
Hawaiian Use of Lava Tube Caves and Shelters

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Abstract

Due to the geological nature of the Hawaiian Islands, there are many lava tubes found throughout the islands. Some of the collapsed lava tubes provided ideal places for permanent or temporary shelters for the ancient Hawaiians.

The larger and longer lava tubes were utilized as places of refuge in time of war. Women, children, and elders hid there. The entrances to the caves were concealed by well constructed stone walls leaving a very narrow passage in which only one person could enter at a time. In these caves they had platforms for sleeping and cooking areas.

Except for refuge caves, other habitation areas are often found in and near the front portions of the opening. These are called shelters. Since these shelters were naturally well protected from the rain and winds, the place was occupied continuously or periodically over time. Since the layers of soil and artifacts are well preserved, by analysing such stratigraphy the archaeologist can determine the sequence of events that took place.

This paper presents several of the typical yet significantly important archaeological shelter sites and refuge caves on the Islands of Oahu and Hawaii.

Introduction

Because of the volcanic origins of the Hawaiian Islands, there are many lava tubes found throughout the islands. Ancient Hawaiians utilized lava tubes or collapsed lava tubes for many functions, especially as permanent or temporary habitation sites.

The terms caves and shelters have been used in Hawaiian archaeological literature rather loosely without any clear distinction. In this paper only the term shelter will be used. There appears to be two major types of such features in the Hawaiian Islands.

- I. Lava tube shelter
 - A. Short tube
 - B. Long tube
 1. With vertical openings
 2. With horizontal openings
- II. Overhang shelter

Lava Tube Shelter There are long and short lava tubes which have been utilized for dwelling, burial, refuge, and religious functions. Since it is difficult to determine what is a long or short tube, I set up criteria based on the utilized zone of the tubes, not the physical length of tubes. The short tubes are in most cases habitation sites. Long tubes, some of which are several miles long, are

usually refuge shelters. Also, a long tube may have several separate habitation areas with separate openings.

The openings of lava tubes can be classified into the two following types:

1. Vertical openings. The breaks are usually from the top of tubes. In many cases, more than one entrance is present.
2. Horizontal openings. There are two types of horizontal openings.
 - a. Some lava tubes were formed higher than the surrounding ground surface and have openings on the sides.
 - b. Tube openings on cliffs usually have an overhang at the opening which provides shelter.

Overhang Shelter No tubes are associated with overhang shelters. Such shelters are usually formed by erosion on the base of a cliff or bluff.

The Use of Lava Tube Shelters

Habitation The collapsed tubes provided ideal places for permanent or temporary habitation. The overhang shelters were naturally well protected from the elements and suitable for habitation. The

deposition of cultural layers on the floors of tubes and shelters are deeper and better preserved compared with those of open sites. By analyzing such stratigraphy and associated artifacts, archaeologists can determine the sequence of events that took place.

Burials and Religious Functions Tube shelters were often used as burial places and the larger tubes were continuously used even into the proto-historic time. These burial tubes were maintained by either lineage groups or communities, and the burial tube entrances were well concealed. Unfortunately, some of those burials have been violated by pot hunters for years and are accessible to anyone today.

Refuge Places The larger and longer lava tubes were used as places of refuge in times of war. Women, children, and elders hid there. The entrances to the tubes were well constructed by stone walls leaving a very narrow passage in which only one person could enter at a time. Thus it was effectively protected against enemy attack. In these tubes there are platforms for sleeping, cooking, and other activities.

	Number of sites	Functions**		
		Habit.	Burial	Refuge
Hawaii	482	133	44	14
Maui	116	33	13	1
Lanai	18	14	4	-
Kahoolawe	5	4	-	-
Molokai	39	28	8	1
Oahu	84	23	35	2
Kauai	27	16	13	-
Total	771	251	117	18

* After Bishop Museum's site database.
** Functions determined for 386 sites.

The Current Record Of the circa 11,000 site records in the Bishop Museum, 771 sites are listed as caves and shelters. Unfortunately there is no clear distinction between tube shelters and overhang shelters. Table 1 shows that there are many unclassified sites, but it may still be possible to classify many of those sites if we go through the site

records carefully. Another concern is that we know there are examples of lava tube shelters that were originally used for habitation and after abandonment became burial places. Such sites are not currently specified in the database.

The number of tubes and shelters on the Island of Hawaii is 482 compared with 116 on Maui, 84 on Oahu, and 27 on Kauai. Although dependent on the size of the island and its geomorphology, the number of recorded lava tube and overhang shelters most likely relates to the number of archaeological surveys conducted on each of the islands.

Hawaii Island Examples

Since the conference is being held on the Island of Hawaii, I would like to show examples of the typical sites in the different categories found on this island.

Lava Tube Shelter Waiahukini Site, #50-Ha-B21-6 (H8), located at Waiahukini near South Point, in Ka'u District.

This is one of the most important sites in the Hawaiian Islands. Fishhooks and other artifacts from the stratified deposit (Figure 1) provided an excellent typological sequence which eventually led to establishing a Hawaiian fishhook typology and chronology (Emory, Bonk, and Sinoto, 1959).

The site is a small fisherman's tube shelter approximately 67 meters from the foot of Pali-okulani cliff and about 200 meters inland from the shore. The tube shelter is a natural chamber for habitation. Entrances on two sides have been provided by natural breaks in the ceiling of the lava tube. The chamber has a floor space that is 6.7 by 8.3 meters and is dimly lit by the two openings.

The tube continues westward from the main living space but the area was not utilized for habitation except possibly for storage.

Three cultural layers in a total depth of 68 centimeters yielded nearly 1,200 fishhooks of many types. The type distribution of the hooks demonstrated a significant chronological sequence for certain types of hooks. This made it possible to place fishhooks from other sites in meaningful order and relationships (Emory *et al. i.b.*).

The subsequent excavations of other tube shelter sites in Waiahukini also showed very similar fishhook typological sequences (Sinoto and Kelly, 1970).

Lava Tube Shelter Hilina Pali Site, #50-Ha-B2-1, also listed as #50-HV-383, is located in Kalapala, Ka'u District. The tube-shelter is ori-

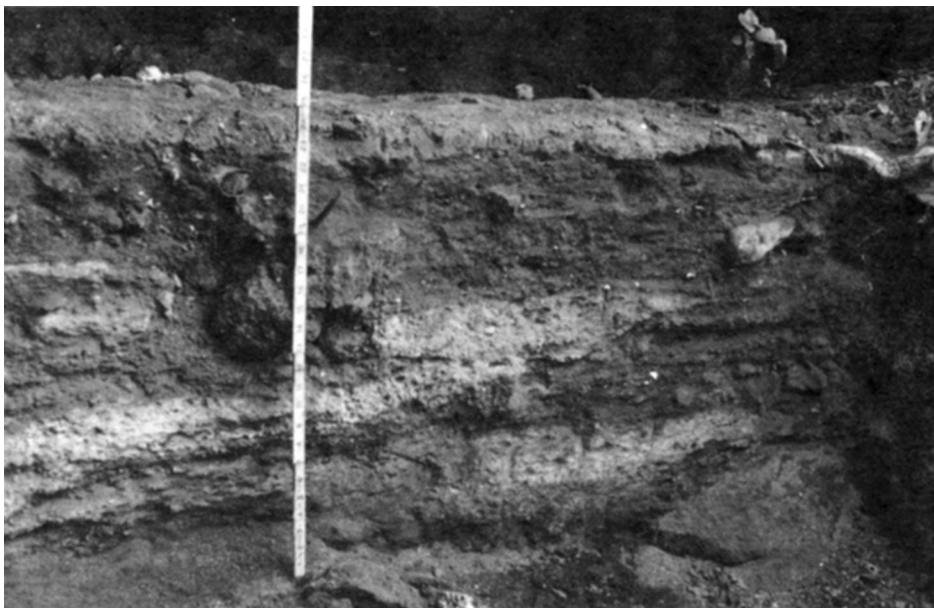


Figure 1—Cultural deposits in Waiahukini lava tube shelter (HA-B21-6), Ka'u, Hawaii Island. Scale in inches (Bishop Museum photo).

ented north to south and a collapsed section of roof permits access from the surrounding plain into both the north and south portions of the tube. The south section, extending 145 meters from the collapse, shows little evidence of use. The north section contains abundant petroglyphs for a distance of about 17 meters from the collapsed area. The collapsed area is roughly circular and about 9.6 meters in diameter with a maximum depth of 2.7 meters. The tube-shelter has about 550 petroglyph units and has a platform with fire places.

The significance of the site is that the petroglyphs on the tube walls (Figure 2) were buried by cultural deposits. Usually, petroglyphs have been found on open lava fields and it has been difficult to establish a chronological sequence of petroglyph forms. The Hilina Pali tube shelter is the first site to provide clues for a typological sequence of Hawaiian petroglyphs. It is hypothesized that in illustrating anthropomorphic forms there was a style preference change from linear to triangular figures around A.D.1600 (Cleghorn, 1980).

Burial Tube Shelter Forty-four burial tube shelters on the Island of Hawaii are listed in the Bishop Museum database. I will describe one of nine burial tube shelters reported from Kalahuipua'a, Anaeho'omalua, and Lalamilo in the District of South Kohala (Kirch, 1979). Site #50-Ha-E2-56 is a large, apparently communal, burial

tube shelter containing 30 individuals with three separate entrances. Burials were only found in the large central chamber. It measures about 20 by 15 meters, with a ceiling height of two to three meters. The burials are mostly found along the northeast wall, except for a central platform on which the scattered crania and infracranial materials of 13 individuals were located. One example of an extended burial lies in a canoe hull segment. There are two more canoe burials along the northeast and southwest walls. After the survey all the burial tube

shelters in the area were sealed off to prevent any disturbance.

Refuge Tube Shelter There are 14 refuge tube shelters listed on the Big Island. I will describe one of them here: Hayes Tube Shelter #50-Ha-C19-1 (H51), located in South Kona District. In 1957 Dr. Kenneth P. Emory and I sketch mapped



Figure 2—Petroglyphs on the wall of Hilina Pali lava tube shelter (HA-B2-1), Ka'u, Hawaii Island (Bishop Museum photo).

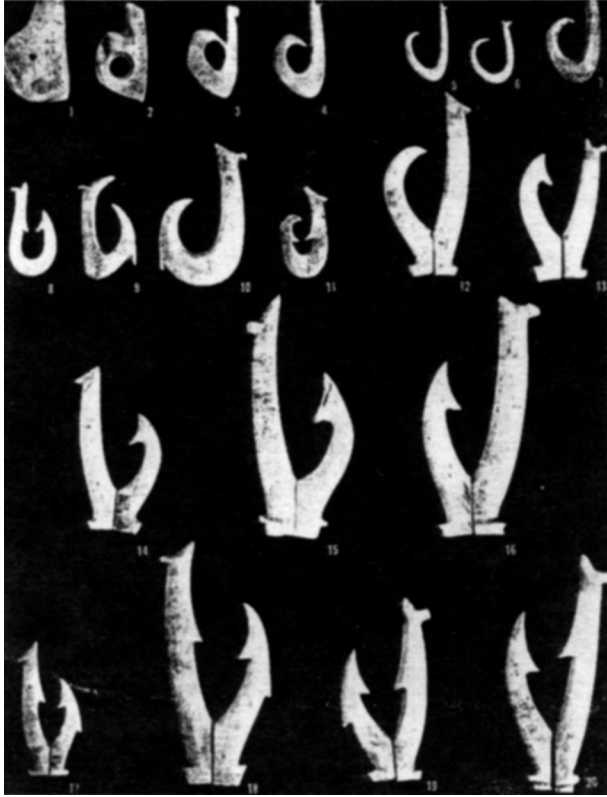


Figure 3—Part of bone fishhook cache found in refuge tube shelter known as Hayes Cave (HA-C19-1), South Kona, Hawaii Island (after Emory, Bonk, and Sinoto, 1959, Plate 4).

the tube shelter with the help of volunteers. The main tube has a narrow passage at the walled entrance and is at least 150 meters long. There are multiple branch tubes, two levels below and one above the main tube. One upper and one lower tube are each about 70 meters long. The tubes average 2.5 to 3.5 meters wide and 1.5 to 3 meters high. Chambers are six to eight meters wide with the ceilings two to six meters high.

Usually, artifacts found in the refuge tube shelters are much better in quality than those found from ordinary sites since refugees probably took with them their prized possessions. There is some evidence of the activities that took place in these refuge shelters, such as fishhook and ornament making.

In this shelter we found a most remarkable fishhook cache (Figure 3). They were buried under about ten centimeters of fine dust in a small area, and every scoop of my hands brought up several

complete hooks. There were 19 unbroken one-piece hooks and 38 two-piece hook shanks and points. One of the one-piece hooks made from a human pelvis is to date the largest one-piece bone hook from an archaeological site in the Hawaiian Islands. There were also fine ornaments such as pendants, bracelets, and game stones found in the tubes and chambers of the site. There were also sleeping platforms and fire places. Inside the tube it is very dark and the candle nut (kukui) shells scattered throughout indicates that Hawaiians used them for a light source.

Archaeological evidence indicates that lava tubes and overhang shelters provided shelter for Hawaiians from the prehistoric to the early historic periods. Although houses and other surface structures were also commonly constructed and used, lava tubes and overhang shelters were convenient natural features that were fully utilized by Hawaiians.

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