

WIAHUKINI SHELTER SITE (H8), KA'U, HAWAII

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The Sand Dune site and Lua Makalei shelter are located on land belonging to the State of Hawaii and the Waiahukini shelter on land owned by the Bishop Estate and leased for cattle ranching. We are appreciative to all those responsible for facilitating permission to survey and excavate sites on these lands.

It is impossible to do justice in recording the events of these years without recognizing the assistance and cooperation received from those who gave unsparingly and who devoted their time and effort so that this work could be accomplished.

Scores of names in our record books attest to the large number of volunteers who participated in our field work. The list is so long that we can mention only those who devoted extensive periods of time to these projects: Mr. and Mrs. Ivan Rainwater, Mrs. Kenneth P. Emory, Mr. and Mrs. J. Halley Cox, Dr. and Mrs. Chandler Rowe, Miss Tiare Emory, Miss Helen Chambers, Miss Joan Steffens, Miss Margaret English, Mrs. John Hansen, and Mrs. William J. Bonk.

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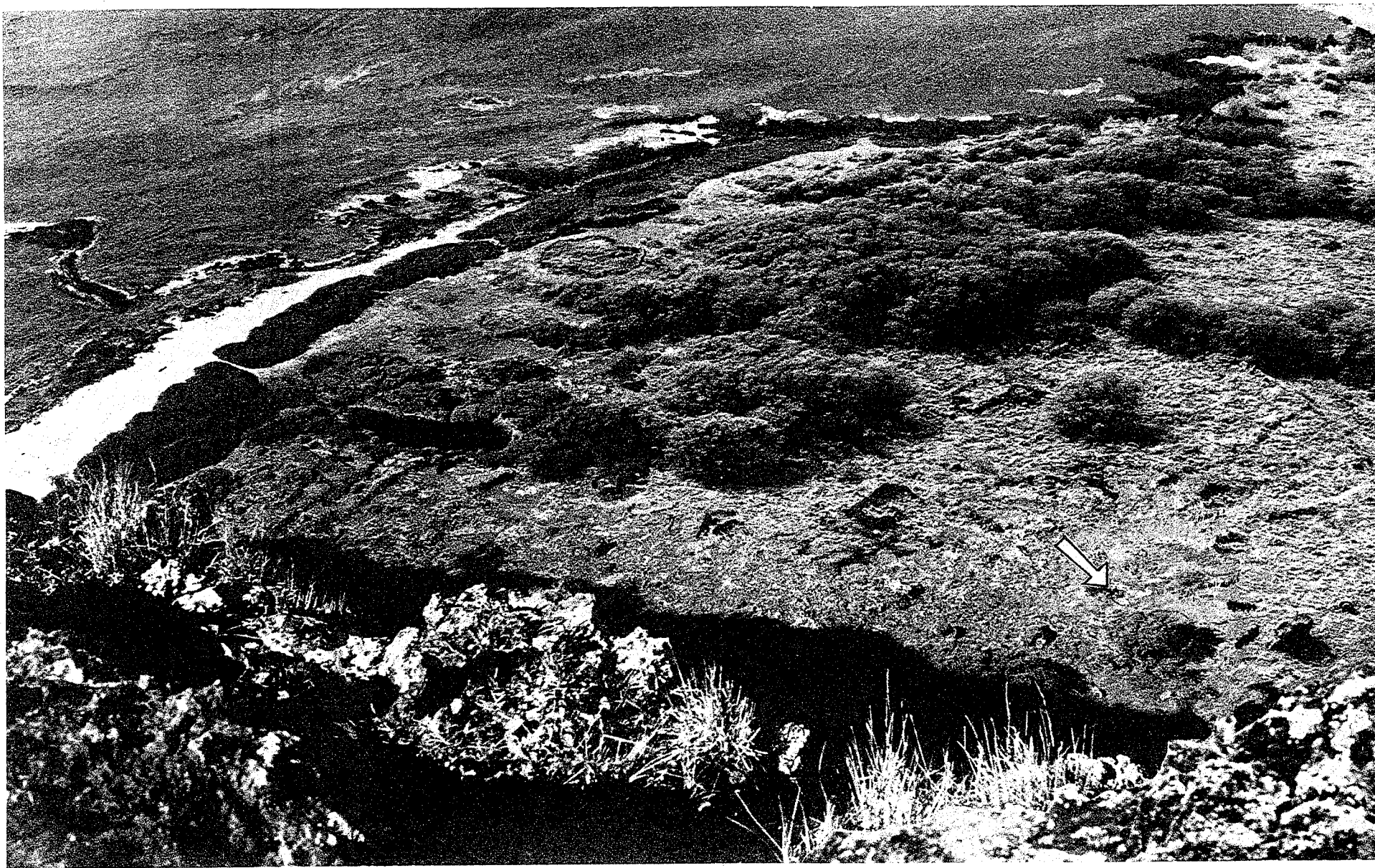


Figure 1. Looking down on Waiahukini from Pali-o-Kulani. Arrow indicates eastern entrance to shelter-cave site, H8. The 1868 lava flow barrier can be seen in the background. Photo by M. Kelly.

## THE SITE

Waiahukini\* Shelter, site H8, is a small fishermen's shelter approximately 200 feet from the foot of Pali-o-Kulani and about 600 feet inland from the shore (Fig. 1; see also Emory and Sinoto, 1969, this vol., opp. p. 1, Fig. 1). The shelter is a natural chamber within a lava tube of an ancient flow which forms the ground of Waiahukini. Entrances on two sides have been provided by breaks in the lava tube (Figs. 2 and 3). The shelter has a floor space of 20 by 25 feet and is dimly lighted by the two openings (Fig. 4). The room is cool during sunny days and dry under normal rainfall conditions. Rainwater seepage takes place only during a very heavy downpour and at those times the constant dripping of water from the cracks overhead results in a short period of uncomfortable living conditions.

The cave continues westward from the main living space. A few artifacts were found on the rock floor of this unlighted tube. Although it could have served as a storage area, it did not provide sufficient light and space for normal living activities. At a distance of 30 feet this westward extension reaches a small exit.

The shelter is inland and to the east of scattered house sites, some of which must be remains of the Hawaiian settlement famous as the place where King Kalaniopuu died in 1782 (Kuykendall, 1938, p. 32; Kamakau, 1961, p. 110).

Waiahukini was the last convenient landing place for canoes bringing people from the west side of Hawaii bound for the windward side, but proceeding on foot (see Kelly, this vol., p. 15, 18-19).

Of the few other natural shelters of the same character which we located in the vicinity, none provides as secure shelter, and none has an earth floor of any depth. The archaeological importance of this shelter was realized after its discovery on August 9, 1954, when a test dig was made of square E 11, on August 11 and 16. This revealed a depth of 24 inches of cultural deposit and yielded 53 artifacts, mostly fishhooks, fishhook blanks, and sea-urchin files. When we closed operations on July 7, 1958, our excavations had resulted in having available for study 1,626 artifacts in addition to 6,809 files and saws, and 196 rubbing stones. The fishhooks alone number above 1,211. We had excavated the entire floor except for some of the fringing area where the deposit was extremely shallow.

## MAPPING AND EXCAVATION

On August 9, 1954 the mapping of the shelter was begun, using a plane-table and alidade. Note that here, as at all sites in the area, we designate a square by its coordinates at its southwest corner.

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\* Waiahukini is a contraction of Wai-o-'Ahukini (Water-of-Ahukini).





Figure 2. Waiahukini Shelter, Site H8. Lowell Tarada stands in east entrance to the lava-tube shelter cave. Behind him Albert Koga sits at the west entrance. July 10, 1956.



Figure 3. General view of area surrounding Waiahukini shelter cave. William J. Bonk standing in east entrance.

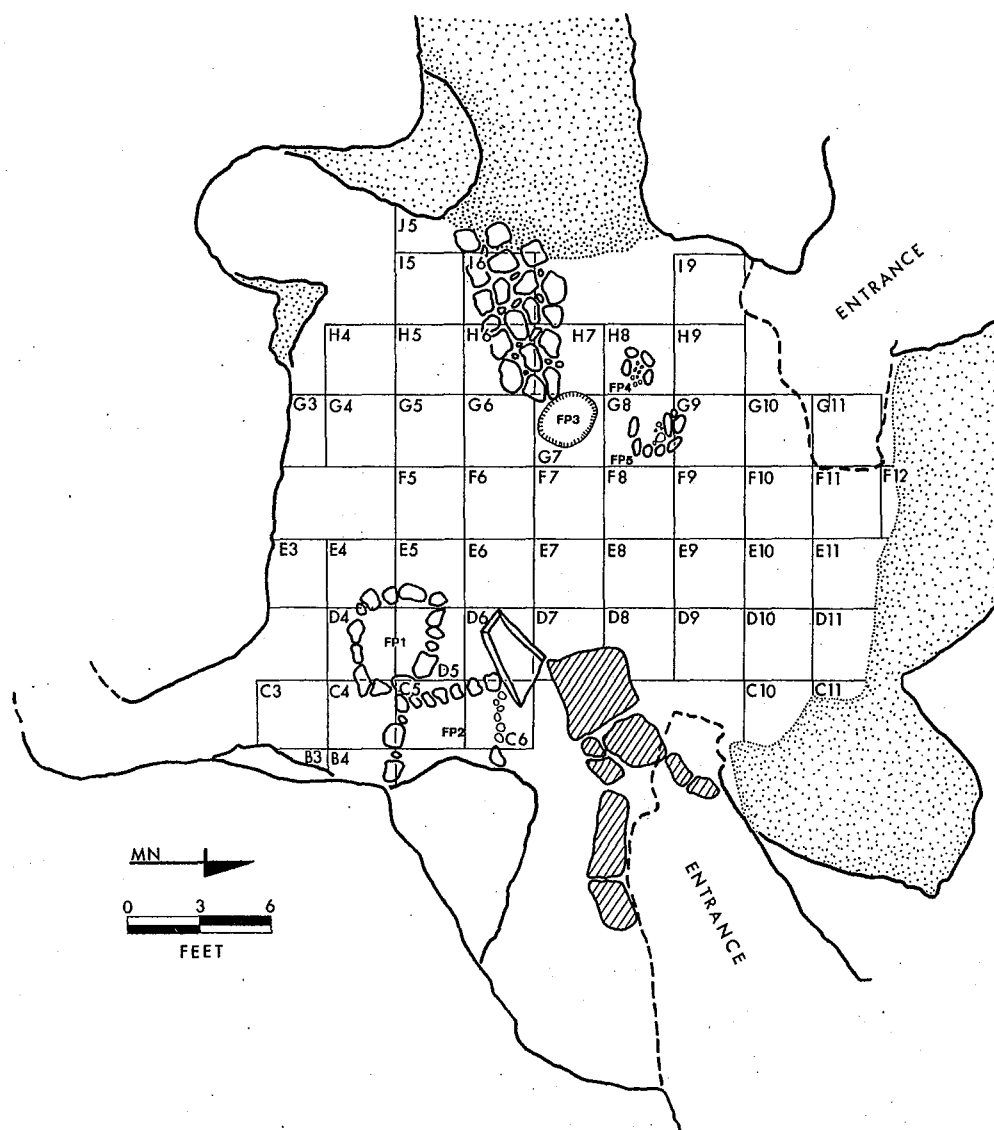


Figure 4. Waiahukini Shelter, Site H8. Floor plan giving location of fireplaces 1 to 5.

Squares E 11 and F 12 were dug to sterile in the first test operation in August 1954. It was not until the summer of 1956 that further excavation of the shelter was undertaken. This was accomplished with students from the University of Hawaii, Hilo Campus, forming the nucleus of the field crew with Bonk in charge.

An east-west trench was dug to bedrock along the entire 9 line in squares D 9 to I 9. A north-south trench along the E line in squares E 3 to E 8 was taken down to a rock-slab paving at a depth about 12 inches below the surface. Another east-west trench was put in along the 5 line in squares D 5 to G 5, again stopping at the paved level. Next, squares G 3 to G 8 were excavated to the paving level and a number of shallow squares, adjacent to the east wall (B 3, B 4, and C 3 to C 6), were dug to the natural lava shelf there. In December 1956 a trench was put down to the very bottom of the lava tube. It went through the northern halves of squares C 10 to G 10. The removal of the contents of adjacent squares C 11 to G 11 in the process exposed a cross section easy to examine at line 10.5 (Fig. 5).

From this stage on, although continuing to dig 3 to 6 inches at a time, we were able to record the two floor levels as we came to them.

Bonk resumed excavations again at the end of 1957, at which time the half-squares still standing (D 10, E 10, F 10, G 10) were dug and screened. The very last digging was accomplished in two field seasons, spring and summer, 1958.

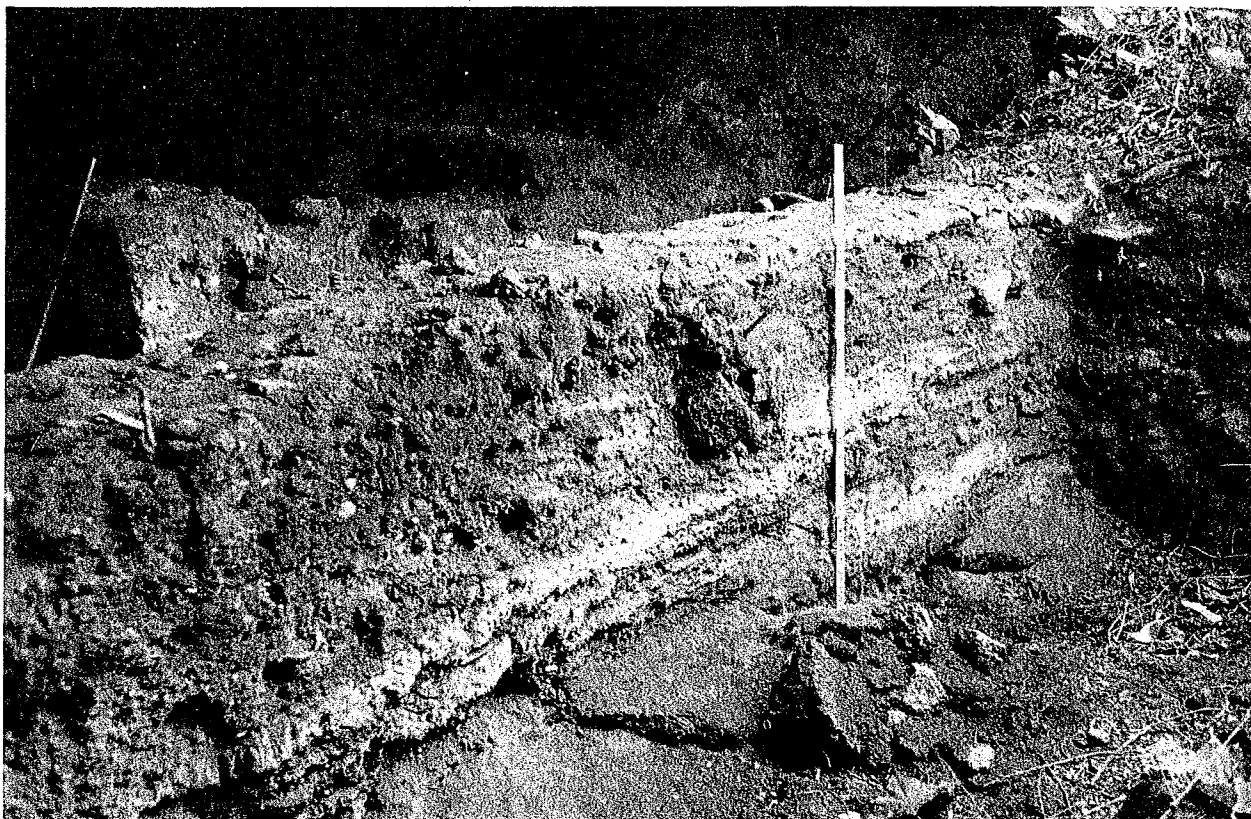


Figure 5. Waiahukini Shelter, Site H8. Cross section from east to west along the 10.5 line toward the west entrance, as of November 28, 1957. Exposed is the north face of part of square E 10.5, of all of squares F 10.5, G 10.5.

#### STRATIFICATION

The floor of the Waiahukini shelter, as it appeared when first entered by us, was quite level except for a slight rising elevation toward the east and west surface opening due to soil wash. It was covered to a depth of two to three inches with light-brown dust. Beneath this the cultural bearing deposit began and extended down to rest on the bottom of the lava tube except for one to three inches of reddish-yellow earth lying in pocket depressions on the lowest parts of the tube. The source of this earth and of the dust covering the top of the floor was the so-called "Pahala ash" which mantles the top of the bluff to the east and is constantly being blown onto this lowland. The shallowness of the "Pahala ash" on the bottom, indicates no great antiquity for the shelter because the red earth had only begun to accumulate, when it was entered by man.

At more or less six inches below the surface it was possible to detect a hard-packed surface at the northern end of the floor and to follow this southward with some certainty along the eastern side of the floor. At an average of 12 inches below the surface a slab pavement was encountered over the central and southern part of the floor. The paving slabs of the central part lay on some slabs placed below, probably to bring the upper slabs on a level with adjacent ones. Hard packed earth at about the level of the pavement and extending over the north end of the floor seemed clearly an extension of this cultural level and has been so regarded in our analyses of artifacts and midden material. The cultural layer from the top of the floor to the hard-packed layer buried at about 6 inches, we have called level I-1, from there down to the pavement level I-2, and from the pavement level to sterile, level II.



The cross-section map in a north-south direction on the E line gives the distinguishable cultural layers (Fig. 6A). The cross-section map in an east-west direction along the 10.5 line gives in detail the distinguishable cultural layers and composition of the floor (Fig. 6B). Figure 7, shows the floor plan of the central part of the floor at the pavement level.

The cross-section of the west face of square E 8 (Fig. 8) gives an excellent idea of the situation as regards cultural levels. The level of the pavement is the only clear-cut horizontal division in this site.

## FEATURES

When the cave was first entered, an irregular pile of rocks lay scattered about the living area in front of the western extension of the lava tube. A great stone block, which had fallen from the roof before the shelter was occupied, lay table-like along the eastern side and, as we proceeded with its excavation, another such block emerged on the opposite side of the floor (see Fig. 3). These very likely fell at the same time as those portions of the roof whose dislodgement opened the east and west entrances. Subsequent earthquakes can explain large stones encountered rather frequently in the cultural deposit.

Fireplaces. Before excavation two stone-enclosed fireplaces were visible along the east border of the floor, numbers 1 and 2 in the floor plan, and charcoal and ashes on the west border marked an unenclosed hearth, number 3 (see Fig. 3). Soon after excavation began, three stone-enclosed hearths appeared, fireplaces 4 and 5, attributable to cultural layer I-1 (see Fig. 6). Fireplace 6 rested on the bottom of cultural layer I-2, and was marked by a circle of stones in square G 7, just under fireplace 3 (see Fig. 6). The rough stones of fireplace 6 occupied a space between 3 and 10 inches below the surface.

Under fireplace 2, at about the pavement level another hearth appeared, fireplace 7, (see Fig. 6). The lowest fireplace of all, number 8, was uncovered under fireplace 6 in square G 7, at 20 to 26 inches below the surface. Its circular shape is to be seen in Figure 9.

## THE ACTIVITY AT THE WAIAHUKINI SHELTER, H 8

The quantity and distribution of artifacts and midden material at H8, inform of the activity of its occupants from the beginning of its use to the end, and of the duration of cultural phases.

### The Midden Material

For a record of midden material all the shells and bones from each 3-inch level were collected from the central square E 8, and weighed. Midden at each level was sorted for the various kinds of mollusks (Table 1), and animal, bird, and fish bones, as well as crustacea remains (Table 2). These data suggest that the shelter was the setting for about the same degree of activity throughout its occupation, with the exception of some intensification immediately prior to and following the laying down of the pavement, which was located at an average of 12 inches below the surface.

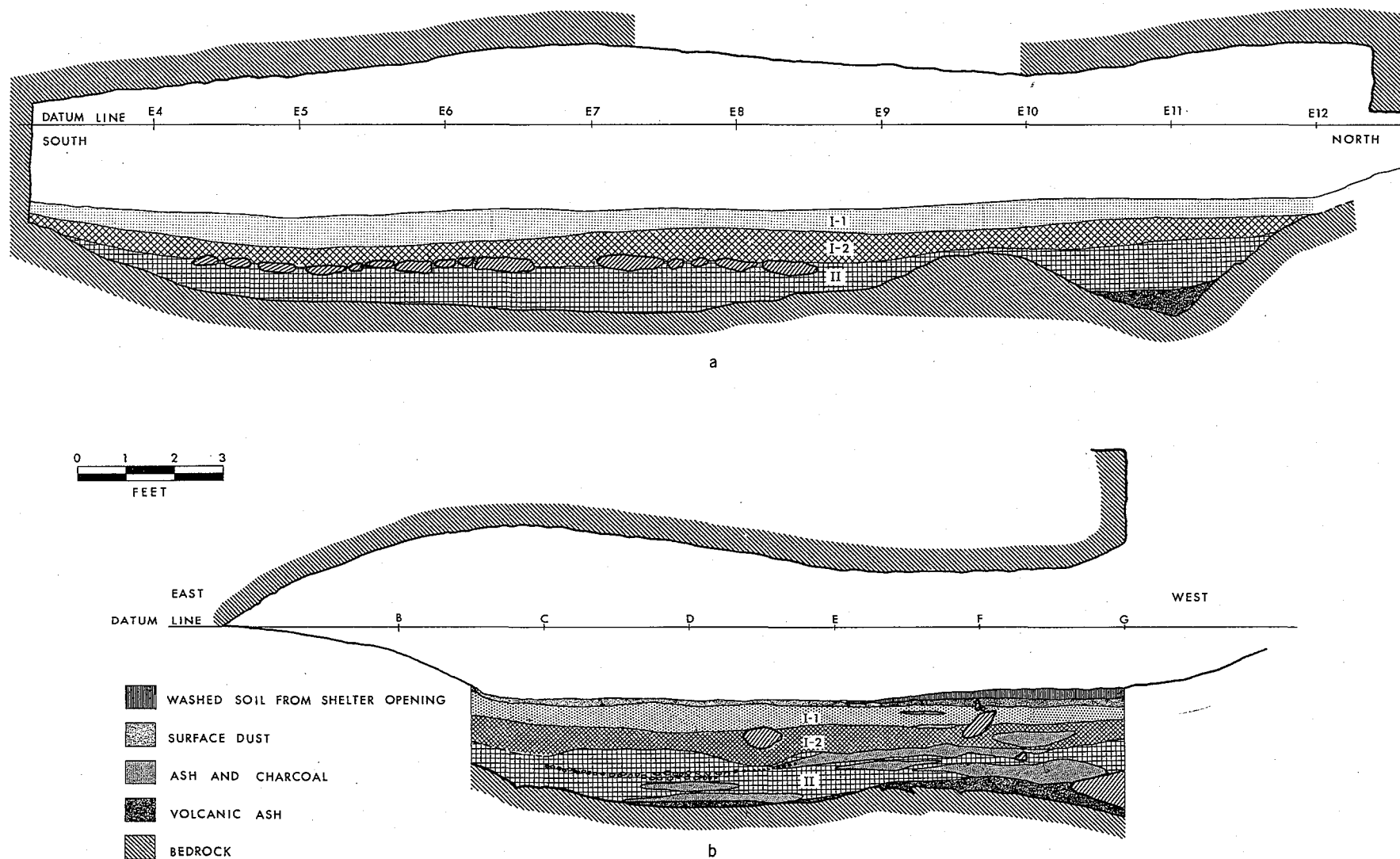


Figure 6. Waiahukini Shelter, Site H8. a. Cross-section of the floor on the E line, viewed from the east; b. cross-section on the 10.5 line, viewed from the north.

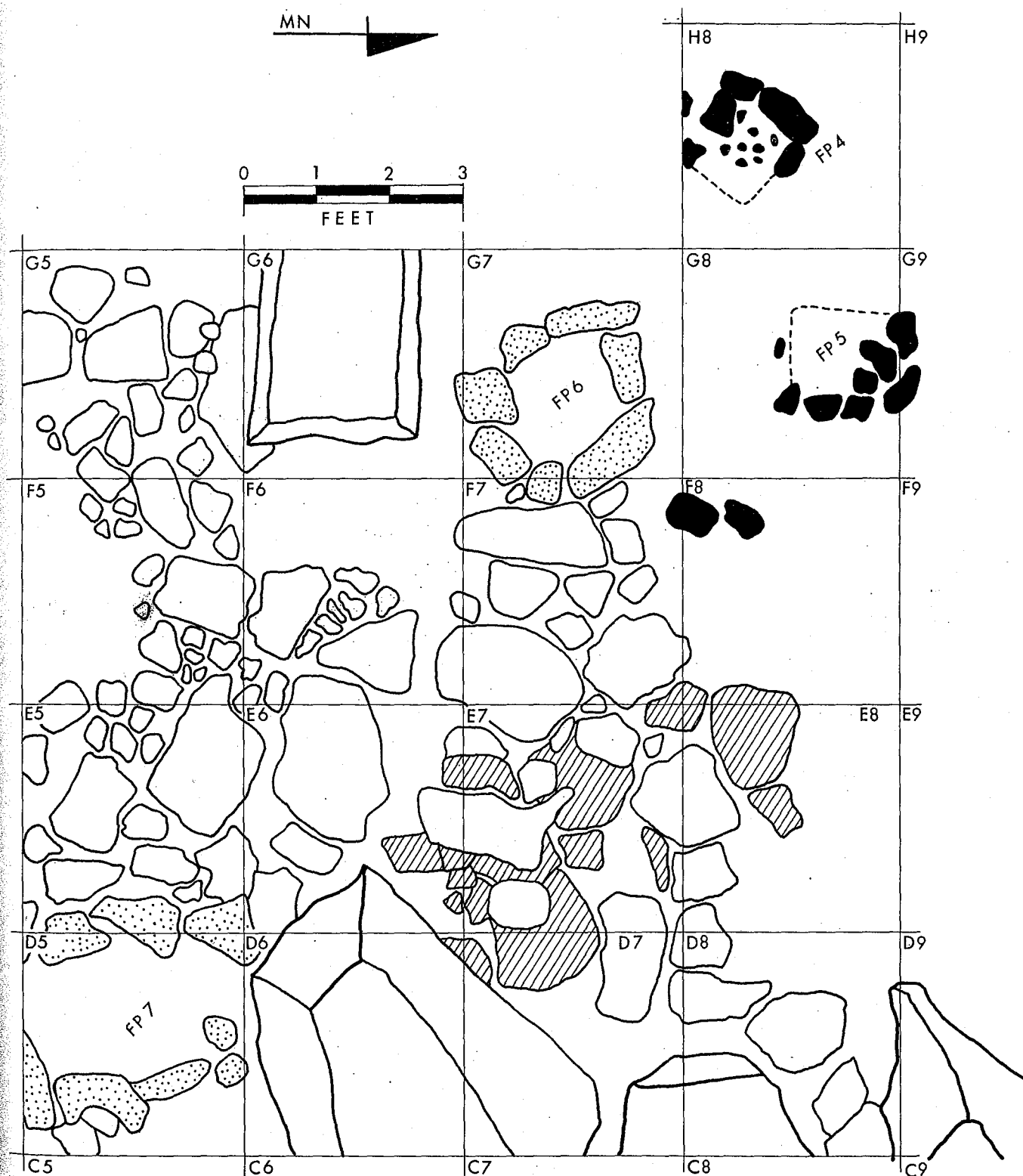


Figure 7. Waiahukini Shelter, Site H8, Floor plan at pavement level 12 inches below the surface. Fireplaces 4 and 5 appeared just below the surface, 6 and 7 rested on or just above the pavement.

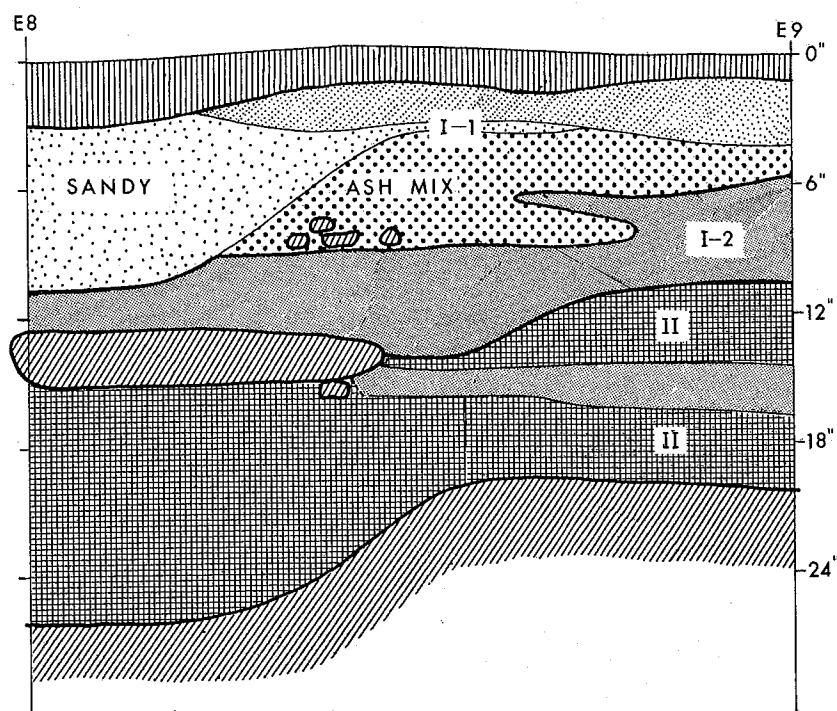


Figure 8. Waiahukini Shelter, Site H8. Cross-section of west face of square E 8, showing in detail irregularities of cultural levels. For interpretation of cross-hatching and dotting see Figure 6.

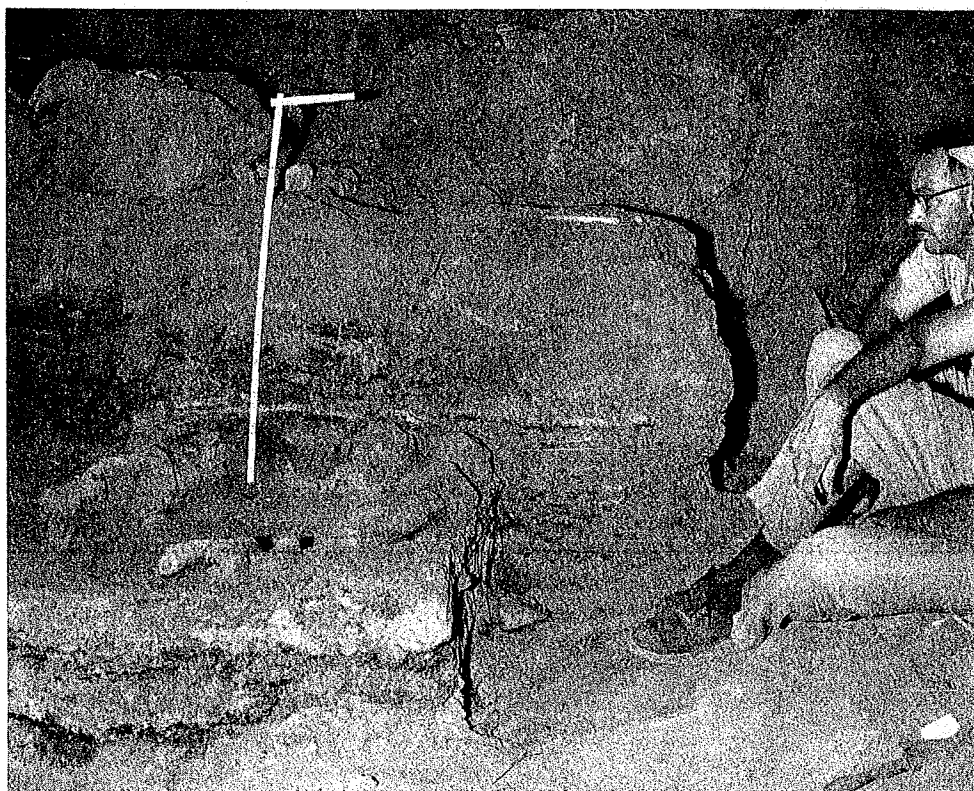


Figure 9. Waiahukini shelter, site H8. Fireplace 8 in lower part of square G7, February 2, 1958.

Table 1. Quantitative Mollusk Content of Square E 8, Waiahukini Shelter Site (H8), Ka'u, Hawaii\*

Depth (in.)	Layers	Weight in Grams								Total
		Neritidae <i>pipipi</i>	<i>kupee</i>	Cypraeidae <i>leho</i>	Muricidae <i>pupu</i> <i>'awa</i>	Conidae <i>pupu</i>	Patellidae <i>opihi</i>	Littorinidae <i>pipipi kolea</i>	Misc.	
0-3	I-1	1,340.7	11.95	539.1	873.9	277.7	106.2	19.3	82.2	3,251.05
4-6		1,149.7	27.8	450.9	667.5	135.0	77.0	25.9	314.28	2,848.08
7-9	I-2	1,106.65	21.58	480.0	819.07	71.04	88.37	27.48	541.42	3,155.61
10-12		3,395.2	60.0	890.0	1,470.8	186.3	272.9	55.2	90.6	6,421.00
13-15	II	2,160.92	41.33	529.24	732.06	230.43	187.5	41.26	51.17	3,973.91
16-18		959.07	35.8	364.22	647.56	104.3	59.47	22.1	24.22	2,216.74
19-21		1,035.52	22.53	266.5	594.9	134.45	50.3	71.9	64.72	2,240.82
22-24		881.0	28.9	311.4	411.5	97.4	105.9	40.35	40.6	1,907.05
24-25½		174.7	36.4	314.5	54.95	58.05	96.4	2.85	7.6	745.45
Totals		12,203.46	276.29	4,145.86	6,272.24	1,294.67	1,044.04	306.34	1,216.81	26,759.71
Percent		45.6	1.0	15.5	23.5	4.8	3.9	1.1	4.6	100

\* Data compiled by W. J. Bonk.

Table 2. Quantitative Content of Square E 8, Waiahukini Shelter Site (H8), Ka'u Hawaii\*

Depth (in.)	Layers	Mollusks	Mammal	Weight in Grams			Total	Percent
				Crus- tacea	Fish	Bird		
0-6	I-1	6,099.13	46.5	11.9	612.5	2.5	6,772.53	21.51
7-12	I-2	9,576.61	30.45	23.2	1,023.76	10.6	10,664.62	33.87
13-18	II	6,190.65	47.55	11.84	1,527.4	31.1	7,808.54	24.80
19-24		4,147.87	17.6	32.68	1,030.62	33.4	5,262.17	16.71
25-25½		745.43	6.95	14.5	168.0	40.0	974.88	3.09
Totals		26,759.69	149.05	94.12	4,362.28	117.6	31,482.74	99.98
Percent		84.99	.47	.29	13.86	.37	99.98	

\* Data compiled by W. J. Bonk.

Among the mollusks there is no indication of a shift in diet. Only the periwinkles (*Littorinidae*) seem to be less favored as time went on. The order of preference, to judge only by weight of the shells, was *Neritidae* (see snails, *pipipi*, *kupee*) 46.6%; *Muricidae* (drupe, *pupu* *'awa*) 23.5%; *Cypraeidae* (cowry, *leho*) 15.5%; *Conidae* (cone, *pupu*) 4.8%; *Patellidae* (limpets, *opihi*) 3.9%; and *Littorinidae* (periwinkles, *pipipi kolea*) 1.1%. However, 1000 grams of *opihi* shells would quite possibly produce more food than 1000 grams of *pipipi* shells. The available supply of shells was practically constant, and that of animals, fish, and birds was more haphazard. Thus, bone remains are not as likely to be sensitive indicators of the amount of use made of the cave for a shelter as shells are. However, as in the case of the mollusks, larger amounts of the bone material cluster around the pavement level (Table 2). The steady decrease in bird bones suggests probably that birds were becoming more wary and consequently more difficult to obtain. Similar decreases of bird bones in the midden material from early to late periods were also observed in excavations on Oahu (Emory and Sinoto, 1961:17), and interestingly, by Sinoto at Hane dune site on Uahuka, Marquesas Islands.



### The Artifacts

The detailed description of artifacts from H8, together with those from H1 and H2, will be published by Sinoto at a future date in a separate report. The distribution of artifacts in Waiahukini shelter (Table 3) indicates that the site came into full use soon after it was made available when an earthquake caused the roof to cave in at two points, creating the east and west entrances. Evidence for this is found in the extremely shallow, sterile bottom deposit which was only a very few inches deep. It remained in the intensive use until the abandonment of the region in historic times, but its maximum popularity was reached around the time the pavement was laid down. At this time, the height of the roof above the floor was a foot more than when we entered the cave, hence it was appreciably more habitable. The subsequent raising of the floor by midden deposit gradually squeezed the occupants against the roof and would have eventually caused the abandonment of the shelter unless the later accumulations were removed.

Table 3. Distribution of Artifacts in Waiahukini Shelter Site H8, Ka'u, Hawaii

Layer	One-Piece Hooks	Two-Piece Hooks	Hook Blanks	Trolling Hooks		Octopus-Lure Hooks															
				Shanks	Points	Cowrie Lures		Points	Sinkers	Toggles	Adzes	Grind Stones	Knives	Drill Points	Scrapers	Shell Stoppers	Picks	Beads	Pendants	Tattoo Needles	Totals
						Primary	Secondary														
I-1	291	238	75	1	2	5	8	1	1	5	11	5	2	2	5	1	45	24	10	0	732
I-2	147	107	57	0	3	3	5	2	0	4	5	0	0	5	1	0	12	11	9	5	376
II	204	151	59	1	0	4	3	0	0	0	2	3	0	4	0	4	19	53	5	2	514
***	14	30	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	49
	656	526	194	2	5	12	16	3	1	9	18	8	2	11	6	5	76	90	24	7	1,671

\* Data compiled by Y. H. Sinoto

\*\* Cultural association unclear.

The nature of the artifacts justifies calling this a fishermen's shelter.

Layers	Fishhooks & blanks		Other artifacts		Total number of artifacts
	number	percent	number	percent	
I - 1	608	83.1	124	16.9	732
I - 2	316	84.0	60	16.0	376
II	415	81.0	99	19.0	514
Totals	1,339	82.6	283	17.4	1,622

The saw and file count for all the levels (Table 4) reveals the activity of making and resharpening the fishhooks. There is no slackening of activity from beginning to end. Cultural layer II has a larger number of these objects (2549) than each of the two succeeding layers. As each of the latter contain approximately an equal number of these tools (2051 and 2122), we can think of them as being each of equal duration, but when taken together, as reflecting a sharp increase in use due to increased population.

Table 4. Quantitative Analysis of Saws and Files in Waiahukini Shelter Site (H8), Ka'u, Hawaii\*

Layers	Saws		Files				Un-identified	Total
	Coral	Lava	Coral	Lava	Sea-urchin spine	Pumice		
I-1	266	36	445	12	1,333	1	29	2,122
I-2	296	2	396	2	1,335		20	2,051
II	445	11	531	1	1,550		11	2,549
***	10	1	23	42	11			87
	1,017	50	1,395	57	4,229	1	60	6,809

\* Data compiled by Y. H. Sinoto.

\*\* Cultural association unclear.

A total of 117 artifacts was recovered from the Test square, E8. All except 13 were fishhooks, fishhook fragments, or blanks. They were distributed as follows:

Layers	Depthsin inches	Numbers of artifacts	Totals
I-1	1-3	14	27
	4-6	<u>13</u>	
I-2	7-9	8	20
	10-12	<u>12</u>	
II	13-15	23	70
	16-18	22	
	19-21	20	
	22-24	4	
	25	<u>1</u>	
			<u>117</u>

The implication here, with 47 artifacts above the pavement and 70 below, is that the amount of use prior to the laying down of the pavement was twice that for the time afterwards. This may have been the case at this particular central part of the shelter, but the overall distribution of artifacts, as shown in Table 3, points to the activity being greater after the pavement was laid down, but only for the period of time covered by layer I-1 above the pavement. This layer has the largest number of artifacts of any layer in the shelter, and if layers I-1 and I-2 are combined, they contain over twice as many artifacts as layer II (see Table 3): This phenomenon could be explained on the basis of the entry of the European goods, when bone, shell, and stone implements were being abandoned due to the drop in local population and the adoption of European ways and implements. All four of the metal hooks collected were in layer I-1, three of them in the first 3 inches of deposit.

The overall artifact distribution, which takes into account 1671 artifacts, while inconsistent with the artifact disposition in square E 8, is not inconsistent with our conclusions from the midden material in square E 8. Thus, one should be cautious in generalizing about the contents of a shelter from the artifacts found in one square alone.

## LITERATURE CITED

Emory, Kenneth P., William J. Bonk, and Yosihiko H. Sinoto

- 1968 *Hawaiian Archaeology: Fishhooks*. Second ed. Bishop Mus. Spec. Pub. 47. Honolulu.

Emory, Kenneth P. and Yosihiko H. Sinoto

- 1961 *Hawaiian Archaeology: Oahu Excavations*. Bishop Mus. Spec. Pub. 49. Honolulu.
- 1969 *Age of the Sites in the South Point Area, Ka'u, Hawaii*. Pacific Anthropological Recs. 8. Dept. Anthropology, B. P. Bishop Mus. Honolulu.

Kamakau, Samuel M.

- 1961 *Ruling Chiefs of Hawaii*. Kamehameha Schools Press.

Kelly, Marion

- 1969 *Historical Background of the South Point Area, Ka'u, Hawaii*. Pacific Anthropological Recs. 6. Dept. Anthropology. B. P. Bishop Mus. Honolulu.

Kuykendall, Ralph S.

- 1938 *The Hawaiian Kingdom: 1778 - 1854*. U. Hawaii Press. Honolulu.