FAGAITUA BAY PHASE II RESEARCH PROJECT

FINAL REPORT ON THE AMERICAN SAMOA POWER AUTHORITY WATERMAIN PROJECT FROM ALEGA TO ALOFAU

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MANAGEMENT ABSTRACT
Phase II archeological testing and monitoring of waterline trenching along Fagaitua Bay highway determined that no significant cultural resources were impacted by the project. For this completed project we feel that no additional research along the corridor is warranted. The impact of the 1 meter wide by 1.1 meter deep trench on subsurface cultural resources was relatively minor. For the 776 meters (25,000 feet) of trenchlines only one pavement of waterworn cobble, two earth ovens, one alignment of stacked angular basalt cobbles, and an isolated portion of a skull in beach sand were located, sampled, and recorded. None of these meet the criteria for nomination to the National Register for Historic Places. Larger excavations at hydrants, meters, and at stream crossings slightly inland from the road yielded isolated artifacts and opportunities to record soil profiles, but no site features.

There are two main reasons for this low frequency of prehistoric indicators. The roadway is within a corridor of highly disturbed ground surface. Large earth moving equipment in the 1960s and 1970s changed the landscape of many of the villages. Marshes were filled in and stream courses were controlled with walls and culverts. A majority of the project area has .6-1.1 meters (2-4 feet) of coral road fill dredged from Fagaitua and Alofa'a reefs in the 1960s and 1970s. Trenching in these areas went down through less than .6m of nondisturbed soil. Secondly, the road corridor is, for the most part, along the beach/land edge and not within the center of the old villages. Approximately one third of the trenching went through low site potential areas of basalt bedrock where ridges descend to the ocean. For these reasons the road is an excellent corridor for future underground utilities.

ARCHEOLOGICAL ABSTRACT
Phase II testing along the Fagaitua Bay waterline project established that use areas or components of prehistoric villages (over the last millennia BP) were present along the current land/beach interface. The research produced four radiocarbon dates between 300 and 1,000 BP in the villages of Ava'a, Ama'a, and Utu'a. The controlled 1m x 3m excavation seven meters inland from the road and below the road grade located a 1,000 year old cultural strata between 86cm and 104cm below surface with a burial, an alignment of stacked angular basalt cobbles, and a small refuse pit. Many upper strata in the units tested (Ama'a, Utusa, Ava'a) had redeposited gravels with large amounts of lithic debitage. Of major concern is the mechanisms of deposit of these artifact-bearing deposits. The bay edge presents a complex combination of natural depositional mechanisms-stream erosion and deposit, sheet wash, earthquake liquefaction, and wave erosion and deposit. A dominant strata throughout the project area was the reddish-brown clayey soils with angular basalt cobble and boulder. These colluvial deposits are often 30cm or more in thickness and frequently have charcoal flecks. Many of these strata lacked horizontal changes and may represent the massive soil movement of a single depositional event. We assume that these colluvial strata are the result of a period of population expansion and the utilization of hill slopes for agriculture. Forest clearing, debris burning and terracing, in all likelihood, resulted in massive landslides. A radiocarbon date of 390 years BP at the bottom (beginning) of a deep colluvial deposit in Ava'a, provides a benchmark for those activities in that valley. The analysis of shell remains provides baseline data for the bay villages. A detailed lithic analysis points out the wide range of the lithic tool inventory and provides a baseline study for island-wide comparisons.
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Correspondence: Letter of Meko Aiunu, Public Works regarding 1960-70 road work on east end of island.
Photo #1 Avaio. A test trench which yielded a carbon sample date of 390 years before present (+/- 50) (using 1950 as "present") Sample was from 142 cm (approx. 4') below surface.

The most common strata throughout the project was a red/brown clayey soil with large boulders. This soil probably came off the steep slopes of hillsides during a period of intensive hillslope agriculture and terrace building which resulted in massive landslides and rapid movement of soil and rock through the village to the beachfront.

Impact of backhoe work was often limited to a narrow swath of 3' subsurface and 7-8' on the surface as a result of tire impacts and bucket scraping. The replaced 14" village waterline lies to the left.

Photo #2 23,000 feet of watermain pipeline trench was excavated to an average of 4 feet depth and was less than 3' wide. Red cinder was placed beneath the pipe for protection.

Most of the Fagaitua waterline trench went through approximately 2 feet of coral and sand fill used in the construction of the road in the 1960s.
TUTUILLA ISLAND, AMERICAN SAMOA
INTRODUCTION

In the first phase of providing improved water systems to 1,500 people in Fagaitua Bay area, ASPA placed 23,000 feet of new water line, on average, four (4) feet below surface along the existing road. This road runs seldom more than 50 feet from the beach.

The project area begins at the east extent of Aumi village just west of Tauga Rock, passes through Alega, Avaio, Auto, Afalei, Aamua, Utusia, Fagaitua, Papai, and Alofa village all of which are situated in valley bottoms of varying sizes. Aumi and Avaio are situated on narrow terraces along the coast. Alega is within a small valley and has a small but distinct bay. The other villages mentioned above are within Tutuila Island's second largest bay, Fagaitua Bay, 1.5 by 1 mile (see map # 1).

Research design: Phase I

A Phase I survey designed by Eric Voight (ASHPO) with Epi Suafo'a (ASPA) divided the 23,000 feet of waterline trenches into three types of areas: nonmonitor areas with little or no potential for archeological sites including areas of basalt with no overlying soils, monitor areas which had some site potential but could not be tested by STPs, and areas tested by shovel test pits (STPs) (see Fagaitua Bay, Phase I Report). Assessment of Suafo'a's 1994 phase I STPs located 10 lithic concentrations and 3 bone fragments which were considered indications of possible human burials. Three of the test pits yielded human bone fragments. The Phase I surface reconnaissance located 3 house platforms and a lithic scatter. These were beyond the impact area of the project and they were noted along with interview data in the Phase I report.

Phase II

The Phase II research plan called for ten (10) .5 x 5.5 m column samples excavated and screened after the backhoe had trenched through the lithic concentration. Three (3) .5 x 2 m trenches were excavated to 1.5 m at the shovel test pit locations which yielded possible human bone fragments. One 1 x 3 m excavation was carried out in the area of the densest lithic concentration. Areas designated for monitoring were monitored as backhoe trenching progressed and in the monitoring areas of Avaio and Fagaitua, a total of seven (7) trenches approximately 3 m long were backhoe excavated ahead of the waterline trenching in order to more carefully examine the strata for cultural data. Additional soil profiles were collected in Aamua at a hydrant and a meter excavation.

Findings

Monitoring in the "monitor" areas did not identify any archeological sites. In Pagai and Alofa we encountered areas of deep road fill and areas of deep road cuts into sterile, non-cultural strata. A redesign of monitoring in Avaio and Fagaitua allowed us to trench the waterline area using 3 m long, 1.3 m to 2 m deep backhoe trenches ahead of the construction crews. In Avaio this provided soil profiles and a carbon 14 date. In Fagaitua it established an area of considerably deep coral/sand road fill and land disturbance. The assessment of the data from the excavation units and trench monitoring has provided insights into the distinct geomorphic land/sea interface zone incorporated in the project. Carbon 14 dates of 1,000 years BP to 350 years BP for cultural features at less than 100 cmbs suggests that features of relatively recent prehistoric villages do occur along the current land/sea corridor. It is probable that this was the village front or beach edge during the last 1000 years. Radiocarbon dates for Aamua, Utusia and Auto features and Avaio colluvial deposits correspond to Clark's radiocarbon dates at Alemu of 1,040 +/- 230 and 590 +/- 70. Data from Kirch and Hunt (1993) suggests that prior to 1000 years BP the ocean level had been 1-2 m above the current level and that beach/land edge and the early habitation sites were further inland. Geomorphic data from the Fagaitua Bay project shows large amounts of both alluvial and colluvial deposits overlying the relatively recent prehistoric sites leading us to believe that earlier sites will be located at far deeper levels and further from the beach.

Lithic analysis of the approximately 150 lbs of basalt waste flakes and tools examined the wide range of retouched flake tool types including scrapers, gravers, perforators, and spoke shaves. Because of the small excavation unit size (.5 x .5 m) of the majority of test units no conclusive tool type distribution
could be formulated. However, the study provides initial data suggesting that a more careful examination of flake tool typologies is necessary for Samoan archeology. Faunal analysis was dependent upon a representation of slightly more than 5,000 gr (5kg) of whole and fragmented shells recovered in the excavations. Only 27 mammal and fish bone fragments were recovered yielding insufficient amounts for any analysis beyond tentative identifications.

**Project Impacts**

Overall impacts of the 23,000 feet of trenching appear to be relatively small. Of the 14 lithic concentrations and possible human burials only three definite features were encountered, a rock wall or foundation, two earth ovens, and a stone pavement. The 1 x 3m test pit was located 5 meters. During the trenching in the monitored and non-monitored areas no definite cultural features were noted. Because the trenching followed the road (which is built on 30-50cm of coral/sand fill) located at the beach edge of the historic and prehistoric villages and because the trenching seldom went deeper than 4 feet (1.3 meters) the impact on historic and relatively recent prehistoric properties was limited (see photos # 1, 2).

**BACKGROUND**

**Post Contact Historic Features:** A check of archives' two microfilm reels provided only blueprints of 1900s military buildings at Pago Pago harbour and WWII buildings at Tafuna and Pago Pago. One map dated 1898 shows the island in outline with the reefs and Lion's Head noted.

In an interview with High Chief Iliato of Fagaitua, the Chief stated that the road which runs through the village was the original road and was built before WWII. He stated that there were no other WWII structures in the area with the exception of the pill boxes.

Kennedy (1985) surveyed the WWII sites and recorded the pill boxes on a map which was turned in with his report. We were unsuccessful in locating the map and there were no additional copies made. Kennedy refers to communication with Mr. Clark of Public Works in which Mr. Clark states he would like to have the pill boxes mapped by DERP in order that they might be removed as eyesores. Since Kennedy's 1985 report two hurricanes have destroyed nearly a number of the pill boxes. Some have been dislodged and tumbled from their original location. Some of these have been broken apart. In addition, a number of pill boxes have been covered by fill so as the roadway has been developed along the bay edge. Pill boxes are noted as far as 70' (25 meters) from the beach. Only a small portion of the original WWII pill boxes remain undamaged or uncovered. As important features of WWII history in American Samoa some consideration should be given to the protection of these structures.

**Present Land Use:**

Post WWII population expansion of the villages in Fagaitua Bay has resulted in major land changes, particularly along the land/sea interface. The geomorphology of this zone, described by Kirch for the Toaga site on Ofu, is distinctly absent in Fagaitua Bay. The natural process of beach progradation and terrace building has been replaced in the last 50 years by purposeful land grading, dredging of corals, excavation and movement of quarried boulder and gravels to create breakwaters and land fill effectively extending the usable beach edge of each village. In addition, freshwater marshes alongside stream drainages and saltwater lagoons have been filled in to create additional building space for houses and possibly as a government inspired program to eliminate mosquitoes.

The littoral vegetation described by Kirch is also poorly represented in the various Fagaitua Bay villages. While it is likely that inhabitants have always tried to advance the usable space along the beach edge, prior to heavy earth moving equipment post WWII, major land form changes occurred as a result of typhoons, earthquakes, and the slower geomorphic processes.

**Prehistory:**

A relatively small number of prehistoric sites are reported for the Fagaitua Bay and its valleys. Kikuchi (1963) noted all the villages in the bay area. Of interest was #20, Fagaitua, which was divided into two malae, Fattlegae and Malaetumau. Kikuchi also mentions the cave near Afulei which had concrete stairs built by the Marines. Site 138 (AS 23-3) was reported as being "on a ridge leading from the village of"
Fagaitua to Mt. Leano. The ridge is called Mauga-o-ali'i (Mountain of the High Chief). Several burial mounds were said by informants to exist here.

Clark's 1988 survey notes AS 23-1 on the NW slope of Mauga-o-ali'i Ridge as a large boulder with two turtle petroglyphs and other faint images. AS 23-6 is a noted adze butt and basalt flakes at the mouth of Slappa stream in Fagaitua. On Filimone Ridge above Pagai, AS 22-36, AS 22-38, two lave mounds and AS 22-37 and AS 22-39, two earth terraces. Most recently Clark (1992) carried out an intensive survey of upper Alega Valley, documenting an extensive adze quarry (AS 23-21 to AS 23-34 (see map #2). With the exception of AS 23-24 locality #1, there are no recorded sites which would have been impacted by the trenching activity. Site AS 23-24 is in the locale of STP 15-20 of the Alega map. No surface or subsurface lithics were recovered suggesting that locality #1 is concentrated further north of the road (see discussion of non-compliance incident, Page 8 of Phase I report).

Environmental Setting
With the exception of Utusia, all the villages have at least one significant stream drainage running through the valley. In some areas habitations are present far back in the valley drainage and located on steep slopes. Subsistence plantations extend to varying degrees up-slope from the village residences. The Samoan Atlas (1981) shows managed land extending, in many cases, to ridge tops surrounding the villages, with interior forests classified as disturbed.

Vegetation
Littoral forest occurs along the entire shoreline of Fagaitua Bay and extends seldom more than 50-100m inland. It is dominated by trees whose seeds are dispersed by the sea. Commonly Barringtonia asiatica (fish poison tree), Calophyllum inophyllum, Pisonia grandis and Hernandia nymphaeifolia (Chinese lantern tree). Non major species include Terminalia catappa (tropical almond), Erythrina variegata (coral tree), Theespesia populnea (Pacific Rosewood), Guettardia speciosa, Hibiscus tiliaceus (beach hibiscus). The dominance of any of these latter species indicates that disturbance has occurred because these species cannot compete with the dominant varieties.

The littoral forest merges with a variety of rainforest types. Rainforest was the dominant undisturbed precontact forest extending from the littoral forest to the high volcanic peaks. There are numerous types of Samoan rainforest depending on the particular environmental conditions. Coastal rainforest has medium sized trees whose seeds are dispersed by birds. Lowland forest, from sea level to 600m exhibits a canopy, subcanopy, and understorey species.

Dysoxylum Lowland forest are dominated by two species of large trees growing on talus slopes and alluvial deposits in coastal lowlands and valleys. These are absent on ridges. Most of these forests have been lost to human disturbance.

Lowland Ridge forest: One of the dominant tree species is Intisia bijuga, a highly valued tree for making bowls. Whistler notes surviving isolated dominant species in three of the Fagaitua Bay areas indicating that these are remnants of earlier forests. In Auto, Hernandia Nymphaeifolia (pula) may have been the original littoral forest. The headlands have native tree species and shrubs such as Calophyllum inophyllum, Hibiscus tiliaceus (fau), Barringtonia asiatica, Scaevola taccada. In Fagaitua the original forest may have been Calophyllum inophyllum. In Alofaa the littoral forest was Calophyllum inophyllum (fetau) (Whistler, A.1992).

Currently, the lower slopes around all of the villages are planted in coconut, banana, mango, papaya, taro, tapioca. According to Coulter (1941), productive slopes for prehistoric and early historic subsistence occurs up to 40 degrees. While human activities in the various valleys have served over time to create a more homogeneous vegetative community, individual valleys continue to have a mosaic of human cultigens, natural regrowth species and residual or remnants of original undisturbed forests.

Reefs
According to the 1991-1992 American Samoa Coastal Resources Inventory, reef species are greatest (most diverse) in south facing bays. In addition, more species are to be found on sloping reefs than on flat
reefs. As a result, Fagaitua Bay provides an extremely rich reef diversity and supports a wide diversity of reef fish and invertebrates. Ayres and Eisler (1987) use marine studies by Hill (1977) and Wass (1983) and information on traditional subsistence (Kramer, 1902, Buck, 1939) to suggest possible harvest volumes. For the south east Tutuila village of Faganangana 6,256 kg of fish and 2,769 kg of invertebrates were estimated for a yearly catch in a bay approximately the size of Alega bay and only a fraction the size of Fagaitua Bay. One would expect marine resources to have been a major food source for the prehistoric communities and should be well represented in the archeology.

Geology
Within the area of the study there are two distinct geologic histories. The first, from Liliilfa Point (west of Aumal village) to the western edge of Mauga ‘oalili ridge (east of Fagaitua). This area has an upper layer of Pliocene and early Quaternary volcanic, extra-caldera basaltic and andesitic flows with a lower level of thin bedded Primitive Basalt flows. The second area is delimited by Mauga‘oalii Ridge which marks the beginning of an eastern geology of thin bedded Olivine bearing basalts from Pliocene and early Pleistocene referred to as Alofau Volcanics. The village of Alofau is situated within the center of an eroded scarp (see map 3).

Soils
Five types of soils are present within the area. At the eastern extent beyond Alofau is an area of Fagasa-Ofu silty clays found on 30-60 degree slopes. On the steepest slopes behind most villages are Aua very stony silty clay loams on 30-60 degree slopes. In several valley bottoms behind Amau and west Fagaitua are Aua very stony silty clay loams on 15-30 degree slopes. At Aumo, east Fagaitua and Pagai, valley bottoms have Urban Land Aua-Leafu complex on 0-30 degree slopes. The Aua stony silty clay loam is found on the slopes and the Leafu silty clay is found on the coastal plain and valley floor. At Alega, Amau, Uutasia, Fagaitua, and Alofau, valley bottom/marine interface is Urbanland Ngedebus complex on a 0.5 degree slope. Included in this area are some poorly drained soils adjacent to streams. The soil at the valley bottom/marine interface is predominantly coral and shell and are very deep and well drained. In addition, Fagaitua has a 100 year flood plain of silts. Generally, then, these valleys are typified by loose calcareous sands along the coast, talus at the foot of steep slopes and alluvium along the valley floor (see map #4).

Sea Level Changes
The historic dynamics of the land/sea interface pose important questions for Samoan archeology. As Kirch and Hunt (1994) have discussed, volcanic activity in Pacific island formation along the ocean floor subduction lines result in a tendency for directionally successional island formation. As the earliest (oldest) islands age, the final mass (weight) results in a sinking of the island into the ocean floor and a rise of the island’s sea level. However, islands may not settle uniformly, but rather, may be tilted with uplift at one side and submergence on the other. The result of island submersion during the last 3,000 years would be that early habitation sites may be either under water or closer to the land/sea interface. The location of early sites (predating 1000 BP) during a period when the sea level was 1-2 meters higher than its current level, would have to have been slightly higher or further inland.

Landform Changes
Two additional processes of concern to island archeology is the formation of new terraces over old ones with either colluvium or beach progradation. Landslides from typically steep valley walls (as high as 60-80 degrees) occurs naturally but its frequency is increased by human activity such as terrace building, vegetation clearing or road building. As valley populations increased, gardening and habitation increased on the steep slopes resulting in landslides. Over time valley bottoms increase in height and become even wider and more habitable as colluvium and alluvium spread sometimes rich soils across the valley floor. Archeologically we may expect to find the oldest habitation sites beneath steep slopes and under deep colluvium. However, Athens and Ward (1993) caution on the extent of human-induced geomorphological change in Hawaiian landscapes and certainly these cautions apply in Samoa as well.
Extra-Caldera Volcanics consist of, Pae, an upper member of Basaltic and Andesitic Flows with their associated cones, dikes and plugs that are later than the caldera and a lower member of thin-bedded Primitive Basalt Flows and their associated cones and dikes that are older than the caldera. The two members are not separated.

**EROSIONAL: E**

Masaeau Dike Con
Thin Basaltic Flows cut Basaltic dikes and associated breccia

**RECENT**

SEDIMENTARY ROCKS
Loose Calcareous Beach Sand along the coast-Talus at the foot of valley walls, and Alluvium on valley floors.

Alofau Volcanics
Thin-bedded Basalts, mostly Olivine-bearing, and associated cones, vitric tuff breccia, and dikes.

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Map #3 from Atlas of American Samoa, 1991
FINDINGS

Amaua 1m x 3m

Amaua unit A 1m x 3m was located 4 meters from the west side of the main road, beyond the elevated coral road grade and approximately .35m lower in elevation than the road surface at 2.6 meters above sea level. The area has been impacted by frequent grading between the houses and the road. Some surface boulders were noted as an alignment interspersed with cordyline plants used to separate two properties (see map #5). Surface lithics (waste flakes and tools) were noted with a concentration occurring approximately 8 meters to the northwest of the unit in a banana and papaya plantation where surface erosion had left disturbed soil exposed. We did not collect surface artefacts because of the level of disturbance in the area.

According to residents, the area belongs to the Tialavea family. Most of the houses in the area are recent. In 1923 the first road was built. At that time the area had only one house and pig walls. Kikuchi provides an early 1960s sketch of Amaua in his 1963 report (see map #6). Changes to the road were made in the 1970s when large amounts of coral were dredged from the bay and used for the road grade near the beach edge (see letter from the Public Works Dept., appendix C). Coconut trees were planted on either side of the road. According to residents, erosion from hurricanes washed out the road and it was rebuilt further inland with the remaining row of coconut trees that had been on the west side of the road now situated on the east, or beach, side of the road.

Excavation of section A

0-15cm, Level I, Strata Aa. We first removed an extremely dense layer of sod of 3-4cm depth across the entire 1m x 3m unit. The unit was divided into 3 one meter units. The northernmost was designated Unit A. Our datum was located in the northeast corner at the soil surface.

4-15cm. We excavated through a dark reddish brown (5YR 3/2) sandy loam with 20% angular, somewhat waterworn 10-15cm basalt boulders, angular and waterworn pebbles, shell, coral and large amounts of lithic artefacts. The depositional nature of this level is questionable. It appeared to be either a stream or ocean redepot or a fill associated with road building and house construction in the area.

15-24cm, Level II, Strata B. This level may also be an imported sandy fill of 10YR6/3 pale sandy soil with small amounts of 4-6cm waterworn pebbles, shell, and some flakes.

25-36cm, Level III, Strata C. This level appears to be another stream or ocean redepot. It is composed of 90% waterworn gravels, tightly compacted in a mix of silts and sands with white flecks of coral, shell fragments. Towards the bottom of this level charcoal and small flakes increase while the amount of pebble decreases. This level has a surprising amount of lithic materials, particularly when the level depth of 11cm is taken into account. Amaua Stream is currently 30 meters to the northeast and may have been the hydrologic force responsible for the redepot of lithic materials with waterworn pebbles.

36-86cm, Level IV, Strata D was a reddish brown clayey soil with 1% 3-4cm sized coral, pebbles, some charcoal flecks, 2% with pockets of light sand, small flakes (see photo #8). Between 43cm and 51cm the soil color becomes increasingly red. Three 10-15cm boulders showed no alignment. At 57cm and again at 71cm we thought we may have encountered a stone pavement or floor. However, the stones at 57cm became irregular and dispersed (see photos # 3, 4 and floor sketch #5, 1, 2). A possible post hole of 20cm diameter turned out to be a rodent burrow. Rat tunnels criss-crossed the unit beginning near the surface and, in places, were filled with white sand and soil as was the possible post hole. Further excavation revealed only 10cm of depth. At 71cm there was a noted change from the clay soil to a sandier soil. An orangy, yellow sand was noted in the west wall profile and the northwest corner of A unit at 76cm. This was also the location of a concentration of lithics, shell and charcoal. However, the pebble and cobble which we thought may be a floor was composed of rounded, angular, and flat stones which had no orientation, i.e. flat rocks at random angles.

76-86cm, Strata E. This is a transitional strata as the soil became less clayey and more sandy. Flakes and preforms increased. Flakes became smaller but there was a definite recovery bias between strata D
Photo #3 Northeast corner of section A, Amaua 1 x 3m unit at 57cmbs. White sands fill rodent tunnels and circular burrow

Photo #4 1 x 3 section A at 77cmbs shows mix of shell, artifacts, coral, rock
Floor Sketch #1: What appeared to be a post hole in the north center of unit was a rodent burrow of approximately 10cm depth. See photo #3.

Floor Sketch #2: The mix of shells, coral, flakes, preforms and waterworn pebbles in the transitional strata between excavation levels IV and V. See Photo #4.
Floor sketch #3 at 102cmbs: a partial alignment of stacked angular cobble and boulder in south portion of unit.

Photo #5: Partial alignment of stacked boulder and cobble at 102cmbs.
Photo #6 shows the uneven transition from strata F, excavation level V a gray sandy loam, to strata G, excavation level VI a likely noncultural yellow, coarse sand.

Photo #7 Heavily worn molars located along with several skull fragments in the northeast wall Amusa 1 x 3 section A at 128cmbs at the transition of level VI and VII.
Photo 8A. Amau 1 x 3m section c
South wall. Boulders cover exposed burial. Lighter level III dips down over the darker level IV. Yellow sand of level VI transitions irregularly into the white sand of level VII.

Photo 9A. Afu Filisi and Siaosi Su'a, A.S.P.A.'s Archeology Field Assistants excavate at 1m section A. (Afu Filisi in bottom of 1 x 1m unit.)
and E. The very sticky clay soil of strata D did not screen well and many smaller flakes were undoubtedly missed. Strata E had 7-12 cm boulders along with rounded and angular cobble. Pebbles decreased in this strata. In sections A and C an orangy, yellowish sandy soil shows up at approximately 65 cm on the west profile but not the east with the lens being strongly associated with cultural materials in section A but not in section C.

86-125 cm, Strata F, Level V. Strata F was a grey sandy soil with coral, shell, and charcoal, also, waterworn cobble and boulders. At 108 cm we located a discontinuous 20 cm high alignment of stacked angular basalt cobble and boulder. At 108 cm we located what appeared to be an alignment of 10-20 cm sized angular rock placed two deep. The alignment had an average height of no more than 20 cm and was not continuous. There was no soil distinction between the north side and the south side, no association with a lithic concentration, charcoal, shell or faunal remains (see photo #5 sketch #3).

125-135 cm, Strata G, Level VI. A yellow to light brown sand. In the top of this level, at 128 cm, we located human molars in the wall of the northeast corner wall. Cranial bone fragments were located 10 cm in the north wall. The thickness of the fragments ranged from 4 mm to 7 mm, were no greater than 5 cm in size and represented no more than 40% of the skull. One decomposed 2 cm piece of coral was located with a skull fragment and coconut roots grew in the spaces between the fragments. Additional excavation of 30 cm x 20 cm deep into the wall yielded no additional bone (see photo #7). The seven flakes recovered in level VI probably represent level V as pockets of yellow sand from Level V occurred in level VI.

135 cm-190 cm, Strata H, Level VII. A coarse white sand with distinctive star shaped grains and larval shells (see photo #13). Excavation continued to 198 cm. This level was devoid of lithics and shells located in these clean sand levels typically evidence extremely worn shell fragments, shell discs (2-3 mm wide). Excavation could go no deeper than 2 meters because of the restrictions of a 1 m x 3 m unit and safety concerns. In addition, heavy rains began at this point and showed no sign of ending in the next several days. During the last several hours of wall profiling the unit filled with 12 cm of water.

Section B and C
Because Strata A, B, and C (Levels I, II, and III) appeared to be redeposit, we did not screen these levels but we did excavate in 5 cm levels in case we were incorrect about the redeposit or fill nature of the levels. We watched carefully for cultural features. Although the levels were not screened we did collect representative lithics and shells. Lithic data, then, cannot be compared between A and B/C sections for levels I, II, and III. Section A lithics represent the likely deposits not collected in B and C. The nature of the three strata remained consistent from A through B and C.

35 cm-70 cm, Strata D, Level IV. Beginning at 35 cm with the reddish brown clay soil the strata continues as in section A as a sticky red/brown clay with white flecks of coral(?), numerous shell fragments, increasing charcoal, small flakes, decreasing pebbles, increasingly red soil, rat burrows and coconut roots. This continues to 70 cm where there is a gradual change to strata E, a transition from clayey to sandy soil. Boulders were present but there was no alignment (see sketch #4, 5, 6).

86 cm-125 cm, Strata F, Level V. This level begins as a relatively rapid change to a grey sandy soil (as in section A). At 100 cm we located two features, a burial in section C and a lens of a possible midden or refuse pit.

Burial Feature: Excavation at the south extent of section C uncovered a portion of a human burial beginning at approximately 100 cm. (See photos #9, 10 and sketches #7, 8). Long bones (most probably humerus, radius, ulna) were partially exposed. Measurements of these segments were 15 cm x 3 cm, 26 cm x 4 cm, 20 cm x 2 cm. Two phalanges of 4.5 cm x 1 cm and 6.5 cm x 1 cm were completely exposed. A 20 cm "lump" of yellow sand with an in situ flake (see sketch and photo) were adjacent to the bones. A pile of predominantly cobble sized stones can be seen in the southeast portion but similar cobble did not appear as a recognizable feature over the rest of the area above the portion of the exposed burial. The south wall profile shows no obvious rock piling. However, a partial mound-like lens of an orangy-yellow sandy soil appears between 70-90 cm and can be seen in the west wall profile extending well beyond the
Photo #8 Amaua A 1m x 3m Section B at 34cm below surface water worn basalt pebbles, charcoal, preform, flakes, coral fragments, trochus shell, whelk shell, in a sticky clay soil at level III/IV transition
Floor sketch #4 Cobble and boulder at 36cmbs level III

Floor sketch #5 Cobble and boulder at 53cmbs level IV

Floor sketch #6 Boulder at 84cmbs level IV transition to V

Boulders show no vertebrate association
Photo #9 Human burial, Amaua 1 x 3m section C at 98cmbs. Radius, ulna, clavicle, humerus, phalanges beneath what may be a rock mound. Note orange soil band between 70cm and 80 cm below surface from southeast to mid wall.

Photo #10 Close-up, partially exposed burial, c-14 dated 1,070 +/- 60BP
AMAUA 1 x 3m Section C
North Wall Profile
and
Floor Sketch at 100cmbs

(see photo #9)

100 cm

10 cm

60 cm

70 cm

10 YR 6/4

10 YR 5/4

sketch #7

note: bottom of humerus, possible ribs/ribs/craniol distal radius fragment

(see photo #10)

C-14 date
1,070 +/- 60 yr BP

sketch #8
Photo #11 Refuse pit, Amaua 1 x 3m section B/C East Wall between 95cm and 125cm below surface. approximately 80cm across. Black, greasy decayed organics, tridacna (giant clam) shell at bottom of level V and sitting on Level VI.

Photo #12 Refuse pit with black greasy soils, waterworn and angular pebble very little charcoal, no flakes and no fire-cracked rock. Dark yellow course sand of Level VI.
burial area. This orangy-yellow sandy lens appears in the west wall of section A and has associated concentrations of flakes, charcoal and shell. This lens, then, is not necessarily associated as a feature of the burial. Nor can we say definitely that there was a rock pile over the burial. Also, there were no indications of the burial excavated into another soil matrix. Soils with and around the burial appeared to be consistent Strata F soils. Additional skeletal material was located in the south wall of section C and include segments of what might possibly be a humerus, distal end of radius, ribs, and clavicle. Condition of the skeletal material ranged from good to extremely soft. Charcoal sample were taken at 10cm in the south west of section C dated the sample to 1,090+/50 or 810AD to 910AD. To date few burials have been excavated on Tutuila. While this burial seems old given the high acidity of the tropical soils, Frost excavated a burial at Tutolou in a 40cm thick occupation strata and had a radiocarbon date of 610BC. The decision to leave the burial intact and not to extend the excavation further was based on several factors. We felt that we had positively identified a feature—a human burial—with sufficient charcoal for reliable dating and we had been excavating the Amaua 1m x 3m unit for several weeks, interrupting the work frequently to excavate column samples in other areas as the backhoe excavated through predetermined column sample areas. A resident family expressed concern about the burial being left open and the possibility of the family getting sick from the spirit of the deceased. In deference to the family we covered the burial in the south 1/2 of section C with sand and cobbles while we finished the rest of the excavation.

Possible lens of midden. In section B beginning at about 96cmbs and going to 125cm and 80cmsg in width with a 25cm tridacna giant clam shell inverted on the bottom of the lens (see photos #11, 12, and B, C, east wall profile). The lens of a greasy black soil, less sandy than the surrounding matrix of Strata F, sits on the yellow sand strata of level VI. The lens contains some waterworn pebbles and charcoal and originally we thought it might be an earth oven, however, there is relatively little charcoal and no heat effected rock of soil. No lithic debitage or tools was located in the portion of this feature that was removed. Approximately 5-10cm of the feature protruded into the unit and one soil sample along with the clam shell was collected from the wall. A 10x lens was used to examine the soil sample. We assume that the C-14 date for the burial can be used for this feature as well.

Summary and conclusions for Amaua 1m x 3m unit. Intensive excavation of this unit yielded a large sample of lithic debitage and tools, a single charcoal sample, and three associated features; a wall segment, a burial, and a refuse pit. The first three strata appear to be either redeposition or fill. Despite the large amounts of lithic materials in I and III we cannot associate these with a particular site without knowing the material source. Level IV is a soil which is probably the result of steep slope rapid weathering/erosion and is probably associated with a period of intensive population increase and horticultural expansion on steep slopes. Large amounts of both angular and waterworn basalts thoroughly mixed in a matrix of clay and charcoal flecks suggest that this level too may be a rapidly redeposited strata. However, the transitional strata which shows a gradual change from clay to sandy soil raises some questions about the depositional history and the geomorphological processes on Tutuila.

The burial feature gives us a firm date and location of a village feature. How this fits into the structure of the community at that time may be determined with the next phase of archeology in the area. Of interest is the position of villages and village features vis a vis the beach edge. This, of course, has to be linked with data which locates that beach edge as it regresses or progrades over time. Because only a portion of the burial was excavated, the remainder will be available for controlled excavation with different research questions providing a different approach. Level VII appears to be a sterile beach with distinctive sands and may be identifiable in future test units. How deep this beach is remains undetermined. It is possible that this beach may overlay a cultural strata of greater age. Excavations deeper than 2 meters require safety considerations.
Summary of Levels and Strata in Amuna 1x3m excavation unit

Level I; Strata A; 0-17cm; Extremely dense soil. Dark reddish brown sandy loam, 5YR3/2. 10-15cm sized cobble/boulder 20% of matrix, angular and waterworn pebbles, shell, coral, large sea urchin spines. Areas of 10YR5/4 as it transitions to strata B & yellowish brown sandy loam.

Lithics: 127 waste flakes; 6 tools (unifaces; perforators, scrapers, gravers, bifaces: 2 preforms)

Shell: 16 whole and 40 fragments of identifiable shell (cowrie, trochus, whelk, surf clam, urchin in order of frequency)

Level II; Strata B; 17-25; A pale yellow brown sandy soil (10YR6/3 and 6/4 with 4-6cm sized waterworn pebbles, 80% of matrix.

Lithics: 26 waste flakes; 6 tools (unifaces; scrapers, backing; bifaces: 3 adze preforms in sections B & C)

Shell: 5 whole shell; 7 fragments

Level III, Strata C; 25-36cm; Sandy silty soil, 10YR3/2 with 90% tightly packed 2-4cm sized angular and waterworn pebbles. Soil flecked with coral/shell. Shell fragments, Increasing charcoal (to 1%), increasing small flakes and shell. Pebbles decrease towards level IV.

Lithics: 326 waste flakes; 43 tools (unifaces; predominantly scrapers and gravers, backing, preforms, one perforator; bifaces: 3 polished adzes in section A and 2 preforms in B/C)

Shells: 834; 161 (cowrie, trochus, turbo, urchin, whelk and clam in order of frequency)

Faunal: five mammal bone fragments

Level IV; Strata D; 36-70cm; Dark reddish brown clayey soil 5YR3/3, with 1% pebble, 2% flecks of light colored sand, 1% of 3-4cm long coral pieces, some charcoal flecks, 5mm to 1mm shell/coral flecks, flakes increase at 66cm. Rat tunnels and burrows through sections A and B from surface to end Level IV.

Strata E; 70-36cm; transitional strata of clayey soil changing to sandier soil with increasing flakes and preforms, flames are smaller in size, fewer pebbles. Some 7-12cm sized cobble, rounded and angular. West profile of section A and C shows an orangy yellowish sand strata at 65cm.

Lithics for Level IV; 261 waste flakes; 7 tools (unifaces; scrapers, one graver; bifaces: 3 preforms)

Shells: 37 whole shells; 116 identifiable fragments (cowrie, turbo, mytilidae, whelk, clam, conus in order of frequency)

Faunal: 2 mammal bone fragments

Level V; Strata F; 36-125cm; A grey brown sandy loam 10YR6/3 and 5/2 (pale brown and grayish brown) with waterworn cobble and boulder, coral fragments, shell, charcoal flecks, pebbles. Areas of 10YR4/2 at 78-112cm a dark brown sandy soil with some clay and pockets of white and yellow sand with charcoal, angular pebble and sea urchin spine. In section C, fractured angular gravel of 2mm size in pockets with 2mm sized charcoal flecks, burned? coral.

Lithics: 299 waste flakes; 20 tools (unifaces; scrapers, gravers, backing; bifaces: 2 preforms)

Shell: 62 whole shells; 160 identifiable fragments (cowrie, trochus, nevita, mytilidae, whelk, turbo, urchin in order of frequency) Faunal; 1 fish bone

Features: discontinuous 20cm high alignment of stacked angular basalt cobble and boulder at 108cm in section A refuse pit of decayed organics, angular and waterworn pebble, a complete tridacna shell at 110cm-125cm in East wall of sections B and C human burial, partially exposed midsection in south wall of section C at 98cm. Carbon dated at 1,690 yrs BP +/- 50 Fragments of human cranium 5cm or less with thickness varying from .4cm to .7cm, and five well worn molar, located at 125cm at the transition of level V and level VI in the northeast wall of section A.

Level VI; Strata G; 125-137cm; a course to medium grain sand 2.5YR8/4

Lithics: 7 waste flakes

Shell: 35 whole shell; 34 identifiable fragments

Level VII; Strata H; 137-200+cm; a very course white sand with large percentage of distinctive star-shaped grains of coral/sand, larval gastropod shells, shell fragments and small flat discs of worn shell.
ANAPA 1 x 3m Section B

East Wall Profile

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<td>B</td>
<td>II</td>
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<tr>
<td>C</td>
<td>III</td>
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<td>D</td>
<td>IV</td>
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<tr>
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<td>V</td>
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<tr>
<td>G</td>
<td>VI</td>
</tr>
<tr>
<td>H</td>
<td>VII</td>
</tr>
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10cm
25cm
35cm
87cm
100cm
112cm
125cm
135cm
195cm

1 Inch = 25 mm

27
AMAUA 1 x 3m Section B

West Wall Profile

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<th>Description</th>
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<td></td>
<td>II</td>
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<td></td>
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<tr>
<td>F</td>
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<tr>
<td>G</td>
<td>VI</td>
<td>yellow sand</td>
</tr>
<tr>
<td>H</td>
<td>VII</td>
<td>white sand</td>
</tr>
</tbody>
</table>

1 inch = .25 meter
AMAUA 1 x 3m Section C
West Wall Profile

Strata Level

A
B
C
D
E
F
G
H

I 6cm
II 13cm
III
27cm
IV
37cm
V 90cm
VI
137cm
VII
195cm

1 inch = .25 meter

6cm
13cm
27cm
37cm
69cm
75cm
98cm
122cm
122cm
137cm

yellow sand
dark brown
yellowish orangy band
light brown sand
flakes
dark grey
yellow sand
white sand

30
Artifactual Retouched Tools (See Appendix A, pg. 87, 89, Amumu 1x1 A Level 3, artifacts 41, 70, 75)

Artifact sketch #1
#70 1x1 B & C Subtrapezoidal, subquadrilateral, one ground surface. Has been flaked and discarded. Possibly used as a core.

Artifact sketch #2
#41 1x1 A Adze butt fragment, 6 ground facets. Type III or IV

Artifact sketch #3
#75 1x1 b & C triangular, subquadrilateral, two biface edges. 3 ground facets, damaged cutting edge. Adze type VI or VII

(drawn to scale) 33
Artifact Sketch #4 (See Appendix A, Pg.78, Amua 1x1 A Level 5, artifact #53)
Sides a & b include dominant platform corners, stragulate center of both lateral edges, Edges a & b functioned as backing. Worked edge c, ventral wear on projecting tip, obvious wear on dorsal sides leading up to it. An expedient grater?
(drawn to scale)

Artifact Sketch #5 (See Appendix A, Pg.77, Amua 1x1 A Level 5, artifact #48)
Worked edge a, heavily used, almost bit like area between two minor projections (scraper/grater); worked edge b, appears to be grater hafting retouch with heavy stepping but no apparent wear; worked edge c is on opposite edge from b, the retouch is ventral and there is a tiny linear ground area on the dorsal edge opposite the retouch (graver function for edge c?). The linear facet is interpreted as movement within the haft as the grater was used. (drawn to scale)
Photo #13 Distinctive Strata II, Excavation Level VII A maua 1 x 3m
Star-shaped sand granules, shell fragments, larval stage shells
Occurs from approximately 140 cmbs to more than 2 mbs as culturally
sterile sands

Photo #14 Possible Turbo shell grater from 1 x 3m A Level 5
Shows a concentric wear surface.
Photo # 15  Amaua 1m x 3m unit  East Wall

Photo # 16  West Wall. Boulders cover exposed burial at South end
Amana Column 3

The backhoe trench excavated through two sections of earth ovens approximately 5m west of proposed column 3 at shovel test pit. We decided to do our .5 x .5m excavation through the easternmost earth oven which seemed to be the larger. What clearly showed up at first glance was a mound of fire-cracked rock. These basalt rocks were both angular and rounded ranging from 10 to 20cm. The mound of rocks was approximately 180cm across at the base and 60cm high from the base to the highest point. The cobble/boulder mound had very little soil in between the rocks and the mound seemed previously undisturbed. A large accumulation of charcoal chunks 2-4cm long by 2cm wide was exposed at the base of the earth oven. Pockets of black greasy soil 5YR 2.5/1 are possibly decomposed vegetation. A charcoal sample taken at 121cmbs provided a C-14 date of 410 +/- 60BP. The arc of heat effected soil - a band of black and orange, each approximately 1cm in thickness, was located beneath a strata of dark grey sandy/silt soil (see photo #s17, 18, 19, 20, 21). Flakes and tools (61 flakes and 7 tools/preforms) came from both the dark grey overlying soil and the rock mound. Lithics from the site show both a high percentage and a complexity of tools, 14% compared to 9% at Amana Section A 1 x 3. Scrapers, clapping tools, graver, a perforator, and a core were recovered from this feature. However, no faunal and only 3.14(3 whole shells, 14 fragments of identifiable shell) were recovered.

Second Earth Oven: Five meters to the west of the excavated earth oven was a somewhat less distinct one between 90cm below the surface and 107. The overlying soil of this earth oven was a dark brown with waterworn pebble and compacted shell, coral, and charcoal flecks. This earth oven had an inverted arc of black on the top and red on the bottom. A portion of the oven was filled with sand and did not have the empty spaces as in the excavated oven. The oven materials were fire-cracked rock and chunks of coral. (see Photo #9)

Skull fragments: 2.5m west of Column C we noted a circular soil pattern in the bottom of the 4' deep trench (see Feature Sketch #10, Photo #22). In this area the backhoe excavated human skull fragments (see Photo #28) and these were retrieved in the backdirt pile. The skull fragments were apparently from the sand strata which began after 100 to 130cmbs. There is then a possible association of the skull fragments with this dark sand ring at 1.3m depth.
Photo #17 Amaua B Column 3
- Black & orange heat-effected soil bands

Photo #18 Amaua B
- 3cm topsoil
- 10cm fill
- 4cm dark grey soil
- 2cm black & orange soil bands
- 1.5cm yellow sand
- 61cm of 15cm-20cm sized heat fractured cobble
Photo #19 Amua 3 Column 3 at 63cm. Top of oven rock pile.

Photo #20 Amua B at 125cm. Bottom of earth oven and beginning of yellow sand strata.

2-4cm sized charcoal chunks used for carbon sample 410 years+/−60BP
Photo #21 Amuua B Column 3
at 125cm. Bottom of earth oven
Beginning of yellow sand strata

2cm-4cm sized charcoal chunks used for carbon sample, 410 years +/- 60B2

Photo #22 Skull fragments
2.5m west of Column B
possibility associated with circular coloration located in trench bottom. (See sketch following page)
Earth Oven (umu) 5m west of Column B

0-12cm topsoil
12-30cm fill of coral/sand
30-44cm fill of yellow sand
44-57cm dark brown waterworn pebbles, compacted shell fragments, charcoal flecks and coral
57-90cm charcoal, firecracked rock, coral chunks
90-107 bands of orange, black & red heat-effected soil

soil coloration possibly associated with human skull fragments removed by backhoe, 2.6m west of Column B
Wall Profile

Strata  Level

A  
13cm

B  
53cm

C  I  
59cm

D  II Lithics:61?
Shell: 3:14

125cm

- Topsoil
- Fill
- Dark gray sandy/silty soil
- Black carbonized yellow/orange heat effected soil
- Charcoal chunks 2-4cm size
- Heat-fractured basalt up to 10cm size, waterworn pebbles in brown sand with a few pebbles

1 inch = .25 meter
50 PVC PIPE

EAST 2 FEET OF CLEARANCE FROM UT ROAD PAVEMENT TO TRENCH WIDTH. RE PAVEMENT AFTER PIPE INSTALLATION.

STA 133+15. INSTALL FIRE HYDRANT. SEE DETAIL C, DWG D-2.
Amaua C 5 x 2m trench

Excavation Level I was road fill to 48cmbs. Excavation Level II began with a light gray/brown sandy soil, with clam shell, flakes, waterworn basalt of 8cm and larger at 1% of the matrix. Lithics was 11:1 (11 flakes and 1 tool-adze preform) and shell 0:2 (no whole shell and only 2 fragments of identifiable shell). Level III begins with 50-60% waterworn pebble to cobble sized stone in a dark clayey soil changing to a dark brown sandy loam with cobble but few pebbles. At 81cmbs, beneath the cobble, was a concentration of sea urchin spines. Lithics for Level III was 36:1, shell was 10:23 with urchin, whelk and cowrie being the most frequent. Level IV at 99cmbs was a dark brown sandy soil with few waterworn pebbles and 1% charcoal chunks. At 115cmbs a smooth basalt boulder took up the .5 x .5m unit. This boulder was surrounded by a concentration of small flakes. Lithics for Level IV was 65:1 and shell was 14:46 with urchin, whelk and trochus the most frequent. Column C has an increase of lithic and shell with increasing depth. A greater amount of fragmented waste flakes occur in Level III. Of interest is the lack of scrapers and gravers typically found in other lithic concentrations. This might suggest some special use area, different from the possible use areas associated with the other units. However, because no feature was identified in this unit we do not know the source of the lithic deposition, how far it is from an identifiable feature or the nature of its deposition.

Monitor of Meter Station

Amaua .5m x 2m trench was excavated along the line of the waterline trench. We did not find any human skeletal material in the trench and cleared the area for the backhoe to excavate. However, the shovel test pit #19 where the human skeletal material was located was actually several meters inland. A meter (for measuring water flow) excavation near the original shovel test pit seemed an appropriate monitor. This meter excavation is located 10'(3.1m) east of the bus stop. The profile began with red cinder (imported crushed quarry cinder) of approximately 20cm, a strata of waterworn pebbles (5cm), 20cm of white sand. Beneath this 25cm of black greasy with flakes, waterworn pebbles at 80% of the matrix. Beneath this a strata of grey sandy soil with waterworn and angular pebble and cobble. The bottom strata was a course yellow sand which extended at least 40cm deep (see photo #24 and wall profile #9). In profile over 30'(10m) the strata of greasy black soil with cobble and pebble ranges from 25 to 40cm thick and drops to the east as it finally tapers to 5cm 20' east of the bus stop. Near the .5m x 2m trench the strata rises to near surface. The area around the stream (from the stream, 12'-4m- on either side) appears to be a fill of greasy dark brown soil with large angular boulders, 30-40cm.

Amaua hydrant excavation monitor.

We monitored the excavation of a hydrant east of the bus stop (photo #23). The profile at this point was: 8cm of topsoil, 20cm of sloping road fill, 27cm of black greasy soil with cobble, preforms, waterworn stones, and crushed shell, 15cm of yellow sand, 23 cm of black greasy soil with cobble and flakes, 12cm of brown sand. Below this is a deep deposit of course white sand. There was a possible alignment of boulders 18cm x 12cm at 98cmbs to a 31cm by 9cm boulder at the same depth.
AMANA C .5 x 2m trench

Wall Profile

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<th>Level</th>
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<tbody>
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<td>A</td>
<td></td>
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<tr>
<td>B</td>
<td>I</td>
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</tbody>
</table>
| C      | II    
  | Lithics: 11 |
  | Shell: .2 |
  | 61 cm |
| D      | III   
  | Lithics: 36:1 |
  | Shell: 10.25 |
  | 98 cm |
| E      | IV    
  | Lithics: 85 |
  | Shell: 14.46 |
  | 115 cm |

sod

coral/sand road fill

light gray/brown sand, flakes, clam shell, plastic, nails, waterworn basalts and 1% angular basalts of 8cm or more

dark brown loam with sand, 50-60% water worn pebble to cobble size basalts

a dark sticky clay soil
changes to a sandy loam with few pebbles at 81cmbs

shells, urchin spines, dark brown sandy loam with few waterworn pebbles (1%), charcoal chunks, very small flakes occur at 115cmbs surrounding a large boulder

1 inch = .25 meter
Photo #3 Amaua hydrant excavation
monitor near bus stop
3cm of topsoil
20cm sloping road fill
27cm of black greasy soil with cobbles, preforms, waterworn pebble and crushed shell
15cm of yellow sand
12cm of gray brown sand
23cm of black greasy soil with cobbles and flakes
12cm brown sand
course white beach sand

Photo #24 Amaua metering station
monitor at bus stop and near stream
red cinder
waterworn gravel above white sand
black greasy soil with flakes and pebbles
gray sandy soil with pebbles and cobbles
ellow coarse beach sand
Trench Sketch 9: Trench profile from Amaua Stream showing possible stream overflow deposits over an old beach. Retaining wall and fill were recently used to control the natural erosion.
Amaua D Column 2

Amaua D Column 2 evidences some of the typical deposits found in trenches throughout the bay edge as well as the difficulties interpreting the history of deposits.

Level I's silty soil included 1-3cm chunks of coral at 5%. Flakes were located in all angles of repose surrounded by soil matrix suggesting that the materials were well "homogenised". (Note: lithics from this level were not analysed. Provenience labels were lost for several bags and we decided not to include an uncertain sample.)

Level II and III suggest successions of deposits with rock size and densities varying for each episode. Boulders appear between 75-85cmbs. At 85cmbs a concentration of boulder and pebble occurred and at 95cmbs there were still some boulders but with 60-80% pebbles (both angular and round). At 104-110cmbs charcoal flecks increased to 2-3% of the soil. In Levels II and III there were no lithics and no crushed shell/coral in the reddish clay soil. Level III (5YR3/2 and 10YR4/2) was a frequently observed sticky clay with angular boulders of 5-15cm.

Auto A Column 1

Coral road fill was removed.

Level I was 11cm of light grey brown sandy soil with waterworn pebbles and shell. Lithics for level I was 11:2 (11 waste flakes and 2 tools). Shell was 14.4 (14 whole shells, 14 fragments of identifiable shell) with urchin the most common.

Level II was a grey sandy soil with 20cm sized waterworn basalt boulders, rats teeth and flakes. Level II lithics: 13:0 Faunal: 1 rats tooth

Level III is the culturally significant level that lies above a possible stone pavement. The matrix is sand with pebble, cobble, charcoal, shell and flakes. Level III lithics: 37:3 and shell: 45:115 with cowrie, urchin, trochus, whelk, and mussels the most common. Level III faunal: 2 mammal bones. These numbers for lithic, shell and fauna materials are high considering that half the unit in this level is taken up by a large basalt boulder. At 87cm was a layer of 10cm x 4cm thick waterworn basalts all situated flat on the horizontal plane. The stone paving extend from the boulder to the unit wall (see photo #25 and floor sketch #11). This 4-6cm deep level was called Level IV and interspersed with the stone was lithics: 14 and shell: 3:15, and faunal: 1.

Below the possible stone pavement was a clean grey sand with few pebbles changing to a light yellow medium course sand with shells: 8:19 and no lithics in Level V.

Level VI was a lighter yellow very fine sand with no pebble.

Lithic analysis suggests nothing unusual about the waste flakes and unifaces located in this unit. There were no distinctive tools or flake types located in this unit. No bifaces or cores were present. (See Lithic Analysis, Appendix I)

It is possible that the partially exposed boulder at the level of the waterworn flat basalt cobbles is associated with this feature as perhaps, a portion of a rock alignment in a house foundation. It is not possible to assign a function for this feature given the small proportion that is exposed. A house floor, work area floor, or a paved path are possibilities. We did not locate sufficient amounts of charcoal in the unit for C-14 dating.

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Wall Profile

Strata  Level

A  

30cm  road fill

large amounts of small coral in silty soil, flake, concentrated at 48cm

B  I

48cm  red/brown sticky clay with waterworn 15-20cm boulders

C  II

85cm  smaller concentration of boulders/pebbles

95cm  end of boulders. Clay with angular pebble

104cm  60-80% charcoal increases to 2-3%  

110cm

D  III

131cm  sticky clay with angular boulders 5-15cm

1 inch = .25 meter
Photo #25 Auto A 87cm below surface
Top of boulder at 71cm. Possible floor of flat 10cm x 4cm thick smooth basalt cobbles all at same level, all laying flat. Beneath these is a strata of clean yellow sand.

Auto A

Sketch # of possible stone floor at 87cm below surface
Wall Profile

Strata  Level

A

14.14 cm

Shell: 6.9  I  Lithics: 11/2
Shell: 14.14
C  Urchin  II
Faunal
1 mammal  Lithics: 13:
Shell: 45.115
D  Urchin  III
Trochus  Lithics: 37/3
E  Shell  3.15  IV
Faunal
1 mammal
F  Shell: 8.19  V
Trochus
Bullocea

48 cm

25 x 25 cm boulder

59 cm

Coral road fill

light gray/brown sandy soil, waterworn pebbles, shell
gray sandy soil with 20 cm waterworn basalt boulders, rats teeth, flakes
sand, waterworn pebbles, cobbles, charcoal, shell flakes
flat waterworn 10 cm x 4 cm pavement clean gray sand with few pebbles becomes
light yellow medium coarse sand

lighter yellow very fine sand

G  VI

132 cm

140 cm

1 inch = .25 meter

* Shell (continued)

shell
Trochus
Faunal
2 mammal
12" CLASS 150 PVC PIPE
INSTALL PIPE IN SHOULDER OF ROAD, 1 TO 4 FEET OFF PAVEMENT, APPROXIMATELY AS SHOWN, EXCEPT AS NOTED.
Auto B Column 2
Column B was located 20m south of a surface lithic scatter of flakes, preforms, adzes under a banana plantation alongside Muliolevai Stream (noted by Suako'a in Phase I reconnaissance).
Coral/sand road fill was removed but, unlike other units, was referred to as Level II.
Level II was a dark grey sandy silt (10YR3/1) which ended in hard, compacted waterworn pebbles along with shell fragments and flakes. Lithics: 28.3 (23 waste flakes, 3 tools).
Beneath the cobble/boulder of level II was white sand, coral, urchin and shell. White sand became medium to fine brown sands (10YR4/3) (See photo #s 26, 27, 28, 29). Level III had 42 waste flakes and one tool, an unusual chisel (See Lithic Analysis, Appendix I). A charcoal sample was submitted to Beta Analytic for dating but the material proved inadequate for conventional analysis.

Auto C .5 x 2m trench
Coral/basalt road fill was removed without screening. flakes, preforms, urchin spines and a 25cm x 7cm x 7cm pounding stone with a damaged distal end were located in the fill. Because the source of the fill is unknown the material was not collected or analysed.
Level I a sandy soil with chunks of charcoal, produced only 8 lithic waste flakes. However, an unusually high (relative to the rest of the units) amount of faunal materials were recovered, 3 mammal bones and four fish bones. Shells were not well represented with 7.97 whole and 9 fragments of identifiable species in level I and 9.12 in Level II.
Level II was a loamy soil with 20cm x 30cm waterworn basalt boulders, some vesicular. This changed to 10cm angular smooth and vesicular basalt cobble after 128cm.

Auto D .5 x 2m trench
8cms of sod and dark brown soils with coral/sand fill and basalt flakes were removed without screening. 47cm of coral road fill was also removed without screening but was, atypically, noted as Level I.
Level II was a yellow sand/coral with historic debris in the first 10cm of the level. This level also had 10-15cm basalt boulders and 8-10cm cobble, some orange weathered sandstone pebbles, a few dark grey gravels, pockets of black sandy and black greasy soil without charcoal. These pockets may have been swamp organics covered by stream and/or ocean redeposits. Level II had 9 lithic waste flakes.
Level III was a medium grey brown soil with waterworn pebbles and coral.

Utusia A Column 1
Backhoe trenching cut through what appeared to be a stone wall at Utusia A Column 1. Angular and waterworn basalt cobble and boulder were exposed over a one meter area. The backhoe appeared to just pass along the wall edge, displacing some of the rock. An area of compacted soil with charcoal flecks was exposed adjacent to the wall to the west (See photo #30 and floor sketch #13).
Level I: 0-62cm has four strata which blend into the other. The first 56cm of brownish grey sandy soil had numerous cobble and boulder along with 85% pebble, also shell, some pockets of yellow sand, flakes, charcoal flecks. Cobble and boulder decreased after 44cm. At 46cm there began numerous flakes, shell, charcoal in loose sands. At 54cm we located a lens of loose fill with dark brown sand, flakes, urchin
Photo 26 Auto B at 75cm below surface
30cm below coral road fill. Waterworn cobble on the right, pebble on the left.

Photo 27 Auto B at 81cm below surface
Beneath pebble is a strata of white sand
Photo #28 Auto B at 21 cm
white sand beneath cobble

Photo #29 Auto B at 123 cm
Level II - dark gray sandy soil
Level III - light brown sandy soil
Strata  Level

A  I

45cm

coral road fill

dark gray sandy silt ending in

B  II  Lithics: 28:3

84 cm

hard, compacted waterworn pebbles
10YR 3/1 some shell fragments, flakes

C  III  Lithics: 42:1

125 cm

10YR 4/3 brown medium fine sand with cobble, coral, urchin, shell
12" CLASS 150 PVC PIPE
INSTALL PIPE IN SHOULDER OF ROAD, 1 TO 4 FEET OFF PAVEMENT, APPROXIMATELY AS SHOWN, EXCEPT AS NOTED.

1" = 50'
AUTO C 0.5 x 2m Trench
Wall Profile

Strata Level

A
road fill, coral, basalt flakes, preforms, urchin spines, poor quality obsidian in basalt cavities, 25 cm x 7 cm x 7 cm pounding stone with damaged distal end

68 cm
metal waterpipe in yellow sand fill

B
I Lithics: 9
Shell 7.9 urchin
Faunal
3 mammal
4 fish

113 cm
sandy soil, charcoal chunks, fish bone, shell, rodent teeth

C
II Lithics:
Shell: 9.12 urchin
corals limpet

129 cm
loamy soil, 20 cm x 30 cm waterworn basalt boulders, some vesicular

D
III

148 cm
10 cm angular and vesicular basalt cobble

1 inch = .25 meter
AUTO D  .5 x 2m trench

Wall Profile

<table>
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<tr>
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<td>B</td>
<td>I</td>
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<tr>
<td>C</td>
<td>II</td>
</tr>
<tr>
<td>D</td>
<td>III</td>
</tr>
</tbody>
</table>

8cm dark brown soils, coral/sand fill, basalt flakes

55cm yellow sand/coral, glass at 10cm, 10-15cm basal boulders and 8-10cm cobbles, some orange weathered sandstone pebbles, a few dark gray gravels, pockets of black sandy and black grass soil (not charcoal) possibly swamp organics

101cm medium gray brown soils, waterworn pebbles and coral

119cm

1 inch = .25 meter

39
spines and pebbles which continued to approximately 70cm. A narrow 4-6cm band of white sand surrounded the edges in the first 5-10cm (see photos and sketches). This level occurring just above the wall, had extremely high amounts of lithic and shell materials. Lithics for Level I occurring predominantly between 44-62cm was 435:28 (435 waste flakes and 28 tools). The tools were scrapers, gravers, perforators, preforms, and unifacially retouched flakes. Level I had high frequencies of secondary flakes (see Lithic Analysis, Appendix I). Shells were 36:155 (36 whole shells, 155 identifiable fragments) with cowrie, trochus, turbo, urchin and whelk being the most common. Faunal materials were 2 mammal and 1 fish bone.

Level II, 62-87cm was where the wall became clear (see photo and sketch). Flakes continue to be dense in the matrix adjacent to the wall. 10-15cm angular and waterworn cobble/boulders were fitted together to form a wall 27cm high and approximately 20cm wide. We collected a charcoal sample at 76cmbs (below surface) within the rock wall. C-14 dating produced a 650 +/- 90BP, or between 1200 and 1500 A.D. Lithics from level II were 114:8 with scrapers and gravers again being the most common tool. Level II had a relatively high frequency of proximal flake fragments. Adzes were distinctly absent in this relatively large lithic sample. Shells were 13:20 with cowrie, whelk and clam being the most common. At 88cm we hit a large boulder and a strata change in the surrounding soil. Level III was a dark brown soil. Shell continued in this strata to 92cm and charcoal continued to at least 100cm. This strata continued below 105cm for an undetermined depth.

Conclusions: The excavation of this 20cm wide by 30cm high by 1 meter long segment of rock wall exhibits three strata, one at the wall level, one above and one below Strata I and II seem distinct enough to be different occupational levels however there remains the possibility that the wall represents a house foundation with fill material. The 650BP date represents the wall and strata II with some certainty. The partial exposure of this feature gives us a definitive use date within Utusia's village occupation sequence and an initial location for a village feature. If the beach edge has not changed too drastically in 650 years we can be certain that intensive activities were occurring near the beach.

Utusia B Column 2

We removed 30cm of coral/sand road fill.

Level I was 30-56cm of a greyish light to medium brown sandy soil (10YR4/3) with 5-10cm waterworn pebbles and cobbles with crushed shell, flakes, urchin and fish bone. Lithics was 54:6 (54 waste flakes and 6 tools) with more gravers than scrapers. Shell was represented by only 3:18 (3 whole shells, 18 identifiable fragments) with whelk and trochus and surf clam being the most frequent shells. Level II begins at 56cm with a dark brown sandy soil (10YR3/1). At 56cm was a pocket of broken shell and pieces of coral, flakes (10YR3/2). At 77cm Level II had a circular lens of yellow grey ash soil surrounded by dark brown sandy soil. This lens had surf clam shell, charcoal flecks. Except for this lens, the matrix in Levels I, II, III, IV were devoid of charcoal. As with the other lenses of ash soil encountered in the project this was not a hearth. It lacked charcoal, fire-cracked rock, heat effected soils, nor was it associated with any recognisable features such as a floor, hearth structure, wall, foundation, etc. It lacks the defined outline of house post. A likely alternative may be a refuse pit with both organic and inorganic waste and rubbish filling either a dug or naturally occurring depression. The upper portion of these features may then have been altered by erosion and deposit sequences. Level II Lithics was 101:5 with more scrapers and perforators than Level I. Shell 50:47 with cowrie, whelk and surf clam the most frequent. Both Levels I and II had a high incidence of tertiary flakes.

Level III. Level II changes into Level III in pockets. Level III is a clean yellow sand that was excavated to 112cm.

Utusia C Column 3

Overburden was removed.

Level I was a dark grey/black sandy soil with lithics 4 and shell:2:9 (2 whole shells and 9 fragments of identifiable shell)
UTUSIA Column A

Trench Wall Profile

Wall Sketch #15

Strata I

- Yellow sandy soil
- Dark grey soil
- Brownish grey sandy soil
- Charcoal
- Beginning of rock wall
- Yellow sandy carbon at 76cm in this rock wall 6800-900BP

Photo #30 Utusia A

0.5m x 0.5m column sample at 50cm below surface
Photo #31  Utusia Column A at 54cm a lens of dark brown loose sandy, pebbly fill, with flakes, urchin spines. A narrow 4-6cm wide band of white sand surrounds the lens in the first 5-10cm. This lens begins prior to the Wall. Level I had an extremely high number of lithics.

Photo #32  At 63cm, angular cobbles stacked linearly across the front of the unit. Shell and angular pebble behind the wall structure. The lens described in Photo # is retreating in upper right of photo & disappears at 70cmbs.
a. Turbinidae (turbo)

b. Trochidae (trochus)  c. Conidae (cone)

d. Acanthinae (limpet)  e. Neritidae  f. Mytilidae (mussel)  g. Hipponicidae  h. Bullidae
i. Thaididae  j. Cymatiidae  k. Strombidae (whelk)  l. Pterygnotidae
m. Thaididae (drupa)

n. Tellinidae  o. Mactridae (surf clam)  p. Tridacna (giant clam)  q. Arcaidae (ark shell)
f. Mytilidae (mussel)

r. Cypraeidae (cowrie)  s. Nassarius, Turridae  e. Neritidae  t. operculum
u. Echinoidea Heterocentrotus (slate pencil sea urchin)  v. Echinoidea
w. Elllobiidae (salt marsh snail)
CONCLUSIONS
Along the ocean/land interface we identified 12 lithic concentrations in Alega, Utusia, and Amaua. Trench monitoring and excavations using 1m x 1m and 0.5m x 0.5m units generated a range of information, both geomorphic and cultural and raised new research questions.
We noted upper strata of what appeared to be hydrologic redeposits, perhaps from sheet wash, stream erosion or wave action. The effect of earthquakes and resultant liquefaction of strata is also a possible mechanism. Future research needs to identify the depositional mechanism of these deposits. Many of these strata had extremely dense concentrations of lithic waste flakes and tools. Surface scatters of lithic materials have been noted frequently along stream sides and certainly these were advantageous areas for many activities. Grinding stones are frequently located in or adjacent to streams. But the dynamics of stream hydrology means that stream erosion and redeposit as well as the contribution of sediments within stream overflow zones along these heavily used areas create some of the most complex and difficult strata interpretations. We had no way of determining how far the cultural materials in these strata had travelled from their source. Weathering of lithic surfaces needs to be addressed as well. We noted strata with lithics that had a mix of both dull edged flakes and extremely sharp edged flakes. What was the chemical weathering process for these basalt and can we distinguish between waterworn lithics and those with chemical weathering?

We noted thick strata of colluvial soils deposited during a relatively recent period with one carbon 14 date of 290BP marking the beginning of the deposition period. The presence of charcoal flecks in the clayey colluvial soils suggests that this was a period of intensified land clearing on the steep slopes behind the villages. These colluvial strata of reddish brown clayey soils with angular basalt cobble and boulder tended to lack horizons suggesting that this was a period of massive soil movement rather than a gradual deposition of weathering volcanics.

In Fagaitua and Amaua marshy areas have been filled in during the recent past. These areas hold great potential for, among other things, palynological data. These areas need to be identified through the use of informants and future testing in the village should include these areas.

We noted strata of what we assumed to be sterile, noncultural beach sands. One strata in Amaua had a distinct concentration of star-shaped granules which may be identifiable as future archeology extends inland. This distinctive nature of beach sands also raises the possibilities of identifying changes in reef health or reef composition over the years.

We located four features along the five miles of the project area. Three of these, a burial, a wall segment and a small refuse pit, occurred in Amaua 1m x 3m unit at approximately 1m below surface and dated 1,090 years BP. This is a relatively shallow depth for this early site compared to the dates generated in Utusia at an earth oven dated to 350 years BP at 96cmbs and at a wall dated to 650 at 63cmbs but with the bottom of the feature at 1m. A conclusion drawn from these features is that areas of village activity were located near the beach/land interface during the last 1,000 years and that the depth below surface and the depositional process probably varies within each bay. These dates are similar to those in Alega at Jeff Clark's quarry site which is inland from the beach edge. Clark notes that the beginning of terrace use at A'Oa at 600BC is probably the same time period as quarry exploitation at Alega. Our 390 BP date for intensified land use associated with colluvial deposits at Avaio adds to the overall picture of intensified land use for the Bay and for the island in general during the last 1,000 years or more.

Kirch and Hunt (1993) predict that the older sites will be found further inland and at greater depths, probably beneath talus slopes. Based on the estimate of 1 to 2 meter higher sea level in the 3,000 to 2,000 years BP and the 1m subsidence/1,000 years it is a reasonable assumption that the oldest villages will be further inland and at deeper levels than those at which we are trenching and excavating. However, the 1,000BP date at 1m approximately 15m from the current beach edge should temper our assumptions.

The lithic analysis noted the presence of a wider range of tools types. Spencer (Appendix A) notes that closer attention could be paid to the temporal and spatial distribution of these tools in future research. The vertebrate faunal material proved too few for meaningful analysis. Invertebrate remains generated a number of observations. Compared to Kirch's data from Ofu, the Fagaitua Bay shell remains were very
low in tridacna and high in cowrie. Oftu shell remains put tridacna among the most frequent with only moderate amounts of cowrie. Strata with shell remains had few corresponding carbon 14 dates so that we cannot compare frequencies of shell families over time. No obvious trends were evident in our invertebrate remains data. Although we had occupation strata and small lenses of refuse, we had no midden deposits of shell remains which we would expect for coastal communities. For some strata the origin of the shell and shell fragments is unknown. Certainly the shells were collected and brought into the village but have these subsequently been mixed in with soils which have been redeposited, used as fill? We cannot accurately state how these shell family representation statistics have been affected by nonhuman forces since they are not clearly in situ deposits. If shellfish represented a major food source as we suggested (see Reefs section), then we have yet to locate representative shell middens.

Project impact on historic properties: Relatively few features were encountered over the entire 23,000 feet of water line trenching project. This was due to the project location along the existing road. Surface basalt bedrock crossed the project area where ridge lines descended to the sea and were areas of low site probability. Large amounts of roadfill, (frequently .6m) covered the valley bottom beach edge. Because trenching seldom exceeded 1.6m in depth only the more recent features were impacted (features at 1m x 3m Amua unit were .6m below road grade and 3m inland from the road).

Curation: The lithic materials, faunal remains, photograph negatives, field notes, and soil samples (from Phase II), are being stored with ASPA. These materials are available for future research as new questions and/or methodologies arise.

Recommendations:
The main water line serving the Fagaitua Bay villages is now in place. We sampled areas of high subsurface potential for archeological sites at areas of subsurface lithic concentrations and we encountered a relatively small number of cultural features. However, we did establish the presence of village use areas during the last 1,000 years within the valley bottom beach edge zone. Of those features, none meet the National Historic Register criterion. We did not encounter unique architecture or exceptional examples of architecture. Nor did we encounter sites associated with important events or persons. Although additional excavation of the features would have the potential to yield further data and to generate new questions concerning Samoan settlement history and land use in the Fagaitua Bay, we recommend no further excavation for the project the main line project. ASPA's service lines to individual houses will require an assessment of the more inland components of these village features. Although service lines will not require deep trenches and the resultant testing may not examine strata of Samoan villages greater than 1000 years old, it is the last 1,000 years which seems to be a period of increasing populations, village expansion, and the utilisation of a wider range of resources. Questions of habitat modification, trade and exchange, and warfare will certainly be addressed for this time period in Fagaitua Bay and may be applied to the island in general.
REFERENCES CITED

Athens, J.S. and Ward, J.V.

Ayres, W. and Elater, D.

Clark, J.

Clark, J.

Clark, J. and Hardrich, D.

Coastal Zone Management

Frost, J.

Kaye, E. and Schoenberg-Dole, O.

Kikuchi, W.

Kirch, P and Hunt, T., eds.
1993 To'aga Site; Three Millennia of Polynesian Occupation in the Marl's Islands, American Samoa, Contributions of the University of California Archeological Research Facility, #51, Berkeley, California.

Dept. of Marine and Wildlife Resources
1978 American Samoa Coral Reef Inventory

Morris, P.

U.S. Department of Agriculture,

Whittier, W.A.
1994 Botanical Inventory of the Proposed Tutuila and Ofu Units of the National Parks of American Samoa, Technical Report #87, Department of Botany, University of Hawaii at Manoa.
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</table>
APPENDIX A

FAGAITUAN BAY WATER LINE
LITHIC ANALYSIS
OF DEBITAGE AND TOOL/PREFORM ARTIFACTS

by

Lee Spencer

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86613 Nelson Mountain Road
Walton, Oregon 97490

Lee Spencer Archeology Paper No. 1995-1
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INTRODUCTION

This appendix reports on the analysis of the flaked stone artifacts from twelve sites located at Fagaitua Bay in American Samoa. A total of 168 tool/preform and 2930 debitage artifacts were examined. Further, approximately 3-5% of the collection was discarded when it was determined the pieces of lithic material were not artifacts at all.

After this preliminary text, the procedures used in this analysis are presented. The artifacts of each site entity will then be reported individually. Following this will come summary statements comparing and contrasting the sites on the basis of their lithic artifact assemblages and components, in so far as this is possible. After the summary, I will present some general comments on Samoan lithics, to my mind completely unique from the technologies I am familiar with in Western North America. The final section will present the bibliography, a glossary of technical terms, and copies of the tabulation sheets where the reader will find the individual analysis data for each tool/preform artifact examined.
SECTION ONE

PROCEDURES USED IN THIS ANALYSIS

The procedures used in this analysis of basalt artifacts from the twelve sites encountered during the construction of the Fagaitua Bay water line are presented here. This discussion will facilitate verification and comparisons with lithic artifacts from other sites. At the end of this section will be a discussion of problems encountered.

There was a ten day time limit for the completion of all phases of this analysis. This necessarily affects the level of analysis carried out herein. I do not think that the time limit adversely affected the results of this analysis because of some ancillary considerations discussed below under the heading, Fragmentation Categories. It is apparent, however, that a more thorough analysis would yield more useful information about the patterns of behavior represented by the artifacts in this collection.

Note: the term, artifact, as herein used, means both debitage and tool/preforms.

THE LITHIC DEBITAGE

All artifacts were removed from their respective bags and sorted into the following categories: angular waste, nonproximal flake fragments, proximal flake fragments, and whole flakes. Only the whole flakes were further subdivided into cortex flake classes. During this sorting, tools were removed, as were nonartifacts. The nonartifacts were tossed; no record of the number or type was kept. They amounted to between 3-5% of the collection.

Each of the debitage classes are described below. Some of the implications of the use of these classes, analytical and otherwise, are also presented.
UTUSIA Column A
Floor Sketches

Sketch #12
- top of stone wall
- charcoal
- loose fill of flakes, archeological pedicles
- 54cmbs, muric shell, conina shell, white sand
- see photo #31

Photo #33
Utusia A, level I
Possible shell artifact. Symmetrically ground Conus shell.

Sketch #13
- yellow sand, charcoal, flakes
- dark brown sand, acme 4cm flakes
- pocket of shell, archeological pedicles
- 10-15cm boulders

Sketch #14
- 92cmbs
- 32, 32cm boulders
- brown soil with shell ends of level III

1 inch = .25 meter

64
Strata  Level

A

17cm

brownish gray sand with waterworn pebble 2-5cm, some mix of yellow sand
pebble, cobble, shell, charcoal

B

31cm

shell, flakes, pebble, cobble ends and sandy soil begins
sandy with 2% loose 5cm pebble, some charcoal 3cm x .5cm
white sand
numerous flakes and shell, charcoal in loose sand
lens of flakes, pebble, charcoal
extremely dense flakes
pocket of shell, urchin, charcoal, flakes in dark yellow sand 13 cm thick
charcoal sample at 76 cm; 650+/-90BP

C

I  Lithics: 635.27
Shell: 36155
Cobble
Trocus
Ochre
Shell

Lithic: 114.6
Shell: 1320
Ochre
Clam

E II

62cm

F III

105cm

Boulder

brown soils, shell, charcoal
Photo #34 Utusia Column A at 63 cm
close-up photo #32

Photo #35 Column A at 105 cm
large boulder beginning at 87 cm
50 PVC PIPE

East 2 feet of clearance from US road pavement to trench width of pavement after pipe installation.

UTUSIA Column B

Wall Profile

<table>
<thead>
<tr>
<th>Strata</th>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>30 cm</td>
</tr>
<tr>
<td>B</td>
<td>I</td>
<td>Lithics: 54:3, Shell: 318, Shell 56 cm, pocket of broken shell, pieces of coral, dark brown sandy soil with shell flakes, crushed small coral 10 YR 4/3</td>
</tr>
<tr>
<td>C</td>
<td>II</td>
<td>Lithics: 100:3, Shell: 50:47, Shells, oyster clam 77 cm, ashy soil with surf clams, charcoal, a circular lens of yellow-gray surrounded by dark brown sandy soil 10 YR 3/2</td>
</tr>
<tr>
<td>C</td>
<td>III</td>
<td>Faunal: 1 fish 87 cm</td>
</tr>
<tr>
<td>D</td>
<td>IV</td>
<td>112 cm, dark sandy layer blends into small pockets of clean yellow sand</td>
</tr>
</tbody>
</table>

1 inch = .25 meter
INSTALL PIPE APPROXIMATELY 7 FT OFF ROAD PAVEMENT. ADJUST PIPE ALIGNMENT TO MAINTAIN CLEARANCE FROM EXIST. PIPE AND OTHER POTENTIAL OBSTRUCTIONS.

STA 13.3+15. INSTALL FIRE HYDRANT. SEE DETAIL C. DWG 0-2.

INSTALL 45 DEG (MIN 2 RED'D) W/ THRUstås

STA 13.3+80. INSTALL 8" PVC RSC VALVE W/ ANCHOR BLOCK AND VALVE BOX.

" = 50 Feet

Map #15
UTUSIA C Column 3

Wall Profile

Strata Level

A

B. I
Lithics: 4
Shell: 2.9

C II
Lithics: 86:8
Shell: 12:27
Cobble
Such

fill

dark gray to black sandy soil

yellow/brown medium grain sand, hardpacker, waterworn pebble and crushed shell 10YR 5/1

cobble, few artifacts, few shell

ashy gray soil with charcoal 10YR 3/3

D

E III
Shell: 4.5

F

10YR 4/1

1 inch = .25 meter
Level II was a yellowish brown sand with hard-packed waterworn pebble and crushed shell (10YR5/1). This changes to dark gray/brown with pebble and cobble, and flakes, and at 79 cm turns to cobble to 100 cm below surface. Lithics: 86:9 (8 uniface retouched scrapers and one slicing tool, and a high percentage of proximal and tertiary flakes) Shell was 12:27 with cowrie, trochus and whelk being the most common.

Level III was an ashy grey soil (10YR3/3) with charcoal becoming 10YR4/1 at 135 cm to 147 cm. Level III had no lithics and only 4:5 shell.

**Utusia D Column 4**

23 cm of road fill was removed.

Level I 23-91 cm was a dark brown sand with numerous large flakes and 10-15 cm cobble at 30%, both angular and rounded in loose sand. At 51 cm there was an increase of coral and flakes. Between 62 cm and 69 cm was a lens of ashy soil, tightly compacted with flakes, shell and angular pebble.

Level I had a particularly high amount of lithics 428:22 (428 waste flakes:22 tools), with a slightly higher than average number of tertiary flakes. There were 22 unifacially flaked scrapers, gravers and perforators. Shell remains were not particularly high with 14:41 (14 whole shells and 41 identifiable fragments) with cowrie, trochus, and conus most numerous.

Level II was an ashy sandy soil with no charcoal, 3% pebble, 10% coral. This level had only 52:1 of lithics and shell was only 7:33.

Level III, 121 cm to 145 cm, was a yellow sand with some pebbles. Level III had no lithics or charcoal but larger amounts of shells 19:87. Despite the absence of lithics this is probably a cultural level. Cowrie, trochus, and whelk, the most common shells in Level II, are the most common in Level III along with mytilidae, clam and conus. Shell representations in what appear to be sterile beach strata are composed of extremely worn shell, larval shell, small drill shells, shell discs.

**Avaio monitor with four test trenches;**

Approximately 200 feet of trench profile was monitored in Avaio with special attention given to four 3 m long trenches excavated ahead of the construction crews. This advance trenching allowed the archeologist additional time to examine the strata, collect charcoal and soil samples, test screen backfill and record profiles. Strata noted in the four trenches were basically similar. Strata A, an overlying sod and black to dark brown soil with waterworn pebbles from 10 to 20 cm in thickness. Strata B, coral/sand road fill from 30 to 40 cm in thickness. In the west two trenches (A and T1), Strata C, 20-30 cm thick medium to dark brown sandy loam with white flecks of coral at 5%, charcoal flecks, pebbles and angular basalt cobble to boulder (exceeding 50 cm). In the two trenches to the east (T2 and T3) Strata C is approximately 75 cm of reddish brown clay with angular cobble to boulder basalt with boulders as large as 130 cm. (Soil sample #1a, at 40-60 cm in trench 1, with 25 cm white fleck, small land snails shells. 3 cm, 10R3/2, dusky red). This reddish brown clay appears in A and T1 as Strata D and continues to an undetermined depth (greater than 90 cm). In T2 and T3 the red clay strata merges into a dark brown to dark grey sandy loam with white specks of coral/shell at 5% (Soil sample #4 at 130 cm in trench 3, sandy loam with shell fragments, 3-5 cm coral at 10%, 10YR3/2, very dark grey brown). In T3 this strata ends in a hard packed 2-4 cm coral fingers and waterworn pebbles. This strata varies from 0 cm to 20 cm, disappearing sporadically. A charcoal sample (CS1 FA1 Avaio: Beta-82500) taken from strata 4 in T3 was taken from a pocket of waterworn pebble, coral fingers, angular basalt (possibly fire cracked) with dark brown/dark grey soil with small flecks of coral/shell at 142 cm. and dated 410 +/- 50 BP. This suggests that 90 cm of predominantly colluvial was deposited onto a beach over a 400 year period.

To the east 2-3 meters, strata D has pockets of greasy black soils with some shell and coral. No cultural lithics were located in the Avaio trenches. Below strata D in T2 and T3 was strata E, a coarse sand of varying shades from brown to yellow (Soil sample #1 at 2 cm fine grain sand, 2.5Y8/2 to 8/4 pale yellow, Soil sample #2, at 173 cm, medium grain sand, 10YR4/6, dark yellowish brown, Soil sample #3 at 173-200 cm in trench #2, fine brown sand with coral, pebble, 10YR5/4 yellowish brown) to white in
dark brown sand with numerous large flakes and 10-15cm cobble 30%, round and angular waterworn in loose sand; shell, loose sand mixed with waterworn cobble/pebble, some flakes

increasing coral, very dense flakes all in sand matrix; 2.5y 3/2 very dark gray brown lens of ashy soil, tightly compacted with flakes, shell and angular pebble

decreasing flakes, isolated pockets of coral, increasing shell and small amounts of charcoal

ashy/sandy soil, no charcoal, 3% pebble 10% coral

decreasing flakes

yellow sand with some pebble

1 inch = .25 meter
Avalo
Trench Profile

Strata

soil and dark brown, sandy/loamy soil with coral and waterworn pebbles 1-2cm

coral/sand road fill

dusky red clayey soil, 10R3/2, with angular basalt 1-8cm size, lesser amounts of cobble to boulder 12cm-100cm, roots, no charcoal

strata C merges with D
roots still present
very dark gray brown soil, 10YR8/4 with white specks of coral/shell at 5%, gritty soil

hard-packed 2-4cm coral fingers and water worn pebbles, possible firecracked rock
Charcoal sample at 142cmbs-410 +/- 50 yrs BP
brown, yellow, and white sands with 1% coral branches

shovel tested to 178cmbs

1 inch = .25 meter
random patterns. This sand strata appeared to be rising slightly to the east. Strata 4 became more complex towards the east with additional pockets, lenses, and layers including sandy soils in lenses. Large boulders in strata 3 continue to the east. Strata 4, the dark brown/grey sandy loam, disappears approximately 5 meters east of T3.

The gradient of the road dropped from 16.5' above sea level at A to 12.5' above sea level at T3. Trenching averaged 4' making the below surface trench bottom 12' to 7' above sea level over approximately 350'.

No cultural lithics were identified during the monitoring however charcoal flecks in various strata suggest that human activity was coincident with the soil depositions. A consistent red colluvial deposit with cobble to extremely large boulders suggest that massive and rapid soil movement from the steep slopes reached the outer edge of the valley and was deposited over a beach. Ideally, we might expect that as human-constructed terraces reached water saturation points and load limits, lithic debris, including flakes and charcoal, would be carried down slope and be deepest along the hill flanks creating colluvial fans that are thinnest toward the middle of the valley. Stream erosion and redeposit of alluvials would cut and mix with colluvials across the valley floor. The actual geomorphological history is undoubtedly complex with both stream erosion and redeposit and ocean erosion and beach deposition occurring. No cultural features or materials were located in Avalu along the land/ocean interface where the trenching occurred. We would suggest that late prehistoric villages were located further inland and that very early prehistoric villages were located further inland and beneath the colluvial deposits along the steep slopes. This is what Kirch and Hunt (1993) suggest for the Ofa habitation sequences given the formation of terraces and the earlier sea level height.

Cave Monitor

On 1/28/95 I monitored the trenching around the cave (mentioned by Kikuchi, 1963) west of Avalu. An 80 degree talus slope is on the west side of the cave. Large amounts of historic refuse is in and surrounding this cave. Trenching 17 meters west of the cave shows 61cm of talus with slightly clayey brown soils with 50% angular basalts in the 10cm range. Beneath this is 30cm of coral/sand fill used for the road construction in the 1970s. Beneath the road fill is 84cm of reddish brown clayey soil with 10cm sized angular basalts. By 119cmbs the soils became extremely clayey. At the bottom of the trench at approximately 1.1m below grade were large basalt boulders of .5 to 1.5 meter in size. In front of the cave at about 35cmbs a strata of greasy grey soil with sand and coral flecks and pebbles. This strata varies from 5 to 15cm thick and drops in sections as though filling a hole. This strata sits on top of a red decomposing basalt with occasional occurrences of 2-3cm water worn black basalt pebbles. A single fragment of giant clam was located in this strata. The 5-15cm thick strata at 85cm is the one potential human habitation strata. However, if we consider the cave's potential for an early site of more than 1,000 years, sea level may have been 1 to 2 meters higher than today's. According to ASPAs survey map the current cave floor is approximately meters above sea level. If no rock has fallen in the last 1,000 years (the cave floor is covered by extremely large boulders from the ceiling, and using the 1m subsidence/1,000 years which Kirch and Hunt (1993) use, the cave floor would have been 1-2 meters above sea level 1,000 years ago. 2,000 or more years ago the cave floor would have been no more than 0-1 meter above sea level. It seem unlikely, then, that this cave would offer high potential for early occupation use.

Alega

The lithic concentration identified by phase I STPs was not tested. An incident of non-compliance with the Phase II project design resulted in the contractor going past the nonmonitor area and through the archeological sampling area without waiting for the archeologist.

The distribution of water services to the home in the Alega area will require the assessment of the cultural resources already established for the area by Clark's study of the Alega quarry and the Phase I work by Suafo’a.
FAUNAL ANALYSIS

Vertebrates. Because of the high pH of the soils encountered in the project and the lack of features with high concentrations of faunal remains, the fish and mammal bone are very poorly represented in the project. Only 36 bone fragments, 26 mammal, 13 fish were recovered (human burial skeletal fragments excluded). It is likely that even with 1/8 inch screens we would not have recovered a significant number of bone remains. No conclusions can be drawn from the small sample (see Chart #1).

Invertebrates. With the exception of sea urchin spines, all of the invertebrate materials recovered were shells of gastropods and pelecypods (bivalves). Relatively small amounts of shell were recovered in the 1/4 inch screens. Whole shell and shell fragments were cleaned and identified by family name only. A more detailed identification was not warranted given the small sample size and the large number of strata which appeared to be redeposits. Also, many of our units were only .5 x .5m making the total soil/faunal volume relatively small. As with bone materials, shell remains were effected by the high acidity of colluvial and loamy soils. The best preservation was in strata of predominantly sand matrix.

Shells were grouped by family. Cowrie, giant clam, urchin (echinoderm), trochus, and turbo shell were subdivided by small, medium, or large specimens. For each level, shells were tallied by the number of whole shells and number of fragments for each identifiable family. The remainder of unidentifiable fragments for each level were totalled. The whole and fragmented shells of separate species were not weighed for each level. Comparisons between heavy shelled species such as tridacna (one complete shell weighed 742 grams, 1.7 lbs.) and light shells such as nevita would be misleading. Weight totals and totals of whole and fragmented shell for each level provide some volume measurement when compared with the total soil volume per level (shell/m3) (see Chart #2 and 3).

Of interest in the data is the relative lack of tridacna (giant clam) for the villages represented in Fagaitua Bay. Kirch's Tonga site had high numbers of this shell which is important as both a food and for tool use. One conclusion that might be drawn from the shell representations is the species availability in that particular area. Ecological conditions may not have been favourable for that species or the species may have been overcollected during some period. Turbo shell, trochus, cowrie and sea urchin were the most frequent shell/fragment species. Whelks, Thais, conus, and clams were the next most common group. Whole shells were most frequently represented by cowrie, whelk, nevita and surf clams (see Chart 4). Because we do not have carbon dates for the various levels we cannot establish a chronology for the shell samples nor do we have sufficient shell numbers to suggest harvest trends. Many strata appeared to be redeposits and no middens were excavated where we would have gotten sizeable samples. Strata of beaches with naturally occurring shells were easy to distinguish by the increased amount of wear on the shell fragments, numerous flat shell discs, large numbers of very small shells including larval shell. What we assumed to be a culturally sterile beach in the Amaua 1x3m unit at 125cmbs had distinct star shaped sand particles, possibly of coral colonies.
<table>
<thead>
<tr>
<th>Column</th>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utusia A</td>
<td>Level 1</td>
<td>20mm x 15mm Long bone fragment-mammal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10mm x 10mm Vertebra-fish</td>
</tr>
<tr>
<td></td>
<td>Level 2</td>
<td>15mm x 5mm Pig tooth fragment-molar</td>
</tr>
<tr>
<td>Utusia B</td>
<td>Level 1</td>
<td>15mm Fish bone fragment</td>
</tr>
<tr>
<td>Auto A</td>
<td>Level 1</td>
<td>5mm x 10mm Fish bone</td>
</tr>
<tr>
<td></td>
<td>Level 2</td>
<td>15mm Distal bone fragment-pig or dog</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40mm x 5mm Long bone fragment-mammal</td>
</tr>
<tr>
<td></td>
<td>Level 3</td>
<td>30mm x 10mm mammal bone fragment</td>
</tr>
<tr>
<td></td>
<td>Level 4</td>
<td>20mm x 7mm Bone fragment-mammal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15mm x 15mm Bone fragment-mammal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20mm x 10mm Fragment of fish vertebra</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30mm x 10mm Mammal bone fragment</td>
</tr>
<tr>
<td>Auto D</td>
<td>Level 1</td>
<td>10mm x 10mm Fish vertebra fragment</td>
</tr>
<tr>
<td></td>
<td>Level 2</td>
<td>25mm x 10mm Fish bone</td>
</tr>
<tr>
<td></td>
<td>Level 3</td>
<td>25mm x 10mm Mammal bone fragment</td>
</tr>
<tr>
<td></td>
<td>5 x 2</td>
<td>20mm x 5mm Dog or pig incisor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30mm x 4mm Fish rib bone</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25mm x 8mm Rib bone fragment-mammal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10mm x 1mm Mouse tooth incisor</td>
</tr>
<tr>
<td>Amausa A</td>
<td>Level 3</td>
<td>28mm x 20mm Vertebra fragment-mammal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35mm x 15mm Long bone fragment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30mm x 20mm Long bone fragment-mammal</td>
</tr>
<tr>
<td></td>
<td>Section A</td>
<td>Pig tooth molar fragment</td>
</tr>
<tr>
<td></td>
<td>Level 4</td>
<td>Vertebral &amp; long bone fragment-human?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large mammal canine tooth fragment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long bone distal fragment-mammal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5mm Fish vertebra</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80mm x 20mm Long bone fragment-whale?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30mm x 20mm Long bone fragment-Pig or human?</td>
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<tr>
<td></td>
<td></td>
<td>30mm x 15mm Bone fragment-human, pig or dog?</td>
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<td>10mm x 10mm Bone fragment-mammal</td>
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<td></td>
<td>Level 5</td>
<td>3mm Fish bone</td>
</tr>
<tr>
<td>Section C</td>
<td>Level 4</td>
<td>Human Burial at 100cm</td>
</tr>
<tr>
<td>Amausa C</td>
<td>5 x 2</td>
<td>Level 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12mm x 20mm Fish vertebra</td>
</tr>
<tr>
<td></td>
<td>Tridacna</td>
<td>Cypraeidae</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>------------</td>
</tr>
<tr>
<td>Utuaia A</td>
<td>Level #1</td>
<td>3.23</td>
</tr>
<tr>
<td>Col 1</td>
<td>Level #2</td>
<td>4.4</td>
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<tr>
<td>Utuaia B</td>
<td>Level #1</td>
<td>0.1</td>
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<td>Col 2</td>
<td>Level #2</td>
<td>0.1</td>
</tr>
<tr>
<td>Utuaia C</td>
<td>Level #1</td>
<td>0.1</td>
</tr>
<tr>
<td>Col 3</td>
<td>Level #2</td>
<td>0.1</td>
</tr>
<tr>
<td>Level #3</td>
<td>0.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Utuaia D</td>
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<tr>
<td>Col 4</td>
<td>Level #2</td>
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<td>Level #5</td>
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<td>0.2</td>
</tr>
<tr>
<td>Auto D</td>
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</tr>
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</tr>
<tr>
<td>Level #5</td>
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<td>0.1</td>
<td>0.2</td>
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<td>Section BC</td>
<td>Level #5</td>
<td>0.1</td>
</tr>
</tbody>
</table>

* on left = whole shells; # number on right = identifiable fragments

*a single tridacna shell from level V, Sections B/C weighed 742 grams. This shell was part of a wall feature and was not included in the sampling*
<table>
<thead>
<tr>
<th></th>
<th>Ulusia A</th>
<th>Ulusia B</th>
<th>Ulusia C</th>
<th>Ulusia D</th>
<th>Auto A</th>
<th>Auto B</th>
<th>Amaea C</th>
<th>Amaea B</th>
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<th>Salems C</th>
<th>Salems D</th>
<th>Salems E</th>
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<tr>
<td>Level #1</td>
<td>6.0</td>
<td>1.0</td>
<td>7.0</td>
<td>1.0</td>
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<td>1.0</td>
<td>0.1</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Level #2</td>
<td>1.0</td>
<td>0.1</td>
<td>2.4</td>
<td>2.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>0.2</td>
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<td>0.1</td>
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<td>0.1</td>
<td>0.1</td>
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<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
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<td>0.1</td>
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<table>
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<tr>
<th></th>
<th>Nazariidae</th>
<th>Acmaeidae</th>
<th>Bulididae</th>
<th>Nectridae</th>
<th>Hipponictidae</th>
<th>Tellinidae</th>
<th>Cellinidae</th>
<th>Unidentifiable fragments</th>
<th>total shell</th>
<th>total weight</th>
<th>total/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulusia A</td>
<td>2.2</td>
<td>1.1</td>
<td>0.6</td>
<td>0.12</td>
<td>24</td>
<td>40</td>
<td>40</td>
<td>167</td>
<td>398 gr.</td>
<td>1,355 m²</td>
<td></td>
</tr>
<tr>
<td>Ulusia B</td>
<td>1.0</td>
<td>0.1</td>
<td>0.1</td>
<td>1.0</td>
<td>3.30</td>
<td>20</td>
<td>20</td>
<td>49.67</td>
<td>239 gr.</td>
<td>1,457 m²</td>
<td></td>
</tr>
<tr>
<td>Ulusia C</td>
<td>7.0</td>
<td>2.4</td>
<td>1.11</td>
<td>0.3</td>
<td>20</td>
<td>49.67</td>
<td>49.67</td>
<td>239 gr.</td>
<td>239 gr.</td>
<td>1,457 m²</td>
<td></td>
</tr>
<tr>
<td>Ulusia D</td>
<td>0.1</td>
<td>1.0</td>
<td>1.1</td>
<td>4.10</td>
<td>4.10</td>
<td>11 gr.</td>
<td>11.0</td>
<td>400 gr.</td>
<td>400 gr.</td>
<td>1,457 m²</td>
<td></td>
</tr>
<tr>
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<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>19.133</td>
<td>19.133 gr.</td>
<td>1,457 m²</td>
<td></td>
</tr>
<tr>
<td>Auto B</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>31.03</td>
<td>31.03 gr.</td>
<td>1,457 m²</td>
<td></td>
</tr>
<tr>
<td>Amaea C</td>
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<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>19.133</td>
<td>19.133 gr.</td>
<td>1,457 m²</td>
<td></td>
</tr>
<tr>
<td>Amaea B</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>31.03</td>
<td>31.03 gr.</td>
<td>1,457 m²</td>
<td></td>
</tr>
</tbody>
</table>

# on left = whole shells ; # on right = identifiable fragments
Chart #3 Excavation levels with densities of total shell remains/meter$^3$ exceeding 1,000/m$^3$

Chart #4 Families of shell ranked by frequency of remains within Faga'itua Bay sites

<table>
<thead>
<tr>
<th>#</th>
<th>Family</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Cypraeidae (cowrie)</td>
<td>55:273</td>
</tr>
<tr>
<td>#2</td>
<td>Trochidae (trochus)</td>
<td>8:287</td>
</tr>
<tr>
<td>#3</td>
<td>Echinoidea (sea urchin)</td>
<td>111:122</td>
</tr>
<tr>
<td>#4</td>
<td>Strombidae (whelk)</td>
<td>95:125</td>
</tr>
<tr>
<td>#5</td>
<td>Turbinidae (turbo)</td>
<td>9:142</td>
</tr>
<tr>
<td>#6</td>
<td>Mytilidae (mussel)</td>
<td>18:89</td>
</tr>
<tr>
<td>#7</td>
<td>Tellinidae (clam)</td>
<td>8:88</td>
</tr>
<tr>
<td>#8</td>
<td>Thaoidae (thais)</td>
<td>4:89</td>
</tr>
<tr>
<td>#9</td>
<td>Mactridae (surf clam)</td>
<td>86:1</td>
</tr>
<tr>
<td>#10</td>
<td>Conidae (cone)</td>
<td>6:82</td>
</tr>
<tr>
<td>#11</td>
<td>Neritidae</td>
<td>47:43</td>
</tr>
<tr>
<td>#12</td>
<td>Arcidae (ark clam)</td>
<td>29:13</td>
</tr>
<tr>
<td>#13</td>
<td>Tridacnacea (giant clam)</td>
<td>5:28</td>
</tr>
<tr>
<td>#14</td>
<td>Acmaeidae (limpet)</td>
<td>23:4</td>
</tr>
</tbody>
</table>

# on left = whole shell
# on right = identifiable fragments
DEBITAGE FRAGMENTATION CLASSES

Heat Spalls. Less than ten heat spalls were observed in this collection of Samoan basalt artifacts. The first three or four times I saw one, I don't think I recognized it. For this reason, I have not included them in this analysis.

Heat spalls are identified when a positive heat spall, or pot lid, surface is observed on an artifact. Herein, a positive surface is a convex surface in the sense that a positive bulb of force is a convex surface. This positive heat spall surface is different from the ventral surface of a flake which is also a positive fracture surface. The positive heat fracture surface referenced is not just a crazed or a cracked surface with or without heat spall scars.

This is only a possible artifact type because the spall may have come from a non-cultural piece of raw material and the fire may not have cultural in origin.

Angular Waste. Angular waste is identified as a piece of lithic raw material which exhibits neither a ventral flake surface, a positive heat spall surface, nor a retouched surface.

This artifact may also be non-artifactual, a by-product of the random natural introduction of force into a non-cultural piece of lithic raw material. As with heat spalls, it is the specimen's context and other features which will determine whether it is cultural and an artifact or not.

Flake. A digression: each of the remaining three descriptive debitage types is a cultural flake or a flake fragment. A few comments on artifactual flakes are therefore necessary. The mechanical principles of the fracture process are the same whether the fracture is induced by a natural or a cultural agency. Those attributes which are generally considered to be diagnostic of a cultural flake are a by-product of the nature of the objective piece the flake is removed from and the angle of force introduction in relation to the outer face of the objective piece, as well as the positioning of the point of force introduction in relation to the edge of the objective piece (see the glossary, herein, for a definition of unfamiliar terms). It is possible--though a rarity--for there to be a natural force introduction into a natural piece of raw material that will produce a flake that is identical to a cultural flake, so context again comes into play, context and probability.

Cultural flakes exhibit the following features:

(definitions of italicized words in this section will be found in the glossary) a platform which may contain a lip or node; a ventral surface with a point of contact, a bulb of force, waves, ripples, and fissures--all represented positively, as well as, possibly an eraillure scar; a dorsal surface containing the same features (not including the eraillure scar) all represented negatively in whatever flake scars or portions of flake scars are present (Spencer 1961). Cortex may be present on the dorsal surface of a flake, as well. Each of these surfaces will intersect the others. These surfaces with their features are angled in relation to each other and specifically shaped by the introduction of force into a relatively flat platform of an objective piece (such as a core) close to an edge with an angle.
ventral flake surface ---→ observed --------→ not observed

- positive heat spall surface--
  NO
  YES
  ANGULAR
  WASTE
  HEAT
  SPALL

—complete or shattered platform present----------
  NO
  YES

NON-PROXIMAL FRAGMENT

—more than 1/5 of a fine feathered edge missing—
  YES
  NO

PROXIMAL FLAKE FRAGMENT

WHOLE FLAKE

Figure 1.1. Descriptive Debitage Key.

of less than 90 degrees with an outer face, generally over a
guiding ridge. Finally, the platform of a flake is the proximal
portion and the termination of a flake is herein and elsewhere
considered the distal end.

Non-Proximal Flake Fragment. A non-proximal flake fragment
does not contain an identifiable platform. Lateral fragments are
included in this fragmentation category.

Proximal Flake Fragment. A proximal flake fragment contains the platform.

Whole Flake. A whole flake is either unbroken or has less
than 20% of a fine, feathered edge missing.

WHOLE FLAKE CORTEX CLASSES

Note: the sizing or inclusion in a cortex class of any
fragmentation type other than the whole flake will yield
information of questionable utility.

Primary Cortex Flake (I). A primary cortex flake contains
100% cortex on its dorsal surface. A primary cortex flake may
contain up to 25% interior surface so long as this interior
surface is located proximally, contiguous to the platform. The
latter stipulation allows for the existence of some objective
WHOLE FLAKE

dorsal surface cortex present
NO    YES

............................

--flakes with no dorsal surface cortex
(except for dorsal cortex less than 25%
contiguous to the termination)--

TERTIARY FLAKE

............................

--flakes with 100% dorsal surface cortex
(except for interior surface of less than 25%
contiguous to the platform)--
YES    NO

PRIMARY CORTEX FLAKE

SECONDARY CORTEX FLAKE

Figure 1.2. Whole Flake Cortex Debitage Key.

piece platform or outerface preparation prior to removal.
The presence or absence of cortex of the flake platform will have no bearing on the identification of this debitage class.

Secondary Cortex Flake (II). A secondary cortex flake contains some cortex on its dorsal surface. The interior surface present must make up more than 25% of the dorsal surface if it is contiguous to the platform—this allows a clear differentiation from the primary cortex flake class.

The cortex surface present must make up more than 25% of the dorsal surface if it is contiguous to the termination, or distal end, of the flake. This distinction allows a clear differentiation from the tertiary, or interior, flake class.

The presence or absence of cortex of the flake platform will have no bearing on the identification of this debitage class.

Tertiary, or Interior, Flake (III). A tertiary flake contains no cortex on its dorsal surface, unless the cortex makes up less than 25% of the dorsal surface and is located distally contiguous to the termination.
The presence or absence of cortex of the flake platform will have no bearing on the identification of this debitage class.

DEBITAGE COMPARISON TABLE

Because of the breakdown of debitage into fragmentation classes and the separation of only the whole flakes into the cortex classes, I have nothing to compare the debitage frequencies of the various units in the various sites to. Without a comparison, the assessment of aberrant or normal frequencies among the various classes becomes problematic.

To solve this problem—to give me a norm to compare to—I have totaled all the classes of debitage and derived percentages for them as this will be done in the reports on the individual sites. Table 1.1 presents this total. Given a large enough number of artifact samples of populations similar in size—varying, say, plus or minus 20%—it could be assumed that skewing due to sampling error and the differential patterning among the sites would average out. This is not the case with this Fagaitua Bay collection; however, the debitage comparison table does give me something to hang my hat on.

Table 1.1. FAGAITUA BAY DEBITAGE COMPARISON TABLE: Basalt Debitage Totals and % from Fagaitua Bay Sites.

<table>
<thead>
<tr>
<th>Fragmentation Debitage Classes</th>
<th>Cortex Debitage Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AW</td>
</tr>
<tr>
<td>TOTAL n</td>
<td>2930</td>
</tr>
<tr>
<td>%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n—number of flakes.

Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.

When more comparable data is forthcoming, this comparison table may be dispensed with. It is probable, that for comparative purposes, it does not apply outside of Fagaitua Bay.

One of the main interactions between the debitage and the tool/proform artifact classes is that of the parent artifacts selected for retouch or use. Table 1.2 presents the breakdown of a selected group of parent artifacts—those with flakes identifiable as to cortex class for parent artifacts. Tables 1.1
and 1.2 are not exactly comparable because even fragmentary
parent artifacts are classed according to the cortex on their
dorsal surfaces and because many parent artifacts are either not
flakes or are not flakes identifiable as to cortex class. Only
secondary and tertiary flakes were identified.
This said, it is interesting that cortex flakes chosen for

<table>
<thead>
<tr>
<th>Debitage Class:</th>
<th>CORTEX**</th>
<th>TERTIARY</th>
<th>TOTAL***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amaua A</td>
<td>12 (26%)</td>
<td>34 (74%)</td>
<td>46 (100%)</td>
</tr>
<tr>
<td>BC</td>
<td>3 (30%)</td>
<td>7 (70%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>subtotal</td>
<td>15 28%</td>
<td>41 73%</td>
<td>56 100%</td>
</tr>
<tr>
<td>Amaua B</td>
<td>3 33%</td>
<td>7 67%</td>
<td>10 100%</td>
</tr>
<tr>
<td>Amaua C</td>
<td>1 100%</td>
<td>-</td>
<td>1 100%</td>
</tr>
<tr>
<td>Utusia A</td>
<td>11 33%</td>
<td>22 67%</td>
<td>33 100%</td>
</tr>
<tr>
<td>Utusia B</td>
<td>3 43%</td>
<td>4 57%</td>
<td>7 100%</td>
</tr>
<tr>
<td>Utusia C</td>
<td>1 10%</td>
<td>9 90%</td>
<td>10 100%</td>
</tr>
<tr>
<td>Utusia D</td>
<td>5 33%</td>
<td>10 67%</td>
<td>15 100%</td>
</tr>
<tr>
<td>Auto A</td>
<td>1 33%</td>
<td>2 67%</td>
<td>3 100%</td>
</tr>
<tr>
<td>Auto B</td>
<td>1 33%</td>
<td>2 67%</td>
<td>3 100%</td>
</tr>
<tr>
<td>Auto D</td>
<td>1 33%</td>
<td>2 67%</td>
<td>3 100%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>42 30%</td>
<td>100 70%</td>
<td>142 100%</td>
</tr>
</tbody>
</table>

Cortex Class
Debitage
Total
144 15% 770 84% 914 100%

* a parent artifact is the artifact class chosen for retouch or
use, i.e. chosen to function as a tool.
** this total derived from joining the primary and secondary
classes. Fragmentary parent artifacts are included on the
basis of observable cortex.
*** this total is for tool/preforms with an identifiable cortex
flake class parent artifact. Other tools have not been
counted.
parent artifacts appear to be twice as common as they are among the debitage artifacts.

THE LITHIC TOOL AND PREFORM ARTIFACTS

The tool/preform artifacts from site Amaua A were subjected to a more intensive analysis than were the artifacts from the other sites dealt with here. Since this was the first site analyzed and contained the most tools, I was interested in seeing whether there would be some types of patterning. The subsequent, simpler analysis was designed to be comparable with that carried out for Amaua A (see the tool/preform tabulation sheets included at the end of this appendix).

Two primary tool/preform retouch classes were identified in this analysis. Tools that are formed solely by use-wear, called unretouched tools in previous Lee Spencer Archaeology analyses and called utilized flakes by some, were not observed. Undoubtedly, they exist; however, the basalt artifacts in those collections have a lot of edge damage on them, that is, artifact edge alteration interpreted as being due to accident and not to retouch or use.

Any systematic identification of use-wear, or unretouched tools, requires the clear differentiation among the alteration types, that is, alteration due to either accident (edge damage), retouch (forming tools and preforms), or use-wear (tools only). This differentiation requires larger samples of artifacts and more time. Multiple sample lot sizes of more than one hundred artifacts would also be optimal.

There are only two possible types of retouch, unifacial and bifacial. All retouched flaked stone artifact classes exhibit one or the other type of retouch.

In this analysis unifacially retouched artifacts dominate and are divided into scrapers, gravers, perforators, gratters, and a miscellaneous unknown class. This functional differentiation is based on retouch, morphology, and use-wear characteristics. Bifacially retouched tool and preform artifacts are divided into flake bifaces and complete bifaces; the latter class is further differentiated into adzes, adze preforms, perforators, unknown preforms, and a miscellaneous unknown class. A small number of cores were identified as well.

The primary tool/preform classes are described below, as are the analytic attributes discussed. Finally, I was impressed with the number of artifacts that exhibit backing, or the purposeful dulling of an edge to facilitate grasping the tool. Backing will also be dealt with below.

After a short discussion of retouch, the procedures used in the analysis of unifacially retouched artifacts will be discussed first, followed by bifacially retouched artifacts, backing, and then, finally, the cores.

Readers may consult the glossary included in this appendix for definition of terms they are unfamiliar with.
RETOUCH

Note: the reader should be aware that it is the working edge that is the unit of study and often there will be more than one working edge per artifact. This means that the counts for working edges will be greater than the total for the tool/preform artifacts.

Definition. Retouch is the purposeful removal of any flake (producing a flake scar) from the edge of any artifact to shape that edge or surface. Retouch includes core preparation, tool manufacture, and hacking; it does not include use-wear or core reduction. There are only two possible types of retouch: unifacial and bifacial.

All of the artifacts and working edges discussed in these procedures are retouched.

Description. In this analysis the minimum description of retouch is the presence on an edge of at least three (3) contiguous, even-sized flake scars in excess of 3.0 mm in length and width on one side of an edge, i.e., unifacial. Any examples of three contiguous flake scars perpendicular or oblique to and on each side of the same portion of the edge, i.e., bifacial, are retouch regardless of size.

UNIFACIALLY RETOUCED ARTIFACTS

Description. This class of artifacts is made up of those preform and tool edges containing retouch on only one surface of an edge or retouch on alternate sides of an edge. If the retouch is on both sides of the same portion of the edge, the retouch is bifacial and is so identified.

The Attributes

Length, Width, and Thickness
Length, width, and thickness were measured to the nearest mm. Flake length is measured from the point of contact through the ripple centers to the termination. Width is measured perpendicular to length and thickness is measured perpendicular to width and length.

Parent Artifact
A parent artifact is the artifact chosen for retouch or for use as a tool.

Number of Working/Retouched Edges
Some tools contain more than one working/retouched edge (hereafter, referred to as working edge). When this was the case, each working edge was treated separately. When it was clear that two clearly distinct working edges modified another working edge, as for instance, when retouch on two sides of a flake enhance a natural projection at the distal end that has been used as a graver, then they are not necessarily treated separately.

Location of Working Edge
The location of each working edge is identified according to the morphology of the relevant parent artifact, whether it was a flake or a broken edge. When the parent artifact is a flake, the working edge is located according to standard flake morphology.
Every flake parent artifact examined was oriented identically—as though on a page with its platform toward the top and the dorsal or ventral side toward the reader. This allows the use of left and right in the location descriptions.

Shape of Working Edge
The shapes documented are: straight, convex, concave, notched, projection, corner, and irregular.

BIFACIALLY RETOUCHED ARTIFACTS

Description. This class of artifacts is made up of those preform and tool edges containing retouch of both sides of the same portion of the edge. Bifacial retouch is distinct from alternate unifacial retouch (see glossary)

FLAKE BIFACES

Description. This class of artifacts is made up of flakes with bifacial edge retouch only. Edge retouch, as the name implies, is confined near the edge of the artifact and is not invasive.

The Attributes
The attributes of this class of artifacts are identical to those of unifaces.

COMPLETE BIFACES

Description. Artifacts of this type have at least one bifacially retouched edge and the majority of at least one nonplatform surface covered with invasive flake scars, exclusive of post-manufacturing fractures and heat spalled surface.

The Attributes
The attributes used to describe this tool/preform type are the same as those of unifaces, except for the addition of cross-section and plan-section outlines and an indication of the number of ground facets. These three additional and self-explanatory attributes are introduced because of the presence of adzes in the collection.

Because of my impression that there is no clear size distinction between those flakes removed from cores and those removed from adze preforms, the five largest flake scars were measured on most of the complete bifaces and the cores. By doing this I hoped to see whether any size distinctions were apparent.

BACKING RETOUCH

Definition. Backing is purposeful alteration for the purpose of dulling an edge to facilitate handling during use. Excluded from consideration here is backing that is present on the stem or proximal portions of any obviously hafted tool, such as, an adze or a projectile point. The reason this latter type of alteration is excluded from consideration is that it is already recognized and incorporated into the type description—
either implicitly or explicitly--of these tools. At present, discussing it here would be needlessly confusing.

Description. Note: backing is inherently difficult to identify and this identification, once made, is more subjective than most functional characterizations in this analysis. Since backing is intentional dulling--that is its use--there is no necessary morphological patterning to the alteration that results, it may be bifacial or unifacial.

For backing to be unambiguously identified, there must be another altered edge on the tool that is identifiable as having been used for slicing, graving, perforating, scraping; any use other than backing. It is preferable that the other edge in question be a slicing or a perforating edge since these uses, potentially, bring the hand into more precarious contact with sharp edges than do other uses that readily come to mind. The backing must effectively dull a platform corner or other projection opposite a working edge. The alteration identified as backing must be anomalous in some way, interfering with the straightforward identification of the alteration in question as having been used for a purpose other than backing.

CORES

Definition. A core is a tool used to produce flakes suitable for manufacture into tools or suitable for use as is; the production of these usable flakes is a core's task, or use.

Description. Cores contain relatively flat platform surfaces and slightly to markedly convex outer faces which intersect the platform and contain at least two flake scars. Variably irregular platform/outerface edge which is convex and which overhangs the outer face is also common. These tools are often angular in appearance, and are also commonly made on nodules and, when this is so, often retain nodular cortex surface. Note: cores may be made on any parent artifact available as long as it is large enough to produce flakes of a desired size.

The Attributes

Number of Platforms
Self-explanatory.

Platform Bifacial or Unifacial
Also self-explanatory. A platform is bifacial when it has served both as a platform and an outer face. For a platform to be identified as bifacial, flakes need to have been removed from both sides of the same edge contemporaneously. Both surfaces intersecting to form a bifacial platform are also outerfaces.

FUNCTIONAL TOOL TYPE DEFINITIONS

Several different functional tool types are identified among the bifacially and unifacially retouched artifacts. These types
will be defined below.

**Scrapper**
This working edge type is placed close to one of the surfaces, rather than being evenly placed between the two surfaces comprising the edge. Usually, scrapers are unifacially retouched and can take many forms, all based on the shape of the edge. Generally speaking, concave working edges modify convex surfaces and convex edges modify concave surfaces.

**Graver**
This working edge type is a markedly convex scraper edge. It is usually associated with a natural or manufactured projection or corner. Generally, this projection doesn’t stand out from the surrounding edges very much.

**Grater**
This working edge type is generally unifacial and opposite this edge is evidence of hafting, either in the form of wear or morphology.

**Perforator**
This working edge is also found on a variably pronounced, either natural or retouched projection. Identification of this working edge type is based on morphology—if the projection formed is quite long in relation to width and thickness—and wear.

**Adze**
This tool/preform type is based mainly on morphological considerations. Herein, the presence of a ground facet implies functional completion.

**Slicing Tool**
This working edge type is generally located evenly placed between the two surfaces comprising the edge in question. Retouch is often bifacial, but not necessarily so. Wear common to the working edge type is bifacial nibbles and steps with scars perpendicular and, especially, oblique to the edge.

**Chopper**
This is usually a massive tool with a simply flaked, unifacial or bifacial edge. Generally, wear is distinctive and takes the form of large flake scars.

**PROBLEMS**

As mentioned before, the ten day time limit on this analysis and write-up has necessitated a simpler analysis than could have been done. There is enough complexity in and apparent patterning among the various classes of debitage and tool/preform artifacts, even at this simple level of analysis, to make it clear that a more detailed analysis would be rewarding.
On some of the artifacts and in some levels at some sites, a rounding of artifact edges was observed. It is unclear what is causing this weathering. Initially, it was my thought that the rounding represented the effects of tumbling in a stream. It was then suggested to me (Gehr 1995: personal communication) that the rounding may represent the affect of soil acids on the artifacts. Whatever the case, the rounding makes the observation of detail difficult to impossible depending on the degree of rounding.

It is worth noting that rounding does not increase with depth (in fact, sometimes the opposite occurs) nor is it everywhere present. This may invalidate the action of soil acids as the cause of the phenomenon.

More than 2/3 of the levels containing cultural material had less than 100 debitage artifacts and over half of these levels contained less than 30 of these artifacts. These small numbers clearly show that sampling error will have to be dealt with during the interpretation of lithic data.

Unfortunately, it was necessary to do this analysis prior to the organization of the other data sets from the site. Since the excavation levels correspond to strata encountered in the field, there is no comparability in the volume of the various levels from the sites in this collection. The reader should therefore be aware that large numbers of artifacts in one level of a site may refer to a very thick strata. Small numbers of artifacts may imply great richness in a very thin stratum. See the body of the report for the correlation of level thicknesses and artifact numbers.
SECTION TWO

LITHIC ANALYSIS

OF THE

FAGAITUA BAY ARCHEOLOGICAL SITES

In the individual site reports to follow, the debitage will be presented first followed by the tool/preform artifact data. Summary statements will be made at the end of each report discussing potential interpretive problems as well as any patterning observed in the lithic assemblage from the site.

The reader should consult the body of this report for other detailed site data and for the correlations of site level thicknesses with artifact numbers.

SITE AMAUA A

Excavations at site Amaua A yielded 45% of debitage artifacts and 48% of the tool/preform artifacts examined in the Fagaitua Bay collection. This, in large part, is probably due to the greater amount of deposit removed in the excavations of the site—a 1X3 m unit rather than the more common .5X.5 m and .5X2 m units used to sample the other sites.

A total of 1,321 debitage artifacts were recovered from Amaua A; 1,046 (79%) are from Unit A, 275 (21%) are from Units B and C. Tables 2.1 and 2.2 present the debitage data for the units.

Artifacts from 1X1 Unit A of the 1X3 m unit were examined apart from those of 1X1 Units B and C (hereafter, Unit BC), which latter units were joined for the sake of this analysis. This division will be held to in the discussions to follow since there are differences in frequency between the levels that may, in part, be due to three features present in Levels 4 and 5 of Unit BC.

Levels 1 and 2 appeared to be a sheetwash? flood? laid cultural deposit in the 1X3 unit. Level 2 was not screened in
Table 2.1. Basalt Debitage from Amaua A, 1X1 Unit A.

<table>
<thead>
<tr>
<th>Level</th>
<th>Debitage Fragmentation Classes</th>
<th>Cortex Debitage Classes</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AW NPRX PRX Whole</td>
<td>(I II III)</td>
<td></td>
</tr>
<tr>
<td>surface/1 n</td>
<td>1 45 45 36</td>
<td>2 8 26</td>
<td>127</td>
</tr>
<tr>
<td>%</td>
<td>8% 35% 35% 28%</td>
<td>(6% 22% 72%)</td>
<td>100%</td>
</tr>
<tr>
<td>2 n</td>
<td>- 12 9 5</td>
<td>- 1 4</td>
<td>26</td>
</tr>
<tr>
<td>%</td>
<td>46% 35% 19%</td>
<td>(20% 80%)</td>
<td>100%</td>
</tr>
<tr>
<td>3 n</td>
<td>1 120 135 70</td>
<td>2 3 55</td>
<td>326</td>
</tr>
<tr>
<td>%</td>
<td>37% 41% 22%</td>
<td>(3% 4% 93%)</td>
<td>100%</td>
</tr>
<tr>
<td>4 n</td>
<td>- 85 100 76</td>
<td>- 4 72</td>
<td>261</td>
</tr>
<tr>
<td>%</td>
<td>33% 38% 29%</td>
<td>(5% 95%)</td>
<td>100%</td>
</tr>
<tr>
<td>5 n</td>
<td>2 100 89 108</td>
<td>2 15 91</td>
<td>299</td>
</tr>
<tr>
<td>%</td>
<td>1% 33% 30% 36%</td>
<td>(2% 14% 84%)</td>
<td>100%</td>
</tr>
<tr>
<td>6 n</td>
<td>- 5 1 1</td>
<td>- - 1</td>
<td>7</td>
</tr>
<tr>
<td>%</td>
<td>71% 14% 14%</td>
<td>(100%)</td>
<td>100%</td>
</tr>
</tbody>
</table>

TOTAL n | 4 367 379 296 | 6 31 259 | 1046 |

Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.

Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.

Unit BC.

Five culture bearing levels were present in the 1X3 m unit. Level 3 is considered the top of the in situ cultural deposit and is richer in artifacts than the other levels, with Levels 4-5 also containing larger numbers of artifacts in Unit A. Levels 4 and 5 in Unit BC contained a rock concentration, a burial, and a possible cooking pit, or Umu.

Debitage Artifacts

Generally, the same patterning in frequencies of the various debitage artifact classes seems to hold throughout the levels of the units, once the probable sampling error inherent in artifact populations of under fifty individuals in a level is considered.
Table 2.2. Basalt Debitage from Amaua A, IX1 Units B & C.

<table>
<thead>
<tr>
<th>Level</th>
<th>AW</th>
<th>NPRX</th>
<th>PRX</th>
<th>Whole</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 n</td>
<td>-</td>
<td>3</td>
<td>5</td>
<td>9</td>
<td>-</td>
<td>1</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>%</td>
<td>18%</td>
<td>29%</td>
<td>53%</td>
<td></td>
<td>(11%</td>
<td>89%</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>2 n</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>%</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 n</td>
<td>1</td>
<td>80</td>
<td>86</td>
<td>73</td>
<td>1</td>
<td>13</td>
<td>59</td>
<td>240</td>
</tr>
<tr>
<td>%</td>
<td>33%</td>
<td>36%</td>
<td>30%</td>
<td></td>
<td>(1%</td>
<td>18%</td>
<td>81%</td>
<td>100%</td>
</tr>
<tr>
<td>4 &amp; 5 n</td>
<td>-</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>-</td>
<td>2</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>%</td>
<td>28%</td>
<td>33%</td>
<td>39%</td>
<td></td>
<td>(29%</td>
<td>71%</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

TOTAL n | 1  | 88  | 97  | 89    | 1  | 15 | 72  | 275   |

Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.

Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.

The single difference is to be found in the frequencies of whole flakes and cortex debitage classes in Level 3 of the units. Unit A contains relatively fewer whole flakes and a higher frequency of tertiary, or interior, flakes than Unit BC and the Fagaitua Bay average.

The implications of this variability in whole flake and tertiary flake numbers are difficult to assess because the functional significance of the cortex debitage classes has yet to be determined for Samoa. Since, in Samoa, cortex flakes are often chosen as parent artifacts of tools, the presence of more or less cortex on debitage has no inherent reduction stage implications here as it does in many places in North America (see supplementary comments section following the summary in Section Three of the appendix).

The Level 3 differences in whole flake and tertiary flake frequencies between Unit A and Unit BC make sense if tertiary flakes are found to be more fragile, or prone to breakage, than are flakes with cortex on their dorsal sides. The high frequency of tertiary flakes continues in Level 4 of Unit A. As mentioned
Table 2.3. Basalt Unifaces from Amana A, LXI Unit A.

<table>
<thead>
<tr>
<th>Surface Level</th>
<th>SC/</th>
<th>SC/</th>
<th>ADZE</th>
<th>UNK</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
</table>
|               | SC/ | GR | GRF | GRT | GRT | UNK | SL | PRE | PRE | CHP (BK**) | 19 | 2 | 16 | 4 | 4 | 3 | 2 | 1 | 2 | 1 | 13 | 67 | 44* * *
| 1 n           | 1   | 2  | 3   |     |     |     |    |     |     |               |    |    |    |    |    |    |    |    |    |    |    | 6  | 6  |
| 2 n           | 1   |    |     | 1   | 2   |     |    |     |     |               |    |    |    |    |    |    |    |    |    |    |    | 4  | 2  |
| 3 n           | 10  | 12 | 1   | 1   | 2   | 1   | 1  | 1   |     |               |    |    |    |    |    |    |    |    |    |    |    | 37 | 26 |
| 4 n           | 3   | 1  |     |     |     |     |    |     |     |               |    |    |    |    |    |    |    |    |    |    |    | 4  | 3  |
| 5 n           | 4   | 3  | 3   | 1   |     |     |    |     |     |               |    |    |    |    |    |    |    |    |    |    |    | 16 | 7  |
| 6 n           |     |    |     |     |     |     |    |     |     |               |    |    |    |    |    |    |    |    |    |    |    |    |    |

* note that there is more than one working edge on many tools.
*** there are two artifacts with both unifacial and biface retouched edges. Each artifact is counted twice, once with the unifaces and once with the biface, thus there are only 52 actual artifacts, not 54.

Table 2.4. Basalt Unifaces from Amana A, LXI Units B & C.

<table>
<thead>
<tr>
<th>Surface Level</th>
<th>SC/</th>
<th>SC/</th>
<th>ADZE</th>
<th>UNK</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SC/</td>
<td>GR</td>
<td>GRF</td>
<td>GRT</td>
<td>GRT</td>
<td>UNK</td>
<td>SL</td>
</tr>
<tr>
<td>1 n</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 n</td>
<td></td>
<td>4</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools.

ABBREVIATIONS: SC-scaper, GR-graver, GRF-perforator, PRE-preform, GRT-grater, UNK-unknown, SL-slicing tool, CHP-chopping tool, BK**-backing (this is generally an ancillary working edge type), WE-working edge, Art.-artifact, SC-scaper, GR-graver, PRE-preform, PRE-preform, GRT-grater, UNK-unknown, SL-slicing tool, CHP-chopping tool, BK**-backing (this is generally an ancillary working edge type), WE-working edge, Art.-artifact
### Table 2.5. Basalt Flake Bifaces from Amaua A, IX Unit A.

<table>
<thead>
<tr>
<th>Level</th>
<th>GRAVER</th>
<th>BACKING</th>
<th>SLICING TOOL</th>
<th>UNKNOWN</th>
<th>TOTAL NO. WE ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/1 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 n</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>2 1</td>
</tr>
<tr>
<td>3 n</td>
<td>1</td>
<td></td>
<td>2</td>
<td>1</td>
<td>4 4</td>
</tr>
<tr>
<td>4 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL n</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>6 5</td>
</tr>
</tbody>
</table>

*Note that there is more than one working edge on many tools.

### Table 2.6. Basalt Complete Bifaces from Amaua A, IX Unit A.

<table>
<thead>
<tr>
<th>Level</th>
<th>ADZE</th>
<th>ADZE PREFORM</th>
<th>UNK PREFORM</th>
<th>UNKNOWN</th>
<th>PERFORATOR</th>
<th>TOTAL NO. WE ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/1 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 n</td>
<td>1</td>
<td>1</td>
<td>1 (adze is a butt section, Type III/IV)</td>
<td>3</td>
<td>3</td>
<td>3 3</td>
</tr>
<tr>
<td>4 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 3</td>
</tr>
<tr>
<td>5 n</td>
<td>2</td>
<td>2</td>
<td>(adzes are butt sections, Type I/II)</td>
<td>4</td>
<td>4</td>
<td>4 4</td>
</tr>
<tr>
<td>6 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL n</td>
<td>3</td>
<td>6</td>
<td>1</td>
<td></td>
<td></td>
<td>10 10</td>
</tr>
</tbody>
</table>

*Note that there is more than one working edge on many tools.
Table 2.7. Basalt Complete Bifaces from Anaua A, XI Unit B & C.
BIFACIALLY RETOUCHEd - WORKING EDGE TYPES*

<table>
<thead>
<tr>
<th>Level</th>
<th>ADZE PREFORM</th>
<th>PREFORM</th>
<th>DISC</th>
<th>UNK</th>
<th>PERFORATOR</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 n</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1 (UNK type)</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2 n</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 n</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td>1 (ADZE Type VI/VII)</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL n</td>
<td>1 6 1 1 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools.

ABBREVIATIONS: UNK = unknown, WE = working edge, Art. = artifact

above, Levels 4 and 5 are not comparable in any way between Unit BC and Unit A.

Given the small area covered by the single 1X3 unit, it is possible this variability in debitage frequency represents the sort of change one would naturally encounter at a flaking station as one moved further away from the flaker. Unfortunately, we do not know whether this deposit is redeposited refuse or a primary deposit and, if so, whether it represents a specialized activity area.

Tool/preform Artifacts

There are 69 tool/preform artifacts and 98 working/retouched edges (hereafter, simply working edges) in this collection from the Anaua A site. Two of the artifacts have both a unifacial and a bifacial retouched edges. Table 2.3-2.7 give the provenience and the type of these artifacts. At the back of this appendix are the tabulated individual artifact data.

Unifacially retouched tool/preform artifact (hereafter, often simply tool artifact) frequencies do not show any dramatic patterning. Level 3 in Unit A does show a higher frequency of unifaces in relation to total level artifacts than does Level 3 in Unit BC. Scrapers and gravers predominate in this level in both Unit A and in Unit BC. There is also the same ratio of working edges to artifacts in both units.

I would imagine that the greater variety of unifacial tool types in Unit A is a factor of the bigger population of these artifacts in this unit. This explanation may account for the higher incidence of backing and for the existence of graters in Level 3 of Unit A.

The class of tools I am calling flake bifaces—that is, artifacts with bifacial retouch that is confined to the edge only.
and is not invasive—seem to fit with the unifaces, in terms of
the functional types represented (Table 2.5). The working edges
associated with them are gravers, slicing tools, and backing.
Flake bifaces were recovered only from Unit A, where 4 of the 5
came from Level 3.

Completely bifacially retouched artifacts—those with
bifacial edges and invasive scars—show some interesting
patterning. They appear in somewhat higher numbers in Unit BC
than in A. This is so even when those artifacts from Levels 1
and 2, the apparently artificial fill level, are considered.
This relatively higher number of bifaces in Unit BC is not
associated with the feature present in Levels 4 and 5 of those
units. No bifaces came from these levels nor did any other
tools.

In Unit A, Levels 4 and 5 produced, relatively speaking,
more bifaces than in Level 3 in this unit. This is opposite the
situation with the unifacial artifacts where relatively fewer are
present in Levels 4 and 5.

Not surprisingly, adzes and adze preforms are the most
common biface type. The complete adzes fall into Types I/II,
III/IV, VI/VII, and unknown.

A single core was recovered from the site and it is from
Level 3 in Unit A. This is not surprising since this level
contains the greatest variety of artifacts from Amaua A. The
core was made on a flake (see tabulation sheet section) and is
trapezoidal in cross-section and subtriangular in plan-section.
It has three bifacial platforms and the ventral surface, which
served as the platforms, is completely covered by invasive scars.

Because of its similarity in shape to some adze preforms
from the collection, it is possible that it is one of these
artifacts that has been reused as a core.

It is worth noting that four perforators, three from the
surface/fill level, were recovered from the site. Perforators
have a restricted distribution in the Pogaitua Bay collection,
unlike scrapers and gravers.

Summary

The deposits at the top of Amaua A were apparently naturally
laid in place and were depauperate in artifacts compared (except
for perforators) to Level 3 and below. Levels 4 and 5 in Unit BC
contain even less cultural material and are associated with a
concentration of rock. The deposits associated with Level 3 in
each unit and Levels 4 and 5 in Unit A appears to be reasonably
productive. Hereafter I will call this deposit Deposit X to
avoid continual reference to the lengthy provenience data.

There is vertical and horizontal variability in Deposit X at
Amaua A, as well. In Unit A where it is thickest, the deposit
shows modalities, with the highest density of artifacts at the
top in Level 3; Level 4 shows a decrease with an increase again
in Level 5.

Horizontal patterning in artifact classes is apparent in
Deposit X with Unit A—when compared with Unit BC—showing
greater overall artifact numbers, higher frequencies of tertiary
flakes and unifaces, lower frequencies of whole flakes, and lower
frequencies of bifaces.
It is intriguing to speculate that the higher frequency of adzes in Unit BC may be the reason there are somewhat higher frequencies of cortex flakes. Concomitantly, the higher frequency of tertiary flakes may represent a higher frequency of non-adze tool/preform artifacts. On the other hand, the relative frequency of cortex flakes between Unit A and BC may simply be a sampling error blip.

All of this suggests a potentially complex deposit which could yield interesting data.
SITE AMAUA B

Sampling of the Amaua B site consists of a single 50X50 cm unit. A total of 61 debitage artifacts and 7 tool/preform artifacts containing 11 working edges. A cooking pit feature, or Umu, is associated. This is an undifferentiated deposit which was excavated in one level.

Debitage Artifacts
Debitage data will be found in Table 2.8. The counts for the different debitage artifact classes are low and subject to skewing; however, they show the general patterning that is common to the Fagaitua Bay sites examined in this analysis, with slightly higher frequencies of whole flakes and tertiary flakes.

Tool/preform Artifacts
The tool/preform assemblage from this single component is interesting, including unifaces, bifaces, and a core. The only chopping tools recognized in the Fagaitua Bay collection come from this site, one is unifacially retouched and one is bifacially retouched (a flake biface). The frequency of artifacts is high too, 14% of the total artifact count, compared with 9% for Level 3 in Unit A at Amaua A. Tables 2.9-2.11 present the tool/preform data for the site.

The most common working edge is the scraper, followed by the chopping tools, and then the graver. One backed edge was observed. The single bifacial tool is a fragment of a perforator. One core was also observed. It resembles a large chopping tool; however, no wear was apparent to indicate this latter use. The core was made on a flake and neither the distal nor the platform ends of the parent artifact were used as platforms.

Summary
The cultural deposit associated with this site appears to be somewhat rich in tool/preform artifacts, particularly unifacially retouched working edges and tools functioning as choppers, the only ones noted for this analysis of the Fagaitua Bay collection. The core from the site also resembles a chopper.

Is the larger tool assemblage, including the choppers, associated with the Umu in this deposit? An answer to this question must wait for a time when, potentially, a larger sample is obtained from this site.
Table 2.8. Basalt Debitage from Amaua B, (Column 3), 50x50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>AW</th>
<th>NPRX</th>
<th>PRX</th>
<th>Whole</th>
<th>(I)</th>
<th>(II)</th>
<th>(III)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL n</td>
<td>20</td>
<td>18</td>
<td>23</td>
<td>1</td>
<td>2</td>
<td>20</td>
<td></td>
<td>61</td>
</tr>
<tr>
<td>%</td>
<td>33%</td>
<td>30%</td>
<td>38%</td>
<td>(4%)</td>
<td>9%</td>
<td>87%</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.
Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.

Table 2.9. Basalt Unifaces from Amaua B, (Column 3), 50x50 cm Unit.

<table>
<thead>
<tr>
<th>SC/SC</th>
<th>SC/SC/ADZE</th>
<th>UNK</th>
<th>ADZE</th>
<th>TOTAL NO. WE ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>SC GR GR</td>
<td>PRF GRT GRT UNK SL</td>
<td>PRE PRE CHP (BK++)</td>
<td></td>
</tr>
<tr>
<td>TOTAL No.</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools.

Table 2.10. Basalt Bifaces from Amaua B, (Column 3), 50x50 cm Unit.

<table>
<thead>
<tr>
<th>ADZE</th>
<th>UNK</th>
<th>ADZE</th>
<th>ADZE PREFORM</th>
<th>TOTAL NO. WE ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>ADZE PREFORM</td>
<td>PREFORM</td>
<td>DISC UNK PERFORATOR</td>
<td>CORE</td>
</tr>
<tr>
<td>TOTAL n</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools.

ABBREVIATIONS: SC-scaper, GR-graver, PRF-preform, PRE-preform, GRT-grater, UNK-unknown, SL-slicing tool, CHP-chopping tool, BK++-backing (this is generally an ancillary working edge type, WE-working edge, ARt.-artifact, UNK-unknown, ADZE DISC-adze discard, WE-working edge, ARt.-artifact
Table 2.11. Basalt Flake Bifaces from Area B, (Column 3), 50x50 cm Unit.

**BIFACIALLY RETOUCHED - WORKING EDGE TYPES**

<table>
<thead>
<tr>
<th>Level</th>
<th>GRAVER</th>
<th>BACKING</th>
<th>SLICING TOOL</th>
<th>CHOPPER</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL n</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

* Note that there is more than one working edge on many tools.
SITE AMAUA C

At site AMAUA C, a .5x2 m unit was placed next to an STP unit that produced human bone. This type of unit was only used when there was an association of some type with human bone. Level 1 in this site was a coral-sand road and associated fill.

Debitage Artifacts

There are 112 debitage artifacts from the three culture bearing levels of this site (Table 2.12). The number of debitage artifacts increases with depth and given the small number of whole flakes in each level, skewing is a problem. That said, there may be an anomalously high amount of fragmentation in Level 3, leading to a small number of whole flakes when compared to the Fagaitua Bay average from the comparison table.

Tool/preform Artifacts

There are two adze preforms, one unifacially and one bifacially flaked (Table 2.13 and 2.14), and a single core from the site. This seems like a small number; however, the sample isn't that large to begin with.

Neither of the adze preforms can be assigned to a type. The core is relatively small and irregular and it is probably exhausted.

Summary

The debitage, other than the potentially significant greater fragmentation in Level 3, appears to be reasonable regular in its distribution. It does increase in number with depth which, possibly, is significant.

There appears to be a relatively small number of tools. The tools consist of a core and two adze preforms which, while common, are not tools that generally show up in high frequencies in these Fagaitua Bay sites. This is particularly interesting when the absence of uniface scrapers and gravers or other unifacial tool/preforms is considered. Whether this patterning is real and whether it represents a specialized activity area remains to be seen.
SITE UTUSIA A

This site contains two culture material bearing levels.

Debitage Artifacts
Level 1 in the site contains 79% of the debitage (Table 2.15) and a somewhat high frequency of secondary flakes compared to the Fagaitua Bay average (Table 1.1). Level 2 has a relatively high frequency of proximal flake fragments which appear to have influenced nonproximal numbers more than whole flakes.

A single flake in Level 1 shows a ground adze facet on its dorsal surface, suggesting that at least one adze was being rejuvenated or turned into another tool.
Artifact numbers are high enough to suggest that this patterning is not skewed.

Tool/Preform Artifacts
These artifacts show interesting distributions (Tables 2.16-2.18). Other than unifaces, only flake bifaces (two) were recovered. No complete bifaces were recovered. There is the same percentage of tools to debitage for Levels 1 and 2, 6.0%. Scrapers and gravers are the most common working edge types in both levels, with four perforators, two adze preforms, and four unifaces with unknown functions in Level 1. One example of backing was noted for each level.

Two of the three artifacts with working edges functioning as perforators and both adze preforms are made on secondary flakes. Secondary flakes are also parent artifacts for two artifacts with graving and two with scraping working edges.

Summary
There are enough artifacts in the sample from this site to suggest that patterning is real and probably unaffected by skewing due to sampling error. I can’t explain the patterning because of a lack of previous Samoan research correlating debitage and tool/preform artifacts, particularly debitage that has been subjected to fragmentation class sorting.

There are more differences between the two levels at the
Table 2.15. Basalt Debitage from Utusia A, (Column 1), 50X50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>AW</th>
<th>NPRX</th>
<th>PRX</th>
<th>Whole</th>
<th>(I)</th>
<th>II</th>
<th>III</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 n</td>
<td>- 134</td>
<td>159</td>
<td>142</td>
<td>1 35 106</td>
<td>435</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>31%</td>
<td>37%</td>
<td>33%</td>
<td>(1%)</td>
<td>25%</td>
<td>75%</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>2 n</td>
<td>- 20 51 43</td>
<td>1 4 38</td>
<td>114</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>18%</td>
<td>45%</td>
<td>38%</td>
<td>(2%)</td>
<td>9% 88%</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

TOTAL n | 154 210 185 | 2 39 144 | 549 |

Comments: ground adze facet on one flake of level 1.

Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.

Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.

The absence of complete bifaces from this sample of site deposits is interesting. Most complete bifaces from the Papaitus Bay collection are adzes or adze preforms and, while bifaces were missing, two of the unifacially retouched artifacts are adze preforms and one of the flake bifaces is a preform of unknown type.
Table 2.16. Basalt Unifaces from Utusia A, (Column 1), 50x50 cm Unit.
UNIFACIALLY RETOUCHED - WORKING EDGE TYPES*

<table>
<thead>
<tr>
<th>Level</th>
<th>SC/ GR</th>
<th>SC/ GR</th>
<th>PRF</th>
<th>GRT</th>
<th>GRT</th>
<th>UNK</th>
<th>SL</th>
<th>PRE</th>
<th>PSE</th>
<th>CHP (2K**)</th>
<th>TOTAL NO</th>
<th>WE</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/</td>
<td>1 n</td>
<td>12 1 7 4</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>31 27</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 n</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL No</td>
<td>17 1 8 4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>38 33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools.

---

Table 2.17. Basalt Complete Bifaces from Utusia A, (Column 1), 50x50 cm Unit.
BIFACIALLY RETOUCHED - WORKING EDGE TYPES*

<table>
<thead>
<tr>
<th>Level</th>
<th>ADZE</th>
<th>UNK</th>
<th>ADZE</th>
<th>PREFORM</th>
<th>PREFORM</th>
<th>DISC</th>
<th>UNK</th>
<th>PERFORATOR</th>
<th>CORE</th>
<th>TOTAL NO</th>
<th>WE</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/</td>
<td>1 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools.

ABBREVIATIONS: SC-scraper, GR-graver, PRF-preform, PRE-preform, GRT-grater, UNK-unknown, SL-slicing tool, CHP-chopping tool, 2K**-backing (this is generally an ancillary working edge type, WE-working edge, Art.-artifact, UNK-unknown, ADZE DISC-adze discard, WE-working edge, Art.-artifact

---

Table 2.18. Basalt Flake Bifaces from Utusia A, (Column 1), 50x50 cm Unit.
BIFACIALLY RETOUCHED - WORKING EDGE TYPES*

<table>
<thead>
<tr>
<th>Level</th>
<th>SCRAPER</th>
<th>BACKING</th>
<th>SLICING TOOL</th>
<th>UNKNOWN/PREFORM</th>
<th>TOTAL NO</th>
<th>WE</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/</td>
<td>1 n</td>
<td>1 (there is unifacial edge on this tool tool)</td>
<td></td>
<td></td>
<td>1 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 n</td>
<td></td>
<td></td>
<td></td>
<td>1 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools.
SITE UTUSIA B

Excavations at Utusia B yielded 155 debitage and 9 tool/preform artifacts in two culture bearing levels.

Debitage Artifacts
Debitage data is presented in Table 2.19. Level 1 contains roughly half the debitage of Level 2, with the possibility of skewing, especially in the cortex debitage classes. That said, it is interesting the Level 1 contains a relatively high frequency of proximal flake fragments which appears to have influenced whole flake frequencies more than nonproximal fragments. The fragmentation classes in Level 2 have a reduced proportion of proximal fragments.

Both levels show a relatively high frequency of tertiary flakes, the higher population of whole flakes in Level 2 reinforcing the same distribution in Level 1.

Tool/preform Artifacts
There are 9 tools with 13 working edges, all of the multiple edges associated with the unifacially retouched artifact class (Tables 2.20-2.22). The populations are small ones to base interpretive or comparative statements on. However, it is interesting that Level 1 produced more gravers than scrapers. In Level 2 scrapers again predominate with an additional two perforators. Level 2 contains a greater variety of artifacts which, besides the scrapers and perforators, include two unknown preforms, both bifacially retouched. A single core with four unifacial platforms and that has a flake for a parent artifact also comes from Level 2.

Summary
There is a predominance of graving tools in Level 1 and, a relatively high frequency of perforators in Level 2. The debitage shows a proportionally high then low frequency of proximal fragments in Levels 1 and 2, respectively. Both levels have a high incidence of tertiary flakes.
Table 2.19. Basalt Debitage from Utusia B, (Column 2), 50X50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>AW</th>
<th>NPRX</th>
<th>PRX</th>
<th>Whole</th>
<th>Cortex Debitage Classes</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(I)</td>
<td>(II)</td>
<td>(III)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 n</td>
<td>- 16</td>
<td>24</td>
<td>14</td>
<td>-</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>%</td>
<td>30%</td>
<td>44%</td>
<td>26%</td>
<td>(7%)</td>
<td>(93%)</td>
<td>100%</td>
</tr>
<tr>
<td>2 n</td>
<td>- 35</td>
<td>31</td>
<td>35</td>
<td>-</td>
<td>3</td>
<td>32</td>
</tr>
<tr>
<td>%</td>
<td>35%</td>
<td>31%</td>
<td>35%</td>
<td>(9%)</td>
<td>(91%)</td>
<td>100%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>n</td>
<td>51</td>
<td>55</td>
<td>49</td>
<td>4</td>
<td>45</td>
</tr>
</tbody>
</table>

Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.

Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.
### Table 2.20. Basalt Unifaces from Utuiaia B, (Column 2), 50X50 cm Unit.
**UNIFACIALLY RETOUCHE - WORKING EDGE TYPES**

<table>
<thead>
<tr>
<th>Level</th>
<th>SC/SC GR/GR FRF GRT GRT UNK SL PRE PRE CHP (BK**)</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/</td>
<td>SC/SC GR/GR FRF GRT GRT UNK SL PRE PRE CHP (BK**)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 n</td>
<td>1 5</td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2 n</td>
<td>3 2</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TOTAL No.</td>
<td>4 5 2</td>
<td>11</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

*note that there is more than one working edge on many tools.*

### Table 2.21. Basalt Complete Bifaces from Utuiaia B, (Column 2), 50X50 cm Unit.
**BIFACIALLY RETOUCHE - WORKING EDGE TYPES**

<table>
<thead>
<tr>
<th>Level</th>
<th>ADZE UNK ADZE ADZE PREFORM</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/</td>
<td>ADZE UNK ADZE ADZE PREFORM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 n</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2 n</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TOTAL n</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*note that there is more than one working edge on many tools.*

**ABBREVIATIONS:** SC-scraper, GR-graver, FRF-preform, FRG-preform, GRT-grater, UNK-unknown, SL-slicing tool, CHP-chopping tool, BK*-backing (this is generally an ancillary working edge type, WE-working edge, Art.-artifact, UNK-unknown, ADZE DISC-adze discard, WE-working edge, Art.-artifact

### Table 2.22. Basalt Flake Bifaces from Utuiaia B, (Column 2), 50X50 cm Unit.
**BIFACIALLY RETOUCHE - WORKING EDGE TYPES**

<table>
<thead>
<tr>
<th>Level</th>
<th>CRAVER BACKING SLICING TOOL UNKNOWN/PREFORM</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/</td>
<td>CRAVER BACKING SLICING TOOL UNKNOWN/PREFORM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 n</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2 n</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TOTAL n</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*note that there is more than one working edge on many tools.*
SITE UTUSIA C

As with all the Utusia sites, Utusia C has two culture bearing levels. A total of 90 debitage and 11 tool/preform artifacts were recovered during the excavations at the site.

Debitage Artifacts

Level 1 contains four flakes, too few to say anything about (Table 2.23). Level 2 appears to have a high incidence of proximal flake fragments and tertiary flakes.

Tool/Preform Artifacts

While only four debitage artifacts came from Level 1, three tools were recovered. Their working edges consist of a scraper and graver, two examples of backing, and one bifacially retouched adze preform. In Level 2, scraping dominates the working edges, but it is interesting that slicing tools, a relatively uncommon function in the Fagaitua Bay collection, were recovered. Three working edges being devoted to this task (Tables 2.24-2.26).

Unifaces outnumber bifaces which is standard for this Fagaitua Bay collection.

Summary

As with most sites having small artifact population numbers, there is little to say about this one, other than to point out potential patterning.

Proximal fragments and tertiary flakes may be occurring in somewhat high frequencies compared to the Fagaitua Bay average determined in Table 1.1 in the procedures section. Only the proximal fragments in Level 2 stand a chance of being unaffected by the sampling error common to small artifact samples.

Tool/preform numbers are similarly small. There are a lot of tools in Level 1 relative to the debitage, however there were only four flakes, so I doubt this means much. In Level 2 scrapers preponderate, as I am learning to expect them to. There is one working edge that was used for slicing, which is an uncommon tool type in these Fagaitua Bay samples.
Table 2.23. Basalt Debitage from Utusia C, (Column 3), 50X50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>AW</th>
<th>NPRX</th>
<th>PRX</th>
<th>Whole</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 n</td>
<td>- 1</td>
<td>2</td>
<td>1</td>
<td></td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>25%</td>
<td>50%</td>
<td>25%</td>
<td></td>
<td></td>
<td></td>
<td>(100%)</td>
<td>100%</td>
</tr>
<tr>
<td>2 n</td>
<td>- 21</td>
<td>44</td>
<td>21</td>
<td></td>
<td>-</td>
<td>1</td>
<td>20</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>24%</td>
<td>51%</td>
<td>24%</td>
<td></td>
<td></td>
<td>(5%</td>
<td>95%)</td>
<td>100%</td>
</tr>
</tbody>
</table>

TOTAL n | 22 | 46 | 22 | | 1 | 21 | 90 |

Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.

Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.
### Table 2.24. Basalt Unifaces from Utusia C, (Column 3), 50x50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>SC/ GR GR PRF GRT GRT UNK SL PRE PRE</th>
<th>SC/ ADZE UKN</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 n</td>
<td>1 1</td>
<td>2</td>
<td></td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>2 n</td>
<td>5 1</td>
<td>2</td>
<td></td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>TOTAL No.</td>
<td>6 2 2 2 2</td>
<td></td>
<td></td>
<td>12</td>
<td>9</td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools.

### Table 2.25. Basalt Complete Bifaces from Utusia C, (Column 3), 50x50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>ADZE UNK ADZE UNK ADZE PREFORM</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 n</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2 n</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL n</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools.

ABBREVIATIONS: SC-scraper, GR-graver, PRF-preform, PRE-preform, GRT-grater, UNK-unknown, SL-slicing tool, CHP-chopping tool, BK++-backing (this is generally an ancillary working edge type, WE-working edge, Art.-artifact, UNK-unknown, ADZE DISC-adze discard, WE-working edge, Art.-artifact

### Table 2.26. Basalt Flake Bifaces from Utusia C, (Column 3), 50x50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>GRAVER BACKING SLICING TOOL UNKNOWN</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 n</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2 n</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL n</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools.
SITE UTUSIA D

This site has two primary culture bearing levels. An overburden was removed without screening. These two levels produced 480 flakes and sixteen tools having twenty-three working edges.

Debitage Artifacts

Level 1 contains 428 artifacts, more than eight times those contained in Level 2 (n=52) (Table 2.27). There is a slightly heightened incidence of whole flakes over the fragmentary categories which is interesting because during the analysis I noted many flakes with multiple edge snaps on fine feathered edges which pushed them over into the proximal fragment class.

There are significantly more tertiary flakes than the Fagaitua Bay average. This might account for the numbers of fine feathered edges noted, since this type of dorsoventral flake edge is more characteristic of tertiary flakes than of the other cortex categories.

Tool/preform Artifacts

Only unifaces were recovered from Utusia D (Table 2.28). Scrapers and gravers are the most common unifaces, but there are goodly numbers of adze preforms (n=3) and perforators (n=3) also.

Summary

Yielding 496 artifacts, this is a rich site and, as is possible with relatively large populations, it shows some internal complexity that is probably not significantly skewed. Whole flakes occur at a frequency higher than the Fagaitua Bay average, as do tertiary flakes.

Unifacially retouched artifacts were the only tool/preform retouch class from the site. This occurred at Site Utusia A, as well. The unifaces fall into the standard categories with a prominence of scraping and graving edges. Also similar to Utusia A, there is a relatively high frequency of perforators in Level 1 at both sites. Level 1 at Utusia B also had a relatively high incidence of perforators.

Perhaps there is more of an organic relationship between Sites Utusia A, B, and D than there is with Utusia C.
Table 2.27. Basalt Debitage from Utusia D, (Column 4), 50x50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>AW</th>
<th>NPRX</th>
<th>PRX</th>
<th>Whole</th>
<th>Total Debitage</th>
<th>Cortex Debitage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(I)</td>
</tr>
<tr>
<td>1</td>
<td>125</td>
<td>155</td>
<td>148</td>
<td></td>
<td>428</td>
<td>11</td>
</tr>
<tr>
<td>%</td>
<td>29%</td>
<td>36%</td>
<td>35%</td>
<td></td>
<td>100%</td>
<td>(7%)</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>22</td>
<td>19</td>
<td></td>
<td>52</td>
<td>2</td>
</tr>
<tr>
<td>%</td>
<td>21%</td>
<td>42%</td>
<td>36%</td>
<td></td>
<td>100%</td>
<td>(10%)</td>
</tr>
</tbody>
</table>

Total n | 136 | 177  | 167 | 13 | 154 | 480 |

Comments: In Level 1 there is a very high frequency of proximal flake fragments because often more than 1/5 of flake fine feathered edges are missing.
Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.
Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.

Table 2.28. Basalt Unifaces from Utusia D, (Column 4), 50x50 cm Unit.

<table>
<thead>
<tr>
<th>Surface</th>
<th>SC/</th>
<th>SC/</th>
<th>SC/</th>
<th>GR</th>
<th>GR</th>
<th>GR</th>
<th>GR</th>
<th>UMK</th>
<th>SL</th>
<th>PRE</th>
<th>PRE</th>
<th>CHP (2X++)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ART.</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total No</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23</td>
</tr>
</tbody>
</table>

*note that there is more than one working edge on many tools.
ABBREVIATIONS: SC-scraper, GR-graver, PRP-preform, PRE-preform, GRT-grater, UMK-unknown, SL-slicing tool, CHP-chopping tool, BK+backing (this is generally an ancillary working edge type, WE-working edge, Art.-artifact, UMK-unknown, ADZE DISC-axe discard, WE-working edge, Art.-artifact
SITE AUTO A

A layer of artificial fill on the surface of this site was removed unscreened. Beneath were four culture bearing levels. The total number of artifacts for the site is seventy-eight, three of them tools.

Debitage Artifacts

The small numbers of artifacts in each level suggest skewing may be a problem (Table 2.29). This said, the frequencies of the various debitage classes is quite similar to what the Fagaitua Bay average is. In those cases where there is a deviation from this average, the artifact numbers are so small as to clearly suggest skewing.

Tool/preform Artifacts

Nothing out of the ordinary shows up in the proveniences or population sizes of the tools either (Table 2.30). There are three tools, two unknown uniface types and a uniface from Level 3 with three working edges: a scraper, a graver, and backing. No bifaces or cores are associated with the site's deposits.

Summary

The debitage seems to fit the pattern established in Table 1.1 as an average for all the debitage from Fagaitua Bay. The number, type, and distribution of the tools is unexceptional.
Table 2.29. Basalt Debitage from Auto A, (Column 1), 50X50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>AW</th>
<th>NPEX</th>
<th>PRX</th>
<th>Whole</th>
<th>Cortex Debitage Classes (I II III)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 n</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td></td>
<td>1 2</td>
<td>11</td>
</tr>
<tr>
<td>%</td>
<td>36%</td>
<td>36%</td>
<td>27%</td>
<td></td>
<td>(33% 67%)</td>
<td>100%</td>
</tr>
<tr>
<td>2 n</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td></td>
<td>1 2</td>
<td>13</td>
</tr>
<tr>
<td>%</td>
<td>38%</td>
<td>38%</td>
<td>23%</td>
<td></td>
<td>(33% 67%)</td>
<td>100%</td>
</tr>
<tr>
<td>3 n</td>
<td>11</td>
<td>14</td>
<td>12</td>
<td></td>
<td>6 6</td>
<td>37</td>
</tr>
<tr>
<td>%</td>
<td>30%</td>
<td>38%</td>
<td>32%</td>
<td></td>
<td>(50% 50%)</td>
<td>100%</td>
</tr>
<tr>
<td>4 n</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td></td>
<td>1 1</td>
<td>14</td>
</tr>
<tr>
<td>%</td>
<td>36%</td>
<td>50%</td>
<td>14%</td>
<td></td>
<td>(50% 50%)</td>
<td>100%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>25</td>
<td>30</td>
<td>20</td>
<td>9 11</td>
<td>75</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: Lev.-level, AW-angular waste, NPEX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.

Table 2.30. Basalt Unifaces from Auto A, (Column 1), 50X50 cm Unit. UNIFACIALY RETOUCHE - WORKING EDGE TYPES+

<table>
<thead>
<tr>
<th>Level</th>
<th>SC/ SC</th>
<th>SC/ SC</th>
<th>ABGE</th>
<th>UNK</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface</td>
<td>1 n</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3 n</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL No</td>
<td>1 1</td>
<td>2</td>
<td>1</td>
<td>5 3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* note that there is more than one working edge on many tools. 

SITE AUTO B

Two culture bearing levels were present at this site. A total of only seventy-four artifacts were recovered, four of which were tools.

Table 2.31. Basalt Debitage from Auto B, (Column 2), 50X50 cm Unit.

| Level | AW | NPRX | PRX | Whole | -Cortex Debitage Classes-
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(I)</td>
<td>(II)</td>
<td>(III)</td>
<td></td>
<td>TOTAL</td>
</tr>
<tr>
<td>1 n</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2 n</td>
<td>8</td>
<td>8</td>
<td>12</td>
<td>1 6</td>
<td>28</td>
</tr>
<tr>
<td>%</td>
<td>29%</td>
<td>29%</td>
<td>43%</td>
<td>6% 50% 42%</td>
<td>100%</td>
</tr>
<tr>
<td>3 n</td>
<td>15</td>
<td>10</td>
<td>17</td>
<td>7 10</td>
<td>42</td>
</tr>
<tr>
<td>%</td>
<td>36%</td>
<td>24%</td>
<td>40%</td>
<td>41% 59%</td>
<td>100%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>23</td>
<td>18</td>
<td>29</td>
<td>1 13  15</td>
<td>70</td>
</tr>
</tbody>
</table>

Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.

Note: Cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.
SITE AUTO C

Auto C was sampled with a 0.5x2.0 m unit. Only one culture bearing level was encountered in the excavation. There is a total of nine artifacts, one of which is a tool/preform artifact.

Debitage Artifacts
Debitage data is presented in Table 2.34. Distributions are what would be expected with even a small population of debitage that matched the Fagaitua Bay average.

Tool/preform Artifacts
A single grater? was recovered from the artificial fill level (Table 2.35).

Summary
Eight debitage artifacts were recovered, indicating a cultural component to the deposit.
Table 2.32. Basalt Unifaces from Auto B, (Column 2), 50X50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>SC/SC</th>
<th>SC/GR</th>
<th>GR</th>
<th>GR</th>
<th>UNK</th>
<th>SL</th>
<th>PRE</th>
<th>PRE</th>
<th>CHIP (BK++)</th>
<th>CHISEL?</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/1 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2 n</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3 n</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

* Note that there is more than one working edge on many tools.

Table 2.33. Basalt Complete Bifaces from Auto B, (Column 2), 50X50 cm Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>ADZE</th>
<th>UNK</th>
<th>ADZE</th>
<th>UNK</th>
<th>ADZE</th>
<th>PERFORATOR</th>
<th>/CORE</th>
<th>TOTAL NO.</th>
<th>WE</th>
<th>ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface/1 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3 n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL n</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>/CORE</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* Note that there is more than one working edge on many tools.

ABBREVIATIONS: SC-scaper, GR-graver, PRE-preform, PRE-preform, GRT-grater, UNK-unknown, SL-slicing tool, CHIP-chopping tool, BK+-+backing (this is generally an ancillary working edge type, WE-working edge, Art.-artifact, UNX-unknown, ADZE DISC-adze discard, WE-working edge, Art.-artifact
Debitage Artifacts

Debitage numbers are small (Table 2.31). Level 3 has more debitage than does Level 2. There are more secondary flakes than common and this might be real, but, again, populations are small.

Tool/preform Artifacts

The distribution of tools is opposite to that of the debitage, three of the four tools coming from Level 2. Other than this, the tool types include: a scraper, two adze preforms, a chisel? The chisel is a unique tool type to this collection and is a beaked tool with a subdiamond-shape cross-section. It is made on a tertiary flake (Tables 2.32-2.33).

Summary

Artifact numbers are small for this site. None-the-less, there appears to be an unusually high frequency of secondary flakes. It is interesting that, while the largest number of debitage is in Level 3, the largest number of tools is in Level 2. To me, this suggests skewing. A chisel was recovered from Level 2.
Site Utusia A

In deposits at this site, the variation of the debitage was more pronounced than of the tools. There are in excess of 500 artifacts from the site in two levels. It is interesting that there are no complete bifaces (a retouch class signifying invasive scars covering the majority of one surface, not a fragmentation class) from the deposit. Four perforators were recovered.

Site Utusia B

A high incidence of tertiary flakes in both levels and the predominance of gravers over scrapers in Level 1 is interesting. Two perforators come from the site.

Site Utuaia C

There is a high incidence of proximal fragments in the fragmentation debitage classes when compared to the Fagaitua Bay average ((Table 1.1)). The predominance of scrapers in Level 2 is standard to the collection.

Site Utusia D

This is a rich and somewhat complex artifact assemblage represented in two excavated levels. Tertiary flakes predominate in Level 1 and whole flakes occur at a higher than average frequency in both levels. Only unifacially retouched tool/preform artifacts were recovered from the deposits and they fall into the standard classes with scrapers and gravers most common.

Level 1 has three working edges that were used as perforators. Perforators were quite common in sites Utusia A and B and Amaua A. In the latter site, 27% of the Fagaitua Bay perforators come from Level 1. This is an admittedly slim problematic body of evidence, yet it perhaps indicates a relationship of some kind between the fill levels at Amaua A and the cultural deposits at Utusia A and B.

Site Auto A

This is a small artifact population. The debitage fit the Fagaitua Bay derived average and there was nothing unusual about the tool/preform artifact distribution.

Site Auto B

This is also a small population of artifacts. There does appear to be an elevated number of secondary flakes in the cortex categories.

Site Auto C

This is a miniscule artifact population that serves primarily to indicate that cultural factors were involved in the deposition of sediments at the site.

Site Auto D

This is also a minute population of artifacts. It indicates that cultural factors were involved in some fashion with the build-up or deposition of the deposit.
SECTION THREE

SUMMARY COMMENTS

AND

SUPPLEMENTARY NOTES

SUMMARY COMMENTS

This will be an abbreviated summary, holding mainly to statements already found in the individual site reports. As always, the reader should be aware of the problems of interpretive statements made on data derived from small sample sizes. Another difficulty is that, even with the larger artifact populations, it is unclear how representative these sample are of a site manifestation as a whole.

Site Amaua A

This is the only site with a big enough artifact sample, on the one hand, and enough area excavated, on the other, to suggest its patterning is unskewed. Unfortunately, not knowing the boundaries of the site, it is unknown whether this sample is representative of the site as a whole.

Amaua A shows vertical and horizontal variability that suggests a rich and reasonably complex, at least, single component site.

Site Amaua B

This was a small sample. It is interesting because, associated with a feature--an Umu, or cooking pit--it also has the only chopping tools recovered from the site. This suggests the sample of artifacts from the site may represent a specialized activity area.

Site Amaua C

This site may represent a specialized activity area. While it population of artifacts is moderately large, the tool/preform artifacts do not include scrapers and gravers, the main tools in this Fagaitua Bay collection. Two adze preforms and a core were recovered (see core comments in supplementary notes).
Cultural material was associated with this deposit. It was not screened.

Table 2.38. Basalt Debitage from Avio.

<table>
<thead>
<tr>
<th>Level</th>
<th>AW</th>
<th>NPRX</th>
<th>PRX</th>
<th>Whole</th>
<th>(I)</th>
<th>(II)</th>
<th>(III)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-Deposit unscreened with artifacts simply collected.
-Material not analyzed.

TOTAL n

Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.

Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.
Table 2.36. Basalt Debitage from Auto D, 0.5X2.0 m Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>AW</th>
<th>NPRX</th>
<th>PRX</th>
<th>Whole</th>
<th>(I)</th>
<th>(II)</th>
<th>(III)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>n</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>(100%)</td>
<td>100%</td>
<td>9</td>
</tr>
<tr>
<td>%</td>
<td>11%</td>
<td>66%</td>
<td>22%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

TOTAL n | 1 | 6 | 2 | 2 | 9

Abbreviations: Lev., level, AW, angular waste, NPRX, nonproximal flake fragments, PRX, proximal flake fragments, I, primary cortex flakes, II, secondary cortex flakes, III, tertiary flakes, n, number of flakes.

Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.

Table 2.37. Basalt Unifaces from Auto D, 0.5X2.0 m Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>SC/</th>
<th>SC/</th>
<th>ADZE</th>
<th>UNK</th>
</tr>
</thead>
<tbody>
<tr>
<td>surface</td>
<td>SC</td>
<td>GR</td>
<td>GRF</td>
<td>GRT</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Total No. | 1 | 1 | 2 | 2

Note that there is more than one working edge on many tools.

ABBREVIATIONS: SC, scraper, CR, graver, PRF, preform, PRE, preform, GRT, grater, UNK, unknown, SL, slicing tool, CHP, chopping tool, 8k**, backing (this is generally an ancillary working edge type, WE, working edge, Art, artifact, UNK, unknown, ADZE, DISC, adze discard, WE, working edge, Art, artifact
SITE AUTO D

It is the surface level, 0-8 cm BS, that contains the cultural material at this site. There is a total of eleven artifacts, two of which are tools.

Debitage Artifacts
The odd distribution of the sample is too small to say anything about (Table 2.36).

Tool/preform Artifacts
Two of these were found. One is a graver/scaper and one is a grater.

Summary
This is a small population of artifacts. The most noteworthy aspect of it is that it indicates that cultural factors were involved in the deposition of Level 1.
Table 2.34. Basalt Debitage from Auto C, 0.5X2.0 m Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>AW</th>
<th>NPRX</th>
<th>PRX</th>
<th>Whole</th>
<th>Cortex Debitage Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(I) II III</td>
</tr>
<tr>
<td>1</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td>TOTAL</td>
</tr>
<tr>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This is an artificial fill level.

| TOTAL n | 2 | 3 | 3 | 3 | 8 |

Abbreviations: Lev.-level, AW-angular waste, NPRX-nonproximal flake fragments, PRX-proximal flake fragments, I-primary cortex flakes, II-secondary cortex flakes, III-tertiary flakes, n-number of flakes.

Note: cortex debitage classes are a subclass of the whole flake fragmentation debitage class. Therefore, the total represents the sum of the fragmentation classes without reference to the cortex classes.

Table 2.35. Basalt Unifaces from Auto C, 0.5X2.0 m Unit.

<table>
<thead>
<tr>
<th>Level</th>
<th>SC/ SC/ ADGE UNK</th>
<th>TOTAL NO. WE ART.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SC OR GI PROF GRT GRT UNK SL PRE PRE CHP (EX++)</td>
<td></td>
</tr>
</tbody>
</table>

| surface/ | 1 | 1 | 1 |
| 1 n      |    |   |   |
| 2 n      |    |   |   |

| TOTAL No. | 1 | 1 |
|           |   |   |

*note that there is more than one working edge on many tools.

ABBREVIATIONS: SC-scraper, GR-graver, PRF-preform, PRE-preform, GRT-grater, UNK-unknown, SL-slicing tool, CHP-chopping tool, EX++-backing (this is generally an ancillary working edge type, WE-working edge, Art.-artifact, UNK-unknown, ADGE DISC-adze discard, WE-working edge, Art.-artifact

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GENERAL COMMENTS

Patterning is apparent in both the debitage and the tool distributions at these sites. In the interest of producing useful comparative lithic data in the future, I recommend that debitage artifact populations be subjected to division into the fragmentation classes prior to sizing and ascription to cortex debitage classes. The advantages of this are self evident, in particular after noting variation in whole flake numbers within and between sites in this collection.

Further work in Samoa on discrete site components, features, and activity areas with the consequent analysis of both debitage and tool/preform artifacts would be useful. This would yield a background to plug analyses such as this into, that is, analyses of samples from a limited volume of deposit consisting of variable and small artifact populations. With this sort of a framework to fit subsequent analyses into, summary statements would be more than actuarial data summaries.

SUPPLEMENTARY NOTES

I am not by any means well read in Oceanic archeology, in general, or Samoan archeology, in particular. I do have more than twenty years of experience in the analysis of debitage and tool/preform artifacts from various contexts in Western North America. The Samoan artifacts in this collection were the first that I have looked at and I am amazed by them.

Initially and gradually, they confused me. I came to realize, however, that reduction sequences responsible for these artifacts are distinctly different and unique from any analysis of North American materials I have been involved with. This difference, I believe, has profound technological and typological implications.

I present these observations here, though this is probably not the proper venue for such discussions. At present I have no other. Please note that these remarks are based on the analysis of a limited, sampling error prone collection of artifacts which may or may not be characteristic of more general patterns present in Samoan component assemblages.

To start with I will attempt to state some of the assumptions at the basic of many, if not most, debitage analyses carried out in North America on North American materials. It is my belief that these assumptions settled into place long ago and are generally sound, if not overelaborate.

Assumptions at the Heart of the Large Majority of Western North American Debitage Analyses and Their Application to Debitage Assemblages From American Samoa.

These assumptions will be stated as general rules to which there are and always will be special exceptions. Also and unless otherwise stated, the following assumptions apply within the reduction sequences which means the use of the same raw material from a single source within a single component at a site. I will
refer to this hereafter as proviso one.

Note: in this discussion, cores are accepted as tools.

1. The parent artifacts of most tools--other than cores--are flakes that have been removed from cores.

2. Cores are of different sizes and shapes and diminish in size as flakes are removed, but--during their use life (when used to produce flakes)--they are at least more massive, if not larger along the height of their outerfaces, than are the tools that made from their flakes. The tools in question run the gamut from simple used flakes to elaborate bifaces.

3. Necessarily, when assumption #2 is true, the flakes removed in the process of tool manufacture are significantly smaller than the parent artifact flake.

4. Cores look distinctively different from other tools and the flakes removed from cores look different from the flakes removed during the retouch and use of the other tools.

5. Cortex--again generally--characterizes nodular raw material and cores.

6a. A complementary assumption is that cortex is uncommon on finished tools, particularly retouched tools. Further, flakes belonging to cortex categories are not considered desirable as parent artifacts, often even for unretouched, or used, tools.

6b. One of the implications of assumptions 5 and 6 is that all cortex flakes are from cores and that tool manufacture flakes with cortex on their dorsal sides are a rarity.

In a simple nutshell, the observations above are the basis for debitage analyses in their common form--those dealing solely with sizes and cortex categories-in North America. This has been true for at least the last two decades. As has been previously stated, these assumptions are thought to be generally sound and useful in interpreting some site materials, if overly simplistic. One of the reasons why they continue to be used is that sizing a flake and looking for cortex on its dorsal side is thought to be easy and unambiguous. I won't argue that here. Again, these assumptions yield useful information about site assemblages.

This analysis of the artifacts in the Fagaitua Bay collection calls most of these assumptions into question when they are applied to Samoan artifact assemblages. An implication of this statement, if it can be shown to be true, is that debitage analyses of Samoan material based on the North American paradigm stated above will yield little in the way of meaningful results in terms of technology or even typology.

The six assumptions given above will be used as a reference for the discussion below; again within the stipulations of proviso one.

1. This assumption is partially true for Samoa: it is my impression that adzes and cores may often come from the same nodular raw material. Three of the five cores in the Fagaitua Bay collection are made on flakes. The parent artifacts for the other two are unknown.

2-4. This collection of Fagaitua Bay artifacts suggests that adze preforms and cores overlap in size and shape. This means that flakes from adze manufacture and core reduction will be largely similar. A range in size of the five largest flake
scar widths was documented for ten adzes and adze preforms, as well as, for five cores. When averaged, the adze range was 19-34 mm wide and the core range was 21-44 mm wide.

I know there are other size and shape cores on Samoa because flakes from these cores were present in Fagaitua Bay collection (see below, Reduction Sequence #2). It is possible that artifacts identified as cores were simply early stage adze preforms. Bear this in mind when assessing the overlap in flake width ranges given above.

5. Cortex characterizes some nodular raw material and cores but it also characterizes adzes preforms and, variably, finished tools.

6a. Among the tool/preform artifacts in this collection that had parent artifacts recognizable as to type, 30% were cortex flakes. This is roughly twice the frequency of cortex flakes in the Fagaitua Bay average (Table 1.1). Bear in mind that the unretouched tool class, also called utilized flakes, was not identified for this collection. Undoubtedly, it is present and would have a significant effect on parent artifact flake percentages.

6b. Tool manufacture flakes must necessarily contain cortex on their dorsal sides in the Fagaitua Bay collection. Based on this examination of the Fagaitua Bay collection, lithic analyses, particularly debitage analyses, based on the North American paradigm should be questioned. Testing of these observations should be simple, though necessitating a fair amount of analytic work.

OTHER OBSERVATIONS

Three Reduction Sequences.

There appear to be at least three distinct reduction sequences represented in the Fagaitua Bay collection. The basis for this observation is a certain amount of patterning in the flakes and parent artifacts of tools observed.

1. Adze Sequence--nodules and or very large cores with and without cortex produce very large flakes used as the parent artifacts of adzes. These flakes are sometimes well in excess of 120 mm long and are often quite thick, having sometimes a single dominant dorsal guiding ridge which gives the flake a triangular cross-section.

2. Blade-like flake Sequence--blade-like flakes that are much thinner and narrower than the flakes in the adze sequence above are present in the Fagaitua Bay collection in enough numbers to suggest a prepared blade? core technology. The flakes have at least two primary dorsal guiding ridges. They are not common as parent artifacts of tools. This suggests that, perhaps, they are trade items that may travel with the trade adzes.

3. Core reduction Sequence--there appear to be a wide variety of sizes and shapes of flakes chosen as the parent artifacts of tools. I do not know whether core breakup occurred specifically to produce these flakes or whether they are by-products of other reduction sequences and have been fortuitously chosen for manufacture into tools. No cores were observed that
could have produced some of the larger flakes observed.

Cores and Adze Preforms.

Each of the cores observed in the collection resembled a
over-large or odd-shaped adze preform. Perhaps there was no
clear distinction made in prehistoric times between adze preforms
and cores—other than sequence 2 above which would have produced
a distinctive core. An artifact might move into and out of
either sequence—cores or adze preforms—depending on the
accidents concomitant with the flaking process and depending on
need.

Ridge and Outerface Preparation flakes.

It was quite common to observe flakes with bifacially and
unifacially modified dorsal ridges, i.e. lame-a-crete-like
flakes. Sometimes these flake dorsal ridges were clearly removed
from the guiding ridge of a core or other objective piece.
Occasionally, these flakes seemed to come from the
outerface/platform edge of a core.

Samoans were obviously capable and aware flokers and knew
the importance of modifying the guiding ridges of objective
pieces prior to the removal of flakes.

Basalt Fragmentation Frequency.

Using nonproximal flake fragments as an index, the Fagaitua
Bay collection contained 931 of them or 32% of all the debitage
in the collection.

Looking back over the analyses of debitage from four sites
in Oregon, Table 3.1 has been produced. The Fagaitua Bay sample
exhibits are relatively small amount of fragmentation. In
Table 3.1, the dominant variable that controls the change in
frequency of nonproximal flake fragments, in so far as I
understand it, is whether the material was curated and or used in
the more controlled flaking associated with tool manufacture or
whether the material was involved in core breakup. In the table,
Times Square Rockshelter and the Dale Beam site offer the best
examples of this variability.

At the Times Square Rockshelter site, obsidian had to be
transported over the Cascade Range from the Klamath Basin to get
to the site. Obsidian debitage, the result primarily of tool
manufacture at the site, has a relatively small proportion of
nonproximal flake fragments. At the Dale Bean site, obsidian
debitage was the result of both core breakup and tool manufacture
and here the nonproximal fragment frequency is twice that of the
Fagaitua Bay collection. There is a difference of 44 percentage
points in the frequency of obsidian nonproximal flake fragments
to whole flakes between the two Oregon site assemblages.

An implication of the data presented in Table 3.1 for the
Fagaitua Bay sample would be that the basalt is being used
primarily in tool manufacture. I am unable to assess this
implication at this time; however, note that if this is the case,
up to 14% of the tool manufacture flakes from the Fagaitua Bay
collection contain cortex.

I am virtually certain that the technologies and assemblages
of Samoa and the sites in Table 3.1 are so different as not to be
readily and unambiguously comparable.

Table 3.1. Nonproximal Flake Fragment Frequencies from Five Selected Sites.

<table>
<thead>
<tr>
<th>Site and Material</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colvard Site (Spencer 1993)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCS</td>
<td>422</td>
<td>39</td>
</tr>
<tr>
<td>Obsidian</td>
<td>613</td>
<td>40</td>
</tr>
<tr>
<td>Basalt</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td>Dale Beam Site (Spencer 1989)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obsidian</td>
<td>2176</td>
<td>69</td>
</tr>
<tr>
<td>Squaw Mountain III (Spencer 1988)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obsidian</td>
<td>547</td>
<td>67</td>
</tr>
<tr>
<td>Canyon Owl Confluence (Spencer 1988)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCS</td>
<td>163</td>
<td>68</td>
</tr>
<tr>
<td>Obsidian</td>
<td>126</td>
<td>53</td>
</tr>
<tr>
<td>Times Square Rockshelter (Spencer 1989)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCS</td>
<td>4,476</td>
<td>51</td>
</tr>
<tr>
<td>Obsidian</td>
<td>195</td>
<td>25</td>
</tr>
<tr>
<td>Basalt</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Fagaitua Bay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basalt</td>
<td>931</td>
<td>32</td>
</tr>
</tbody>
</table>

**Bifacial Retouch.**

Bifaces are uncommon in the collection from Fagaitua Bay and when found they are mostly adzes and adze preforms. This is a distinctive difference from many North American sites. Most bifacial retouch in Western North America is associated with projectile points. Is the relative absence of bifaces in Samoan assemblages related to the fact that projectile weapon systems, such as, atlatl or bows, were unnecessary for the production of food?

**Alternate Edge Unifacial Retouch (AUR).**

I have seen this type of unifacial retouch before but never to the degree it is represented in this collection. In the tabulation sheets at the end of the appendix this type of retouch is listed as AUR when observed. Alternate unifacial retouch consists of retouch that goes from one surface of an edge to the other; however, the retouch is never found overlapping on both sides of the same edge.

There are 133 unifacially retouched tools and 20% of these
exhibit alternate unifacial retouch. Since this type of retouch could easily be confused with simple bifacial retouch, care must be taken in identifying it or not doing so, as the case may be. The frequency of AUR is high enough to suggest it may form a discrete working edge type.

Alternate unifacial retouch is an interesting working edge type and it is unclear what it represents. One possibility is that it would cause an edge to "track" better when being used to groove a relatively hard material, such as, shell or bone or wood. I have worked very hard woods and antler with stone tools and have found that "tracking" is a problem. When cutting a hard material, the natural curvature of a flake edge has a tendency to pull itself out of the groove being cut, usually on the side of the groove that fronts the dorsal surface of a flake. Alternate unifacial retouch might solve this "tracking" problem and would certainly be easier to produce than bifacial retouch.

Buck (1930:368-369) indicates . . . "something must have been used for cutting grooves in shell before the pieces necessary for trolling hooks could be snapped off."

An awareness of this retouch type and its documentation in other site assemblages might clarify what it represents.

Circumferential Less the Platform Retouch (C<P).

Another unusual retouch type, well represented in this collection, covered all the edges of the tool other than the parent artifact's platform. The symbol C<P was used for this in the tabulation sheets. Twenty-two percent (22%) of the unifacial artifacts and 17% of the flake bifaces showed it.

As is the case with AUR, this frequency is high enough to single it out as representing perhaps a specific working edge type. Commonly, the retouch scars were variable in size, often changing sides—exhibiting the alternate unifacial retouch pattern—and sometimes were somewhat discontinuous. I do not know what this working edge type represents. Is this a convex slicing edge? The retouch is rarely uniform enough to call it a scraper.

Sometimes this type of retouch is associated with graters where all of the available edges other than the platform have received uniform unifacial retouch. This is a special case though.
SECTION FOUR

REFERENCES CITED AND BIBLIOGRAPHY,

GLOSSARY, TABULATION SHEETS
REFERENCES CITED AND SELECT BIBLIOGRAPHY

Bradley, Bruce

Buck, P.H.

Corliss, D.W.

Cotterell, B., and J. Kamminga

Crabtree, Don E.
1972 An Introduction to Flintworking, Occasional Papers of the Idaho State University Museum, Number 28.

Epstein, J. F.

Farque, Tony
1986 Use-Wear Experiment: Slicing and Scraping with Obsidian Unretouched tools on Bone. Unpublished manuscript prepared for Lithic Use-Wear Analysis, a spring course at the University of Oregon.

Green, R.C., and Janet M. Davidson

Hayden, Brian (editor)

Lawrence, Robert A.
Lenoir, M.

Newman, Thomas M.

Oakley, Kenneth P.

Pettisgrew, R. M., and C. G. Lebow
1987 Data Recovery at Sites 35JA27, 35JA59, and 35JA100, Elk Creek Lake Project, Jackson County, Oregon. Infotec Research Incorporated Report No. PNN87-7.

Shafer, Harry J.

Sollberger, J. B.

Spencer, L.


Spencer, L.


1986 Debitage Analysis for CA-SBR-3801, the Owl Canyon Site. Appendix 3 in Archaeological Investigations at the Owl Canyon Site (CA-SBR-3801), Mojave Desert, California, by M. Q. Sutton. Coyote Press Archives of California Prehistory, No. 9.

1987d The Debitage Analysis for the Elk Creek Lake Project. Appendix G in, Data Recovery at Sites 35JA27, 35JA259, and 35JA100, Elk Creek Lake Project, Jackson County, Oregon. Infotrac Research Incorporated report No. PNH87-7.


GLOSSARY

ALTERATION  Any change in the pristine nature of a lithic edge. A generic term that includes retouch, use-wear, and edge damage. See: Edge Damage, Retouch, and Use-Wear.

ALTERNATE UNIFACIAL RETOUCH  This type of retouched edge has a series of unifacial flake scars on one side of an edge, then on the opposite surface, then the same surface, and so on. This may be confused with bifacial retouch on occasion. However, bifacial retouch is on both sides of the same portion of an edge, not both side of alternate portions of an edge.

ANGULAR WASTE  An artifact class which is considered to be an accidental by product of flake removals. Thought to be platform shatter. Size of angular waste probably related to flake size and removal trauma; angular waste of a size to be retained in 1/8 inch screen is probably from core preparation and reduction activities. Similar to chunk and shatter.

ARTIFACT  Any object used, moved, or modified by man. The generic class to which all cultural flaked stone belongs. Non-tool non-preform artifacts, or debitage; preform artifacts; and tool artifacts describe the population of flaked stone artifacts from any site.

ATTRITION-WEAR  Wear in the form of flake scars, grinding or polishing, as opposed to the deposit of silica sheen or other residue, for instance.

BACKING  Purposeful dulling of an edge to facilitate holding a tool during use. Often this type of edge alteration is more visible than the working edge in question. This is especially true for used alling tool edges. Backing is a form of retouch.

BIFACE  A tool or preform with an edge formed by retouch along both sides of the same portion of an edge. These scars may be confined to the edge or may travel completely across the surface of an artifact. See: Uniface and Retouch. Also see Tixier (1974:4) and
Crabtree (1972:38).

BIFACE BIAS In North America, the tendency to identify bifacial tool manufacture/rejuvenation as the most important reduction activity at a site when solely using frequency comparisons of debitage and preform/tool types for interpretive purposes.

COMPLETE BIFACE Any artifact having at least one bifacially retouched edge and the majority of at least one surface covered with invasive flake scars, the latter exclusive of post-manufacturing fractures and heat spalled surface.

CONTINUOUS LIP A projecting platform/ventral edge which extends uninterrupted from one platform/dorsal/ventral corner to the other and overhangs the ventral side. Similar to the term, lip, as defined in Crabtree (1972:74). Differs from Crabtree's term in that a continuous lip is not interrupted by a node or point of contact.

See: Node. Also see Crabtree's term, point of contact (1972:84).

CONTRARY FLAKE SCARS Dorsal surface flake scars that come from a direction significantly different from the direction of the force that produced the flake in question (Spencer 1981 and 1986).

CORE A tool used to produce flakes suitable for manufacture into other tools or for use as is; the production of these flakes is a core's use.

See: Objective Piece. Similar to Crabtree's term, nucleus (1972:79). Also see Bradley's (1975:6) term, primary core.

CORE BREAKUP A general term encompassing both core preparation and core reduction.

CORE PLATFORM The flattened surface of a core into which removal force is introduced. May be a natural cortex surface or a prepared interior striking surface made up of one or more flake scars.

See: Flake and Core. See also Tixier's plan de frappe, or striking platform.

CORE PREPARATION FLAKE A type of flake removed from a nodule or parent artifact during the process of forming a functional core. These flakes are removed during the formation of the platform, the outer face, the appropriate platform/outer face angle, the removal of cortex or undesirable material, or the preparation of ridges to guide the removal of core reduction flakes. Since a core is herein considered to be a tool a core preparation flake is a tool manufacture flake of a very specific type. Similar to primary flake and secondary flake.

See: Core Reduction Flake and Tool Manufacture Flake.

CORE REDUCTION The process by which potential tool production flakes, or parent artifacts, are removed from a core; the task of
a core. Core reduction is not a type of retouch as the latter term is used here.

See: Core Reduction Flake, Core, and Parent Artifact.

CORE REDUCTION FLAKE A type of flake removed from a core for the purpose of becoming a tool. Strictly defined, the identification of the salient attributes on this class of artifacts requires reference to tools and tool manufacturing processes at a particular site or in a particular region. The term core reduction flake is not synonymous with interior or tertiary flake.

See: Flake, Parent Artifact, and Core Reduction. Similar to: interior, or tertiary flake. Also see Bradley's (1975:6) term, primary flake blank.

CORE TOOL Herein, this term means those tools whose parent artifacts were cores and cobbles or other nodules of raw material that were not flakes.

CORTEX The weathered exterior of a nodule. Cortex may be found only on the dorsal and platform surfaces of a flake.

See: Nodule and Flake.

CURATION The removal of an artifact from its site of manufacture or use. Commonly only broken curated tools are recovered from areas where they are used.

DEBITAGE This term includes the following lithic artifact types: flakes and flake fragments, angular waste, and heat spalls. May be applied to wood or bone chips or shavings, as well. Debitage artifacts along with tool and preform artifacts form the totality of the class, flaked stone artifacts.

DIAGNOSTICALLY COMPLETE FLAKES Whole flakes and the proximal fragments flakes.

DISTAL see: Flake Areas

DORSAL RIDGE A surface attribute formed by the intersection of a negative scar with another scar or cortex on the dorsal surface of a flake.

See: Outer-Face. Similar to arris, arete, norvure (Tixier 1974:4.5.22) interflake crest, and crest (Crabtree 1972:56).

DORSAL SURFACE This term refers to a flake surface which was originally the outer face of a core or an outside of the objective piece. This surface contains negative flake scars, ridges, and/or cortex.

See: Outer-Face.

EDGE A morphological term used to describe the intersection of any two surfaces. This is the working portion of flaked stone tools. Examples are: the dorsal/ventral edge, the platform/dorsal edge, the platform/ventral edge, the ridge formed by the intersection of any two flake scars, and the intersection of a
fracture face and any other surface.

See: Surface.

EDGE DAMAGE The accidental alteration of an artifact edge; alteration not due to retouch or use of an artifact; non-artifactual alteration. Commonly different for different sites. Must be considered whenever defining use-wear. Most often confused with use-wear caused by the slicing use motion.

See: Alteration, Use-Wear, Retouch.

ERAILLURE FLAKE SCAR A negative representation of a secondary fracture produced at the same time as the main fracture on the ventral, or positive, surface of a flake. An eraillure scar is a small flake scar which is sometimes present on the proximal half of the positive bulb of force and which propagates laterally from one of the pronounced fissures associated with the point of contact. Not always present. Most pronounced with hard hammer percussion and may be directly related to removal trauma.

See Crabtree (1972:60) and Spencer (1981:30).

FEATHER TERMINATION see: Termination

FINE FEATHERED EDGE A dorso/ventral flake edge with an angle of less than 20 degrees.

FINISHED TOOL This term is included for clarification purposes only. Synonymous with "tool" since, herein, every tool is by definition finished. What have been termed "unfinished tools" are preforms.

FISSURES Fine grooves or lines radiating out from the point of contact along the surface of a fracture face. This feature is associated primarily with the the point of contact and one lateral edge: ventrally the edge furthest from the flake’s dominant guiding ridge on the dorsal side of the flake. More pronounced with hard hammer percussion and may be directly related to removal trauma.


FLAKE An artifact class produced by the introduction of force into a core or other objective piece close to an edge which is less than 90 degrees, and usually over a guiding ridge.

Specific Attributes
Platform surface: lip and/or node may be present. Ventral surface: point of contact, bulb of force, waves, ripples, and fissures, all represented positively. Eraillure scar may be present. Dorsal surface: point of contact, bulb of force, waves, ripples, and fissures, all represented negatively, to varying degrees, in whatever flake scars are present. Cortex may be present. Eraillure scars will not be present.
Shape: in transverse, side-to-side cross-section the ventral side is smoothly convex and any dorsal flake scars are smoothly concave and bounded by ridges; in longitudinal cross-section the ventral surface is concave, commonly with wave-like undulations, and the dorsal surface is convex.

See the term flake in Crabtree (1972:64) and Spencer (1981:27-30).

FLAKE AREAS Descriptive terms for the anatomy of a flake, inclusive of surfaces and edges.
Proximal: portion of a flake containing the platform and bulb of force.
Distal: portion of the flake containing the termination.
Medial: center of the flake.
Lateral: portion containing two or more of the above portions and one dorsoventral margin.
Left, or Right: pertaining to dorsal, ventral, or platform lateral edges. Note: the dorsal-left edge is the ventral right edge.

FLAKE BIFACE Artifact containing bifacial edge retouch only.

FLAKE ORIENTATION The way in which a flake is held during analysis which allows the use of the terms left or right. As an example, in this analysis all flakes are oriented with their platforms towards the top of the page, and--unless otherwise indicated--their dorsal sides in plan view.

FLAKE PLANE A generalized, variably curved, end-to-end, two dimensional surface passing between the left and right dorsoventral edges. The platform of a flake may be more to one side or the other of this plane, i.e., to the dorsal or ventral side. Whether this is so is related to guiding ridge prominence and the curvature of the platform outer face edge. For example, biface tool manufacture flake platforms are commonly to the ventral side of this plane, whereas the platforms of core preparation and reduction flakes are commonly to the dorsal side of this plane.

FLAKE PLATFORM SURFACE Present at the proximal end of the complete flake, this flake surface is a remnant of the objective piece platform and is contained between the platform/outer face edge and the point of contact.


FLAKE SCAR See: Negative Flake Scar

FLAKE TOOL Any tool which has a flake for a parent artifact. Sometimes loosely used to designate a tool made on a flake which retains most of the morphology of the parent artifact.
FRACTURE FACE  An artifact surface, a flat-faced fracture on a flake or other artifact which is generally perpendicular to the length and/or width of the artifact. This surface forms an edge with other surfaces it contacts and this edge is often used as a working edge of a tool.

See Crabtree’s terms, amputated (1972: 33,61) and end shock (1972:60,61).

GENERALIZED BIFACE  Any bifacially retouched tool/preform artifact which cannot be functionally identified; a typological class of artifacts. Commonly fragmentary biface, including very small fragments, are classed as generalized bifaces because of the lack of diagnostic features. Note: no attributes identify an artifact as a member of this typological class other than the presence of bifacial retouch; it is the absence or paucity of functional or stylistic attributes which identify membership.

GRINDING  See Use-Wear.

GUIDING RIDGE  Any ridge on the dorsal side of a flake prominent enough to have had a dramatic influence on flake shape.

HEAT SPALL  A possible artifact caused by the traumatic introduction of heat into a piece of lithic material. Whether heat spalls are culturally or nonculturally produced will usually be determined by context and attributes.

See pot-lid in Oakley (1957:15-17) and pot-lid in Crabtree (1972:84).

HINGE TERMINATION  See: Termination.

INTERFLAKE CREST  A ridge formed by the intersection of two negative flake scars. This phrase is commonly used with reference to the retouched surfaces of an objective piece.

See: Ridge.

INTERIOR FLAKES  This is a descriptive flake category referring to those flakes removed from a core or other objective piece containing little or no cortex. In this report Interior flakes have dorsal surfaces containing 100% interior surface or less than 25% cortex located distally contiguous to the termination.

Some cores retain a small patch of cortex at their bases and this cortex is occasionally captured by flakes removed late in the reduction sequence of the core. The location and the amount of cortex permitted in this definition is to allow the inclusion of such flakes in the interior flake category. In one analysis of the author’s only 16 (2.9%) of 549 interior flakes checked contained cortex.

INTERIOR SURFACE  Any non-cortex surface.

LATERAL  See: Flake Areas.

LIMINAL ARTIFACT  A tool which has been finished but not used and is thus identical to some unfinished and otherwise undamaged
preforms. A rite of passage of a tool artifact during its manufacture and use life.

LIP The projecting portions of the platform/ventral edge. How pronounced this attribute is varies, although most flakes exhibit it to some degree in the platform/dorsal/ventral corners.

See: Continuous Lip.

LITHIC REDUCTION SEQUENCE This phrase is a theoretical construct and means the manufacturing continuum between raw material and finished tool. A reduction sequence may have branches as when a core is reduced to produce the parent artifacts for projectile points, unifacially retouched scraping tools, and unretouched tools. Each tool has its own reduction sequence; however, the phrase is more useful and practical when it applies to a whole subclass of tools such as unifacially retouched scraping tools from a particular component in a site. Any component containing more than one tool type contains more than one reduction sequence.

MANUFACTURING PROCESS The operation (s) by which a retouched tool is produced extending from the parent artifact to the tool and including the relevant morphological changes that occur. The process may incorporate identifiable stages, as in the production of a projectile point from a core reduction flake, or it may be a single stage, as in the retouch of a simple uniface.

MEDIAL see: Flake Areas

NEGATIVE FLAKE SCAR The negative representation (mirror image) produced on the surface of any objective piece by the removal of a flake.

NIBBLES See: Use-Wear

NODE An attribute of the platform surface of a flake, node is a hemispherical projection from the center of the flake platform edge where it intersects the ventral surface at the point of contact. Not always present. More pronounced with percussive flake removals.

See Spencer (1981:31). See the term, point of impact, in Oakley (1957:15) and the term, point of contact, in Crabtree (1972:84).

ODULE An unmodified piece of lithic raw material, usually with a cortex exterior. These specimens are commonly smaller than a VW. An assayed and discarded nodule would be the preform of a core and no longer a nodule by this definition.

OBJECTIVE PIECE Any artifact from which flakes are purposely removed (retouch) whether that artifact is a core, another tool, or a manufacturing stage of another tool.

See Crabtree’s use of this term (1972:48).
OBJECTIVE PIECE PLATFORM Any surface of an objective piece into which force is introduced to remove a flake.

ORIGINAL FLAKE SURFACE Any remnant parent artifact surface if the parent artifact was a flake.

OUTERFACE The surface intersecting the platform on a core or other objective piece containing the guiding ridges beneath and along which force is introduced and propagated.
See: Core, Flake, Dorsal Ridge. Also see Sollberger (1980:33) and Spencer (1981:29).

OVERSHOT FLAKE Any flake which travels completely across the surface of an objective piece and removes a relatively large portion of an opposite edge. This term is usually used with reference to biface tool manufacture flakes. Commonly the platform is missing and the resultant termination is sometimes mistaken for the lateral fragment of a biface.
See: Undershot Flake. Also see Tixier's term, outrepasse, in Crabtree (1972: 80).

PARENT ARTIFACT TYPE The artifact class originally containing any tool or preform prior to use—in the case of unretouched tools—or retouch. Identifiable either with reference to the tool's morphology or by remnant parent artifact surface retained on a tool or preform. May not be identifiable.

PLATFORM/DORSAL SIDE ANGLE The angle formed by the intersection of the platform and the proximal portion of the dorsal side of a flake. This is the angle of the platform and the outer face of the core or other objective piece from which the flake was removed from. On a tool manufacture or resharpening flake this is the original edge angle of the preform or tool.

POINT OF CONTACT A term from Crabtree (1972:84). An attribute of a man-made flake, the point of contact is a small, classic Hertzian cone produced at the point of introduced force at the top of a fracture, sometimes associated with a hemispherical ventral extension of the platform of a flake (a nodule). Contains its own ripples and fissures. Most pronounced with hard hammer percussion and least with pressure or soft hammer percussion. It may be argued though, that, during soft hammer percussion, the totality of any platform surface with a continuous lip constitutes a point of contact. Herein, the use of the term is used to refer to the presence of a small hertzian cone.
Similar to Crabtree's contact area (1972: 44) and to Oakley's point of impact (1957:15).

POLISH see: Use-Wear

POT LID see: Heat Spall
PREFORM Any unfinished, retouched artifact that is part of the recognized manufacturing process of a retouched tool. This unfinished state must be demonstrable and thus must have diagnostic attributes. The continuum between parent artifact and tool may be broken up into several identifiable preform stages or may not, as with unifaces. A preform may be used at any point in the manufacturing process for a task other than that for which it was designed. In this case the preform then becomes the parent artifact type of that particular tool. All retouched tools have at one time been preforms. Preforms themselves, however, are only recognizable in the archaeological record when abandoned or lost. Preform attributes will vary according to the parent artifact type, the tool type, and retouch technology. This definition incorporates the "blank" stage of Huto (1971:43), Crabtree (1972:43), and Bradley (1975:5), and thus differs from the definitions of preforms by these authors.

PREFORMING The process of manufacturing a retouched tool.

PREPARATION A term synonymous with manufacture and maintenance. Preparation is used most commonly with reference to those flakes removed in the manufacture and maintenance of cores. Core preparation flakes are terminologically distinguished from other tool manufacture and maintenance flakes because of the unique position of cores in the flake tool reduction sequence.

PRIMARY CORTEX FLAKE This flake type contains 100% cortex on its dorsal surface or it can contain less 25% interior surface contiguous to the platform. The presence of cortex on the platform has no bearing on this type.

PRISTINE The condition of an edge or surface immediately after flaking and prior to any alteration.

PROXIMAL RIDGE PREPARATION The modification of a guiding ridge contiguous to the platform of an objective piece.

PROXIMAL See: Flake Areas.

REJUVENATION The process of regenerating a dysfunctional working edge. May be one flake removal, as in core platform rejuvenation, or many removals, as in the rejuvenation of a damaged projectile point.

RETTOUCH The removal of any flake from, or the production of a flake scar on, the edge of any artifact for the purpose of shaping that edge or surface. Includes core preparation and tool manufacture, but does not include use-wear or core reduction. There are only two possible types of retouch: unifacial and bifacial. Note: this definition differs from Crabtree (1972:89).


RETouched ARTIFACT An artifact which has been formed through retouch. Includes cores, and unifacially and bifacially
retouched preforms and tools.

REVERSE HINGE  A fracture type separate from that which produced the flake. Occurs during the removal of a flake from an objective piece. The fracture is initiated on the dorsal or ventral side and terminates on the opposite side of the flake in question. A cross section of this fracture commonly has an S shape. Appears to be associated with some sort of bending or flexing tension during the removal. Common on blade-like flake fragments produced during tool manufacture. Medial fragments of this type of flake often have positive-reverse hinges on either end. A reverse hinge may have a hinge termination, or a step fracture at its distal end.


RIDGE  The intersection of any flake scar with any other surface whether ventral or dorsal surface, cortex, platform, negative flake scar, or etc. May refer to the interflake crests on the surfaces of a retouched artifact. Ridges act as a guide to the propagation of a fracture beneath them.


RIPPLES  Narrow, closely spaced, concentric rings fanning out from the point of contact and superimposed over the bulb of force and the waves and fissures on a flake. More pronounced with hard hammer percussion.

See: waves. See Crabtree's compression rings and ripples (1972:52,09) and see Spencer (1981:31).

SCRAPING  A tool use motion common to both unretouched and retouched tools. Use of working edge with a movement perpendicular to the long axis of that edge. Usually understood as unidirectional. Typical wear produced is contiguous, unifacial nibbles with striations perpendicular to the working edge. Stepping is variable. On a unretouched working edge this use-motion results in wear which may be mistaken for fine unifacial retouch.

SECONDARY CORTEX FLAKE  This flake type contains some cortex on its dorsal surface as long as it is more than 25% contiguous to the termination. Presence or absence of cortex on the platform is irrelevant to this determination.

SIMPLE INTERIOR SURFACE  See: Interior Surface.

SLICING  A tool use motion common to both unretouched and retouched working edges. Use of a working edge with a movement parallel to the long axis of that edge. May be unidirectional or bi-directional. Typical wear produced is noncontiguous, bifacial nibbles, snaps, and striations oriented parallel to the working edge. Nibbles and steps are sometimes oriented oblique to the edge. Stepping is variable. On used edges this type of wear might be confused with edge damage.
SNAPS  See:  Use-Wear.

STEP  See:  Use-Wear;  Step Fracture.

STEP FRACTURE  A type of fracture separate from that which produced the flake; the truncation of a flake prior to the "normal" termination of the removal.  Common on the working edge of a scraping tool.  This fracture is not a flake termination.  On the flake itself a step fracture looks like an fracture face, or amputation.

See:  Crabtree (1972:93).

STRIATIONS  See:  Use-Wear.

SURFACE  A morphological term used to describe a planar area bounded by edges on the outside of an artifact.  Examples are: on a core, the platform or the outer face; on a flake, the dorsal or ventral sides, the platform surface, negative flake scars; on a retouched tool, the retouched surface, parent artifact surface.  Some descriptive surfaces are made up of smaller surfaces.  For instance the outer face of a core, the dorsal side of a flake, and a retouched surface are each made up--commonly--of intersecting negative flake scars.

See:  Edge.

TASK  See:  Tool Task.

TERMINATION  A characterization of the way in which propagated force ultimately separates a flake from its objective piece.  A termination is part of the same fracture that removes the flake--it is not a separate surface--it is the termination of that fracture.

There is only one termination type, the hinge fracture.  What is normally called a feather termination is really a minute hinge.  It is important to distinguish pronounced hinges from minute hinges.  This is the distinction that I am making here.

Hinge Termination:  the smooth movement of the distal end of the flake away from the center of the objective piece, and up 180 degrees.  There may be several of these undulations diminishing in size.

Feather Termination:  a sharp, non-rounded termination with a minute hinge which is less than 1/5 of the flake’s width.

See:  Step Fracture.

TERTIARY FLAKE  A flake with no cortex on its dorsal side or only 25% or less contiguous to the termination.  The presence of cortex on the platform has no bearing on this flake type.

TOOL  Any artifact which has been used for a task.  May be retouched or simply use-worn (an unretouched tool).  Note: a preform is not a tool since it has not been used.

See:  Artifact, Preform, Liminal Tool.  Similar to Bradley’s (1975:5) term implement.
TOOL MANUFACTURE Flake A flake produced by retouch during the process of manufacturing a tool. There are two generic categories: biface and uniface tool manufacture flakes.

TOOL TASK The work done, or to be done, by a particular tool. Identified by working edge use-wear or retouch morphology of the tool. Thus heavy unifacial use-wear with stepping on a working edge implies a scraping use-motion; this is the task of this tool's working edge as determined by use-wear on the tool. However, a classic Desert-Side-Notched projectile point is understood as an arrow point used for hunting game even if no use-wear is present; this is the task of this tool as determined by the formal morphology of the tool.

TOOL TYPE The tool artifact class to which a tool belongs. Determined by use-wear and retouch morphology. Use-wear, when not associated with retouch, identifies the tool type as unretouched tool. Completely retouched artifacts are often identified by the shape imparted to the artifact by the retouch, examples of this are the projectile point, a drill, or a core.

See: Tool Task.

TOOL USER The person who uses a tool.

TRANSPORT ARTIFACT The artifact class removed from a quarry, a workshop site, or any other production area by the people using that site. May be a nodule, a core, an initial or generalized preform, or a finished tool. May be any artifact class.

UNDERSHOT Flake Any flake which terminates less than two platform thicknesses below the platform. On these flakes the platform is commonly as large or larger than the dorsal side. When removed during the production of bifaces these artifacts are commonly mistaken for the lateral fragments of bifaces.

See: Overshot Flake.

UNIFACE A tool with a working edge formed by retouch along only one side of an edge.

See: Biface and Retouch. Also see Crabtree (1972: 97)

UNRETouched TOOL A tool with a working edge which has been used without prior retouch. Similar to utilized flake, used flake, and used edge without the ambiguities inherent in such terms, i.e., unretouched working edges are found on parent artifacts other than flakes and all tool edges are used.

USE See: Tool Task.

USE-MOTION Characteristic task associated working edge movements.

See: Slicing and Scraping.

USE-WEAR Any flake scars, striations, grinding, or polishing produced by the use of an artifact as a tool. May overlay a
retouched or an unretouched surface.

See: Retouch and Edge Damage.

USE-WEAR TYPES
Grinding: coarse abrasion.
Nibbles: minute flake scars with feather terminations.
Polish: a polished appearance to a surface.
Snaps: semicircular, concave removal on an edge with a flat surface perpendicular to the flake plane. Also known as bending fractures, Lawrence (1979:115).
Steps: scars caused by the breaking of a flake prior to termination. In appearance, a small ledge.
Striations: scratches on the surface (s) of a tools. Caused by the interaction of a working edge with an abrasive particles. The abrasive particle may be either fixed in place or freely moving in relation to the working edge.

WAVES A flake attribute. The large concentric undulations present on a fracture face. Related to but larger than ripples (ripples overlay the waves). There may be five to six per fracture. More pronounced with hard hammer percussion. Similar to Crabtree's undulations (1972:97).

WORKING EDGE The portion of an edge of a tool which has been used. Determined by observable use-wear or retouch morphology. It is possible for a single artifact to have more than one working edge.

When more than one working edge is present on an artifact the relationship between the various edges may be of different types. On a hafted tool, such as a projectile point, the stem, or hafting area, may be considered a separate working edge from the blade. This relationship of working edges can be termed functionally symbiotic since the one working edge is dependent on the other. A relationship of working edges can be termed similar when two or more working edges of the same type, i.e., two scraping edges, are present on an artifact. Finally, a relationship can be termed dissimilar when working edges of different types, i.e., slicing and scraping edges, are present on the same artifact.

A different type of relationship altogether exists when a dysfunctional tool, for example a broken hafted scraper, is remanufactured into a projectile point. In this circumstance the fragmentary hafted scraper may be more properly considered the parent artifact of the projectile point.
TABULATION SHEETS FOR INDIVIDUAL TOOL/PREFORM ARTIFACTS
ABBREVIATIONS AND OTHER TERMS

Abbreviations used in this appendix:
AUR--alternate unifacial retouch
B/U--bifacial or unifacial
CATG #--catalogue number
COL.--column, herein a 40X40 cm unit encompassing a given stratum.
F/C--fragmentary or complete
Lev--level
LV--level
LOC--location
D,V,L,R--dorsal, ventral, left, right, respectively.
l,d,p,m--lateral, distal, platform, medial, respectively.
FF--fracture face, or fragmentation face, of a flake or other artifact.

Measurement
L--length
Th--thickness
W--width
PA--parent artifact
FLK--flake
T--tertiary flake
S--secondary cortex flake
P--primary cortex flake
?--unknown
QUAD--quadrilateral

SHP--shape of working edge
CV, CX, ST, IRR, PROJ, Circum--concave, convex, straight, irregular, projection, circumferential, respectively.
*NOTE: the term irregular refers to the lateral axis, while the term, uneven, refers to the doroventral (thickness) axis of an artifact.
C<P--circumferential retouch except for the platform

SRF/L--surface and level L
SUBTRAP--subtrapezoidal
SUBTRIANG--subtriangular
SUBQUAD--subquadrilateral
TRAP--trapezoidal
TRIANG--triangular
WE--working edge
WE No.--number of working edges
### UNIFACTLY RETouched TOOLS—EXPANDED ANALYSIS

#### BASALT

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### Unifacially Retouched Tools—Expanded Analysis

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76
### BASALT

#### WORKING EDGE ATTRIBUTES

| CATG # | SITE | UNIT | LV | C/F | L | W | Th | PA | No. LOC | SHP | WE | WE | WE | WE |
|--------|------|------|----|-----|---|---|----|----|---------|-----|-----|----|----|----|----|----|
| 31     | AMAUA A | 1X1 A | 3 | F   | 35+ | 31+ | 6  | S  | 2a   | DRI  | IRR | UNKNOWN |
|        |       |      |    |     |     |     |    |    | b    | DLI  | IRR | UNKNOWN |
|        |       |      |    |     |     |     |    |    | - WE a, steep edge retouch, AUR (alternate unifacial retouch) |
| 32     | AMAUA A | 1X1 A | 3 | F   | 35+ | 43  | 11 | S  | --   | --   | --  | GRADE |
|        |       |      |    |     |     |     |    |    | - three retouched edges intersect to form two unworn corners, distal flake fragment |
| 33     | AMAUA A | 1X1 A | 3 | F   | 48+ | 42  | 9  | T  | 1    | VLI  | PROJ | PERFORATOR |
|        |       |      |    |     |     |     |    |    | - enhancement of a projection formed by the intersection of two fracture faces |
| 34     | AMAUA A | 1X1 A | 3 | F   | 51+ | 22+ | 10 | T  | 2a   | --   | IRR | SCRAPER |
|        |       |      |    |     |     |     |    |    | b    | (bifacial) |
| 35     | AMAUA A | 1X1 A | 3 | C   | 39  | 59  | 14 | S  | 1    | C/F  | PROJ | GRAPER |
|        |       |      |    |     |     |     |    |    | - enhanced projection, AUR (alternate unifacial retouch) primarily dorsal, ventral bit retouch |
| 36     | AMAUA A | 1X1 A | 3 | F   | 57+ | 43+ | 26 | S  | --   | --   | --  | ADZE PREFORM |
|        |       |      |    |     |     |     |    |    | - large unifacial ventral retouch scars, dorsal facets of nodular cortex (largest scar 25 mm wide) |
| 37     | AMAUA A | 1X1 A | 3 | C   | 47  | 35  | 16 | T  | 1    | DLRd | ST-CX | SCRAPER/GRAPER |
|        |       |      |    |     |     |     |    |    | - one large ventral wear scar distally, steep sided edge retouch |
| 40     | AMAUA A | 1X1 A | 3 | F   | 73+ | 30  | 17 | S  | 1    | VR    | IRR/CN | SLICING |
|        |       |      |    |     |     |     |    |    | - parent artifact is an adze that has been made on a flake of unknown cortex class. Retouch scars form an acute edge angle with no wear apparent on this edge. Parent artifact adze has a ground facet. This parent artifact adze retains both triangular and trapezoidal cross-sections. |
| 42     | AMAUA A | 1X1 A | 4 | F   | 41+ | 46+ | 6  | S  | 2a   | VLI-p/d | IRR | SCRAPER |
|        |       |      |    |     |     |     |    |    | b    | DLIp  | CV  | SCRAPER |
|        |       |      |    |     |     |     |    |    | - WE a, intersects with three larger snaps (basalt appears to snap more than CCS or obsidian, either that or the use to which the flakes may be put inordinately produce this type of wear); WE b, scars become discontinuous and uneven in size away from platform, platform corner included in this retouch, backing? |
| 43     | AMAUA A | 1X1 A | 4 | F   | 46+ | 51+ | 12 | T  | 1    | DLRd | PROJ | GRAVER |
|        |       |      |    |     |     |     |    |    | - retouch creates a small triangular bit |
| 44     | AMAUA A | 1X1 A | 4 | C   | 37  | 55  | 14 | T  | 1    | VLI  | IRR | SCRAPER |
| 46     | AMAUA A | 1X1 A | 5 | C   | 69  | 72  | 14 | T  | 3a   | DLIp  | CN/IRR | SCRAPER/GRAPER |
|        |       |      |    |     |     |     |    |    | b    | Dd    | ST   | GRAVY-HAFT |
|        |       |      |    |     |     |     |    |    | c    | VLI  | ST   | GRAVER |
|        |       |      |    |     |     |     |    |    | - WE a, heavily used, almost bit-like area between two minor projections; WE b, appears to be greater hafting retouch with heavy stepping but no apparent wear; WE c, this WE is on the opposite edge from WE b, the retouch is ventral and there is a tiny linear ground area on the dorsal edge opposite the retouch. This linear facet is interpreted as movement within the haft as the grater was used. |
### Basalt

**Working Edge Attributes**

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- WE a, steep, heavy retouch leaving quite irregular edges with flake scar intersections, edge generally straight however; WE b, incorporates platform corner, backing?

- WE a, interflake edge intersections produce a marked irregular edge; WE b, modifies main FF/FF/Ventral corner

- WE c, 13 mm wide bit

- WE a, discontinuous, uneven scars, smooth working edge with a projection where dorsal ridge intersects edge, this bit is worn; however it does not stand out very much. WE b, AUR with platform corner and fracture face corner removed.

- sides a & b, include dominant platform corners, strangulate center of both lateral edges; WE c, ventral wear on projecting tip, obvious wear on dorsal and ventral sides leading up to it. Is this an expedient grater? A shell fish knife?

- AUR projection enhancement
### Unifacially Retouched Tools

#### Basalt

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<td>-platform corners modified, this is a proximal flake fragment with both lateral edges retouched dorsally</td>
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<td>-wide flake with distal retouch</td>
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<td>-WE a, platform corner; WE b, fracture face/lateral edge. Both sides contain AUR (alternate Unifacial retouch).</td>
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<td>-both sides are possible backing. This is a proximal fragment with AUR on both edges, as well.</td>
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<td>-WE a, working edge on platform corner; WE b, retouch enhanced projection, AUR on dorsal left.</td>
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<td>-there are three unifacial retouched edges forming two corners. The two subparallel sides are expanding. Possible size preform fragment.</td>
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<td>-WE a, retouch is ventrodistal; WE b, retouch is dorsoleft/ventrornright and consists of AUR, quite irregular; WE c, retouch is ventroleft and convex.</td>
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### Unifacially Retouched Tools

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- WEa, located dorsolateral and its shape is CV/XX/IRR; WEb, located ventrodorsal and is straight in shape; WE c, located dorsoscutal lateral and is irregular, includes platform corner.

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- three unifacial edges, trapezoidal cross-section and sub-quadrilateral plan.

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- WE located dorsodistally. This is a wide flake.

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- bit is 11 mm wide.

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- retouch is circumferential and consists of AUR.

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<td>92</td>
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<td>Lev. 1 F</td>
<td>S</td>
<td>1</td>
<td>GRAVER</td>
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- WE located dorsodistally and bit is broken, retouch on proximal portion of blade may be backing.

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- retouch is lateral and incorporates platform corners. Proximal fragment of a thin flake. Backing?

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- AUR, thin flake.

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<td>PERFORATOR</td>
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- AUR on a fracture face edge

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- AUR

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- WE a, minor retouch on fracture face/ventral edge

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- both WE are damaged. Parent artifact measures 17X40X8 mm.

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<td>2a</td>
<td>SCAPER</td>
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- proximal flake fragment, part of the working edges are missing. WE b, AUR.
### UNIFACTALLY RETOUCHEO TOOLS

#### BASALT

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<th>CATG #</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>b</td>
<td>GRAVER</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>-two WE are sides of broken projection. One is dorsal and other is ventral. Both perforators.</td>
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<td>-small edge retouch on thumbnail size flake.</td>
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<td>-retouch forms an acute edge, WE incomplete with many flat-faced fractures, or snaps.</td>
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<td>-&lt;P</td>
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<td>-&lt;P, snaps</td>
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<td>-enhanced natural projection</td>
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<td></td>
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<td>-bit missing, retouch includes AUR which may be backing or edge enhancement. Perforator?</td>
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<td></td>
<td>-very irregular, almost denticulate edge</td>
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<tr>
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<td></td>
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<td>b</td>
<td>BACKING?</td>
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<td></td>
<td></td>
<td></td>
<td>-backing? modifies platform corner (see backing discussion in procedures section herein)</td>
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<tr>
<td>111</td>
<td>UTOUSIA A COL. 1</td>
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<td>--</td>
<td>ADZE PREFORM</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td>-wide parent artifact flake with distal and lateral retouch that is very irregular, leaving uneven edges. Artifact has a subtrapezoidal cross-section and a subquadrilateral plan-section.</td>
<td></td>
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<td>112</td>
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<td>SCRAPER</td>
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<td></td>
<td></td>
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<td>-&lt;P</td>
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</tr>
<tr>
<td>113</td>
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<td>S</td>
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<td>SCRAPER</td>
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<td>114</td>
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<td></td>
<td></td>
<td>this is only an adze rejuvenation flake</td>
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### Unifacially Retouched Tools

**Basalt**

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<tr>
<td>115</td>
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<td>ADZE PREFORM</td>
<td>two unifacially retouched edges and a trapezoidal cross-section</td>
</tr>
<tr>
<td>116</td>
<td>UTUSIA A COL. 1</td>
<td>Lev. 2</td>
<td>C</td>
<td>S</td>
<td></td>
<td>1</td>
<td>SCRAPER</td>
<td>CP, relatively small retouch, platform corner modified</td>
</tr>
<tr>
<td>117</td>
<td>UTUSIA A COL. 1</td>
<td>Lev. 2</td>
<td>F</td>
<td>T</td>
<td></td>
<td>1</td>
<td>SCRAPER?</td>
<td>WE located ventroleft proximal, very irregular, interrupted by two large fracture faces</td>
</tr>
<tr>
<td>118</td>
<td>UTUSIA A COL. 1</td>
<td>Lev. 2</td>
<td>F</td>
<td>T</td>
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<td>1</td>
<td>SCRAPER</td>
<td>WE located ventroleft distal</td>
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<td>119</td>
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<td>Lev. 2</td>
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<td>T</td>
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<td>1</td>
<td>SCRAPER</td>
<td>WE located dorsodistally, this alteration is in the gray area between retouch and use-wear</td>
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<td>120</td>
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<td>Lev. 2</td>
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<td>T</td>
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<td>1</td>
<td>GRAVER</td>
<td>platform corners modified. Perforator?</td>
</tr>
<tr>
<td>121</td>
<td>UTUSIA A COL. 1</td>
<td>Lev. 2</td>
<td>C</td>
<td>S</td>
<td></td>
<td>2a</td>
<td>SCRAPER</td>
<td>WE a, located dorsoright laterally, this is the steep, thick edge; WE b, located dorsoleft</td>
</tr>
</tbody>
</table>

| 123     | UTUSIA B COL. 2 | Lev. 1 | F | S   |    | 2a | GRAVER | all retouch is on the dorsal side, the edge is very irregular and the flake has a triangular cross-section, wear is assoc. with break on distal end. Both perforators? |
| 124     | UTUSIA B COL. 2 | Lev. 1 | F | T   |    | 1  | SCRAPER | CP, ventral retouch |
| 125     | UTUSIA B COL. 2 | Lev. 1 | F | T   |    | 2a | GRAVER | all retouch on the corners produced by the intersections of fracture faces |
| 127     | UTUSIA B COL. 2 | Lev. 2 | C | T   |    | 1  | PERFORATOR | unifacial retouch on one WE, alternate unifacial retouch on the other, two retouched edges have enhanced a projection |
| 128     | UTUSIA B COL. 2 | Lev. 2 | C | T   |    | 1  | PERFORATOR, LIGHT DUTY | alterations scars are less than 3.0 mm; however, this alteration is by definition retouch since it has been used to enhance a projection |

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## UNIFACIALLY RETOUCHED TOOLS

### BASALT

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<td>SCRAPER</td>
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<td>SCRAPER</td>
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</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>c</td>
<td>SCRAPER</td>
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<td></td>
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</tr>
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</table>

- WE a, located dorsodistally; WE b, located on ventrolateral; WE c, located on dorsocentral. While edge projections exist, apparently none of them were used.

| 131  | UTUSIA C COL. 3 | Lev. 1 | C | T | 2a | SCRAPER |
|      |      |        |    |    | b  | BACKING |

- WE a, located dorsolateral, edge shape is convex, and while there is multiple layered stopping, the edge is even and regular; WE b, retouch forms non-edge that includes the platform corner, 3-5 mm continuous and discontinuous scars.

| 132  | UTUSIA C COL. 3 | Lev. 1 | C | T | 2a | GRAVER |
|      |      |        |    |    | b  | BACKING |

- all corners and projections appear to be dulled.

| 134  | UTUSIA C COL. 3 | Lev. 2 | F | T | 2a | SCRAPER |
|      |      |        |    |    | b  | SCRAPER |

- distal end of parent artifact missing, retouch C<RF & fracture faces.

| 135  | UTUSIA C COL. 3 | Lev. 2 | C | T | 1  | SCRAPER |
|      |      |        |    |    |    | -C<RF, AUR |

| 137  | UTUSIA C COL. 3 | Lev. 2 | F | T | 1  | UNKNOWN |
|      |      |        |    |    |    | -C<RF & fracture faces, AUR |

| 138  | UTUSIA C COL. 3 | Lev. 2 | C | T | 1  | GRAVER |
|      |      |        |    |    |    | -slightly enhanced natural platform |

| 139  | UTUSIA C COL. 3 | Lev. 2 | F | T | 1  | SCRAPER |
|      |      |        |    |    |    | -C<RF & fracture faces |

| 140  | UTUSIA C COL. 3 | Lev. 2 | F | T | 1  | UNKNOWN |
|      |      |        |    |    |    | -C<RF & fracture faces, unifacial and bifacial alteration |

| 141  | UTUSIA C COL. 3 | Lev. 2 | C | S | 1  | SCRAPER |

- WE located dorsodistal lateral, uneven (dorsoventrally) though irregular edge, some dulling present, which includes platform corner.

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UNIFACIALLY RETOUCHEO TOOLS

BASALT

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</table>
| 142  | UTUSIA D COL. 4 Lev. 1 C T 2a PERFORATOR  b GRAVER  
     |      |      |    |     |    |     |          |
|      |      |      |    |     |    |     |          |
| 143  | UTUSIA D COL. 4 Lev. 1 F T 2a PERFORATOR  b BACKING  
     |      |      |    |     |    |     |          |
| 144  | UTUSIA D COL. 4 Lev. 1 F S 1 SCRAPER  
     |      |      |    |     |    |     |          |
| 145  | UTUSIA D COL. 4 Lev. 1 F T 1 UNKNOWN  
     |      |      |    |     |    |     |          |
| 146  | UTUSIA D COL. 4 Lev. 1 C T 1 SCRAPER  
     |      |      |    |     |    |     |          |
| 147  | UTUSIA D COL. 4 Lev. 1 F T 1 UNKNOWN  
     |      |      |    |     |    |     |          |
| 148  | UTUSIA D COL. 4 Lev. 1 C T 1 GRAVER  
     |      |      |    |     |    |     |          |
| 149  | UTUSIA D COL. 4 Lev. 1 F S 1 SCRAPER  
     |      |      |    |     |    |     |          |
| 150  | UTUSIA D COL. 4 Lev. 1 F T - ADZE PREFORM  
     |      |      |    |     |    |     |          |
| 152  | UTUSIA D COL. 4 Lev. 1 F ? 1 ADZE PREFORM  
     |      |      |    |     |    |     |          |
| 153  | UTUSIA D COL. 4 Lev. 1 C T 1 UNKNOWN  
     |      |      |    |     |    |     |          |
### UNFACTAELY RETOUCHED TOOLS

#### BASALT

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<th>C/F</th>
<th>PA</th>
<th>WE</th>
<th>WE No.</th>
<th>Function</th>
</tr>
</thead>
</table>

| 154  | UTUSIA D COL. 4 Lev. 1 F T 2a SCRAPER<sup>b</sup> c BACKING  
WE<sub>a</sub>, located dorsolateral platform to termination corner, graver; WE<sub>b</sub>, located on a dorsonatal distal projection; WE<sub>c</sub>, located on dorsolateral platform corner. |

| 155  | UTUSIA D COL. 4 Lev. 1 F T 2a SCRAPER<sup>b</sup>  
WE<sub>a</sub>, located dorsolateral; WE<sub>b</sub>, located ventrolateral. Both of these edges may constitute backing for a working edge (WE) that has been broken off. |

| 156  | UTUSIA D COL. 4 Lev. 1 F S 1 UNKNOWN  
-C<sup>b</sup>P. This a thick cortex flake with dorsal retouch, some ventral alternate retouch. Scars are uneven in size. This artifact may be some kind of preform. |

| 157  | UTUSIA D COL. 4 Lev. 1 C S 1 ADZE PREFORM<sup>c</sup>  
-minimally retouched, retouch located dorsolateral and ventrolateral distal |

| 158  | UTUSIA D COL. 4 Lev. 2 C S 1 UNKNOWN  
-C<sup>b</sup>P. This is an irregular artifact, relatively thin, with distinct dorsal unifacial retouch (Dr). The rest of the artifact edge is covered with small and <5mm scars except for platform and section of cortex on the proximal half of the dorsal left edge. All alteration has served to make is circular in shape. |

| 159  | AUTO A COL. 1 Lev. 1 F T 1 UNKNOWN  
-C<sup>b</sup>P. AUR. platform corner modification, scraper? |

| 160  | AUTO A COL. 1 Lev. 1 C T 1 UNKNOWN  
-thick parent artifact flake, C<sup>b</sup>P. AUR, scraper? |

| 161  | AUTO A COL. 1 Lev. 3 C S 3a GRAYER  
b SCRAPER  
b BACKING?  
WE<sub>a</sub>, located dorsonal lateral to distal; WE<sub>b</sub>, located dorsolateral lateral to distal; WE<sub>c</sub>, dorsoleft platform corner |

| 162  | AUTO B COL. 2 Lev. 2 C T 1 CHISEL  
-beaked tool of some kind, subdiamond shape cross-section, grater? |
**UNIFACIALLY RETOUCHED TOOLS**

**BASALT**

<table>
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<tr>
<th>CATG &amp; SITE</th>
<th>UNIT</th>
<th>LW</th>
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<th>No.</th>
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<td>-dorsal left distal corner broken, platform corners modified, C&lt;7, AUR.</td>
</tr>
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</table>

165 AUTO B COL. 2 Lev. 3 C T | 1 | ADZE PREFORM (most initial stage) |
|                             |   | -large variability in the size of the flake scars; retouch is discontinuous, looking much like edge preparation. Artifact is triangular in cross-section and subquadrilateral in plan-section. |

166 AUTO D .5X2.0 m Lev. 1 C T | 1 | GRAYER/SCRAPER |
|                             |   | -graver on platform dorsal right corner, scraper retouch is distal to the graver projection on dorsoright lateral edge to the distal end. |

167 AUTO D .5X2.0 m Lev. 1 C S | -- | GRATER? |
|                             |   | -C-P retouch dorsally with two distal corners. Threesides, dorsal left, right, and distal. Cross-section is trapezoidal. |

168 AUTO C .5X2.0 m Lev. 2 C T | -- | GRATER? |
|                             |   | -circumferentially retouch includes half of the platform. Platform retouch is the largest and the most uniform. AUR. |
### BASALT

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<td>-dorsal surface completely retouched, steep edge retouch, retouch primarily AUR-not an adze preform</td>
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<td>Fk trap</td>
<td>quad</td>
<td>none</td>
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<td>-sides expand out of parallel toward the fracture face</td>
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<td>butt frag</td>
<td>41+</td>
<td>35+</td>
<td>13+</td>
<td>?</td>
<td>subtrap subquad 6</td>
<td>ADZE, type 3 or 4</td>
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<td>-mix ground facets, sides expand out of parallel from butt</td>
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<td>77+</td>
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<td>?</td>
<td>trap subquad 0</td>
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<td>-cortex is present on parent artifact, five largest flake scars range from 18-48 mm wide. If this artifact is a core, it has two platforms—one unifacial and one bifacial. Core?</td>
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<td>4</td>
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<td>42+</td>
<td>29+</td>
<td>17+</td>
<td>?</td>
<td>trap ovale</td>
<td>0</td>
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<td>-cortex present on the parent artifact, the five largest flake scars range from 18-24 mm wide, the only unretouched surface contains cortex.</td>
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<td>?</td>
<td>triang subtriang 0</td>
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<td>-parent artifact contains cortex. Triangular cross-section suggests it may be a type 6 or 7 preform. There appear to be two bevels flaked into the artifact. The two main edges are bifacial and unifacial. Nonretouched surface are cortex.</td>
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<tr>
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<td>5</td>
<td>F</td>
<td>62+</td>
<td>25+</td>
<td>19+</td>
<td>?</td>
<td>triang subquad 0</td>
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<td>-this is a small triangular-section preform, sides are expanding</td>
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<td>34+</td>
<td>30+</td>
<td>11+</td>
<td>?</td>
<td>trap quad 2</td>
<td>ADZE Type 1/II</td>
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<td>-facets are from front and back, one is quite small. Flake scars suggest that this artifact was rejuvenated and discarded. Butt fragment.</td>
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<td>66+</td>
<td>35</td>
<td>S</td>
<td>triang subquad 0</td>
<td>ADZE PREFORM</td>
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<td>-unifacial, five largest flake scar widths range from 18-41 mm wide.</td>
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<td>50+</td>
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<td>?</td>
<td>trap subquad 0</td>
<td>ADZE Type 1/II</td>
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<td>-parent artifact contains cortex, cortex on front contains faint linear scratches. Butt fragment.</td>
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<td>subtrap subquad 0</td>
<td>ADZE PREFORM</td>
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<td>-this parent artifact flake contains a cortex platform and lateral cortex. The five largest flake scar widths range from 14-28 mm wide.</td>
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<td>subtrap subtriang 0</td>
<td>ADZE PREFORM/ CORE</td>
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<td>-parent artifact contains cortex. The five largest flake scars range from 33-43 mm wide. If this artifact is a core, then it has three platforms, two bifacial and one unifacial.</td>
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<td>triang/trap subquad 0</td>
<td>ADZE PREFORM</td>
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<td>-this level in these units was unscreened. The five largest flake scars range from 25-49 mm wide. The parent artifact contains cortex. One, retouched lateral edge is bifacial and the other is unifacial.</td>
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### BIFACIALLY RETOUCHEO TOOLS--EXPANDED ANALYSIS COMPLETE BIFACES

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<td>108+ 43+ 24</td>
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<td>subquad</td>
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<td>ADZE PREFORM</td>
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<td>-the five largest flake scars range from 26-37 mm wide. One of the retouched lateral edges is bifacial and one is primarily unifacial.</td>
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<td>64</td>
<td>AMAU A 1X1 BSC</td>
<td>2</td>
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<td>83+ 40 17</td>
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<td>-this level in these units was unscreened. The five largest flake scars range from 18-44 mm wide. One retouched lateral edge is bifacial and the other is unifacial.</td>
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<td>70</td>
<td>AMAU A 1X1 BSC</td>
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<td>C</td>
<td>74 35 20</td>
<td>?</td>
<td>subtrapped</td>
<td>subquad</td>
<td>1</td>
<td>ADZE DISCARD</td>
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<td>-the facet measures 73x25 mm. It has been flaked and discarded, possibly used as a core.</td>
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<td>-parent artifact contains cortex. This artifact also contains massive stepping.</td>
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<td>-bifacial and AU retouch along the dorsal edge, no signs of use. Artisans were possibly trying to even an edge prior to discard. Parent artifact is rounded.</td>
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<td>-very uneven edges and irregular outline in plan.</td>
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<td>subquad</td>
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<td>-two bifacial edges. Damage cutting edge.</td>
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| 84   | AMAU B COL.3 | - | F | 43+ 27+ 19+ | triangulated | triangled | 0 | PERFORATOR |
|      |              |   |   |     |     |     |    |    |     |     | -parent artifact is a bifacially retouched artifact fragment |

---

| 133  | UTUSIA C COL.3 | 1 | C | 65 35 14 | FLK | trap | subquad | 0 | ADZE PREFORM |
|      |              |   |   |     |     |   |    |    |     |     | -one of the retouched edges is bifacial and the other is unifacial. |

---

| 164  | AUTO B COL.2 | 2 | C | 86 40 23 | FLK | subtrapped | sub-oval | 0 | ADZE PREFORM |
|      |              |   |   |     |     |   |    |    |     |     | -parent artifact is rounded. One retouched edge is bifacial and the other is unifacial. The five largest flake scars range from 18-25 mm wide. |

---

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### BIFACIALLY RETOUCHEO TOOLS--EXPANDED ANALYSIS: FLAKE BIFACES

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<td>60</td>
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<td>-WE a, this irregularity also varies between straight and convex</td>
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<td>2a (unifacial)</td>
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<td>-this is a tiny proximal fragment</td>
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<td>-it appears that the working end of this tool is broken, retouch minimal and shows no sign of wear</td>
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<td>F</td>
<td>51+</td>
<td>22+</td>
<td>10+</td>
<td>FLK 2a (unifacial)</td>
<td></td>
<td></td>
<td>IRR UNKNOWN</td>
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<td></td>
<td></td>
<td></td>
<td>b</td>
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### BIFACIALLY RETOUCHEO TOOLS--FLAKE BIFACES

#### BASALT

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<td>78</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>-WE a, bifacial and unifacial retouch on dorsal left and dorsodistal edges, 1/2 artifact edge is the working edge, rounded; WE b, retouch present on natural projection opposite to the other working edge (backing?)</td>
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<td></td>
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<td></td>
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<td>-wear suggests light duty chopping, edges are irregular and retouch scars are unsystematic</td>
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<td>85</td>
<td>AMAUA B</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-sinuous edge</td>
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| 97      | UTUSIA A | COL. 1 | 1  | F   | T  | 2a (unifacial, see relevant sheet) | SCRAPER |
|         |       |      |    |     |    | b      |            |
|         |       |      |    |     |    | -WE b, bifacial notch, edge retouch only |
| 122     | UTUSIA A | COL. 1 | 2  | C   | T  | 1      | UNKNOWN PREFORM |
|         |       |      |    |     |    |         | -C<5, flake scars large, edges irregular and uneven |
BIFACIALLY RETOUCHE D TOOLS--FLAKE BIFACES

BASALT

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<td>retouch on dorsalfacet</td>
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<td>2</td>
<td>F</td>
<td>T</td>
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Cores

Basalt

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<td>COL. 3 BAG L</td>
<td>C</td>
<td>S</td>
<td>2</td>
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<td>?</td>
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APPENDIX B

Changes to the Fagaitua land/beach interface
the current beach front row of houses.
Artificial beach edge was approximately 80' inland and 100' beneath
recent road was built on fill past the artificial beach edge. The
map #20 1993 6,5, G's map shows the original road through Fagatua. The
Photo 36 Aerial photo 1993 shows Faiaitua Bay with what appears to be lines of reef dredging in front of Faiaitua and Alofa. Dredging channels appear as wide black trenches.
Map Sketch 8: Three test trenches in Pagoitua Village. Dotted line shows probable original beachline prior to road building. Test trenches 1 and 2 had 4 to 5 feet (1.1 to 1.2 meters) of coral road fill. Test trench 3 is an embankment below the road grade and shows an original swampy area with gray/black greasy soils from 150-183 cm below surface. Historic debris and fill made up the first 150 cm. The top of a concrete pill box is located just east of the road to Masefau/Masausi.

Sketch 6: Concrete World War II pill box. For detailed description and floor plans see Ayres and Kisler (1987).
September 07, 1994

To: Epi Suafo'a

Reference: Mainu East - West Road

Regarding the above matter, the ASG starting its crash program in 1960 - 1970. And most of the repairs to the main road was done on this period.

On the Eastern side of the island starting from the airport road junction to the terminal building, the road were filled approximate 4 feet to six feet from the intersection passing the Union World store, and approximate 4 feet from the Union store to intersection to Lions park.

From said intersection, the road has been adjusted to avoid small bending on the road and continue all the way to BHP Terminal.

From this point, the road was re-routed toward the sami side to meet with the existing road front of Shimasaki store.

From Shimasaki store, the road was widen up and shifted more on the sami side until passing the turn out to the Hotel. The filled is about the same as I previously mentioned. From this point all the way to Pago Park passing that sharp curve east of Asuenga guest fale, the road was cut approximate 4 to 5 feet opposite that existing rock wall on the mountain side. Continuing to Satala before the Cemetery, the road was re-routed again toward sami side passing the power house toward the west end of the Marine Railway. All landfilled.

From these section of the road toward Aum the road location remain the same but improvement has been made and widen up until passing Joe Sappa's two story fale. After Sappa's fale, the road was re-routed again toward the sami side. All landfilled approximate four feet above mean sea level.

From Anasosopo, Lauli'ifou and Lauli'iluai until you reached the west end of the village of Aumi. The road was slightest realigned toward the sami side to avoid the small bending before you reached the village. The road on the waterfront was also improved and widen up more to the sami. I think you notice that if you study the land contours of the area.
In Alega, passing Tisa's Barefoot Bar, the road was re-routed again toward the same, also filled, improved and widen-up.

Amaua, the road was improved and widen up all the way to the concrete bridge on west end of Faga'itua village, at a turn off to Faga'itua High School. From that point, the road was also re-routed to Southern part of the village on the sami side of the road. It's a landfilled.

Between Faga'itua and Alofa, just passing Faga'itua village where the road wind up on the hill before reaching Pagai village. The road was re-routed about 100 meters inland on the mountain side from the original road, which runs along the beach in Pagai. This portion of the road the cut is about more than 10 feet and filled for compaction.

In Alofa the road is in same location, but was widen up and filled. When come to a part of the road adjoining with the swamp where the box culvert is located. This part of the road is sinking almost 2 feet above mean sea level, and has been refill several times in the past. Especially last two hurricanes two years ago.

After Alofa, going toward the east end of the island. Before Fogaau, the road was re-excavated and extended more to the road shoulders approximate 3 feet on each side of the road. When reached Fogaau the road was re-aligned about a 4 feet to the mountain side.

In Amouli, the road was elevated about a foot and extended to the sides. Passing Uru's guest fale in Amouli, the road was realigned toward the south or sami side of the village. Materials they used, were from road sharp points. They trimmed those hills and used those materials for road improvement.

Passing Amouli, going toward Anasi, the road location is about remain the same, except some improvement during that period.

Before reaching Aloa, the road, again re-routed to the foot of the hill and much wider than the old road. In Aloa village, the road is much wider and higher than the old road, and the realignment is much straight than the old road.

In Tula, the road is much in the same location as before. The Government planned to realign the road north of the village, crossing the swamp area. That planned was rejected by the village in 1968.

I hope this document will help you solved some mystery regarding our roads.

Meko L. Anum
RESUME

NAME
David C. Eisler

ADDRESS
88613 Nelson Mtn Road
Walton, Oregon 97490
503-935-7847

DEGREES
University of Oregon, Eugene, Oregon
Ph.D in Anthropology. August 1979.
Dissertation: "Continuity and Change in a Lowland Village Political System in Papua New Guinea"

Temple University, Philadelphia, Pennsylvania
M.A. in Anthropology, January 1971
Thesis: "Development of the Dancing Societies on the Northwest Coast of North America"

Franklin and Marshall College, Lancaster, Pennsylvania
B.A. in Anthropology, June 1968.

TEACHING EXPERIENCE

Courtesy Research Associate, Institute for a Sustainable Environment

Assistant Professor, Anthropology Dept., University of Oregon, Eugene
Courses taught: Cultures of Melanesia, Cultures of Micronesia and Polynesia,
Pacific Perspective, Pacific Islands; an interdisciplinary approach, Pacific Islands through film, Geography of the South Pacific, Graduate Teaching Fellow, Fall 1976, Introductory Anthropology.

Assistant Professor, Anthropology Dept., Oregon State University,
Courses taught; Cultural Anthropology, Peoples of the Pacific, Peoples of North America, Primitive Art, Anthropology through Film, World Cultures.

Member of the Pacific Islands Studies Committee, University of Oregon, 1987-present. Curriculum development.


Instructor, Portland State University, Department of Continuing Education.
Fall 1979, Introductory Anthropology.

Instructor, Anthropology Dept., Drew University, Madison, New Jersey; September 1970-June 1972.
Courses taught: Introductory Anthropology, Human Geography, Ethnology, Regional Ethnography of North America, Regional Ethnography of Oceania, Physical Anthropology, Primatology, Anthropological Theory; Senior Seminar, Human Behavior.


**ETHNOGRAPHIC FIELDWORK**


**ARCHEOLOGICAL FIELDWORK**

Staff Archeologist for the American Samoa Power Authority, P.O.Box PPH, Pago Pago, American Samoa, January 1995-present

Field Researcher, Excavation and survey of Ahalanui and Pohoiki, Puna District, Hawaii, for Archeological Consultants of Hawaii, Haleiwa Oahu, 1990

Field Supervisor, survey and excavation on western Tutuila Island, American Samoa, for the Historic Preservation Office, Parks and Recreation Department, American Samoa, October 1985

Contractor for Ochoco National Forest, Young's Butte Fire Rehabilitation Survey, October 1978

Lassen National Forest, October 1977, Rogue River National Forest, September 1978 Project Director, Allen Camp Reservoir, Bureau of Land Reclamation Survey, Pitt River, California, June-July 1975

For Museum of Natural History, University of Oregon; Breitenbush Springs, Willamette National forest, September 1975. Mc Credie Springs, Willamette National forest, October 1975

**EXCAVATIONS**

For Museum of Natural History, University of Oregon, Field Supervisor, Long Tom Highway 126 salvage projects, Fall 1986. Salvage project, Salem, Oregon, July 1976


**WRITTEN WORK**

Archaeological Report on Fagaitua Bay waterfront, Phase II Section 106 for the American Samoa Power Authority, American Samoa, August 1995


Ethnographic Report on the Shasta Indian Nation for Que Pasa Research Alliance, 1984


Ethnographic reports on the Great Basin, Plateau, and Northern California cultures for Professional Analysis, National Forest contracts 1977-1978


**PROFESSIONAL INTERESTS**

Lee Spencer

88613 Nelson Mtn. Rd.
Walton, OR 97490
(503) 935-7847

January 1993

Born: September 28, 1950, Portland, Oregon

Education
University of California at Berkeley B.S. Anthropology 1973
University of Oregon M.S. Anthropology 1978

Archaeological Skills
Field Work: excavation using stratigraphic or arbitrary levels;
mapping; rockshelter/cave sites, particularly dry sites
Analysis: lithics (debitage, preforms, and tools), lithic use-wear,
stratigraphy, wood and bone tools, Pacific salmon and other fluvial
data
Other: cartography, illustration
Instructional: lithic technology, lithic use-wear analysis, field
methods, archeological report writing
Contract Language and Law relating to archeological work

Summary of Experience
Field Work: 23 years
Teaching: University 120 hours Lithic Technology
90 hours Field Methods
Junior College 90 hours Lithic Technology
Public Schools 100+ hours Prehistoric Technology
Running Archeological Contracting Business: 1986-91
Lee Spencer Archeology

Geographic Areas of Field Work
Oregon, Nevada, California, Peru, Washington, Idaho, Texas

References
Dr. C. M. Aikens Department of Anthropology
University of Oregon
Eugene, OR 97403

Dr. R. Hanes Bureau of Land Management
State Office
P.O. Box 2955
Portland, OR 97208

Other reference persons are available
DETAILS OF PROFESSIONAL ARCHAEOLOGICAL EMPLOYMENT

1994
(Idaho) Field Director for Science Applications International Corporation (SAIC) on a Highway Department data recovery project in Weiser: excavation of a deeply buried Windust component.

1993
(Oregon) Lithic analysis of the Colvard Site, Jackson County, for the Southern Oregon Historical Society (SOHS).
(Oregon & Washington) Crew Chief for BCAS on a data recovery and survey activities in the Western Cascades.
(Idaho) Field Supervisor on a survey SAIC in the Owyhee Plateau of S.W. Idaho; crew chief on Highway testing project in Weiser.

1992
(Oregon) Crew Chief for Infotec Research Inc. (IRI) doing supplemental data recovery on the Johnson Site (35JES1B): excavation of a very rich open site containing features, including house pits, spanning more than 7000 years—from pre-Mazama tephra into the protohistoric period.
(Oregon and California) Crew Chief and Field Archeologist on other IRI surveys and excavations.

1991
(Oregon) Contracted by SOHS to research and write-up a monograph on climate and environmental change in the Rogue Basin and how these factors influenced the prehistoric availability of fluvial subsistence resources, particularly Pacific salmon runs.
(Oregon and California) Field Archeologist on two IRI testing and data recovery excavation projects.

1990
(Oregon and California) Field Archeologist on three IRI survey and test excavation projects.
(Oregon) Conclusion of litigation with Region 6 of the USDA Forest Service concerning a LSA Times Square Rockshelter (35D0212) data recovery contract. Times Square Rockshelter is a culturally stratified dry site with a large perishable artifact assemblage. The pivotal issues in the litigation were: the nature of an archeological feature and whether the site retained cultural stratigraphy or not. I prevailed.

1989
(Oregon) Work on Lee Spencer Archeology (LSA) projects for Region 6 of the Forest Service, including the completion of LSA data recovery report for Times Square Rockshelter (pp. 556).
(Oregon and California) Field Archeologist on three IRI archeological survey projects.
(Oregon) Litigation with Region 6 of the Forest Service relating to Times Square Rockshelter data recovery contract: continuing.

1988
(Oregon) Analysis and write-up of various LSA field data, primarily Times Square Rockshelter.
(Oregon) Litigation with Region 6 of the Forest Service relating to Times Square Rockshelter data recovery contract: continuing.
1987

[Oregon] Principal Investigator on two LSA contracts with the Umpqua National Forest: the testing and evaluation of one open site, Horseshoe #6; and data recovery excavations of Times Square Rockshelter.

[Oregon] Principal Investigator on four LSA testing and evaluation contracts with the Willamette National Forest: the Bee Bee site, the Dale Beam site, the Canyon Owl Confluence site, and the Squaw Mountain North III site.

[Oregon] Principal Investigator on volunteer LSA project at the Cal Schmidt Clovis site for Lakeview BLM.

[Oregon] Litigation with Region 6 of the Forest Service relating to Times Square Rockshelter data recovery contract: commenced.

1986

Lee Spencer Archeology (LSA) formed.

[Washington] Principal Investigator on a LSA contract with Gifford Pinchot National Forest: the testing and evaluation of stratified open site (45SA117).

[Oregon] Principle Investigator on a LSA contract to examine lithic artifacts from two sites on the Willamette National Forest.

Instructor of two courses, Lithic Technology and Lithic Use-Wear Analysis, University of Oregon.

[Oregon] Contracted by the Willamette National Forest to write up draft guidelines for analysis of debitage and unretouched tools.

[Oregon] Lithic Analyst for IRI.

1985

[Nebraska] Laboratory Director for Archeological Research Services (ARS).

[Nebraska] Principal Investigator for Elko Bureau of Land Management (BLM) at Upper Shelter: a very complexly stratified dry rockshelter site which produced numerous perishable artifacts. This work resulted in report published in the BLM technical series (see bibliography).

[Nebraska] Fulfilled duties of Elko Area BLM Archeologist relating to federal antiquities regulations, in particular to 3809 laws.

1984

[Nebraska] Specialist in stratified dry rockshelter excavation for Elko BLM at James Creek Rockshelter: a complexly stratified dry rockshelter site which produced numerous perishable artifacts.

[Nebraska] Field Director for ARS.

[Oregon] Field Supervisor for University of Oregon (UO)

Instructor of two Lithic Technology courses, one at UO and Oregon State University.


1983

[Oregon] Field Archeologist for HRA and the Lakeview BLM (Oregon).

[Oregon] Field Supervisor for the UO.

Instructor of two Prehistoric Technology classes at Lane Community College.

Demonstrated Prehistoric Technology for various classes in the District 4lj School system and Willamette National Forest Archeological Technician training sessions.

1982

[Oregon] Field Archeologist on UO and HRA projects, including work at South Umpqua Falls Rockshelters.
1981
[California] Lithic Analyst for Barstow BLM project.
[California] Field Archeologist for IRI on the New Melones Project.

1980
[California] Field Archeologist for Professional Analysts.
[California] Principle Investigator for Tule River Indian Reservation.
[Texas] Staff Archeologist for the University of Texas at San Antonio.

1979
[California] Field Supervisor for Archeo-Tec, Inc.
[Peru] Crew Chief for Peruvian National Museum at Proyecto Huaricoto in
Maraca, Peru. Huaricoto was a very deep, stratified ceremonial site, with
pre-ceramic and ceramic components in the central highlands of Peru (South
America). Dr. Richard Burger was the project director. I also worked with
Dr. Izumi Shimada for about two weeks during this time.

1978
[Washington] Crew Chief for Washington State University at the Manis Mastodon
Project on the Olympic Peninsula.
[Oregon] Principle Investigator on contract with the Ochoco National Forest.
Graduate Student, UO, Eugene.
[Oregon] Principal Investigator on testing and evaluation of Zotto Cave.

1977
Graduate Student, UO, Eugene.
[Oregon] Field Archeologist of various University projects, including the
excavation and write-up of a 10,000 year old camel at Fossil Lake.
[Oregon] Principle Investigator for a BLM project in Fossil Lake.

1976
Instructor of Lithic Technology and Analysis course, College of Marin,
Kentfield, California.
[California] Education Director of Novato Prehistory Museum.
Graduate Student, (UO), Eugene.

1975
[Nevada] Analysis of archaeological material and data from the North Fork of
the Little Humboldt River Project.

1974
[Nevada] Ran an archeological field school for the University of California,
Berkeley (UCB) Archeological Research Facility on the North Fork of the
Little Humboldt River Project.

1973
Teaching Assistant on graduate level UCB course in Archeological Method and
Theory at Napa 16, a midden site in the Napa Valley (California).
[Nevada] Ran an archeological field school for the UCB Archeological Research
Facility on the North Fork of the Little Humboldt River Project; sites
include: Ezra’s Retreat, a rockshelter/cave site; Stolen Shelter, a
rockshelter; and numerous open sites.
1972

[Nevada] Field school student at UCB: work at Lovelock Cave, Ocala Cave, and other sites.
[California] Ethnographic and survey work in the Napa Valley.

BIBLIOGRAPHY (some smaller reports not included)

Spencer, L.

1995
Four Northern Great Basin Atlats. Accepted for publication by the Journal of California and Great Basin Anthropology. 6:2 (Malki Museums, Inc., Banning, CA) with Erik Burke.

1993

1992

1991

1990

1989a

1989b

1989c

1989d
1972
(Nevada) Field school student at UCB: work at Lovelock Cave, Ocala Cave, and other sites.
(California) Ethnographic and survey work in the Napa Valley.

BIBLIOGRAPHY  (some smaller reports not included)

Spencer, L.


Tonal Movements


1987d The Debitage Analysis for the Elk Creek Lake Project. Appendix G in, Data Recovery at Sites 35JA27, 35JA49, and 35JA100, Elk Creek Lake Project, Jackson County, Oregon. Infotec Research Incorporated report No. PNW87-7, Eugene (pp. 143).


1986 Debitage Analysis for CASBR3801, the Owl Canyon Site. Appendix 3 in Archaeological Investigations at the Owl Canyon Site (CASBR3801), Mojave Desert, California, by M. Q. Satton. Coyote Press Archives of California Prehistory, No. 9.

1985 Upper Shelter (26EK42) testing manuscript. Ms. in possession of Elko Bureau of Land Management office.

1985 26NY4358, The Small Rockshelter Site. On file with the Archeological Research Services (Gold Hill, NV). Ms. in possession of author.

1983 The Pacheco Site (Marin-152) and the Middle Horizon in Central California. *Journal of New World Archeology.* UCLA, 8:1. With E. B. Goerke, R. Cowan, and A. Ramenofsky.


1978 Zotto Cave (35ML212) Lithic Analysis. Ms. in possession of author.


1975 *Sections on Projectile Points and Preforms and Artifact Illustrations in, The Pink Point Site, by C. Busby, J. Bard, and T. Clark*. Copies available from the Archeological Research Facility at the Univ. of California, Berkeley, I think.


REFERENCES CITED


Ayres, W. and Eisler, D.

Clark, J.

Clark, J.

Clark, J. and Herdrich, D.

Coastal Zone Management

Frost, J.

Kay, E. and Schoenberg-Dole, O.

Kikuchi, W.

Kirch, P. and Hunt, T., eds.
1993 To'aga Site; Three Millennia of Polynesian Occupation in the Manu'a Islands, American Samoa, Contributions of the University of California Archaeological Research Facility, #51, Berkeley, California.

Morris, P.

U.S. Department of Agriculture,

Whistler, W.
1994 Botanical Inventory of Tutuila Island.