bay floor sands are overlaid by loamy sands and/or sandy loams. These sediments represent the infilling of the bay. Cores from both CT1 and CT3 further show that in the middle and upper portion of the valley, these loamy sands were overlaid by a sludge-like, almost mucky, silt loam. This build-up of silt loam was not found near the accretion barrier or along the eastern shoreline. Above the silt loam are silty clay loams and clay loams. Because of the substantial bay closure caused by the accretion barrier, erosional sediments from the surrounding slopes accumulated in the bay. The bay shallows would have filled with deposits fairly early, and the accretion barrier probably closed further, thus exacerbating the developing conditions. The deeper portion of the bay was eventually transformed into a backbarrier lagoon. The lagoonal formation developed into a marsh that shrank over time, eventually reaching its present size. The fact that there is no true peat layer—indeed, the organic matter content in the silt loam is not substantial—suggests that the transition to valley floor was rather rapid.

The implications of this descriptive model of geomorphological transformation for human settlement are explored below.
DISCUSSION

This discussion will deal with two major areas of concern to emerge from the project. One is the nature of star mounds, a particular concern to Hendrich, and the other is the geomorphological change evidenced for 'Aoa, an issue of interest to Clark. In this section of the report each of these concerns will be addressed, although the former is dealt with at much greater length. For both areas we feel the project has lead to extremely important findings and clearly shows the need for future research.

Star Mounds

This survey brings the total number of "star mounds" that have been recorded in the Samoan archipelago to sixty-five. "Star mounds," or "cog mounds," have been identified in Western and American Samoa (Green and Davidson 1969a, 1974; Jennings et al. 1976, 1980; Frost 1978; Clark 1980). One star mound was found on the island of Manono, eight on Savai'i, and thirty-one on Upolu. Until recently, only nine star mounds had been reported for Tutuila, all found on the Tafuna Plain (Frost 1978; Clark 1980). With the sixteen mounds found during the eastern Tutuila survey, however, the recorded total for the island now stands at twenty-five. Additionally, the number on Tutuila is probably much higher as we know of three others behind Sa'iliela and Frost (1978:67) notes that there were many more in the Tafuna area that went unrecorded.

The mounds around 'Aoa are in some senses different from the mounds found at Tafuna. To begin with, all but one of those mounds are said to be constructed entirely from rock fill, while the mounds around 'Aoa were composed either of soil fill or were apparently built up as part of the ridge; they were usually faced with stacked basalt rock. Second, six of the previously reported mounds were found on relatively flat ground, while only two were located on low ridges. Finally, the number of arms on those mounds varied from three to seven, while the number of arms on the 'Aoa mounds varied from four to ten, possibly eleven.

The terms "star mound" and "cog mound" have generally been taken to designate any mound composed of rock or earthen fill and which usually has a stone facing of anywhere from one to about fourteen courses high. In addition, these mounds, or 'ti'a, have projecting arms, or rays, that average about 3 m long and 3 to 4 m wide. The number of arms on such mounds generally has been found to vary from four to eleven. Most frequently, the arms tend to be squared-off at the end or to exhibit a rather blunted roundness. This squared-off aspect of the arms seems to be purposeful in design and not merely a matter of erosion. Rarely do the arms taper to a sharp point. Of the mounds that have been described in sufficient detail, most have eight arms.

For nearly twenty years there have been various attempts to construct a satisfactory interpretation of the meaning and function of these mounds. There is no known primary ethnographical source that describe these mounds or any like them in any detail (Frost 1978:67, 250; but see Davidson 1974b:205, for one possible instance). Previous investigations of star mounds have primarily focused on three interrelated aspects of investigation: descriptive surveys, functional analyses, and structural analyses.
Descriptive surveys constitute the bulk of the work that has been carried out on star mounds. The aim of such surveys is to determine the number, size, dimensions, and locations of star mounds. Surveys can be purely descriptive or can be driven by attempts to test scientific hypotheses.

Functional analyses attempt to establish the particular use function or range of use functions of a given site or sites. These investigations often utilize analogies from the known function of contemporaneous sites that are related culturally and geographically to sites that are structurally the same as or similar to the archaeological sites. Along with such analyses goes the not-unproblematic assumption that there is some relationship, however loose, between a site’s structure and its function. Ethnohistorical data are also often integral to attempts to provide a functional interpretation for a site. Ideally, any given interpretation should be explicit enough that it is open to testing. For example, to say simply that a site had a ritual function is an almost vacuous claim since almost any archaeological site can be interpreted in this way. Specific claims about the rituals that are supposed to have taken place are necessary if the term “ritual” is to be more than the mere label of a catch-all category where all functionally problematic sites are thrown.

Structural analysis consists of detailed descriptions of the entities in question and an attempt to analyze the relations between similar entities, as well as the relationships between the sites and their environmental context. The perspective of such studies is analytical and involves attempts to place the archaeological entities within formally defined categories. Davidson’s (1974b) article on “specialized” sites is an example of such an analysis. She proposes a category that, based on her analysis of various “irregular structures” and “star mounds,” places these sites together as a single structural type. The utility of any given structural categorization is, of course, subject to modification and even complete rejection based on the analysis of additional empirical data and the forwarding of a more reasonable alternative.

It should be noted that all three of these types of analyses are usually pursued by archaeologists, though, depending on the interest of the archaeologist and the nature and state of any given investigation, more emphasis may be placed on one aspect rather than another. Ultimately, however, any one type of analysis is often highly intertwined with and dependent on the others.

FUNCTIONAL INTERPRETATIONS

To “explain” the star mounds, four preliminary hypotheses have been proposed in the literature (Peters 1969; Holmer 1976b; Frost 1978). It has been suggested that the mounds may have functioned as burial mounds, residential structures, pigeon-catching mounds, and for ritual divination. As of this writing, however, none these hypotheses has been adequately tested. Preliminary investigations by Peters (1969), Holmer (1976b), Frost (1978), and Hewitt (1980a) have cast doubts on the first and second hypotheses. Peters, Holmer, and Hewitt conducted test excavations on the island of Upolu while Frost’s work was carried out on Tutuila. No supporting evidence for interpreting the star mounds as either burial mounds or residential structures was found. In addition, current Samoan burial practices cast further doubt on the burial interpretation since Samoans often bury their dead next to their
homes rather than out in the bush where star mounds are most frequently located (McKinlay 1974:31; Holmes 1974:92; Turner 1984:147). The residential occupation hypothesis also has very little evidence to support it in that very few artifacts have been recovered from these sites and no evidence of postmolds for structural supports has been found.

Holmer's (1976a:31) excavation did provide positive information concerning the time period in which one star mound was constructed. Two radiocarbon determinations place the date of mound construction at about A.D. 1500 (Holmer 1976a:31). The current view is that star mounds were constructed late in Samoa's prehistory (Davidson 1974c:243; Holmer 1976a:31; Frost 1978:75).

The third and fourth hypotheses—pigeon catching and ritual divination—have had little formal testing or investigation other than some very suggestive remarks made by Davidson (1974b:205). The following will consist of a review of the current literature and additional exploration of these two hypotheses. It will be seen that they are closely related and that it may actually be artificial to separate them into two distinct competing hypotheses as suggested by Holmer (1976b:49) and Hewitt (1980a:41).

Hypothesis three originates from the fact that many of the researchers that have described the star mounds reported that their Samoan workers told them that the mounds were used for pigeon catching (Davidson 1974a:191; Peters 1969:221; Buist 1969:40). Scott (1969), Davidson (1974b), and Frost (1978) took the matter further and conducted limited surveys of the ethnographical literature in attempts to see if pigeon hunting was indeed practiced on star mounds. The literature that was surveyed was preceived as inconclusive since no accounts of pigeon catching were ever explicitly described the use of star-like mounds, although some sources did mention ti'a (mound or cleared area) and ti'a seu lupe (pigeon catching mound) (Pritchard 1866:161; Buck 1930:534). These surveys did, however, add a new dimension to the problem. It was found that pigeon hunting was a very popular "sport" which apparently had ritual or ceremonial significance (Scott 1969:89).

Davidson, for instance, provided evidence that ritual was associated with pigeon catching, and possibly a star mound, by quoting from a missionary's journal entry of Feb. 3, 1836. It is related that pigeon snaring on a stone mound was conducted to divine the outcome of a war. In addition, the bodies of the dead were also said to have been temporarily placed on the same mound. The mound on which these activities took place was described as follows,

It is an immense pile of stones of several hundred yards. We could not well estimate the extent on account of the thick bush in front. The side which we passed projected in several places like buttresses of three or four yards in extent each about 12 or 15 yards with niches in between [Platt MS 1835-36:entry for February 1836 quoted by Davidson 1974b:205].

It should be pointed out that divining the future outcomes of wars was not uncommon and signs other than pigeon snaring were seen as telling the outcome of contemplated attacks (Turner 1984:44). Furthermore, Davidson (1974b:205), citing Kramer (1902:23), notes that the pigeon was known to be the representation of a number of Samoan mythological entities, including the
war god Vave. Thus, it seems reasonable to imagine that the outcome of a competitive “sport” such as pigeon catching could be viewed as foreshadowing the future outcome of something as competitive as warfare.

It is at this point in the argument that previous authors have stopped. The literature provides little else in the form of explicit argumentation concerning the function of star mounds as pigeon-catching structures either with or without the addition of ritual. It is possible, however, to cite additional evidence for the idea that the mounds were used for pigeon hunting and ritual.

First, the following quotes illustrate the idea that pigeon catching though “amusing” also had a sacred aspect to it.

One of the most popular of Samoan amusements is pigeon catching. There are places in the wood expressly prepared for, and devoted to the sport from time immemorial, called Tia. Great preparations are made for the expedition, which may remain on the hills for a month or more. Pigs, yams, taro, and breadfruit are cooked in abundance; and nearly all the people of the village accompany their chiefs. Arrived at the ita [sic], the bush is cleared off, huts run up, and stones placed, to form the circle round which the chiefs sit in ambush, under green boughs, cut fresh every day from the trees. By his side each chief has his tame pigeon, perching on a stick about three feet long, and with some fifty yards of string attached to its legs; and before him lies a bamboo, thirty or forty feet in length, to the small end of which is fastened a net bag. When all is ready, and after a drink of ava all round, the tame pigeons are thrown up to fly together, while the chiefs hold the strings in their hands and with a gentle jerk make them wheel around and round the circle very prettily. The wild pigeons are attracted, and fancying they are hovering over food, flock in amongst them. One chief after another then raises his net to entangle the wild birds, and the man who catches the greatest number is the winner [Pritchard 1886:161-2].

Pigeon catching was another amusement, and like our English falconry of other days, in which the chiefs especially delighted. The principal season set in about June. Great preparations were made for it, all the pigs of the settlement were sometimes slaughtered and baked for the occasion; and, laden with all kinds of food, the whole population of the place went off in the bush. There they put up huts, and remained sometimes for months at the sport [Turner 1884:127].

There were matters connected with the pigeon catching also which should be noticed. The sport was conducted under very strict regulations. All the chiefs engaged in it were for the time being sacred, and all of equal influence...The temporary sanctity seems to point to inherent sanctity in the pigeons, or to the sacred nature of the competition in
which the chiefs were engaged, or to both... [Williamson 1967:235-7]

Pigeon netting by providing a cause for such gatherings must therefore rank high as a social institution and its purely economic status occupies a secondary place [Buck 1930:544].

In the above quote from Pritchard, an 'ava ceremony is alluded to as part of pigeon hunting. This is not surprising since the major participants of the hunt were described as village matai. If such an event took place on star mounds one might expect to find artifacts that are associated with 'ava ceremonies on or near star mounds. In fact, Peters (1969) reports that

The third grindstone, G17/530, has a large deep linear hollow on one side, and was immediately identified by the workman as a stone used for preparing kava. It had been discarded, for it was recovered from the rock build up of the star mound... [Peters 1969:218].

This next point further relates to the notion of pigeon-catching mounds being associated with ritual. Richard Moyle, in a 1974 article on Samoan ritual curing, quotes the following incantation as part of a cure for a distinct class of headaches and paralysis called mo'omo'o va lal. At one point in the cure the native doctor or shaman is said to chant:

Mo'omo'o, mo'omo'o
Jump on to the pigeon-snaring mound,
Jump into the gap;
I'm going to transfix you [Moyle 1974:165].

This quote is interesting in two ways. First, a "gap" is associated with the pigeon-snaring mound, which suggests that the mound being called to mind is one with gaps between the arms or rays of the mound as with star mounds. Second, this quotation again clearly associates a pigeon-snaring mound with certain magical rituals, in this case a ritual in the domain of illness and healing. (One further note. There is another related class of illness called fe'e, or octopus [Moyle 1974:169]. It may be no small coincidence that the majority of star mounds have eight "arms" as does fe'e. We will return to this suggestion later.)

Next, among the remains excavated by Holmer was a bird bone. He says that it was "wedged between the stones of the perimeter wall of the cog mound," but he felt that it was probably recent because "it was extractable without the removal of any stone" (Holmer 1976a:30). Unfortunately, because of the supposed recency of the bone, Holmer apparently did not have the bone analyzed.

In Kramer (1902:84) there is a very suggestive drawing of a tattoo which was found on the back of a woman's leg. The tattoo has a set of three motifs that are found in direct association with each other, and include a group of birds, a net, and two five-pointed stars. As one will notice in the illustration reproduced below (Fig. 37), the net is between the birds and the star-like objects. It should be remembered, of course, that the descriptions of pigeon catching that we have thus far considered involve the use of nets.
Figure 37. Tattoo on the back of a woman's legs. The tattoo on the right includes the depiction of birds, a net, and two five-pointed stars. (From Kramer 1902:64, Fig. 6)
The relationship between the objects on the tattoo is the same as that in pigeon catching (i.e., birds above the net and the net above the mound). It should further be pointed out that while Kramer identified the middle motif above the stars as a "net," Mary Pritchard (1984:41; Kramer 1902:84) has explicitly identified a very similar sago design as a pigeon- and turtle-catching net. In Buck's account of women's tattooing, one also finds illustrations of star-like, bird-like, and net-like motifs (Buck 1930:641-60; see also Handy and Handy 1924; Marquardt 1934). Thus, the interpretation of the design motifs as representations of pigeon catching is a sensible one.

STRUCTURAL ANALYSIS

Summarizing the functional analysis, it seems that there is rather suggestive evidence that supports the interpretation of star mounds as pigeon-catching mounds with related ritual functions. At this point in the analysis, we cannot effectively examine additional evidence without first turning to the results of the only structural analysis involving star mounds that has been attempted to date. This analysis was conducted by Janet Davidson and has important implications for the pigeon-snaring hypothesis.

Davidson (1974b), in a cautious article that makes few claims about functionality, argues that certain structural similarities between what have sometimes been called "irregular structures" (see also Davidson 1974a:193) and star mounds can be seen as the basis for collectively categorizing these apparently different sites. "Irregular" sites include mound-like structures which can be described as having between one and five arms, or rays (we will hereafter use the term ray). In addition, they are found in isolated areas and usually have stone facing. Unlike star mounds, these sites rarely exhibit circular or even oval closure on one end, and in many cases they have only what could be considered to be one ray (Davidson 1974b:206-09). Taken alone these do not readily call to mind a star-like image. Davidson, however, argues that,

The important formal characteristics which place a site in this category beyond doubt include a tendency to slope toward the end facing down the ridge, and the presence of protruding arms and recessed bays. Any structures exhibiting these features, where they are not merely a result of careless or erratic constructions, must be considered specialized sites. The same characteristics relate these sites to the even more distinct star-shaped mounds [Davidson 1974b:209].

As noted above, irregular structures are found in isolated locations in the bush and on ridges; this is also a characteristic of star mounds with few exceptions (see Holmer 1976a:21-32 for example). In addition, two of our structures, sites AS-21-12 and AS-21-19, which are clearly what have been called star mounds, only exhibit complete closure by a rather ad hoc method of shallow ditches dug across the ridge of which they are a part. Furthermore, the star mound of site AS-21-20 clearly does not exhibit closure, but given its location in the context of so many other star mounds, it is hard to argue that it is not a star mound. We therefore follow Davidson in placing all structures that meet the characteristics of having ray-like structures and being in isolated areas in the bush as belonging to a single over-arching category which Davidson calls "specialized sites" (Davidson 1974b).
category would include all of the types of sites exhibited in Figure 38. Mounds with one ray are slightly problematic in that in some cases they do not exhibit anything that could be considered a "recessed bay". Davidson, however, argues that their isolated location and "their resemblance to tia seu luge as described by Buck" is enough to place them in the specialized site category (Davidson 1974b:209). We concur, but argue that it is unnecessary and inconsistent to call on functional descriptions of tia seu luge to back up the claim that single-rayed mounds are specialized structures. Instead, the criteria of recessed bays should be seen as a derivative and not a defining feature of these structures. We tentatively propose that the defining features are ray(s) (from 1 to 11), a mound or a leveled and built-up terrace, stone facing, and a bush location.

A linear mound is the limiting case of a mound with a ray. A recessed bay or bays will be a natural consequence of any mound that just happens to have more than one ray and therefore can not be considered a defining characteristic. Additionally, to call these sites "specialized" has functional overtones, so instead it is proposed that the Samoan term tia 'ave or 'ray mound' be used for the above category and any mounds that fall into it. We will use this term throughout the rest of the text.

SURFACE VARIATION

It seems important to offer a tentative explanation for the large amount of variation so apparent among the structures that we are arguing belong to the same category. There does seem to be one apparent counter example to the last defining feature. In Holmer (1976a:21-32; 1976b:49) and Hewitt (1980a:55-61), we find a tia 'ave that is in close proximity to residential structures and could therefore be argued not to be in a bush context. This site is an important apparent counter example because there are radiocarbon dates for both the tia 'ave and the associated structures, on the basis of which those authors argue that the mound and other structures were contemporaneous. Even if they are correct, the complex could still be seen as in the bush from the every day village (nu'u) location. There are two reasons for this. First, the "cog mound complex" is part of the inland Mt Olo tract settlement. Second, as we saw above, whole village populations were reported to have moved into the bush to support the pigeon-catching activities, and Buck (1930:539) points out that the camps associated with pigeon snaring were called malolonga, or, more properly, malologa. Buck writes that:

The place was called a malolonga (resting place). A little distance away from the tia seen on the ridge near Leone, we found the malolonga marked by the oven site and cooking stones [Buck 1930:539].

The "cog mound complex" could be interpreted as a cog mound site with accompanying malologa site, and thus it may not be a counter example to our category. Holmer might agree with our conclusion (i.e., that the "cog mound complex" is an inadequate counter example to our categorial feature of in the bush), but not with our rationale. Instead, he suggests that "the locational differences may result from the fact that there are no ridges around Mt. Olo that are isolated from community structures" (Holmer 1967b:49). Presumably, he means (if we are to avoid circularity) that the lack of topographic differences at Mt. Olo is responsible for the proximity of "community
Figure 38. Specialized structures reported by Davidson (1974b:207-09). Figure numbers and captions of illustrations from Davidson.
structures" to the "cog mound." Still, no categorial differences are involved and his position need not conflict with our interpretation. In other words, the relative distance of tia lave from maloloa sites may well be constrained by local topography in particular instances.

Even given the above arguments, there is still a fair amount of surface variation among these structures. Two factors can account for the variation without forcing us to abandon the above category. These two factors are environmental constraints and the notion of varieties within a category. The most noticeable features of variation are the following: some mounds are circular while others are oval, some mounds do not exhibit border closure, some mounds do not have stone facing, and the number of rays vary from 1 to 11.

Environmental constraints can explain the first two variations. Considering the first, during our survey we observed that if a ridge-top area on which a mound was built was wide and flat, then the mound would tend to be very close to a circle. If, on the other hand, the ridge-top area was very narrow, the mound would be constructed in a way that would conform to the narrow ridge, thus making the mound oval or linear in shape. (For example, compare sites AS-21-12, AS-21-13, and AS-22-12 with AS-21-14 and AS-22-9). It appears that the builders had a minimum size criterion in mind so that no small circular mounds are found on the narrow ridges. Thus, when the builders were faced with the task of building a mound at least, say, 20 m in diameter, and were also confronted with a narrow ridge, the compromise would be the construction of an oval to linear mound that uses all of the available space. The reality of this criterion is falsifiable. Except for the case of single-rayed mounds, the discovery of oval mounds on broad flat areas would entail that oval star mounds were built by design.

A similar argument can be made for the closure deviation. We had one mound--site AS-21-20 (Fig.14b)--that was faced with rays in a single direction with no closure on the opposite side. Interestingly, the area of the mound that did not exhibit closure was backed up against the steep vertical incline of the ridge. In other words, it was not possible to complete the tia lave because of the local topography. In addition, two other examples, sites AS-21-12 and AS-21-19, both had a back area that was only defined by a very shallow ditch. It may be that other structures as well as site AS-21-20 were, in fact, defined in a similar way, but the eroding slope filled in the defining ditch. If one examines Davidson's (1974b:206-209) examples of "specialized sites" that do not exhibit closure, one finds that the vast majority are heavily constrained by local topography such as a steep inclining or declining slope directly behind and without visible signs of closure. It may be that either the slope itself was considered to be defining enough or the defining shallow ditch was buried by erosional deposits. Only future excavations of these sites can resolve the issue.

The lack of stone facing can be accounted for in a number of ways. First, it is important to note that very few mounds are known that do not have stone facing. Of the sixteen we described, only sites AS-21-14 and AS-22-11 did not clearly exhibit rock facing around the rays. There are a number of reasonable explanations for why we find such examples. Natural forces such as root activity or soil deposition could account for the fact that the stones were either missing or buried. It could also be the case that the mound was never completed or that the stones were removed. It should be recalled that
sites AS-21-14 and AS-22-11 were very small mounds ranging from only 0.3 to 0.75 m in height and hence possibly not completed.

The argument that we have been making is that, in addition to the other features already mentioned (rays, etc.), there may have been something like an "ideal" plan for tia 'ave which included closure and size, but given the environmental constraints of the Samoan mountain ridges and slopes, the actual instantiation (realization) of any given mound may "deviate" to some extent from that ideal model. Thus, the category tia 'ave was probably composed of the following features: ray(s), from 1 to 11; a mound or a leveled, built-up terrace; isolated location in the bush; stone facing; at least 50 square meters in area; and complete closure by a boundary of some type. Circular shape may also have been an aim in the construction of most mounds. But, given the linear single-ray mounds, circular shape cannot be taken as a defining characteristic of tia 'ave.

It is proposed that the variation in the number of rays cannot be accounted for in terms of environmental constraints alone. The variation is instead seen to have had significance for the builders. It is therefore tentatively proposed that mounds with different numbers of rays are varieties of the category tia 'ave (as, say, forks, spoons and knives are varieties of, but not natural kinds of, silverware). At this point the term "variety" is deliberately chosen since not enough evidence is available to know whether or not subcategorization in the taxonomic sense is involved (see Wierzbicka, 1985, for an important discussion of this issue.)

Given the above argument, we will consider an interesting functional implication that follows from the category tia 'ave. Recall that tia 'ave, as defined, includes mounds that have from one to eleven rays. Recall also that Davidson remarked that the single-rayed structures show a "resemblance to tia seu lupe as described by Buck" (Davidson 1974b:209). Since Davidson's article appeared, Leach and Witter (n.d.:26) have positively identified and mapped the tia seu lupe that Buck described at the Tatage-Matau Fortified Quarry Complex near Leone, Tutuila. The feature that Leach and Witter described was a single-rayed structure with a "masonry wall consisting of 1-4 courses of stone." Figure 39 is an adaptation of their Figure 2. It is clear that this site fits quite nicely into the category of tia 'ave, the single-rayed variety in particular.

If we accept that the tia 'ave category is correctly defined, and that what has been identified ethnohistorically as a pigeon-catching mound is a member of that category, then this can be taken as positive evidence for the idea that other members of the category, namely, what have previously been called "star mounds," may also have the same or a very closely related function. In other words, as all varieties of silverware can be said to be functionally involved in eating food so tia 'ave of all varieties may have been used to catch pigeons.

BASIS OF TIA 'AVE VARIETIES

Assuming this functional interpretation for the moment, we now need to consider a pressing question relative to the structural analysis. We have proposed that tia 'ave is a category which includes distinct varietal members. It can rightfully be asked what the nature or basis of these
Figure 39. Tia 'ave from Tataga-Matau basalt quarry, Tutuila. Initially reported by Buck (1930), it was mapped in 1985 by Leach and Witter (n.d.). (From Leach and Witter n.d.:26)
varieties was. Since the hypotheses of burial and residential structures have at this point no positive evidence, and since there is some positive evidence for the hypothesis that these mounds were used for pigeon catching, as well as some type of ritual, we decided it would be best to explore the question of function from the point of view of pigeon hunting and ritual.

Rituals are often performed within the context of a particular religious or cosmological system. If rituals were performed on the mounds or were an aspect of pigeon hunting, it is likely that they would have been done in the context of 'old Samoan' religion. One may thus ask the following questions: Is there any evidence in Samoan mythology that would place tia 'ave within the supernatural realm? Is it possible to discern any structural correspondences between the structure of tia 'ave and entities in Samoan religion?

To answer the first question, let us first consider the old Samoan conceptions of the universe and space. We find that these conceptions place the tia 'ave in spatial proximity with the supernatural. Samoans are said to have believed that the world and heavens were created by Tagaloa and there were anywhere from 8 to 10 heavens which surrounded a flat earth (Turner 1834:13; Fraser 1892:167, 176-177). Tagaloa was said to live in the uppermost heaven. The sun, moon (both animate), and the "family of Tagaloa" or Sa Tagaloa, which included many of the Samoan gods, were supposed to live in the first heaven which was closest to the earth (Fraser 1892:265). The intervening heavens are usually described as having been empty (Fraser 1892:177). In addition, there were at least three underworlds: Sa le Fe'e, Fafa, and Pulotu (Stair 1897:22, 217; Grattan 1948:133). This description of the Samoan universe is suggestive since we have found that tia 'ave are frequently located on the prominent points of ridge tops. This is particularly clear at 'Aoa, as is illustrated in Figure 10. Consequently, in terms of the Samoan conception of space, the tia 'ave are Samoan-made structures that are closest to heaven and to the majority of the Samoan gods. In addition, the entrances to the underworld were said to be in the bush and on high bluffs (Pritchard 1866:114, Stuebe 1967:28). Early missionary accounts mention the bush as having religious significance (Williams 1984:102,113; Lundie n.d.:36,116, 119). Many Samoans still believe that the bush, where the mounds are located, is the domain of the supernatural, especially at night.

Samoan mythology explicitly supports the association of aitu (ghosts or spirits) with pigeon-catching mounds. Moyle (1981) has recorded a story, or fagogo, called "Tulelepuia'ilama" which tells the story of Masei who, after much searching, marries Tulelepuia'ilama. He, however, already has two concubines who kill him out of jealousy. Tulelepuia'ilama's aitu cannot rest and he goes to Masei and their child. Once he finds them he takes them to Ta'u, to a section of Ta'u village called Si'uflaga. Masei does not know that he is dead (she was visiting her parents), and does not immediately recognize him as an aitu. The story states that, "when the boat arrived at Si'uflaga, they walked off and went inland, to this pigeon-snaring mound belonging to a man called Saleva'o" (Moyle 1981:173). Saleva'o was a shaman, or "native-doctor" (Moyle 1981:306 note 17). Masei is warned by the aitu to stay at the mound and sleep, and to "please be careful of Saleva'o's pigeon-snaring mound, in case it gives way" (Moyle 1981:173). Presumably, the link between the natural and the supernatural world is fragile and dangerous. Masei sleeps and later wakes finding her husband missing; it is at this point that she realizes he is an aitu. After a short time he reappears and tells Masei to
walk down to the village in the morning to where his body lies in preparation for burial. She is told to walk straight there and to ignore anything that happens around her. He tells her that his killers will confront her and claim that she is his murderer. She is to pay no heed. In the morning Mase does as she was told and goes straight to the body. She places an offering of a mat on the body and shortly thereafter Salevaco appears, hits Tuleleipuialame's body twice with a long staff and the husband comes to life. He then quickly dispatches the two women responsible for his death and he and Mase live happily ever after.

Three related points can be made regarding this tale, pigeon catching, and tia 'ave. First, the story clearly links pigeon-snaring mounds with the supernatural. Second, the location is "inland," in the bush (i.e., where the majority of tia 'ave of all types are found). Finally, the act of going to the pigeon-snaring mound can be interpreted as part of a magical ritual. Magical rituals try to create all the conditions that "go along with" a particular desired event. So, for instance, rain-making rituals will include things like making the ground wet, making noise like thunder, etc. In order to understand how pigeon-catching mounds fit into such a ritual it is necessary to understand that catching pigeons was a prevalent metaphor for the acquisition of a wife. Schultz (1965:32-3 no.99) states that,

When a chief, with the help of his tulafale succeeds in obtaining the hand of a noble lady the latter (as well as the child issued from the marriage is praised as,

O le lupe na fa'ia ma'ite le fui fui.
The pigeon was detached from the rest of the flock.

The same figure of speech is used when the offspring of a noble family has been adopted by another village and honoured with a matai name.

Schultz offers us another example along the same lines,

When the wooing has presented particular difficulties, as through the lack of connections between families of the bride and bridegroom, then the young wife and her child are referred to as,

O le lupe na seu silasila.
A pigeon caught in the sight of all.

This figure of speech presupposes that a single pigeon was spied by a hunting party and that it was artfully enticed and caught in the presence of all the hunters. The tulafale try their utmost to bring about the wedding of their chief and when this is accomplished they are not sparing in their flatteries as they will be rewarde with the fine mats that constitute the bride dowery [Schultz 1965:33, no. 100].

Thus, if the aim of the shaman is to bring the dead husband and living wife together, it seems that the pigeon-snaring mound should naturally be a part of any ritual enactment by the pair. This is so because the
pigeon-snares and mound can easily be viewed as an interface between the natural and the supernatural worlds, and because pigeon-snares has important metaphorical associations that identify a chief's wife and child with captured pigeons. In other words, pigeon catching "goes with" bringing husbands and wives together and hence can be seen as an important part of the ritual magic that brought Tulelepua'ilama back to life and thus back to his wife Muso.

Given that there is a reasonable case for the idea that the location of tia 'ave in the bush places them in the context of the supernatural from the Samoan point of view, and that pigeon mounds were also located in the bush and had a ritual function, we now turn to the second question mentioned above: Is it possible to discern any structural correspondences between the structure of tia 'ave and entities found in old Samoan religion?

Buck (Ta Rangi Hiroa) (1935) and Turner (1884), among others, have pointed out that many of the entities (gods, spirits, etc.) in the old Samoan religious system were once believed to be incarnate in, or represented by, objects in the world such as animals, celestial objects, rocks, and man-made structures. Buist (1969:36) states that, "It was striking that most legends endeavored to explain natural features of the landscape by some form of personification, or by associating ancestor or mythical figures with them." In an inventory of cultural sites of American Samoa prepared by Clark in 1980, 25 sites (nearly 15% of the total) fall into the category of tupua, or commemorative feature.

In order to explore the possibility that tia 'ave represented different gods in the old Samoan pantheon, a search was made through a number of sources containing information on Samoan mythology and entities. Sources consulted were by Abercromby (1892), Stair (1896), Turner (1884), Fraser (1891, 1892a, 1892b, 1897, 1898, 1900), Moyle (1892), and Pritchard (1866). In particular, the search looked for any entities that could be described, or were explicitly described, as having some type of ray-like structure to determine if this might throw light on the variety of tia 'ave.

Table 16 compares two sets of figures. The first set designates the number of mounds of a particular type, which have from one to eleven rays, and which have been recorded in the archaeological literature on Samoa. One will notice almost immediately that eight-rayed star mounds are the most common type of tia 'ave. The next most common type, though not on Tutuila, is the single-rayed tia 'ave. Next are those mounds with ten, six, five, and seven, respectively, followed by mounds with four, three, and two rays. Only those mounds that have a positive identification as to the number of arms are included in Table 16. The next set of figures in Table 16 designates the number of times a given mythological figure with rays is described in the myths or missionary accounts such as those of Turner and Stair. There is a very striking correspondence between this set of figures and the number of recorded tia 'ave. As one can see, the octopus, an entity with eight rays, is apparently one of the most important of the Samoan gods, and this corresponds with the fact that tia 'ave with eight rays are the most highly represented. Next in frequency in the mythology is the eel (and snake) or single "rayed" entities, again this corresponds with the number of single rayed tia 'ave in rate of frequency. In fact, to the extent it was possible to identify the number of rays on the given entities, the correspondence was almost exact for all of the given categories of entities when they are compared to the tia 'ave.

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TABLE 16. Comparison of *tia 'ave* varieties, their frequency of occurrence, and the frequency of references to various mythological entities.

<table>
<thead>
<tr>
<th>&quot;TIA 'AVE&quot; # RAYS</th>
<th># of STRUCTURES</th>
<th># of RELIGIOUS ENTITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEVEN RAYS</td>
<td>1</td>
<td>?</td>
</tr>
<tr>
<td>TEN RAYS</td>
<td>7</td>
<td>SUN: 10 (see note #1)</td>
</tr>
<tr>
<td>NINE RAYS</td>
<td>1</td>
<td>?</td>
</tr>
<tr>
<td>EIGHT RAYS</td>
<td>22</td>
<td>OCTOPUS: 39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EIGHT LIVERED: 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EIGHT EARS: 2</td>
</tr>
<tr>
<td>SEVEN RAYS</td>
<td>4</td>
<td>?</td>
</tr>
<tr>
<td>SIX RAYS</td>
<td>5</td>
<td>TURTLE: 10</td>
</tr>
<tr>
<td>FIVE RAYS</td>
<td>5</td>
<td>STAR: ? (see page 166)</td>
</tr>
<tr>
<td>FOUR RAYS</td>
<td>3</td>
<td>STARFISH?: (see note #2)</td>
</tr>
<tr>
<td>THREE RAYS</td>
<td>2</td>
<td>?</td>
</tr>
<tr>
<td>TWO RAYS</td>
<td>2</td>
<td>?</td>
</tr>
<tr>
<td>ONE RAY</td>
<td>10</td>
<td>EEL: 15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SNAKE: 1</td>
</tr>
</tbody>
</table>
In six cases the number of rays was not included in the description of the mound. In other cases, the mounds were so disturbed by erosional forces that the archaeologist could not make a positive identification, so an estimate was given instead. The estimates and the number of mounds which fit them are given below.

| 11 or 10 | --- > 2  
| 9 or 8   | --- > 1  
| 8 or 7   | --- > 4  
| 7 or 6   | --- > 3  
| ("possibly 6") | --- > 1  
| 7 or 5   | --- > 1  
| ("possibly 5") | --- > 1  
| 5 or 4   | --- > 2  
| (?)      | --- > 6  

Note further that the above figures roughly coincide with the trend established by the set of numbers in Table 16 where exact identification of the number of rays was possible.

We think that the convergence of these data sets provides evidence for the idea that Samoan mythological gods and entities form the basis for the varieties of tia 'ave.

OLD SAMOAN GODS AND PIGEON CATCHING

Thus far it has been shown that there is a fair amount of evidence supporting the idea that tia 'ave functioned as pigeon-catching mounds and that pigeon-catching mounds were associated with religious rituals. For example, it has been shown that Davidson's categorization of "star mounds" and "irregular sites" under an over-arching category (which has been modified slightly and labeled tia 'ave) supports the pigeon-catching hypothesis since there is archaeological and ethnohistorical information that indicates that a single-rayed member of this category did function as a pigeon-snaring mound. In addition, we have expanded on Davidson's categorization and proposed that the category encompasses a number of varieties which can be differentiated from each other on the basis of the number of rays. Finally, we have provided evidence that the varieties derive their distinctive basis from the conceptual structure of Samoan mythology.

At this point one might ask what the varieties of tia 'ave have to do with pigeon catching. Or, more specifically, what do the octopus, eel, turtle, sun, etc., have to do with pigeon catching? The basic outline of the answer is that the tia 'ave represent gods in the Samoan pantheon and these gods were viewed as "assisting" the hunters in their attempts to catch pigeons. But why these particular gods? What is their connection to pigeon catching?

In order to examine the relationship of pigeon catching to these various gods, a more detailed examination of what pigeon snaring entailed is necessary. To begin with, pigeon snaring is reported to have been primarily a seasonal activity. Buck states that the tia were permanent structures, but that fowling houses were built each season (Buck 1930:534). Turner says that June was the time of year that pigeon-catchng was practiced (1884:127) and that traditionally June "was called Oloamunu, or the song of birds, it was thus named from the unusual joy among the birds over a plentiful supply of favourite buds and berries" (1884:206). It would seem that this was an ideal
time to catch pigeons (i.e., when they were fat and healthy.) Not only was
the event seasonal, but by all accounts the sport was highly competitive and
was monopolized by those of high rank (Buck 1930:542). Buck points out that,

> Chiefs could command the organizing of labor to build
> the earth platforms faced with stone. They had the
> leisure and time to carefully train decoy birds. They
> could pay skilled craftsmen to make the best nets
> [Buck 1930:542].

The event is said to have called upon "the full resources of village
social organization" (Buck 1930:544). It has been reported that great
preparations were made, frequently involving the slaughter of all the pigs in
the village with the whole population moving into the bush, often for months
(Turner 1884:127; Pritchard 1866:161; Buck 1930:544). Kramer (1903:333) says
that it usually took place from June till October. Feasting and dancing were
involved but took place away from the netting platform at what Buck called the
malolonga camp (Buck 1930:544). Buck states that, "a little distance away from
the tia seen on the ridge near Lena, we found the malolonga marked by the
oven site and cooking stones" (Buck 1930:539).

Pigeon catching itself is described by Buck as having occurred on netting
platforms called tia seu lupe (Buck 1930:534). Pritchard merely identifies
them as tia while other authors simply say the ground was cleared (Pritchard
1866:161, Schultz 1961:31). Buck's description is as follows:

> A space was then cleared to form the platform (tia) on
> which the fowling houses to conceal the fowlers could be
> erected. Ridges that had an upward slope had to be cut
down at one end and the spoil used to build up the other
> end. Unworked stone was used to build up the sides of
> the earthwork...Some, to be more readily seen by the wild
> pigeons, were built up all around with stone to make a
> raised platform [Buck 1930:534].

Notice that this description shows how the environmental constraints of
sloping ridges affect the construction of the mounds. This fits in well with
the earlier discussion in which it was argued that some variation did not
involve any categorial differentiation between the mounds.

The houses that the fowlers were in were apparently on top of the
platform. These houses were said to have had a ground plan four feet by two
feet and to have been made of sticks called aulauta over which were arched
three lengths of vine which were covered with the leaves of a bush fern called
aulauta (Buck 1930:534). The houses were placed on the sides with a central
space in the middle (Buck 1930:534, Turner 1884:127). Buck states that,

> A fully equipped ground tia had four houses set as
> follows: towards the descending slope end was the fale
> mua (first house) also termed fale va'ai (lookout
> house). At the up hill end was the fale matua
> (principle house) or simply matua. To the left side
> looking downhill was the fale elo (flying house) and on
> the right the palalau [Buck 1930:544].
It is presumed that Buck's description of a "fully equipped ground tia" was of the single-rayed type, as at Leona, which is more part of the ridge than elevated multi-rayed mounds. It is not known if more than four fa'e sev were ever used, but one does get that impression from Turner and Pritchard.

The Fowler was said to sit in the hut on a small seat and would wear gill shades, presumably so the birds would not see the gill of the Fowler's eyes (Buck 1930:537-38). The seat was used so the Fowler could stand up rapidly to catch a pigeon with a net that was attached to a long bamboo pole (Turner 1884:127; Buck 1930:535). Birds were attracted to the mounds with use of decoy pigeons that were raised from young or occasionally from older birds caught on the mounds (Buck 1930:533). The birds were trained to sit on a perch (Buck 1930:533) and had a cord attached to one of their legs. Pritchard says that "after a drink of ava all round the birds would be tossed up above the tia and circle around attracting wild pigeons" (Pritchard 1866:162). The wild ones would follow to be caught in the nets of the waiting chiefs (Turner 1884:127; Williamson 1867:236-8). Once the birds were caught some were baked while others were distributed and tamed for later use (Turner 1884:127). Buck states that they "were not necessarily killed at once, but were put in an ola basket or in a small covered stone enclosure (fa'e lupa) near at hand" (Buck 1930:539).

Buck also points out that pigeons were often caught from trees. Huts were built in the trees and "a suitable place was... where natural branches if possible formed cross beams onto which the hut was attached" (Buck 1930:539). Decoy pigeons and nets were also used in this type of hunting. These tree platforms with houses were called "tia sev a lupa or fonatia" (Buck 1930:539). It should be noted that pigeons were not the only birds that were caught by the Samoans. Terns were also caught with the use of decoys (terns in this case) and nets, though no tia were used (Buck 1930:541). In addition, a bird called a punae, which had burrows in the ground, was caught in its burrow with nets and the help of dogs that would find the burrows (Pritchard 1866:164).

Four general aspects of the above description can be seen as significant.

1) the activity was competitive
2) the principle contestants were matai
3) it was a ritualistic social institution
4) it was about capturing things, in this case, pigeons

In order to understand the relationship between Samoan pigeon-catching tia and Samoan gods such as the eel and octopus it is necessary to keep in mind the metaphorical association of pigeon catching with the acquisition of a wife. As it turns out, if we examine Samoan mythology carefully we find that this metaphor is expanded upon in a large corpus of tales. For example, consider the myth of Tigilau and Sina (Muse 1982:13). Sina was said to be the daughter of Taififai and Onega. She was in love with Tigilau, but her parents wanted her to marry the Tuhu o le Fanua (Muse 1982:12). She was forceably taken away to the house of the Tuhu o le Fanua to be his wife. At one point in the story Sina finds out that he has control over many birds in his household and asks him to call them together. He grants her request and,

The house was soon filled with flocks of different kinds of birds. Then said the chief to Sina, 'Select
for yourself any bird you please, and dismiss the others: their din distresses me.' She chose a young pigeon. Tigilau had assumed that form. The bird's leg was tied with a string and fastened to a perch, which was placed in the sleeping apartment of Sina and her husband [Muse 1982:13].

Later that night,

Sina arose. The bird had changed into a man. Tigilau had assumed his own form. Off went the couple and arrived, unpursued, at the house of Tigilau... [Muse 1982:13].

The metaphorical association here is rather striking. The description of Tigilau (who will ultimately become Sina's husband) as a decoy pigeon matches precisely Buck's description of a decoy pigeon. Given the above Samoan proverbs, Sina can be see as the pigeon who is ultimately caught. We thus have a clear instance where the capture of a woman for the role of wife is in the context of the pigeon-catching metaphor.

Let us now turn our attention to the sun. We find that it is frequently associated with the acquisition of wives, often by force. Consider the myth as related by Williamson,

Kramer tells a story of complaints made against the sun for not remaining longer in the sky between rising and setting. This angered the sun, who said he would be terrible, making his uprising felt, and would next morning begin to slay men. Then followed a discussion between a boy Lua and his sister U' as to which of them should be the first to die, each wishing to make the sacrifice. The girl prevailed, and the next morning she went to the spot where the sun rose, and sat facing him with her legs apart. The sun told her that his name was Tangaroa, and said that, as a reward for her submission to him, and as she had become his wife, he would no longer kill and make meals of men, and would travel more slowly. He gave her instructions as to the treatment of her child, when born, directing, among other things that she call it Tangaroa-a-Ui... [Williamson 1967:50].

The sun is an important character in many Samoan myths. Mead points out that in Manu'a there were many myths about the sun and his cannibalistic tendencies. In fact, she believed that there may have even been a "sun cult" of some kind in operation at one time (Mead 1969:162). The frequently cited course of action to stop the sun's cannibalism was to offer up a woman who then became the sun's wife (Mead 1930:163; Muse 1982:115). Given the association of pigeon-catching with catching women, one can detect a certain logic in associating a god with rays (i.e. the sun), who is successful at acquiring women, with pigeon catching.

Other myths associate the eel with trying to catch a woman. These myths can be seen as the basis of Ti 'ave with one ray. The basic structure to all of them is the same: Sina and an eel (in some cases a snake) fall in love with
each other but at some point Sina gets upset with the eel and flees. In many of the versions the eel is ultimately turned into a coconut so that Sina can always remember him when she gets a drink from a coconut (the three holes on a coconut are said to be the eyes and mouth of the eel) (Nelson 1925:132-134). The following is a passage from a myth related by Nelson. The eel has made an advance at Sina and she feels threatened and is in the process of fleeing.

Sina made the round of various districts of Savai'i...
Sina fled to her family in Upo and to Upo also came the eel. He reached the part in from the coast as the sun was in the west. He threw his shadow toward the east, and the part lying seaward of Mageagi was, therefore, called Lalocata (under the shadow), since it was under the shadow of the eel that was cast toward the east [Nelson 1925:143].

The imagery is rather suggestive, especially if we recall an earlier myth about Mageu and Tulelepu'i'ilama. It was a "native-doctor" by the name of Salevao who brought Tulelepu'i'ilama back to life. Turner tells us that Salevao means "sacred of the bush" (Turner 1884:49). Salevao was also known as a village and household god, and was associated with healing the sick (Turner 1884:49, 51). Most important for our purposes is that he was known to be incarnate as the eel and the turtle (Turner 1884:50). Furthermore, a myth in Stuebel (1976) shows him to be "addicted to pigeon-catching." Thus we find that the owner of the pigeon mound in the earlier myth was someone who, in at least one case, is incarnated as the eel. If Sina is metaphorically viewed as a pigeon, the above passages can be seen as evidence that the eel is the basis for the shape of single-rayed pigeon-catching mounds. (By extension the turtle may be the basis for six-rayed mounds.)

The above pattern continues with the other entities we have posited as being represented by the tia 'ave. As noted earlier, tia 'ave with eight rays appear to be the most common. Their hypothetical counter part, the octopus (fe'e), is also the most common of Samoan gods. In addition to the octopus there are two other deities who are said to have a kind of eight-ray structure. There was a god who was a member of the Sa Tagaloa who was described as having eight livers on the outside of his body (Fraser 1692b:266, 279). Next there is a myth that describes an ogre who was said to have eight ears on his head. And, of course there is O le Fe'e with his eight tentacles.

We will first examine the eight-livered god. Fraser records two versions that tell of a group of giants from earth who do battle with the Sa Tagaloa gods in the first heaven of the Samoan universe. One of the gods that did battle was named Le-ate-valu or "the-eight-livered" (Fraser 1692b:276). There is no clear connection between this god and the acquisition of women. It may be that there is, however, a loose connection with pigeon catching and this entity in that they are both involved in competition and, as noted earlier, Davidson did connect pigeon catching with divination and warfare. It is certainly possible that pigeon catching had more than a single set of symbolic associations and rituals connected with it; there is no reason to believe that any given structure should necessarily be limited to one function. Modern churches and temples have a multitude of rituals performed in them, each ritual referring to different aspects of the religious mythology. Since, however, the suggestion is only tentative, we will turn to the other mythological entities mentioned above that have eight "rays."

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The second mythological creature involved was said to be called Talingamaivalu (Abercromby 1892:158). The name is more correctly spelled Taligamaivalu and means "eight eared;" taliga is ear, and valu is eight (Abercromby 1892:165; Molye 1981:300, note 8). There are two complete versions of the myth that we know of (Abercromby 1892:158-165; Molye 1981:55-89). These versions are similar to the myth of Tigilau and Sina that was outlined above (Muse 1984:12). In Abercromby’s version and an abridged version found in Reed (1974), the eight ears appear to be an actual characteristic: "The men came, and Sina welcomed them with surprise, [exclaiming] 'O Talingamaivalu, listen with your eight ears, while I explain to you..." (Abercromby 1892:164).

While Reed "gives the name as 'the demon giant with eight ears'" (Reed 1974:129, quoted in Molye 1981:330), in the version by Molye we find that their status as a real characteristic is not clear: "(Now this man—listen again to his name Taligamaivalu—did he have eight ears, what was their condition, was there something wrong with his ears?)" (Molye 1981:65). But whatever their ontological status, they seem to be a salient part of the character as the story teller appears to be drawing his audience’s attention to them. In addition, it is not just that he has eight ears but that they have a distinct ray-like quality since Molye’s story teller later describes them variously as “ulcerous ears,” “bushy ears,” “dragging ears,” “shining ears,” and “luminous ears” (Molye 1981:71-79).

The primary characters in these myths are Sina, Tigilau, and Taligamaivalu. In Abercromby’s version, Sina’s parents are Tafitofou and Ongafau, while in Molye, Sina is referred to as Sina or Sinalemalama and her mother is Sinasegi. Sinasegi also appears in the Abercromby version, but in a different role as we will see below. The basic plot in these myths is that Sina is married to Tigilau, but is then abducted by Taligamaivalu who takes her to an underground supernatural location (Molye 1981:81). Tigilau then goes on a journey to find her and eventually succeeds in stealing her away from Taligamaivalu, who ends up being blinded by a Kingfisher (a type of bird) that is left behind in Sina’s place.

There is one suggestive section in Abercromby’s version of the myth that centers around birds and the bringing together of husband and wife. During Tigilau’s journey before he eventually finds Sina, he is married to Sinasegi (Abercromby 1892:163). Upon their initial meeting,

The birds fluttered about. Then Sinasegi: ‘Bother it! what is the matter with the birds? There are two kinds of birds in my country, the tern [sic] and the heron.’

The woman went down to visit the birds [Abercromby 1892:163].

She then finds Tigilau and they are married and have a child before Tigilau again goes on his search for Sina. It is interesting that Sinasegi says that there are only two kinds of birds in her country, the tern and heron, and the pigeon is missing. The tern is caught like the pigeon with decoys and nets, but it was not as important, as the pigeon was the head of all the birds (Muse 1984:33). This could be seen as foreshadowing the fact that Tigilau would marry Sinasegi, but that he would eventually continue his search for his "pigeon," or wife Sina, as she is seen as the more valuable catch.
Even more suggestive, for our purposes, is the fact that in three of the myths examined up to this point we find Tigilau (who was identified as a decoy pigeon in one myth), who steals Sina away from another individual. In the two myths we are now considering, Tigilau steals Sina from Talingamaivaiau, a creature who can be described as having eight rays. Again we have the association of a rayed entity in a myth that can be viewed as being metaphorically associated with pigeon catching.

Finally, in the examination of gods with what could be described as eight rays, we turn to O le Fe'ea or the octopus with his eight tentacles. To begin with, Fe'ea was considered to be one of the most powerful and important of the gods in the Samoan pantheon. Williamson, for instance, writes that Fe'ea "was a most important Samoan god of the dead, and was I suspect, one of the oldest of the Samoan deities" (Williamson 1967(2):221).

Fe'ea was also said to have been a war god and was,

present in the white shell of the *Cypraea ovula*;

hence a string of these was suspended in the house of the priest and were supposed to murmur or 'cry' when a war was determined on [Turner 1884:29].

White was supposed to be associated with Fe'ea. Turner states that one district had a three month festival devoted to Fe'ea, during which white turbans were forbidden as they were to be used only at time of war. Though Fe'ea was symbolically represented by white shell and white turbans, his radiating tentacles were still one of his most salient aspects. Turner states that during the above mentioned festival, "all unsightly projecting burdens—such as logs of firewood on the shoulder—were forbidden, lest it should be considered by the god as a mockery of his tentacula" (Turner 1884:30).

Moyle, in an article on Samoan medical incantations, discusses a set of ailments that are associated with the octopus and in which representations and incantations associated with the octopus are important to the cure. In one instance, "the crown of the patient's head is gently stroked with the fingers, whose actions represent those of the octopus' tentacles" (Moyle 1974:171). Fe'ea is also considered to be very close to man since Fe'ea was born of the same woman as man (Turner 1884:8).

It may seem odd to consider the octopus as possibly being represented by inland structures since they are creatures of the sea, but apparently the Samoan conception of the god did not limit him to an aquatic environment. He was, in fact, said to live on land, and there is a myth that states that this was his primary location and that he even set up nets inland to catch men, or possibly siva. (Pratt 1891:71 & 72-73 note 6). He is also said to have had a house on the island of Uopou, inland from Apia, which has been visited by various authors (Moyle 1974:169; Freeman 1944; Stair 1894, 1896:45). It was at this house that Fe'ea is said to have kept his many wives (Pritchard 1866:117). Churchill (1902:206) reported that So'oala, a son of Fe'ea, was a notorious cannibal chief "who nets men and women from his stone tia, or stone platform," and his body "is buried on the very summit of Mount Vaea."

Given the above discussion, it is not hard to imagine that the Samoans would consider the Fe'ea a desirable symbolic presence while catching pigeons,
since he is powerful, has many wives, and makes use of a net in an inland context. In addition, his rays appear to be a salient characteristic so it would make sense to represent him as an eight-rayed mound. There is, however, even more evidence. There are, in fact, two suggestive versions of a myth concerning the capture of a turtle by a character called Saumani Afa'ese who is identified in one version as a "devilfish" (i.e., octopus).

These myths are suggestive in a number of ways. First, one of the characters is referred to as an octopus. Second, an additional entity, the turtle, is introduced as also having a mysterious ray-like quality. Finally, and most interestingly, the pigeon metaphor for woman and the acquisition thereof is part of the closing part of the two tales.

The myth is essentially as follows. Saumani Afa'ese, son of the Saumani family, captures a huge turtle and brings it on land. He then attempts to get the turtle to his village, but it ends up dying on the top of a hill. The turtle is cooked and its shell has magical power—in particular, healing power. Because of this fact, many people were interested in the shell and took bits and pieces of it away.

Saumani Afa'ese saw the shell dwindling away, so he took a piece and planted it in a cave, but the gloss was such that it threw a reflection on the sky, which from Upolu looked like a rainbow hanging over Savai'i every afternoon [Nelson 1925:136].

In the myth recorded by Schultz (1965:31), we are told that the turtle that was caught was "a wonderous turtle whose shell sent forth a luminous red glow." In addition, as above, the remaining piece of shell was buried in the mountains of Savai'i... On a fine afternoon Savai'i could be seen distinctly and, as the buried shell glowed even through the covering earth, the island with its broad back resembled a huge turtle sleeping on the waters [Schultz 1965:32].

In the Nelson version, a generation passed and the shell was covered with soil and the "shell ceased to make the rainbow reflection (Nelson 1925:136). Saumani had a son, Matila, who had a son by the name of Pule. In the Schultz version there is no time passage and Saumani Afa'ese and Pulelele'i'te are the same person. In both versions Maliata comes into the story. In the Nelson version he wants the shell uncovered so it can shine again while in the Schultz version Maliata wants to possesses the shell. In return, in both versions, Pule or Pulele'i'te asks for a tula, or a perch for a decoy pigeon. But, after he has given Pule pigeon perches, Maliata finds that Pule's request had been a riddle, the answer to which the reader should now be able to guess—"What he really wanted, was a girl" (Schultz 1965:32).

These two versions again serve as examples of where rayed entities, the turtle or at least the turtle shell (and in Nelsons version the octopus as well), are associated with pigeon hunting and the acquisition of women. (See note #3. Note also that here is a connection between the octopus and healing in that it was his character in the guise of Saumani Afa'ese who had control over the healing tortise shell.) Also, the turtle in Nelson's version was said to have died on a hill top and both versions have the shell being placed
in an inland location. One problematic feature about the turtle, however, is
that it is not really clear how many rays are being talked about; one can
imagine it to have been six--head, tail and four flippers--or just one since
the Nelson version speaks of a single mysterious rainbow-like ray. There may
be even more possibilities depending on what appendages were considered
sallent. (For instance, did the Samoans consider the head and tail or for
that matter the legs or flippers of the turtle as equally relevant?) Only
future research can determine this with any certainty.

One final mythological example will be presented. There are two myths
that tell the story of Lady Tapuita; "she became wild, horns grew out of her
head, she ate human flesh, and ten to fifteen Fijians were used up on her
cannibal appetite" (Turner 1884:260). She eventually has a confrontation with
her son and falls into a pool of water where her horns break off. Her son is
not pleased with her behavior and tells her she must leave the earth and go to
heaven. She agreed,

But before going up she promised to shine down as an
evening star and give him light for his evening meal.
She also promised to give him light in the morning,
when he went into the bush at the season of pigeon-
catching [Turner 1884:262].

In Stuebel's version she says,

...I shall reappear of an evening while you eat your
supper. When you go pigeon-snaring in the early morning,
I shall also be there to light you on the way
[Stuebel 1976:56].

Thus, once again we have a mythological creature who has projections or
ray-like structures (in two instances; first as a cannibal with horns and then
as the morning star) and who is directly associated with pigeon catching. In
the Stuebel version there is a drawing of the morning star by a Samoan artist
who gives the star five rays (Stuebel 1976:56).

To summarize, a preliminary survey of Samoan mythological literature has
shown that entities such as the sun (ten rays?), the octopus, Le-ate-vaiu, and
Taligamaivalu (eight rays), the turtle (six rays?), the morning star (five
rays) and the eel/snake (one ray) are all important members of the Samoan
pantheon. In addition, it has been shown that these entities are either
directly associated with pigeon catching or are indirectly associated with it
in that they are depicted in myths where the acquisition of a wife is a major
theme and the acquisition of wives is related to pigeon catching via Samoan
proverbs. We consider this to be supporting evidence for the idea that the
variations in the tia 'ave are based on the mounds being representations of the
above mythological entities. In addition, we see the above groups of myths
and what has been said in the ethnohistorical literature as being evidence for
the idea that pigeon-snaring mounds (i.e., tia 'ave) served a ritual function
as well as the function of providing a competitive forum for the chiefs.
Rituals are often the reenactment of myth. It may be the case that pigeon
catching was seen as a reenactment of one or the other or all of the above
myths.
FUTURE RESEARCH

Some evidence exists that the metaphoric analysis of pigeon catching that has been provided so far is incomplete. A more comprehensive analysis would build on the metaphor of women as pigeons 'shared' for marriage. Samoan marriage practices in the context of political alliance formation seem to provide a source domain (Lakoff 1987) for an expansion of the pigeon-catching metaphor. A brief description of these practices, following Jan Hjarno's (1979-80) ethnohistorical analysis, will be provided, along with suggestions for the metaphorical mapping between marriage alliance building and pigeon catching.

Hjarno (1979-80) believes that during aboriginal times political alliances were formed via a model of generalized exchange where lower ranked individuals (wife-givers) were on the lookout for higher ranked families into which they could marry their daughters. In addition, high ranked individuals (wife-takers) searched for women of lower ranked families who were willing to part with their daughters and large dowries (toga) of fine mats. In return, the wife-takers would give political support and gifts, called 'o'loa, to the wife-givers. Toga, primarily fine mats and barkcloth (siapo) was the product of women's labor (Stuebel 1976:132). On the other hand, 'o'loa, which consisted of items such as food, red feathers, decoy pigeons, and tools, belonged to the province of men (Stuebel 1976:132; Hjarno 1979-80:102). The promise of political support to the wife-givers was a major motivation for parting with large quantities of fine mats. This political support would enable them to move up in rank in the political sphere.

An important relationship in this struggle for wealth and political status was that between the tulafale (High Talking Chief) and ali'i (High Chief). In terms of overall rank, tulafale were subordinate to the ali'i, though any particular tulafale title might out-rank a given ali'i title (Hjarno 1979-80:94-96). The tulafale would act as the ali'i's orator and represent his views in the village council (fono). In addition, tulafale, in groups known as faleyauali, would try to find their ali'i suitable wives who would bring in large dowries of fine mats (Hjarno 1979-80:97). Once marriage arrangements were made the tulafale were expected to provide their chief with 'o'loa goods for the wedding exchange (Hjarno 1979-80:97). Having done this the tulafale could expect to share in a redistribution of fine mats after the wedding (Schultz 1965:33; Stuebel 1976:124).

Given the above it is suggested that the following metaphorical correspondence may hold,

1) Wifes---------->Pigeons
2) Tulafale---------->Decoy Pigeons
3) Ali'i---------->Ta 'ave

The evidence for number one has already been presented. Evidence for number two includes the fact that the word tula means high ranked talking chief and pigeon catching perch (Milner 1966:285). In addition, Schultz provides some suggestive proverbs which identify the decoy pigeon with the tulafale. For instance, one proverb reads as follows: O le foata la va malu maunu; Schultz translates it as, "The catching place is full of decoy pigeons" and interprets it as a metaphorical compliment "referring to a village that boasts of many experienced orators" (Schultz q965:31). In addition, he says.

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the translation of the proverb Ua fa'atagito'a is "like the call of a
stricken decoy bird" since "when a decoy bird refuses to call, people say it
is ta'ia-stricken (with sickness or obstinacy)" (Schultz 1965:36). He goes
on to say that the proverb is applied as an insult "to an orator whose speech
does not meet with approval" (Schultz 1965:36).

The evidence for number three which identifies ali'i with the ti'a 'ave is
fairly indirect. Hjarno points out that "the highest ranked title holders
were considered the nearest descendents of the gods and were thus the nearest
contact society had with the supernatural" (Hjarno 1979-80:112). If ti'a 'ave
were symbolic representations of Samoan gods (like, say, the octopus or sun)
then ali'i, being their nearest descendents, could be considered to be
associated with ti'a 'ave via the gods. In addition, High Chief Malietoa is
portrayed as having star-like eyes (see note #4) by a Samoan artist (Stuebel
1978:69) and Albert Wendt ends one of his short stories about a high chief by
the name of Mauga with the line 'Mauga stood crowned by the last rays of the
setting sun' (Wendt 1974:6).

Finally, Schultz provides a suggestive proverb which might be interpreted
as supporting the association of gods/ti'a 'ave with high chief. The proverb is
E la se fe'e'rty ti'a. Schultz translates the proverb as, "Not like the
octopus that sits wounded in its cave" (Schultz 1967:128). He says it is a
proverb recited to a high chief upon his arrival to a village he is visiting.
Schultz interprets it to be a compliment dissociating the chief from a
cowardly octopus, who, upon being wounded, just sits in his cave (Schultz
1967:128). However, given the fact that the words "wounded," "sits," and
"cave" do not appear in a literal translation of the proverb, there is reason
to believe that Schultz was mistaken in his translation and interpretation of
the proverb. A more literal translation would read, "It is not the octopus
that stands on the pigeon perch." This can still be interpreted as a
compliment to the ali'i, but in this case it identifies the ali'i with the
octopus. It is a compliment in that it implies that the high chief does not
stand in the position of the tulafale (i.e. on the pigeon perch) thereby
reaffirming the superordinate position of the ali'i has over the tulafale.

If these suggestions are correct then the pigeon-catching metaphor could
be paraphrased as follows: As the decoy pigeon attracts pigeons to the ti'a
'ave so the tulafale attracts wives to his ali'i (see note #5). Only future
research can determine the accuracy of this hypotheses. Such research might
include a survey of archival materials, analysis of Samoan mythology, and
modern literature, a detailed analysis of Samoan proverbial expressions from
both historical sources and from present day usage, as well as archaeological
evacuation of ti'a 'ave.

Before concluding this analysis, the question of future testing of the
ritual/pigeon-catching hypothesis should be addressed. Part of the problem
with earlier research that has dealt with these and similar structures is a
tendency to lump them into categories such as "ritual" and leave the matter
there. The problem with this is that "ritual" is never defined in an explicit
way and hence there is no possible way to test the hypothesis. We feel that
this is a very unproductive state of affairs and so have defined ritual, at
the very least, as a reenactment of a myth or some aspect of a myth, usually
with some outcome in mind, be it changing someone's social status, as in a
marriage ritual, or healing someone with a ritual incantation, or maintaining
the status quo, as in insuring that the sun will rise in the morning. This
definition of ritual compels one to treat mythology as genuine empirical data, though not to limit its treatment to a literal understanding. By treating myths as data and by considering the pigeon catching and ritual hypotheses cautiously and seriously, we have been able to provide a detailed and explicit account of why these hypotheses may be correct. In addition, making explicit claims makes it easier to devise tests for our hypotheses.

A careful reading of both the traditional ethnobiological descriptions of pigeon hunting and the related mythology brings to light the kinds of material remains one would expect to find if pigeon hunting occurred at these mounds.

(1) Buck states that in some instances small stone enclosures near the pigeon hunter were sometimes used to temporarily store the pigeons while hunting. Small circles of stone found on a number of mounds at 'Aoa and other sites may be those structures or there may be better canidates that have not yet been adequately described.

(2) Buck (1930:544) says that maicloqa camps were set up near the ti'a during the pigeon hunting festivals. More intensive field surveys need to be undertaken to see if these sites can be located and to see if a relation between them and ti'a 'ave can be established.

(3) Davidson describes a shift from inland settlements to nucleated coastal settlements at the time of European contact. She attributes this shift to Samoans' desire for European trade goods, and discounts the Samoan explanation that they moved "when the Gospel came" (Davidson 1974d:53-55). It may, however, turn out that these camps, and the inland settlements described by Davidson and others, are one and the same. Thus, if inland settlements were associated with star mounds, and if star mounds and pigeon catching were part of old Samoan religion, then the Samoans' adoption of Christianity may have entailed the permanent abandonment of these inland sites (see note #6).

The Mt. Olo tract settlement with its associated ti'a 'ave (Jennings et al. 1980), the Vaigafa site with one nearby site which includes ti'a 'ave (Davidson 1974a:184-188), and the Lefutu Ridge site (Frost 1978) may be possible instances.

(4) Buck (1930:534) describes the structures that the hunters sat in to conceal themselves from the wild pigeons. They were said to have a basic floor plan that was four feet by two feet with posts that were placed in the ground. Such a structure could have fit on the arms of a star mound. Careful excavation on a relatively undisturbed mound might provide evidence of these small structures in the form of shallow postmolds. Their absence from earlier excavations could be due to any number of factors. First, two of the mounds excavated earlier were made of stone, hence one would not expect to find evidence of postmolds. Second, the mounds were only partially excavated so it is possible that no structures had been built on the excavated locations. Third, shallow postmolds are very difficult to detect, especially if root activity is extensive as it is in tropical forests. Fourth, there appears to have been variation in the types of blinds that were made to conceal the hunter. Williams (1984:249) describes a portable blind which may not have actually been secured in the ground. It may be the case that only a subset of earthen mounds have the possibility of exhibiting post molds. Clearly, further testing is necessary.
(5) A number of myths give relatively specific locations for pigeon-catching mounds. If these locations are accurate, a description of these mounds would provide further evidence either for or against the idea that pigeon catching mounds included "star mounds." Several examples follow:

3: In a myth recorded by Muse and Schultz, the location of a mound called Tiapepe is given. It is said to have been located on Upolu on a narrow strip of land near the coast, near the village of Poutasi. An examination of a map of Upolu shows a Tiapepe cape on the north side of the island of Upolu near said village. No surveys have been conducted there to date so no information is available as to whether or not there is a tia there and what its shape might be. This would be relatively easy to investigate.

(b) In a myth discussed above, there is supposed to be a pigeon-catching mound located on the island of Ta'u inland from the section called Siu'ufa'aga which is part of the village of Ta'u. The tia was said to belong to an individual by the name of Salevao who was identified earlier as being incarnated in the eel and turtle, among other things. One would thus expect, if his tia could be identified, that it would have either one or six rays. This should also be relatively easy to investigate.

(c) The previously mentioned myths concerning the turtle and turtle shell with a ray or rays give an approximate location for where the shell was kept and where the turtle was supposed to have died. The turtle died at Matega, the shell was said to be in a cave Sagano.

(6) If any of the above mentioned gods were represented by the tia 'ave, it may be that other material objects that were associated with them would be found at these locations. For instance, a turtle shell at a six or single-rayed mound. If at least some of the eight rayed mounds represented the octopus one might expect to find Cypraea ovula shells which Turner says represented Fe'e.

One final bit of data needs to be considered before we conclude. Recent research on the structure of the ideal conception of the Samoan village has been done by Shore (1982:50) and Neich (1984). If one turns to Figure 40 (from Neich 1984), one finds it very difficult to ignore the structural similarity that this figure has with star mounds. It is not at all clear how this should be interpreted, it may be pure coincidence, but we will suggest one possible interpretation. One will note that each ray on the village plan represents or contains a 'aiga potopoto. Each 'aiga potopoto has an individual who is a matai or head of the family. Since pigeon catching was, among other things, a competition between matai, it may be the case that each ray on a given tia 'ave (except the long linear single rayed type which we know had four individuals on it in one case) represented a matai in the village, much as each matai has a post associated with his title in the village fono. This interpretation could be correct and in no way conflict with the above interpretation; symbols need not have a single interpretation. It seems to be the case that symbols can be interpreted from multiple points of
Figure 40. Ideal conceptualization of the Samoan village. (From Reich 1984)

Houses belonging to one 'aiga potopoto:

A Guesthouse
B Dwelling houses
C Cook houses
D Toilets
E Pig-sty
view within any given society depending on the knowledge domain from which one is doing the interpreting. So from a mythical point of view, Samoans may have interpreted the mound as we have outlined above, while from another point of view it could be interpreted as corresponding to the social structure and village organization. What people have frequently called the "power" of symbols seems to be that all of these interpretations are focused on one symbolic object (for three important discussions of symbolism and symbols relation to other theoretical domains in a society see Wessing 1978, Lehman 1978, and Skorupski 1978).

SUMMARY

In summary, it seems that as soon as one asks why so many Samoans have been reported to say that "star mounds" were used for pigeon catching, one is forced to view the question from the Samoans' perspective. In other words, one needs to look into their art, social structure, mythology and even their way of organizing space. Clearly, sufficient evidence has been presented to argue plausibly for five points.

(1) There is a single category tia 'ave that includes structures that have been earlier referred to as "star mounds" and "irregular structures." This category has as its members varietal structures which are distinguished from each other on the basis of the number of rays, or projections.

(2) All tia 'ave functioned, at least in part, as pigeon-snaring mounds.

(3) The varietal members mentioned above are based on mythological creatures found in the Samoan pantheon and hence the tia 'ave can be viewed as symbolic representations of those entities.

(4) The above symbolic representation and various Samoan proverbs tie the tia 'ave to a set of myths. Pigeon catching is claimed to have been viewed by Samoans as a ritual reenactment of those myths that are related to procuring wives and to warfare.

(5) The tia 'ave may at the same time have represented village social structure and spatial organization.

At this stage in the research all of the data considered have converged around the above interpretation. Other interpretations, such as burial mounds or residential structures, have no supporting evidence. Finally, further testing of this interpretation and related hypotheses is still necessary.
'Aoa Valley in Prehistory

Initial settlement at 'Aoa was situated on the slightly higher ground of the eastern slope of the valley. Pottery, indicative of early occupation, has been found at three localities (2, 3, and 4), all in that part of the valley. Our excavations at AS-21-5, Locality 2, probably fall in the southeastern extension of the early coastal settlement. It should be remembered that the Locality 3 finds were at stream mouths and are transported artifacts that originated farther inland. Although precise dates for this early settlement are not available, it can fairly safely be placed between 3000 BP and 1700 BP based solely on the presence of pottery. The predominance of thin-walled, fine-tempered sherds at Locality 2 leads us to suggest that initial occupation probably took place between 2500 and 2000 BP. The larger numbers of thicker, coarse-tempered sherds at Locality 3 and, especially, Locality 4 may indicate a slightly later occupation in the more northern and western portions of the eastern valley.

At the time of initial settlement at 'Aoa, an embayment existed where most the valley now sets (see Fig. 36). This is indicated by six conditions: (1) buried calcareous sand deposit indicative of a marine environment in the western valley, (2) site AS-21-5, Locality 2, is located at the rear of the valley rather than along the present coast, (3) the buried calcareous sand deposit does not underlie the cultural deposit, (4) the site is situated near the edge of the old shoreline, (5) the sediments overlying the buried calcareous sands suggest human activity along the valley slopes, and (6) the absence of pottery from western valley (old embayment area) sites. Over time, the embayment filled with sediments that washed down from the surrounding ridges and ponded against a growing accretion barrier. The landscape thus underwent a transition from bay to backbarrier lagoon to marsh to valley.

As the land area increased, the growing population of the settlement would have become more and more dispersed. The enlarged accretion barrier may have been one of the first new land areas to be occupied. That occupation may be evidenced by the buried cultural deposit revealed in the lower valley cores of CTI. Eventually, most of the lower and middle valley was occupied. Settlement also spread onto sections of the slope where scattered abandoned terraces are now found. In the latter centuries of the prehistoric period, a series of star mounds were built on prominent points along the ridges surrounding the valley. As noted by Davidson (1959a) for Western Samoa, the shift to more nucleated village settlements may not have come about until the early historic period. That may have been the time when the residential sites evidenced for the lower and middle valley were largely abandoned and people clustered in the villages at 'Aoa and Fa'afulu. Star mound use was also abandoned, apparently sometime in the early historic period. That abandonment may relate to the adoption of Christianity and the apparent link between star mounds and traditional Samoan religion.

In short, we are left with an intriguing case of significant geomorphological change taking place at 'Aoa Valley during the time of human settlement. How that change took place and what influence the human population had on it are critical questions. Four hypotheses can be proposed to account for the geomorphological change.

First, we began this project with a general model that postulated geologic tilting of Tutuila, since initial human settlement, that resulted in
uplift of the eastern end of the island. Consequently, at Aoa and other locations on the eastern end of the island, marine embayments were rapidly transformed into valley floors. At the same time, early occupation sites on the western end of the island became submerged. A possible cause of such tilting could have been volcanism—still undemonstrated—a short distance off the eastern tip of the island. While human action may have contributed to the process of valley creation, tilting was the critical factor.

A second hypothesis is that the transformed geomorphology was a purely local phenomenon brought about by the interaction of human farmers and their environmental surroundings at Aoa. That is, the existence of the accretion barrier and the initiation of human activities at Aoa were significant factors in the transformation of the embayment to a valley. The relatively sudden influx of clay and silt into the bay was substantially due to human occupation. The early Oceanic colonists were farmers who undoubtedly would have implemented their agricultural technology immediately upon colonization. A central component of that agricultural package was slash-and-burn farming which, due to the terrain at Aoa, would have to have been carried out on the slopes surrounding the bay. Given the nature of the soils and the heavy rains, erosion and slumping would certainly follow closely upon vegetation clearing. The erosional sediments would have been washed into the bay. The scattered bits of charcoal in the sediments overlying the sand are most reasonably attributed to the vegetation burning in land clearing (repeated natural fires in this environment are not likely). As the valley floor grew, it, too, would have been put in cultivation, undergoing vegetation clearing and erosion. Consequently, the geomorphological changes at Aoa came about due to localized human activity.

A third hypothesis postulates a higher sea level 2000–3000 years ago that fell after, or, more likely, was in the process of falling during the time of, the human colonization of the island. The general lowering of sea level was probably only 1–2 m—at least since human settlement—but that was sufficient to expose previously submerged land at many locations around the island. Such a drop could be due to regional conditions or may reflect broader eustatic change (see Kidson 1982). In the 1920s Mayor (1924a, 1924b), Daly (1924), and Chamberlain (1924) concurred that there was evidence in American Samoa for a higher sea stand during the Holocene than at present. Furthermore, a postulated sea level drop in the south-central Pacific is certainly consistent with some more recent data and models for Holocene sea levels (e.g., Pirazzoli and Montaggioni 1986; Pirazzoli et al. 1988; Montaggioni and Pirazzoli 1984; Clark et al. 1978). Such a condition would also have had a profound effect on early settlement patterns in the archipelago, and perhaps beyond. It would mean that many of the earliest settlements in this area of the Pacific will now be found some distance from the coast and quite possibly be buried under subsequent alluvium and colluvium. Human action would have been a contributing factor acting to accelerate the transformation process, but unlike the second hypothesis, it was not the primary factor.

The fourth hypothesis is that there has been general island uplift since the time of human occupation. Uplift has been used by several people to account for changes in the coastal geomorphology of several islands in the central Pacific during the Holocene (e.g., Taylor and Bloom 1977; Kirch 1975; Green 1976). The location of the Samoan chain in a tectonically active region strengthens this hypothesis. As with lowering sea level, the implication of
uplift is that early settlements will be found somewhat inland of the present coast and along ancient shorelines.

Each of these hypotheses has important implications for understanding Samoan settlement patterns, and for the ability of archaeologists to discover early sites. They also have significant implications for local geological and sea level studies. At this point we have no means for selecting between the hypotheses but further research should be able to shed some light. Briefly, hypothesis one can be refuted by finding evidence of comparable sea level change at the west end of Tutuila. Hypothesis two can be refuted by gathering more data that clearly demonstrate a change in sea level affecting Tutuila. Hypotheses three and four can be refuted if no evidence of changing sea level can be produced at other locations around the island. If evidence of change is found, however, differentiating between these hypotheses will be difficult. Uplift has generally been assumed when evidence is revealed of a change in sea stand. For example, Kirch has reported uplift for Futuna (1975) even though there is no sound means for differentiating change in sea stand brought about by uplift versus drop in sea level. For Tongatapu, Taylor and Bloom (1977) have proposed uplift to account for the change in shoreline in the last few thousand years, but Spennemann (1987) has recently suggested that a drop in sea level may be the cause. Perhaps the only means by which we can select between the alternatives is to look to the wider region. If changing sea stand is localized to just a few islands, then uplift may be the answer. But the more islands that must be accounted for by isolated uplift, the more likely it will be that a much broader process is involved, a process such as eustatic change. In this sense, the data gathered from 'Aoa represent only a few small pieces of a much larger and extremely fascinating puzzle.

CONCLUSIONS

The Eastern Tutuila Archaeological Project was extraordinarily successful. Survey, excavation, and soil coring all yielded significant data on Samoan prehistory. The investigations reported here also have pointed to new directions for critical research.

The recovery of pottery at 'Aoa marks one of the more significant achievements of the project. These are the first and only prehistoric ceramics recovered from Tutuila. The preliminary indication, on the basis of typological considerations, is that the 'Aoa site is the earliest site thus far found on Tutuila, and perhaps all of American Samoa. The presence of ceramic sites on Tutuila and in Manu'a demonstrates that material culture in American Samoa was not aberrant from other West Polynesian societies.

We were also able to collect data on substantial geomorphological change at 'Aoa Valley. The implications of these data for settlement pattern, human-environment interaction, and, possibly, for changing sea level are extremely important. Follow-up work is clearly warranted.

As a result of the survey, we now have a better idea of the distribution of sites in eastern Tutuila. It now appears that the earliest sites are likely to be near the rear of the valleys, or at least some distance back from the coast. Also, they are likely to be buried under alluvium and colluvium.
Perhaps the most unexpected find was the distribution of star mounds along the ridge tops. We feel that a big step has been taken toward understanding these enigmatic features.

The results of the Eastern Tutuila Archaeological Project demonstrate the important role that archaeological data from American Samoa can play in answering critical questions about Pacific prehistory. Future research will undoubtedly contribute significant new information to our understanding of Samoan prehistory, and the prehistory of Oceania in general.
1) There is no known Samoan myth that gives the exact number of rays for the sun. There is one Tahitian myth that states that the sun had ten rays and we tentatively adopt that number here (Makemson 1941).

2) There is no mention of starfish (aveau) in any of the myths we examined. They are mentioned here because various descriptions of Samoan tattooing show four rayed stars that are identified as "starfish" (see Buck 1930:557).

3) The identification of women with birds in general and not just with pigeons, along with their capture by a given husband, is a common metaphor in Samoan mythology. It was earlier pointed out that a bird called a punae, which burrows in the ground, was captured by netting (Pritchard 1866:164). Consider the following section of a myth related to Turner (1884:231):

Manga had a daughter called Sina, who married the King of Manu'a. They had a daughter called Sinaleana, white of the cave, because she lived in a cave in which there was also kept a parrot of the king. The god, Tagaloa, of the heavens looked down and fancied her. He sent Thunder and Storm for her; they did not get her. Lightning and Darkness were also sent to fetch her, but they failed also. Next Deluging Rain, dashing down in great egg-drops, was sent, but to no purpose. He then let down a net, which covered up the mouth of the cave, caught her, and pulled her up to the heavens. She became his wife, had a child, and named him Pili, or Entangled, from the way in which she was entangled in the net.

The correspondence between catching birds in burrows and the mythical capture of Sina by Tagaloa is difficult to ignore. One interesting aspect of this is the place of the supernatural. The hunter is not only being associated with a husband, but with Tagaloa himself! If one is a chief, not to mention a husband, it would obviously be to one's ideological advantage to make such an identification.

4) The metaphor of "snaring" someone with one's eyes is a pervasive one in Wendt's stories. For instance, Wendt writes, "He stood in front of her, confronted his reflection snared in her eyes and wept" (Wendt 1977:95), and "everytime she looks at the doctor she has the clinging octopus eye on him" (Wendt 1974:105).

5) Although there is no direct evidence, this metaphor may have had more general usage. Since, during courtship, an untitled young man would utilize a soa, or friend, (whose role here paralleled that of a tulafala) to arrange things between himself and his prospective bride (Mead 1969:94-95; Milner 1966:212; Stuebel 1976:126), this metaphor may have had application beyond the marriages of the elite of Samoan society. Only future research can shed light on this question.

6) There is some supporting evidence for this hypothesis. For instance, William B. Churchward, who was British Consul in Samoa,
wrote the following concerning pigeon catching in 1887:

Pigeon catching is the oldest and most cherished sport in all Samoa, and until lately, partook much more of the nature of a fixed ceremony than a mere amusement. It was made the occasion for feasting and junketing in a high degree, and whilst it lasted all sorts of irregularities could be indulged in without comment [Churchward 1971:139].

In days of old these yearly pigeon festivals were attended by the entire population of the village, to the sad neglect of all domestic affairs. Old and young, schoolmaster and pupil, fisherman, pig-hunter, carpenter or agriculturalist, no matter—all went to offer at St. Hurlingham’s shrine in the bush, carrying with them all the provisions they could lay their hands upon, so as to ensure a good time of it in their sylvan quarters. In fact, for the time they returned to their original state of barbarism, making their picnic the excuse for undesirable orgies of a most damaging nature to the progress of the civilization they were so satisfactorily acquiring.

Thanks to their kind friends the missionaries, this is not so nowadays. The natives, at all times conscious of their sincere efforts to socially improve the race, listened attentively to their protests, and with the strong common-sense that the Samoans in general possess, were soon able to realize the damage that was being done to the cause of their own advancement by keeping up this dangerous old custom, and consequently abandoned all the objectionable parts thereof [Churchward 1971:141].
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