Native Use of Marine Invertebrates in Old Hawaii

MARGARET TITCOMB
with the collaboration of DANIELLE B. FELLOWS, MARY KAWENA PUUKI, and DENNIS M. DEVANEY

PREFACE: This paper on the marine invertebrates of Hawaii is one link in a continuing study of the traditional Hawaiian food chain. Many years ago the idea of studying the food customs of the old Hawaiians was suggested to me by a friend, E. S. C. Handy, then an anthropologist at Bishop Museum. Acquiescing, innocently, I began to gather notes on all phases of the subject. Thanks to the great help given to me by Mary Kawena Pukui, a mass of notes was finally brought together and it then seemed best to slow up on collecting information and begin organizing what had been gathered. Some topics have been studied and the results published, notably, “Kava in Hawaii,” Dog and Man in the Ancient Pacific, and Native Use of Fish in Hawaii (Titcomb 1948, 1969, 1972).

The present work is the latest attempt to share the results of our food study. In the preparation of this manuscript, I have been fortunate enough to attract the help of others. To assure accuracy in identifying the shore animals involved, their scientific names had to be included. Dennis M. Devaney, invertebrate zoologist at the Bishop Museum, kindly looked at the manuscript and supplied scientific names of animals covered by his department. Danielle B. Fellows searched the others needed, and added many notes. Her work has been done with so much empathy with the Hawaiian people and their culture that her contribution to the original paper has been considerable. E. Alison Kay also brought up to date many scientific names from the ever-changing records of nomenclature.

Many persons served as informants during the collection of the material. The list of names included at the end of this paper is much too brief. In many cases where a few words of information were procured, the record of the informant’s name may have been lost. This is regretted. Chief among the informants is Mary Kawena Pukui, to whom the Hawaiian record owes so much. The writings of Kaauwana Aukai, S. M. Kamakau, Z. Kepelino, and David Malo also provided a great deal of information.

Grateful acknowledgment is also made for the use of the resources and staff at Bernice Pauahi Bishop Museum in obtaining scientific information, Hawaiian names, photographs, and additional information concerning the animals. A card file of Hawaiian names for marine invertebrates was established at the museum, and a great deal of searching for additional names and identifications was done.

Photographs have proved as revealing as words, and we are most grateful for their use—loaned or donated—as well as the use of the Bishop Museum’s collections, especially those of Ray Jerome Baker, made many years ago.

---

1 Bishop Museum, P.O. Box 19000-A, Honolulu, Hawaii 96819.
2 The portion of the work done by Danielle B. Fellows was supported in part by National Science Foundation grant GB-1329.
Some pictures from Edmondson (1933) have been used. Other photographs come from Spencer Tinker, former Director of the Waikiki Aquarium; David P. Fellows; John Maciolek; Dennis Devaney; Warren Roll; Ralph Bowers; and Frank Tabrah. A search for shore scenes showing Hawaiians gathering marine invertebrates in early days yielded only a few. Notable among them are photographs taken long ago by the well-known Alonzo Gartley, a kama'aina (old resident) and early amateur photographer. More than others, he chose scenes characteristic of Hawaiian life.

**IN HAWAIIAN FOOD ECONOMY,** there was great dependence upon marine resources to supplement *poi,* the starchy mainstay among land foods. The figurative expression for food was *i'a a me poi* (fish and poi). The term *i'a* signified not only fish but all animal foods from sea and land. While the emphasis was on the use of marine invertebrates as food, they were also used for medicinal purposes and in making tools.

There was abundant shore life in the old days, because Hawaiians were observant of the supply available and were careful not to take more than could replenish itself. But as foreigners settled in Hawaii, less care was taken, and the supply eventually became much reduced. Some attempts were made to replenish supplies; for example, the Samoan crab (*Scylla serrata*) and other species were introduced. Such introductions have somewhat altered the composition of the shore fauna. Brock (1952, 1960) recorded attempts at introduction of aquatic animals. He points out the difficulties and the lack of success in the majority of attempts.

People have made many changes in shore waters through the addition of high-nutrient sewage; by dumping bagasse from sugar processing; by increasing siltation; through increased fresh-water run-off; and through structural changes, such as neglect of fish ponds, accommodation for ships, dredging and land-fill projects, and construction of berms and retaining walls along property fronting the shoreline.

Depletion of invertebrates is apparent in the local markets. There is little to buy in the way of native forms, which are too scarce to permit commercial collection. The Hawaiians, Japanese, and others who search for the local forms enjoy their catch themselves.

It is now recognized that a period of well-planned conservation must take place in order to preserve the remaining marine resources. Increasing awareness of the deleterious effects of present-day technology and population expansion has resulted in new legislation aimed at protecting Hawaii's shoreline habitats and marine life.

Great use has been made in this paper of the knowledge of Mary Kawena Pukui, part of whose life has been spent in the district of Ka'u (in southern Hawaii) among Hawaiians with food habits that have not changed greatly from the old ways. Other information was found recorded in old Hawaiian newspapers and was chosen and translated by Pukui. Additional sources are noted throughout this paper. No stress has been put upon the timing of each custom. The cited source reveals a good deal, but so many customs were handed down from ancient days and so many others are obviously of recent introduction that the attempt to pinpoint the time of introduction seems futile. When known it has been cited.

Scientific determination of the invertebrates has been done gradually, as informants have offered Hawaiian identification of organisms. Mary Kawena Pukui's knowledge of Ka'u district names and customs has made possible many determinations (Pukui and Elbert 1957). In some instances, scientific determinations have been deduced from the Hawaiian descriptions. Isolated scraps of information have been discovered now and then as notes in privately owned copies of Edmondson (1933), and in journals, letters, and notes from missionaries, adventurers, and scientists.

It must be stressed that the information contained in this work depicts uses and names in the period of Hawaiian history.
following *haole* (foreign) contact. We do not know whether precontact uses and names for the invertebrates were different from those given for postcontact Hawaii. If changes were made, they must have occurred gradually. No comparative work in southeastern Polynesia, which might possibly indicate the age of some customs, has been done. Careful analyses of invertebrate remains—principally of mollusks and sea urchins—probably would reflect regional differences in food habits that are not indicated in this work, as well as give additional and perhaps different insight into Hawaiian uses of marine invertebrates.

**HAWAIIAN NOMENCLATURE**

It would be in error to state that the Hawaiians did not have a system of nomenclature founded on keen observation. One need only examine the groups of animals indicated as *lo'i* (Holothuroidea, sea cucumbers), *leho* (Cypraeidae, cowries), *'ina* and *wana* (Echinoidea, sea urchins), and *pūpū* (Gastropoda, snails) to realize that the Hawaiians saw relationships among various kinds of animals and subconsciously, perhaps, organized their concepts of these animals into a classification system. But it should be pointed out and emphasized that anatomical and morphological relationships were only part of the basis for classification.

Distances between the islands precluded the amount of communication that would have been needed for complete agreement among the people as to names. What is more, although the astute minds who picked Hawaiian names and groupings did very well indeed, agreement among all the islands was not an aim, and records were not kept—except in memories. Therefore, more than one name may have been chosen, here and there, as acquaintance with the various animals was made. This creates confusion at times, which will become evident as one reads this paper.

Formation of names depended upon habitat preferences, economic uses, behavioral traits, color variations, and particular isolated stages in the life cycle—all these were equally important with gross body structure in naming and classifying organisms. One must therefore keep an open mind in attempting to attach scientific names to organisms described in Hawaiian literature. In many cases, more than one kind of organism (phylum, class, family, or species) is designated by one particular Hawaiian name, simply because the general appearance, habitat preference, economic use, behavioral trait, color pattern, or stage in the life cycle connotes sameness in the Hawaiian view.

The use of a binomial system of nomenclature is also suggested in Hawaiian names for organisms. If the animal under discussion belonged to a sharply defined group, the particular animal's name was found to consist of the group name followed by a qualifying term, which was in most cases descriptive of the animal's appearance, behavior, habitat preference, or use. In other cases, animals of equal cultural or economic value (or of no value at all) that were only superficially similar in habits and appearances had a common Hawaiian name—if in fact they were named—and only sometimes were their differences denoted by qualifying terms used with the group name.

Finally, as is true in the case of common English names for particular species, Hawaiian names for organisms were found to vary from locality to locality.

**GATHERING OF MARINE INVERTEBRATES**

As stated in an earlier work on the native use of Hawaiian fish (Titcomb 1972), the custom of food division in the old days when Hawaiians were their own managers was patterned in a communal manner. Food gathered was surrendered to an officer of the high chief and a fair division was made there on the shore, whether the recipients had had anything to do with the collecting or not.

It was chiefly women's work to gather shellfish and seaweeds (*limu*). Every day they went out on the reefs and shores in numbers, with children searching right along with them for everything edible (Figures 1, 2). A
gourd calabash would be tied to their persons by a string or rope that was long enough to allow the calabash to float out of their way, but it could be pulled in quickly to take the catch. Often, storms would interrupt the search, as Kamakau (n.d.: chap. 4:43) says: “During the stormy days of winter, winds blow, rains fall, thunder and lightning play, mud is washed into the foaming sea over the squid beds, covering the holes of the
sand crabs. Shore fishing is impossible with the floor obscured by the silt; the fisherman must turn his attention to the deep sea.”

**NATIVE USE OF HAWAIIAN MARINE INVERTEBRATES**

**Sponges**

_Hu'ahu'a, hu'ehu'e, hu'ahu'a-kai_ (foam of the sea), _hu'ehu'e-kai, hu'a-kai_; _'ūpi_ (derived from the word meaning “to squeeze”): any of the various sponges found in Hawaiian waters. Not used as food or medicine.

_'Ana: Leiodermatium, a siliceous sponge (Figure 3A). Used as medicine (Kamakau 1964:103, 143). Andrews (1865:54) defines_ ‘ana as “a kind of light stone found in the sea, used by nurses to cure the ea, or the white fur on the tongue; also used in rubbing and polishing off canoes and wooden calabashes.” Pukui and Elbert (1957:22) define it as a stony sponge, used as medicine and as sandpaper. It has been suggested that perhaps the _‘ana_ used medicinally is different from the _‘ana_ used as sandpaper. The former may be a kind of sponge, _Leiodermatium_, that is relatively uncommon, and the latter may include a common, easily obtained coral, _Porites_, and (volcanic) pumice. Scientific identification of a piece of medicinal _‘ana_ furnished by Pukui was made by G. J. Bakus of the Allan Hancock Foundation, University of Southern California, in November 1963. The following is a description of the medicinal _‘ana_ made by Pooloa (1921):
Let us examine this pōhaku 'ana. It is white, its many holes [pores] are grainy, and it looks hard. This pōhaku 'ana is found at Mo'omomi in a hidden cave. One dives into the sea and comes up inside this cave on land. It is guarded by an eel, and there inside by a mo'o. It is at Kala'e, Molokai. Let us turn and look elsewhere. This pōhaku 'ana is [also] to be found in 'A'alaloa, a hidden cave; one dives into the sea and comes up on land. This is on the island of Maui. This is the pōhaku 'ana that is given as an 'ea remedy to little children and for certain kinds of illnesses found in this life. Pulverize it until it is white then give it with prayer. 'Amama, ua noa.

A Laie, Oahu, woman recommends a rinse or gargle of a mixture of crushed 'ana and water for treatment of 'ea (thrush) (Ryan, informant).

Coelenterates: Hydrozoans

'Ili mane'o, pa'imalau, palalia, pololia: Physalia, Portuguese man-of-war. Bryan (1933:146) suggests that the name palalia probably comes from pala, which means soft, and lia, which connotes fear of something. Certainly, the Portuguese man-of-war and its stinging tentacles was as familiar to the old Hawaiians as it is to all swimmers in Hawaii today.

Anthozoans

'Okola, ʻōkole (the anus), ʻōkala (roughness), ʻōkole-emiei (shrinking anus), ʻōkole-hāwele (tied ʻōkole): Actiniarians, sea anemones. Two species were eaten: (1) a white kind (Radianthus cookei) (= Anthoeopsis papillosa), about 1 inch across at the mouth and 1.5 inches long, which lives in the sand; and (2) a dark-brown or reddish kind (Anthopleura nigrescens), a little larger, which lives on lava rocks (Kawelo, informant). PREPARATION: Remove the tentacles, rub the rest of the animal with salt to clean off the slime, sprinkle with salt, and leave it for a few hours. Then it may be eaten raw or cooked in ti leaves. The center is particularly sweet. "Delicious," say Kawelo and others. Kondo reports that as a child in the Hana district of Maui he and his Hawaiian friends gathered anemones and cooked them on a charcoal fire; they ate the entire animals.

Kio-noho-one (sand-dwelling kio): perhaps Isarachnanthus bandanensis. See remarks under kio-noho-one in the Kio section, below. 'Ekaha-ku-moana: Antipathes grandis and similar forms, black coral (Figure 3B). 'Āko'ako'a-ʻele'ele (literally, black coral) is the modern name that was created when interest was aroused in black coral jewelry and the tourist industry demanded that a Hawaiian name be attached to it. Kamakau (1964:103, 144) indicates that it was used medicinally. Kaaiakamu and Akina (1922:23–24) give recipes for the use of ʻekaha-ku-moana:

This is a certain growth in deep water where deep sea fish is sought. It grows like a tree and it is of coral make-up. A small piece from such a growth is used for sores about the mouths of children. The piece is ground to powder and mixed with the juice from the softening or partly decaying banana tree and from four young "kukui" nuts and a piece of mountain apple bark. The mixture is then applied directly to the afflicted part or parts of the mouth.

For lung trouble and for kindred diseases, the following mixture is found to be very effective: an equal amount of each of the "koa," mountain apple and "kukui" bark (each piece being the size of the palm of the hand); about a quart full of the Peperomia stems and flowers; two onion bulbs; one partly dried cocoanut and two segments of the red sugar-cane. Have these materials thoroughly pounded together and then pour into the mixture the milk of a partly dried-up cocoanut. The liquid thus formed is then pressed out and strained. Then four medium-sized red-hot stones are dropped into the liquid to cook it. In the meantime, enough limbs of the "ekaha-ku-moana" have been gathered and powdered, producing an amount which would fill a tablespoon. This and an equal amount of the "ti" juice are then put together and poured into the above mixture after it is cooled to the right temperature. The entire content is then placed in a covered container where its strength can be conserved. The patient then takes about a tablespoonful of this liquid before each meal, morning, noon and at night.

Limu-make, limu-make-o-Hāna, limu-make-o-Mū'olea: Palythoa toxica, a reddish zoanthid or "soft coral" (Figure 4). Previously thought to grow only in one locality in the Hana district, Maui (at Muolea, Kanewai, south of Hana), but recently reported also from Lanai Lookout and Halona Blowhole, Oahu. It is deadly poi-
FIGURE 4. *Palythoa toxica*, the poisonous limu-make-o-Hāna. (Courtesy of William J. Cooke.)

sonous, containing a poison second only to botulism in toxicity (Moore and Scheuer 1971, Walsh and Bowers 1971).

A legend tells how a vicious shark-man was destroyed and the ashes of its body were thrown where this soft coral grows; the ashes turned into this deadly organism. The poison from it was used by Kamanawa, grandfather of Kalakaua *ma*, to kill his wife. N. B. Emerson (Malo 1951:201, note 11) states that it was smeared on spear points to make them lethal. The men who did the smearing were called *hamohamo*, the smearsers. The following letter to the editor of *Ka Lahui Hawai‘i* appeared in the August 23, 1877 issue of that newspaper:

Editor, Greetings,

Please permit me to tell something of the poisonous sea weed of Muolea, at Hana, East Maui.

In olden times it did not grow as it does now and the natives who lived near the sea pools did not know that it was poisonous. When some children went to the sea pools to catch ohua fish to eat, those who ate a quantity became dizzy and fainted by the pools. They revived when medicine was administered. After that, a man from Honaunau in Kona, Hawaii, discovered it. When the pigs ate sweet potatoes he went to fetch the sea weed and rubbed it over the potatoes. After the pigs came back to eat them, every single one died. When the dogs went to lick the vomited matter from the dead pigs, they too died. That is how they found out that it was poisonous, for it also grows in Honaunau, Hawaii.

If you should pick it up with your fingers, they will rot and break off. The only thing to do is to poke it up with a stick and lay it down on a ti or taro leaf. As soon as you touch it it shrinks and wilts like a sensitive plant. It is not long like other algae and is like the suckers on an octopus. On certain kapu nights of the year, a red glow is seen where it is found.

In A.D. 1841 perhaps, the sea pool was filled with stones but now more is growing and out toward the open flats. The fish that swim around it are not harmed, but if you eat the fish of the sea pools, you will die.

This is the fastest working poison like the deadliest haole poison and perhaps more potent. For this reason any person who has not the right to, is absolutely prohibited from going there.

With thanks to the printers and my love to the Editor,

Abraham Kauhi
Muolea, Hana, Aug. 11, 1877

On 30 December 1961, zoologists from the University of Hawaii and Hawaii Institute of Marine Biology (Coconut Island facility) traveled to Kanewai, Hana, to collect living *limu-make-o-Hāna* for research concerning its toxicity. They were repeatedly warned by the Hawaiian residents that the area was *kapu*—that entry into it was a serious transgression of ancient Hawaiian law, and that they might expect punitive action. (On 30 December 1961, at approximately the same time that the zoologists were in the Kanewai area considered *kapu*, a fire of undetermined origin occurred at the Coconut Island marine laboratory, completely destroying the main building and its contents.) On the following day, some specimens of *limu-make* were actually collected and first-hand knowledge of its toxic nature was obtained. The collector absorbed enough of the animal’s mucous secretions through numerous scratches and abrasions on his hands and feet to experience nausea, dizziness, headache, swelling of his hands and feet, and general malaise; the latter two symptoms lasted for about a week (Helfrich and Bowers 1962).

**Corals**


'Āko'ako'-a-kohe, ko'a-kohe (vagina coral): Fungia scutaria, mushroom coral (Figure 5B).

Pōhaku puna, puna: Porites spp. (Figure 5A; W. A. Bryan and K. P. Emory, personal communications).

Kāwae'wa'e: a kind of stone or coral. Used in polishing canoes or in rubbing bristles off pigs destined for the imu.

Corals were used as abrasives, the mushroom coral being most effective and popular. See also comments under 'ana.

Annelids

Muiona: a polychaete annelid worm, resembling a centipede (Pukui and Elbert 1957). No information on uses available.

Kauna'oa, kauno'a, una'oa: Lanice conchilega, a terebellid or "spaghetti worm" (Figure 6; Pukui, personal communication to D. B. Barrère 1962). Note that this is a correction to an earlier statement (Pukui and Elbert 1957) that the kauna'oa is a vermetid mollusk and that the kio is the terebellid worm.

The tentacles were dried, then mixed in water, and taken as a remedy for cancer, according to some modern informants. Other methods of using kauna'oa for this purpose include drinking an infusion of cooked kauna'oa tentacles daily for several weeks (Molokai Island), and sucking the body fluid from a live kauna'oa through a fine bamboo tube (Kona district, Hawaii Island) (Tabrah 1970).

Ko'e: polychaetes from coral (Bryan 1915: plate 113). No data on uses are available.

See also 'aha-hulu-hulu in the section on Echinoderms, Holothuroids, and Kio-po'apo'ai in the discussion of Kio.

Other Worm groups

Ko'e, ko'e kai: sea worms, as the nereidans, echiurids, nematodes, etc. (Pukui and Elbert 1957).

Kio

Kio (Figure 7) appears to be the name for a group of animals rather than for a particular
kind of animal or even for a group of closely related animals. In this case, the grouping seems to be based upon a particular aspect of the animals' appearance—a hard, permanent growth or protuberance on or in the substrate, indicating the presence of the animal. The word *kio* itself means protuberance, bubo, projection (Pukui and Elbert 1957); descriptions of the various kinds of *kio* animals indicate that, in addition to building or forming protuberances, the animals themselves—or parts of them—protrude/emerge from their structures.

Kepelino describes several sea creatures which he calls *kio* (n.d. I: 73, II: 74–77). His descriptions are listed here; the authors' interpretations and tentative identifications appear following each description:
The kio is a very hard creature. The shell surrounding its body is like real stone and around the opening it is like the ‘olepe. The flesh is eaten but the shell has to be broken open with a stone to extract the flesh. It is eaten raw like the ‘olepe. The kingdom of the kio is the beds where the seaweeds grow [1: 73].

There are three kinds of kio, 1. the kio po’apo’ai [Figure 7A], 2. the kio that resembles the nahawele [Figure 7E], 3. the kio that lives in the sand ... all good, classed with i’a because they are edible. They cannot swim away nor can they leave their homes until they die. So I call them creatures that have taken the Carmelite oath.

These are delicious creatures. Their homes are not alike, some live in sand and some on the rocks.

Kio po’apo’ai (serpentine kio): It builds its home on a rock and takes the lime crushed by the sea onto a flat rock where it desires to build. This is how it does it: it reaches down until its tail touches the sand, then it mixes the sand with the lime that is crushed fine as ashes by the sea. This it applies all over its body and gives out some sticky substance within itself. Then the sand and lime become one, like a single shell. Then it begins to build its house close to its head and that is the size and width it will build. When that is done,
then it works on the middle part until it is its whole length, winding around like a coil of rope or the kind of wind instrument called the serpent. In building its home, it does make it look very much like the serpent instrument, in being large at first and tapering down to the tail. Its house is made the size of its body. It is shiny and beautifully smooth inside and extremely hard. The hands alone cannot break its house open, nor can the feet, without the assistance of a rock or iron hammer. When it lives without its house, it hides in the sand and after the house is finished it lives greatly protected. It does not come out nor does anything disturb it. There it is, in its “office,” and stretches out its petals from within, at high tide, and it looks very much like a flower in the ocean. But if touched by anything, it immediately withdraws and disappears. Knowledge of what it eats is not certain—I think probably the minute particles in the sea. Its body is entirely fleshy; there is no bone at all. Its flesh is delicious. It does not live where it is always submerged but where it is frequently left emerged ("sea constantly not" is the literal translation). The “petals” are used to grasp its food and with them it also pushes away any filth or dirt that touches it [II: 74].

The characteristics of the kio po'apo'ai seem to be: (1) it makes a serpentine, very hard tube out of mucus, sand, and lime, the full length of its body; (2) it can live without its “house”; (3) it possesses “petals” (branched gills), capable of being instantly retracted; (4) the animal itself can disappear within its “house” when disturbed; (5) it is intertidal. The description fits sabellid worms and serpulid worms (polychaete annelids).

Kio nahawe [Figure 7E]. This kio lives on a rock like the kio po'apo'ai. Its shell is extremely hard. It makes itself almost immovable on a flat rock. It opens up slightly like the uth [mother-of-pearl shell]. How it makes its house is not clearly understood. I think its house just grows like the uth, nahawe, 'olepe, and so forth [all various kinds of pelecypod mollusks]. Its flesh is like that of the 'olepe, nahawe, 'olepe, and so forth [all various kinds of pelecypod mollusks]. Its flesh is like that of the 'olepe, nahawe, 'olepe, and so forth, and their appearance is alike. When something touches the opening, it clamps shut quickly and holds it fast. Its valves (mau iwi kuapo'i) are the hands by which it takes its food. Its real name is kio. The base (mole) of this kio is made fast to a smooth rock and one side is turned slightly upward. Where the valves (mau iwi kuapo'i) of the shell meet they are closed with a hinge, like the valves (mau iwi kuapo'i) of the 'olepe [clam]. Its shell is extremely hard. The flesh can be removed only by pounding with stone or hammer. It doesn't like to be in calm water but in non-placid [turbulent?] waters, like the kio po'apo'ai [II: 76].

To this, Kawelo adds that these creatures are clamlke, but very small, a large number occurring closely bunched together; it lives at tide level. Pukui and Elbert (1957) identify kio-nahawe as Brachidontes cerebristriatus, the common mussel; this bivalve mollusk fits the description as amended by Kawelo, although rock oysters (Chamidae) also are a possibility.

Kio noho one [sand-dwelling kio; Figure 7B]. This is a creature that lives under the sand. It makes its dwelling (ke'ena noho, lit., “dwelling room”) under the sand and its workshop (hale 'ohana, lit., “office”) is built right over the dwelling place. This is what it does: It makes its “office” in the shape of a spiral (po'ai), like the steps leading up to the steeple of Mary the Victorious, at Lahaina, Maui. These coils are made very thin like a stiff ribbon, each coil close to the next, like a long ribbon that has been wound up. It is small at the top and nice and big below—perfectly rounded like the wheel of a cart. Its dwelling place stands straight up, four or five or more inches high. Its workshop is as big around as it is long. Its tail takes up the sand and with some sticky substance from its body, it glues the sand grains until they adhere. The tail serves as hands and in making lime for building. With its head, it works back and forth to smooth it. Because of the perfect evenness of the roll of ribbon that it makes, therefore the hole in the center is beautifully round from bottom to the very top. From the outside it looks like a rounded spiral stairway.

When it goes up to work, it goes up from its dwelling place (ke'ena noho) to its office (hale 'ohana). It spies on the things that move close to its office (hale 'ohana) and the small fish (i'a ili'i) that may be swimming leisurely among the coils of the sandy ribbon that comprise its office. Immediately it allows its body [tentacles?] to touch them like bait and the little fish (i'a ili'i) are surrounded and caught. They are caught when they are touched by the sticky substance from its body and are unable to escape. So they die. It carries small fish (i'a ili'i) into its dwelling (ke'ena noho). This weak creature is extremely smart. The outward appearance is beautiful, clever, humble, and wise, but its behavior is that of a robber. If it notices that its enemy is stronger, it withdraws its head at once into the spiral and watches from within. If the enemy is too strong for it, it retires into its dwelling place (ke'ena noho) [II: 77].

The characteristics of kio-noho-one are interpreted as follows: (1) it lives under the sand—it burrows in it, perhaps, but not necessarily; (2) its “dwelling place” and its “office” are different entities; (3) its “office” is made in a spiral, of mucus and sand grains; (4) its “dwelling place” is straight and upright, of mucus and sand grains; (5) it

procures food with its tentacles; (6) being a type of kio, it cannot leave its home. Our tentative identification of kio-noho-one is that the “office,” that is, the spiral part, is the egg capsule of the moon shell (Natica gualteriana; Figure 7D), common on sand flats exposed at low tide (Pukui and Elbert 1957:142); the animal itself, with its “dwelling place,” could be the sand-dwelling Isarachnanthus bandanensis (Coelenterata, Anthozoa, Ceriantharia), found in the same habitat as the moon shell (Edmondson 1946:49).

In addition to the varieties of kio described by Kepelino, there appears to be another group designated as kio by some informants and as kauna’oa, kauno’a and una’oa by others. These are greatly feared because they are capable of inflicting serious cuts if they are stepped on. These forms are found growing on reef platforms (papa) and are not designated as being edible. They are identified as worm shells, family Vermetidae (Mollusca, Gastropoda). Natives of the Pacific believe that unless the wound is cut out or burned out at once, infection will develop and death will surely follow. Cooke remembered a case of a small child stepping on a worm shell years ago. Without the slightest hesitation, the contents of a glowing pipe of tobacco were pressed onto the wound. Pukui and Elbert (1957:127) state that the mollusk was believed to be somehow related to the dodder (Cuscuta sandvichiana, belonging to the morning glory family). Kawelo adds that if anyone steps on it, the suffering is excruciating, and that if it is too far within the flesh to remove it completely, it continues
to grow, just as the shell continues to grow on the reef. According to our informants, at the time when the dodder vine is abundant (in the late summer), the aching is most intense.

Kawelo (personal communication) says, “There is also the ho which grows straight upright on the lava—not so dangerous as the kauna’oa.”

Garrett (n.d.) supplied the name kio-pōhaku, or stone kio. He noted that it is firmly attached to the rocks on the “bold” shore.

**Mollusks: Amphineura—Chitons**

Kuapa’a (Hawaii name); pe’elu (Oahu name); pūpū-pe’elu; pupu-mo’o: Acanthochiton viridis and some other chitons. Not used as food, but used in the māwaewae ceremony for first-born babies (Pukui; see also Pukui and Elbert 1957:157, 224). Hawaiians used to ask the riddle, “What is the fish that has eight scales?” The answer would be kuapa’a or chitons (Garrett n.d.). Naka was also used by some to designate Ischnochiton petaloides.

**Gastropoda—Snails**

Hawaiian names for gastropod mollusks abound, indicating that this group of marine invertebrates was of major importance in the Hawaiian economy. The uses of these organisms included food, tools, and ornaments (Figures 8, 9). Hawaiians on Kauai used practically all varieties of mollusks found on the reefs as food; often the various
animals were combined and boiled together (Kay 1949). Doubtless this was the case elsewhere as well.

With this abundance of native names comes insight into the structure of Hawaiian nomenclature systems. In addition to different names in different localities for the same species, we find different names for the same shell used in different ways, for variations in shell colors, for behavioral and habitat variations, and, of course, for gross differences in shape among the various snail groups.

The name pūpū was used by itself to indicate snail shells in general; there is some indication that it was sometimes used in a more specific sense to connote various shells that terminate in a point, or perhaps to connote all nocturnal species. Shells to which no significance was attached—i.e., those which were simply unnamed, undifferentiated, unnoticed parts of the surroundings—were not called anything. When pointed out specifically to Hawaiian informants, they were called simply pūpū, and sometimes a descriptive qualifying term was composed on the spur of the moment. Hence, we have no Hawaiian names for the inconspicuous smaller species of shells, other than the all-inclusive term pūpū. This term was also frequently used in combination with qualifying terms to indicate more specifically types of snails important or at least noticed in ancient Hawaii, although the confusing habit of designating various shells solely by their qualifying terms also became evident.

In addition to pūpū, frequently encountered Hawaiian names for gastropods include hīhiwai, kūpe'e, leho, ʻopīhi, and pīpīpī. These terms, which were widely used throughout the Hawaiian islands, seem to have been treated as names for shell groups rather than for particular kinds of shells. The groupings are based on readily discernible differences in shape, habitat, and behavior among the various snails. Snails included in these groups were obviously the most important gastropod food sources.

All pūpū are gathered during the day, as well as during the night when they come out from hiding and climb up onto the stones. There is a special word for this journeying:

\[ e'e. \text{Ua e'e ka pūpū means "the pūpū have come up onto the rocks."} \]

Hīhiwai, hapawai, hūwai, wi: Family Neritidae, *Theodoxus cariosus*, *Neritina granosa*, *T. vespertinus* (Figure 10). Nerites inhabit fresh and brackish water. Kepelino (n.d. I: 68) says: “The hūwai is closely related to the pīpīpī but the shell is flattish and the pīpīpī is rounded . . . . The pīpīpī lives in the sea and the hūwai lives in fresh water or in sea ponds. This is what [sic] it is called hīwai [water growth] . . . . The hūwai is eaten.”

Pukui differentiates between the hūwai and the hīhiwai, saying that the hūwai is similar in shape to the hīhiwai but differs in color and size. The wi is called hīhiwai in some localities. It lives in streams, hiding under stones by day, and coming up at night. It is easily seen, especially on Kāloa nights, the 24th to 26th of the Hawaiian month. Aukai gives us hīhiwai for Nerita granosa, hapawai and hapakai for *Theodoxus vespertinus*, and pīpīwai for *T. cariosus*, the species that most closely resembles the marine pīpīpī. However, based on the fact that *N. granosa* is truly a brackish-water species (waters part salt and part fresh), Maciolek feels that the Hawaiians probably were referring to this species when using the name *hapa-wai* (half water).

Wī and hīhiwai are eaten raw after the shells have been broken and the meat extracted and salted. They are a good accompaniment to poi. Formerly, they were cooked in *ti* leaf bundles or in a calabash with hot stones; the flesh was then more easily removed from the shell. Garrett (n.d.) says of the wī, “Named perhaps from the fact that they are much eaten in time of scarcity of food.” One meaning of wī is famine.

As in fishing, men did not speak of going for wī, lest only empty shells be found. They thought that the ghosts of the night might overhear them, hurry to the streams, and take the wī before they got there.

Kūpe'e: *Nerita polita*, polished nerite, a dweller of sandy, rocky shores with strikingly nocturnal habits, similar in form to the pīpīpī (in fact, closely related to it in the *haole* classification) but sharply differentiated from the latter by the Hawaiians on the basis of the differences in behavior and habitat

(FIGURES 10H, I, 11). The Hawaiians had names for many kūpe’e according to their markings. There were the kūpe’e ‘ula (red); the ānuenue (rainbow), red or black striped; the palaoa (whale tooth ivory), creamy white; the ‘ele‘ele (black), the most common; the kāni‘o (vertical stripes), black with white streaks; the mahiole (warrior’s helmet), white with red stripes; and the puna, rare. The rarest were the ‘ula, ānuenue, mahiole, and puna, and these were therefore saved for the chiefs. The rare ‘ula was believed to have the ability to leap and hide. The common kūpe’e were used by commoners.

Custom evidently varied among localities regarding the manner of preparing the kūpe’e for eating: Pukui (from Ka‘u) states that the larger ones were not eaten raw but were always cooked in the shell and then extracted. Kawelo says they were eaten raw; Kepelino (n.d. I:44) says they were “delicious when cooked.” Kay (1949) points out that the kūpe’e is very meaty, so only a few are needed to make a meal.
**Figure 11.** Bone pick to aid in extracting flesh from shell of *kūpe'e*, *Nerita polita*. (Courtesy of Bernice P. Bishop Museum.)

*Kūpe'e* were prized highly as ornaments; they were pierced and strung together as neck ornaments or worn as anklets by hula dancers. In later years, although *kūpe'e* were less often used, the name was retained for any kind of anklet or bracelet.  

*Kūpe'e* niho: *Nerita plicata*, "toothed" nerite (Wiggin and Reist, informants).  

*Leho*: general name for family Cypraeidae, cowries (Figure 12). *Pūleholeho*, long, narrow species of cowries. Garrett (n.d.) says large cowries were called *leho* and small ones, *poleholeho*.

The cowries are as a group readily distinguished from all the other invertebrates with which the Hawaiians were familiar, and the various kinds and variations within the group are also easily discernible to the nonscientist. These may account for the plenitude of names for different types of cowries. The number of names for the various types also indicates that the group was of major importance in the Hawaiian economy as food, ornaments, tools, and octopus fishing lures.


*Kuoho*: a large cowry, probably *C. maculifera* (Pukui and Elbert 1957).  

*Leho-ahi*: *C. mauritiana*. Used as octopus fishing lures as well as food.  

*Leho-kiko*: *C. tigris*. Used less frequently than *C. mauritiana* as food and lures.  


*Leho-lei*: *C. moneta*. Used in leis (Figure 8E).  

*Leho-maoli* (literally, genuine cowry): *C. caputserpentis*.  

*Leho-nuku*: cowry with the extremities drawn out, as *C. cicercula*. Sometimes used in leis.  

*Leho-ōkala* (literally, rough cowry): *C. granulata*.  

*Leho-ōma'o*: a greenish cowry (diseased cowries sometimes turn greenish).  


*Leho-ōpu'upu'u* (literally, bumpy, or rough cowry): *C. granulata*.  

*Leho-pa'a*: a cowry of a solid color.  


*Leho-pouli*: a very dark brown cowry, *C. mauritiana*.  

*Leho-puna*: *C. moneta*, white color variation.  


*Leho-u'ula*: Pukui and Elbert (1957) say *C. mauritiana*; Kamakau uses the term to mean a prized cowry, for example, *C. mauritiana* (*leho ahi, leho-kupa*), of particularly good coloring for octopus fishing.
Puleho: *C. isabella*. Used in leis (Pukui and Elbert 1957).

Puleho-hōlei: a yellowish puleho (Pukui and Elbert 1957).

Puleho-kāni’o: streaked puleho (Pukui and Elbert 1957).


Puleholeho: an ivory-colored puleho (Pukui and Elbert 1957).

To prepare leho for consumption, the shells were broken open, the meat was removed, and then it was worked with salt to remove the black slime. The flesh was wrapped in ti leaves and cooked over coals. Some people merely boiled the shell and then broke it open to remove the meat. On Kauai, leho were either boiled as the sole method of cooking or occasionally eaten raw (Kay 1949). The smaller species were not eaten. Small yellow and white leho were reserved for the chiefs to use as ornaments and were occasionally used as a means of currency. Pukui mentions the use of *Cypraea isabella* for bracelets (*leho-kūpe’e-lima*; Pukui and Elbert 1957).

Larger cowries (*C. mauritiana, C. maculifera*) were used to make scrapers for removing the skin from cooked taro and breadfruit and for grating coconuts (Figures 9D, 12A, 12B). These scrapers were elliptical at one end and square at the other end; the square end had a natural curve to it and in some scrapers was ground on the outer edge to a sharp point. Cowry scrapers with a sharp, serrated edge were also used to
incise wauke bark to remove it from the plant (Ihara 1967).

The mauritius and sometimes the tiger cowries were used as lures in fishing for deep-water octopus (Figure 13). According to Beckley (1883:2–3), “only the finest kind of Mauritius or Tiger cowries are employed for this purpose as the octopus will not rise to a large-spotted or ugly one. The spots on the back must be very small and red, breaking through a reddish brown ground; such a shell would have the strongest attraction for an octopus, and is called ipo (lover).”

Kamakau (n.d.: chap. 4: 19, 25) says: “Excellent kinds of cowry [for fishing lures] were the ahi and the kupa. The ahi had well-shaped lips, was of a deep red color, extending from the edges of the lips to the very peak .... The kupa cowry might be likened to a dark red mountain apple ripened in the shade .... The ahi is used for the morning (says the fisherman), the ʻōlipalaha and the pauhu are to use when the sun warms, and almost at noon I shall use the kupa ....”

W. A. Bryan (1915:458) indicates that sometimes Cypraea (carneola = leviathan) was used as an octopus lure: “The squid if captured under certain conditions by this species of shell, was supposed to be a very valuable remedy in the healing of the sick.”

ʻOpihi, limpets and forms with similar shells (families Fissurellidae, Patellidae, Siphonaridae; Figure 10A). Again, we find that the Hawaiians differentiated among the various ʻ opihi; the names varied somewhat in different localities. From Kaʻu comes the following list:

ʻOpihi kōʻele: Cellana talcosa and other
large, tough 'opīhi (Pukui and Elbert 1957). Very large; not easily procured, as they are found on rocks along the abrupt cliffs. Meat is dark colored and tough after being salted. A specimen of C. talecosa was identified as kō'ele by Pukui to Kondo (informant), although to the Hawaiian mind the kō'ele was simply the adult form of the next three kinds listed below.

'Opīhi 'alinalina: Cellana sandwichensis (designated as 'alinalina by Pukui). The favorite; according to Kondo, this form is found only where the waves are the roughest and always rough. Has yellow meat.

'Opīhi ko'ala: Cellana talecosa. Found on rocks in deep water; yellow meat.

'Opīhi makaiauli: C. exarata (Figure 10A). Shell is dark colored; easier to procure than 'alinalina, for it occurs higher on the rocks than does the 'alinalina. Meat is bluish-gray.

'Opīhi-awa: Siphonaria normalis and perhaps Hipponix spp. According to Fornander (1916–1919:531), “the kind that clings to water-worn boulders (pa'alā).” Small; bitter to the taste; not eaten as food; used by sorcerers.

Kilinahe, an informant on Maui, lists four species: the maka-ia-ūli, pāpapa, 'awa, and kō'ele. He adds that there were two kinds of kō'ele, one with dark meat and one with yellow meat. The yellow kind was called 'opīhi kō'ele māku'e kū'e. Aukai (informant) gives S. normalis as 'opīhi-ma-ka'i-ūli; Pukui and Elbert (1957) say “makaiauli, the bluish-gray meat of the 'opīhi.”

Other names that have been found for limpets are 'opīhi-kapua'i-lio (literally, horseshoe 'opīhi): Cellana exarata (Pukui); kuapo'i; naka-kua-po'i (Pukui); and 'opīhi makalahi (thin 'opīhi; Garrett n.d.).

The 'opīhi were extremely well liked as a food item and in fact were reportedly the most commonly eaten shells in the Hawaiian islands (Kay 1949). Even in 1969, 'opīhi were an important part of the diet of most of the Hawaiian families living near the shore. The favorite method of preparation was raw and salted, either with or without seaweed. They were sometimes washed clean and then cooked in the shell, in a calabash with hot stones. The shells were picked out later. This method enabled the delicious liquor (kai) to be saved. Kai was appreciated especially by the sick or very young. The raw or cooked meat was plucked from the shells or was sometimes scooped out with an empty 'opīhi shell. Babies were fed the soft organs with sweet potatoes or poi.

'Opīhi, especially the 'opīhi 'awa, were used extensively as medicine.

'Opīhi shells were good instruments for scooping, peeling, and scraping because of their sharp edges (Figure 14).

Before the days of knives in Hawaii, a sharp-edged stone was used to knock the 'opīhi off the rocks, where they cling tenaciously, especially when warned of an attack by an unsuccessful blow. 'Opīhi fishing is still called ku'i 'opīhi ('opīhi pounding), although stones are no longer used.

Pukui tells of a belief of Ka'u:

There is a place in Ka'u called 'Opīhi-nehe (rustling 'opīhi). It was kapu to make a rattling noise with the shells (always plentiful on a beach in olden days, for 'opīhi were often eaten where and as they were procured). If anyone made such a noise it was prudent to go home at once and not camp there. Otherwise he might be lifted from his sleeping place by invisible hands. Anyone near by would hear a voice call, “Inland or seaward?” and an answer, either “Inland” or “Seaward.” If the answer was “Inland,” he would be taken up and dropped a mile or so inland, where he would be found the next day, bruised and aching; if the answer were “Seaward,” he would be tossed into the sea and not return alive. The answer “Inland” signified that he had a relative among the guardians of that shore who had interceded for him.

It was kapu for anyone to eat 'opīhi on shore while a companion was out gathering more. If one broke this kapu, the one still collecting would be pounded by the sea. An 'opīhi gatherer was warned never to turn his back on the sea but to watch it to guard against an especially large wave that might wash him to sea if he did not dodge it or get a good grip on some secure rock before the wave struck. Gathering of 'opīhi is so dangerous that it was called the fish (creature) of death (he i'a make) (Pukui).

Pipipi: family Neritidae, marine nerites (except kūpe'e, which see). Pipipi do not include Neritina spp., which inhabit brackish and fresh water. For the nonmarine forms,
see the section on *Hihiwai*. *Theodoxus neglectus* and *Nerita picea* (Figures 10B, 10C) are two species of common *pipipi*. Pukui and Elbert (1957) indicate that *pipipi* is a general name for small mollusks. *Pipipi* is also used with modifying terms to indicate various snails with habits and habitat similar to the above-named nerites; perhaps *pipipi* is the “group name” for small, littoral, edible, common marine snails. The Hawaiians observed that the *pipipi* do not hide but may be found on the rocks during the day or night, whereas the *kūpe‘e*, like the *pūpu*, come out on some nights but lie under the sand or rocks during the day.

**Pipipi-kai**: *Nerita picea, Theodoxus neglectus* (Aukai, informant).

*Pipipi* were enjoyed as a food item. Children would snack on them as they collected them, prying the meat out and eating it at once. Kepelino (n.d. I:66) says the snails were boiled or wrapped in leaves and broiled. “But a needle is required to dig out the flesh.” Some people made a broth of the *pipipi*, adding the shells for flavor. Pregnant women were discouraged from eating *pipipi* lest their children be born with small eyes (*makapipipi*) (Pukui and Elbert 1957).

We have found names and obtained identifications for gastropods other than those included in the groups discussed to this point. Some of the snails that appear in the following list may have been restricted in their use to smaller localities or may have been a minor part of the Hawaiian economy; or the names themselves may have been very localized or perhaps used to designate single species of gastropods. “Several of these species are almost microscopic” (Kay, personal communication).

*Aha‘aha*: miters (*Mitra consanguinea, M. litterata*), olive shells (*Oliva sandwichensis*), marginellids (*Kogomea sandwichensis*) (Wiggin and Reist, informants).


*Alealea, Plectotrema striata* (Pukui and Elbert 1957).
'Āilea: *Turbo sandwichensis* (Pukui and Elbert 1957). Hawaii name, according to Wiggin and Reist (informants). The Oahu name, according to Wiggin and Reist, is *mahina* (literally, moon shell, so-called because the operculum is round like the moon). Edible (Aukai, informant).

'Anaunau: *Cymatium pyrum*, Maui name (Wiggin and Reist). Also 'iinaunau, naunau (Pukui and Elbert 1957).


'A-'una'una: *Nassa serta* (Wiggin and Reist); Pukui and Elbert (1957) spell it 'ii-unauna.

'Aupūpū: *Thais intermedia* (Figure 10M). Also called pūpū-'awa, makaloa (Pukui and Elbert 1957). Eaten raw; some people like the bitter taste, which is destroyed by cooking.

'Awa: *Purpura aperta*, *Drupa ricina* (Figure 10K; Pukui and Elbert 1957, Aukai, Wiggin and Reist). See also makaloa, aupūpū.

Hālili: sundial shells, family Architectonicidae (Pukui and Elbert 1957). Also called pūpū-puhi.

Hālili lenalena: small yellow shells, possibly *Leptothyra* (Niihau shell lei); Niihau name for *Euplica varians*.

Hāʻupu: trochids, as *Trochus histrio*, *Euchelus* (Wiggin and Reist, Aukai). Iwi moe one: *Colubraria* sp., Maui name (Wiggin and Reist).

Kahele-lani: species of small, colored shells, as *Leptothyra*, *Euchelus*, etc. Kahele-lani 'ula'ula: small, dark red shells; Niihau name for *Leptothyra verruca*.

Kahele-lani 'okala: small, light pink shells, as *Leptothyra verruca*.

Kaanaloe: phasianellids (*Tricola variabilis*); smooth, brightly colored shells (Pukui and Elbert 1957).


Kiki: undetermined shellfish (Pukui and Elbert 1957).
Plentiful on Kāloa nights according to Pukui. Kepelino (n.d.: I:46) says: “The piipū makaloa [Morula granulata] is long and its body is black. Some are yellow and some spotted. One side is rolled inward and one side spreads flat. The back is large and the front small. The flesh is delicious when cooked.”

Maka-o-ka-kai: Bulla sp. Garrett (n.d.) says “occasionally eaten by the natives.”

Mamaiki: Strombus maculatus (Pukui and Elbert 1957).

Moa: unidentified small gastropod; also called kāmoa (Pukui and Elbert 1957).

Momi: Niihau name for Euplica varians (brown form), the columbellid known elsewhere as the Niilu shell (Figure 8D).

Momi keʻokeʻo: white form of Euplica varians, and a Niihau name for Heliacus variegatus.

Naka-huluhulu: the marine air-breathing slug, Onchidium sp. (Wiggin and Reist). Also used for Umbraculum sinicum.


Nene: unidentified shellfish (Pukui and Elbert 1957).

Nukuloa: Hawaii name for Latirus nodatus, the spindle shell from which drills were made (Wiggin and Reist). Also Fusimus sandvicensis, another spindle shell (Pukui and Elbert 1957).

Numui: large auger shells, as Terebra maculata (Aukai).

Oe: Melampus. Eaten by the natives in Hilo and Puna (Garrett n.d.).

ʻOle: large Charonia tritonis, the triton shell used as a trumpet (Figure 15; Pukui and Elbert 1957, Wiggin and Reist). Also Terebra maculata and Pyramidella sulcata (Pukui and Elbert 1957)—in other words, shells that have elongate, pointed spires.

ʻOle-kiwi: Cymatium pyrum (Pukui and Elbert 1957).

ʻOlōʻolō: small triton shell (Wiggin and Reist). Pukui and Elbert (1957) say conch shell, but compare ʻolē above.

Onohi-ʻawa: tectibranch gastropods, as Haminoea spp. (Pukui and Elbert 1957).

Pai: a kind of snail said to be poisonous to the touch (Pukui and Elbert 1957).

Panapuhi: Conus sponsalis, Hilo and Puna name (Garrett n.d.).

Pipipi-ʻākōlea, pipipi-kōlea, etc.: see ʻākōlea above.


Poʻopalaoa: unidentified white shell (Pukui and Elbert 1957).

Pū: shell trumpets; the helmet Cassis cornuta and the trumpet shell Charonia tritonis (Figure 15; Pukui and Elbert 1957). Both are eaten (Kay 1949).

Pū hoʻokani: conch (Malo 1951), probably Cassis cornuta. Compare ʻolē.

Pū puhi: Charonia tritonis (Aukai).


Pūleho: Tonna perdix (Aukai); eaten (Kay 1949:119–121).


Pūʻōnīʻonīʻo: Tonna perdix (Pukui and Elbert 1957). The partridge tun.

Pūpū-ʻalā: cone shells, family Conidae. In some localities, restricted to types that do not sting. Compare pūpū-pōnīniu. Kay (1949) reports that one species, Conus millepunctatus, was used by only a few families for food, but that the shell was prized as an ornament.
Pūpū-alapa'i: staircase shell, *Epitonium* spp. (probably more than one; Pukui and Elbert 1957).

Pūpūau: *Purpura aperta* (Pukui and Elbert 1957). See also 'āwa, aupūpū, etc.

Pūpū hohopū: *Cymatium nicobaricum*, Hilo name (Garrett n.d.).

Pūpū kamoa: *Vanikoro* sp. (Wiggin and Reist).


Pūpū-lei-'aha'aha: miter shells (Pukui and Elbert 1957). Same as 'aha'aha.

Pūpū-lei-hala: the triton *Bursa granularis* (Pukui and Elbert 1957); also, the pink bubble shell, *Hydatina amplustre* (Pukui and Elbert 1957).

Pūpū makaloa (literally, shell with a long, sharp edge): any of several kinds of shells, we surmise, with a lip that is long, sharp and strong enough to be made into large or small adzes, for example, *Conus leopardus, C. quercinus, Drupa, Thais, Nassa*, and other muricids. Compare makalao above (Archeology Collection, Bishop Museum).

Pūpū-Nīihau: see momi above.

Pūpū-noho: unidentified shell (literally, sitting shell) (Pukui and Elbert 1957).

Pūpū-ōni'oni'o: *Haminoea* spp. and *Hydatinaidae*.

Pūpū-pani (literally, cork shell) and pūpū-poni (literally, purple shell; Aukai): violet snail *Janthina* spp., which floats on the ocean surface by means of a raft of bubbles attached to its foot.

Pūpū pō'ai: *Odostomia* spp. (Wiggin and Reist).

Pūpū pōniuniu (literally, dizzy shell): poisonous cone shells, that is, those that sting (Pukui and Elbert 1957). Compare pūpū-alā above.


Pūpū-waha-loa (literally, long-mouthed...
Pelecypods—Bivalves

In studying the Hawaiian names for bivalves, we find the same sort of nomenclature and classification as appears for gastropods. That is, general names are given for types of shells, and additional, more specific, names are given for the kinds that were of importance in the Hawaiian economy. ‘Olepe was used in some localities to denote all bivalves (Pukui and Elbert 1957), but Garrett (ca. 1855, in Hilo and Puna and also on Kauai) found that the term was used for “all bivalves resembling the Cardium and Venus”—that is, for clams only (Garrett n.d.). It may be that the restricted meaning of the word “olepe was used
in various areas where several kinds of bivalves were available and thus the need was felt to differentiate among them, as opposed to areas in which only a few were present and there was no need for differentiation.

The words pā and paua have often been encountered with various contextual meanings (Figure 16G). While both words mean valved—as opposed to snail-like—it appears that pā was often used only to denote mother of pearl shells of light construction. Paua (or pāpaua) was used to designate all sorts of shells of heavier construction. Pā and paua also appear in combination with other words as descriptive modifiers, for example, 'ōlepe-pāpaua, Arca sp.; pāpaua-momi, Chama ostiosa [heavy pearl (shell)].

Bivalves, in general, were not a very popular food item on Kauai when Kay observed native food habits there. Exceptions to this condition were *Pinctada margaritifera* and *Spondylus tenebrosus*.

As to fish hooks (Figure 17), Buck (1957: 325) says: “Shell hooks were usually made of pearl shell (uhi) [*Pteria nebulosa* (= *Pinctada*)] in small and medium sizes. The small shell hooks were termed makau paweo, and were used for catching *ʻopelu.*”

Shell was greatly appreciated as material for fish hooks, but it was not abundant. Emory, Bonk, and Sinoto (1968:31) say: “The great predominance of bone hooks on Molokai, Lanai, and Hawaii may be due to the lack of sufficient pearl shell .... There was a steady shift [in archaeological diggings] from pearl shell to bone at the three sites on Hawaii ... suggesting that pearl shell was preferred but abandoned by necessity. The island of Oahu, on the other hand, had a relative abundance of pearl shell from Pearl Harbor ....”

Shell was also used in making composite hooks, both the shank and the point, for ocean bonito fishing. At the South Point (island of Hawaii) excavations, bonito hooks were found at the deepest excavations as well as at excavations near the surface, which indicates that bonito were fished from earliest antiquity in Hawaii as well as from then on. According to Emory (personal communication), fish hook remains of all kinds numbered 1710 at the South Point site for archaeological work.

Malo (1951:61) says: “The pa was a plate of mother of pearl with a hook of bone attached. It was used as a troll for *aku* (ocean bonito). The color and sheen of the
pearl seemed to have some sort of fascination for the fish.” The sheen of all pearl shell hooks shared this fascination.

Kamakau (n.d.: chap. 4: 37–38) describes the making of bonito lures: “For pearl shell lures, a good-sized uhi or paua shell was selected, the size of a hand or larger. The best shells had markings like the arch of a rainbow. The shell was cut down from base to tip. The carver scraped down the coarse outer covering until the smooth part was reached . . . It was to the aku as a beautiful chiefess . . .” A hole was drilled through the ridge at the base of the shell and a hook of wood or dog bone fastened to it securely with fine cord. Hog bristles were fastened at the base of the hook where it joined the lift of the shell and crossed there so that the hook would not turn over. As the hook moved over the water, the bristles sprayed on the water, and the aku mistook it for the ‘iaoa (bait fish) and rushed to seize it.


Kupekala, kala: family Chamidae, rock oyster (Figure 16B; Pukui and Elbert 1957). Lāhilahi Webb (informant), who lived at Ewa on the shore of Pearl Harbor for many years, remembered being taken out to a spot near the inner part of the entrance of the harbor by two elderly women to see where kupekala were to be found. They could be seen through the clear water. They looked like small rocks themselves, as they clung to the rocks. The two women dove for them, taking a stone with which to knock them off. It was hard work and they got only seven during the trip. The taste is richer than the famed pipi. Aukai says that it is sometimes found at Kualoa, the northern end of Kaneohe Bay. In Kaneohe Bay they are reported to be smaller, usually about an inch and a half long, but good to eat raw or cooked. Kepelino (n.d. I: 72) includes nahawele among the seafoods that were delicious.

Pahikaua is a modern name for nahawele; the meaning is sword—literally, open-shut mouth) is mentioned in a reference to the fish pond that used to be in Hilo Bay, called Loko-waka (Anonymous 1899b): “This is the place where people dive to get the ‘owāowaka.”

In Pearl Harbor (old name, Pu‘uloa), nahawele grew to finger length, and sometimes half as long again. They were popular as food, and in later days those who sold them would be careful to keep to themselves the knowledge of just where they grew thickest (Webb, informant). In Kaneohe Bay they are reported to be smaller, usually about an inch and a half long, but good to eat raw or cooked. Kepelino (n.d. I: 72) includes nahawele among the seafoods that were delicious.

Pahikaua is designated as Ostrea sandvicensis by Aukai, however.

Ōkūpe: Spondylus tenebrosus (Figure 16A). Similar to a rock oyster to the informants: “abundant at Ewa; . . . dirty gray in color, thick shelled” (Pukui and Webb). Spondylus tenebrosus is also called pūpū-momi (Aukai, Pukui and Elbert 1957) and pana-pana-puhi (Kay 1949: 119–121). Length 10.3 cm.

‘Ōlepe: clams (Figure 16C–E). Hawaiians classed many species of clams as ‘ōlepe. Just which ones were the favorites as food is not recorded. Edible clams are not commonly found in the market.

According to Kepelino (n.d. I: 70), “The ‘ōlepe is entirely white; its shell is ridged. Its body is round and plump . . . . The ‘ōlepe lives in the sand. Its flesh is delicious, eaten just as it is—raw.” Aukai says, “The ‘ōlepe
is a delicious bivalve which we ate raw with limu 'ōnini, which grew in sea ponds. It was generally eaten raw, the slime removed by stirring it in salt; the flesh is soft."

Sereno Bishop (1916: 46) wrote: “In the thirties . . . there was at Pearl River a handsome speckled clam, of a delicate flavor which contained milk white pearls of exquisite luster and perfectly spherical. I think the clam is still found in the Ewa Lochs.” This clam is probably Lioconcha hieroglyphica. Length 5 cm.

‘Olepe-kupe (literally, native clam): also pūpū-kupa, pūpū kupe, Trachycardium orbita (Wiggin and Reist, informants), Periglypta reticulata (Aukai, informant), Ctena (Pukui and Elbert 1957), Codakia (Pukui and Elbert 1957).

‘Olepe-kupe ʻōpiopio: Ctena bella (Aukai). Length 7.3 cm.


Pūpū-ʻōlepe: Tapes philippinarum, family Veneridae (Pukui and Elbert 1957). This must be a modern name because the species was introduced early in this century (Kay, personal communication).

An illustration (Figure 18) of people streaming into Kaneohe Bay in September 1968 to greet the opening of the clamming season of that year shows the public enthusiasm for the bivalve that lives in that bay. This animal is not Hawaiian but is the Japanese little-neck clam (Tapes philippinarum), first introduced to Hawaii in 1920 (Brock 1960). Following the 1968 season, however, soil erosion, associated with heavy rain, contributed to the demise of the Kaneohe Bay population (Honolulu Star-Bulletin, June 13, 1969). A ban on clamming has remained in effect up to the present time due to the slow revival of the population.

Pā, paua, pāpaua: Pinctada margaritifera
(Figure 16G), *Pinctada radiata*, family Isognomonidae (Aukai, Kay, Pukui and Elbert 1957). This is a little larger than the pearl oyster. It too was and is eaten, and has been successfully transplanted into Kaneohe Bay.

**PREPARATION:** Let them stand overnight in water to free the sand from the shell. Remove the slimy fluid with salt. Cook or eat raw (Kawelo, informant).

*Pā hau:* shell with white on inside (Pukui and Elbert 1957).

*Pā maʻe:* variegated shell (Pukui and Elbert 1957).

*Pipi:* *Pinctada radiata,* pearl oysters.

*Unahi-pipi:* young *pipi* (Pukui and Elbert 1957).

The *pipi* was referred to in many old chants. Poetical names for it were *ka iʻa hāmaʻu leo o ʻEwa* (the silent fish of ʻEwa) and *ka iʻa kuhi lima o ʻEwa* (the gesturing sea creature of ʻEwa)—it was forbidden to talk while gathering them (Pukui and Elbert 1957). The *pipi* used to be very abundant in Pearl Harbor, and in modern times was transplanted to Kaneohe Bay. The populations of *pipi* in these areas fluctuate in size from year to year.

According to Kamakau (n.d.):

The oyster from Namakaohalawa to the cliff of Honolulu, from the sea ponds of upper ʻEwa clear out to Kapakule; the shell that came in from the deep water to the shallow mussel beds near shore, from the channel entrance to the rocks along the edges of the lochs. They grew right on the mussel shells . . . Not six months after the hau branches [kapu signs] were set up, pearl oysters were found in abundance for all ʻEwa, fat with flesh, and sometimes within the oyster a pearl . . . shining with the colors of the rainbow, with red, yellow or dark colors and some pinkish white, ranging in size from small to large and of great value, but in those days considered rubbish in Ewa.

Sereno Bishop (1916:46) wrote: “In the thirties the small pearl oyster was quite abundant and common on our table. Small pearls were frequently found in them. No doubt the copious inflow of fresh water favored their presence. I think they have become almost entirely extinct, drowned out by the mud.”

*Pipi* were eaten both raw and cooked. When taken out of the shell the animal is covered with slimy fluid. For common people the *pipi* was merely salted. For chiefs and children it was removed from the shell, salted, and placed in a nest of ʻahuʻawa (a sedge) fibers to drain all night. The next morning the *pipi* were wrapped in clean ti leaves and taken to the chief (Webb, informant). Pukui reports that the meat is delicious and says, “I have seen my uncle cook them by laying them, still in the shell, on hot coals, or boiling them in a very little water.”

In fishing for *pipi*, one had to keep perfectly still and talk by gesture only. Hawaiians believed that if there were a ripple made on the water, or a word uttered, the oyster would drop off the spot where it was visible into the depths of the water. This belief is often referred to in Hawaiian literature. Evidently, even the winds knew that gathering *pipi* had to be done in silence, as shown in this tale (Anonymous 1899a):

> When I came to the new land (Ewa) to live I found a wife here and she told me, “Do not speak lest the wind blow.” We went to the beach of Keamonaʻale, and the day was very calm, there was not a breath of wind and the sea was still. We swam out and saw the *pipi* which so resembled the *popaua* bivalve. We gathered them in silence and then . . . I called out in a loud voice, “Say! There are a large number of *pipi* here!” I kept on calling. Not five minutes later, the wind blew all around us and . . . doubt of the truth of my wife’s words left me.

An explanation of both the origin and disappearance of the *pipi* is set forth in the same story of ʻEwa:

It was Kanekuaʻana, the famous lizard god of ʻEwa, who brought this *pipi* from Kahiki [ancient homeland of Polynesians] . . . . The goddess possessed her aged keeper (a woman of ʻEwa) and said: “I am taking the *pipi* back to Kahiki and they will not return until all the descendants of this man [a man who had fined the keeper of the god because she took some *pipi* when they were kapu] are dead. I shall go to sleep. Do not waken my medium, let her waken of her own accord.” The command was obeyed, and she slept four days and four nights, during which time the pearl oysters vanished from the places where they had been found in great numbers, up to the very shore . . . . The few we find today are nothing . . . .

As to the pearls, Kamakau (n.d.) says: “Inside of the *pipi* were beautiful pearls like the eyeballs of fish. Some were white and
were called mühe'e-kea. Some had red colors in them and were called mühe'e-mākoko . . . .

Uhi: probably Pteria nebulosa. Also called paua. Kepelino (n.d. I: 69) says:

The uhi is a large flat creature (about 8 inches across), some plump and some flat and thin. It has a hard, blackish shell. The edges are very thin and fine. It has two shells as covers and between the two shells is its meat. The end upon which it fastens itself to a rock is very small. It opens like the mitre of an archbishop . . . . The uhi is used in making hooks for aku fishing, called pa, with a hog's tusk for shank and hog's bristles at the back for lure . . . . The uhi keeps its mouth open in order to catch its enemy. If something gets into the mouth, the two edges clamp together and its enemy is eaten entirely. Thus it obtains its livelihood. If a man's finger gets into it, he can never release it . . . . its grip is very strong. Its flesh is delicious indeed.

As to the hook, Kamakau (n.d. 4: 36) says, “The aku mistook it for an 'iao or other small fish and rushed roaring to seize the shell.”

Wāwāhi-wa'a: borer that bores into canoe hulls; a teredo, Teredo spp. and related forms (Pukui and Elbert 1957).

Cephalopods—Squid, Octopus

In Hawaii the term “squid” is used indiscriminately to signify both squid and octopus. While as many as thirty different forms of cephalopods have been reported from Hawaiian waters, only a few are found in shallow waters (Figure 19).

The Hawaiians had names for the reef species of octopus: he'e, the common species, the day octopus, Octopus cyanea; he'e-mākoko, rarely eaten, bitter, used in medicine, probably O. ornatus (Pukui and Elbert 1957); he'e pali, the young tiny octopus that clings to rocks along sea pools, especially in certain seasons (probably the young of the O. marmoratus); he'e māhola, the octopus given for sickness caused by sorcery (Pukui and Elbert 1957); he'e-pū-loa, or pū-loa, is O. ornatus, the “night octopus,” considered excellent food by some (Edmondson 1946: 216), but according to Pukui and Elbert (1957) used for bait rather than for food and distinguished by “longer head (pū) and tentacles than those of the common octopus.” Garrett, however, says, “They [octopus] are much esteemed by the natives, who call them Ha pale [‘he'e pali] when young and Ha when fully grown. It is quite common among the natives to give different names to the young and old of the same species” (Garrett to Barnard). Pukui and Elbert (1957) also give 'ape'ape'a as the name for an unidentified cephalopod.

The term mühe'e was used to designate true squids, including Sepioteuthis arcticpinis and Euprymna scolopes. Beckley (1883: 9) notes that the mühe'e is “a kind of squid that floats on the sea in great quantities.”

Shells of the paper nautilus, Argonauta argo, were designated as 'au-moa, 'au-wa'a-lā-lua (the usual name), moamoa, and moamoa-wa'a. Naukilo is a transliteration of
Nautilus and probably entered the vocabulary in modern times. The chambered nautilus, *Nautilus pompilius*, and related forms has—as far as is known—never been reported from Hawaiian waters.

The common *he'e* was, and is, exceedingly popular as food.

**PREPARATION:** In a pan or calabash put a handful of Hawaiian salt (the residue of seawater evaporated in shallow pools, or in artificially hollowed places along the shore; it dries in coarse crystals which have considerably more abrasive power than our finely ground table salt). Hold the octopus just below the bulbous head. Spread out the tentacles and pound the octopus against the salt until the tentacles begin to curl. The slimy fluid will ooze out by this treatment. Pinch the flesh at the base of the head. If the skin breaks easily, it is ready to be cut into pieces. By pressing off the slime rather than washing it off, no salt is lost in the pounding process, and the flesh keeps well. Washing removes too much of the salt and the flesh begins to decompose quickly, turning pink.

*He'e* is eaten raw or cooked. For eating raw, it is cut into small pieces, perhaps half an inch long, and salted or left unsalted. Some of the deep brown fluid of the 'ala'ala (liver), some kukui nut relish, some chili pepper (introduced in Hawaii in the early days and popular at once), and perhaps some a'ala-'ula or lipe'epe'e limu (seaweed) may be added to it. Raw *he'e* does not keep long and in a day or two turns pink and develops an unpleasant odor. This stage is called mākole or paholoholo. Some Hawaiians are fond of *he'e* in this partially decomposed state.

Dried *he'e* was popular. When well dried it keeps for many years, and is therefore ready to eat at any time. To dry *he'e* it is first cleaned. A large number are most easily cleaned by putting them into a large container (barrel in post-European times), sifting ashes of a nonpoisonous wood over them generously, then working the entire contents of the container around and around with a stick. Care must be taken to wash all the ashes from the tentacles. Cut open the head so that it can be flattened out, remove the internal organs, taking care not to cut the ink bag (*weka*) that lies close to the liver; the livers are set aside for separate treatment. The cleaned *he'e* are sprinkled generously with salt and left in the brine for several hours or overnight, after which the excess salt is rinsed off. The *he'e* are hung to dry in a sunny, airy place, sometimes on the branches of trees (Figure 19). When thoroughly dry—which may take two or three days—the tentacles are braided tightly together to assist efficient packing in a calabash or other container. When wanted, dried *he'e* are cut into bite-size pieces and eaten as is. Some people prefer to broil them first. Aukai (informant) described the drying process also and added that “Soaking in fresh water does make it [the flesh] tender, and some did it, but the strong smell is unpleasant to many.” The 'ala'ala (livers) are salted and dried separately. When thoroughly dry, they resemble prunes. They are eaten as a relish.

Fresh *he'e* was also cooked in *ti* leaf bundles in the *imu*; dried *he'e* were not so used. The *he'e* was cut into portions and salted; then it was wrapped, sometimes with greens such as sweet potato or taro leaves, in *ti* leaves and placed at the edge of the food heap in the *imu*, where the heat would not be too severe. In modern times, the expressed cream of grated coconuts is usually added—a culinary custom imported from southern Polynesia.

*Mūhe'e*, that is, true squid, was also eaten, although it was not as popular as octopus. It was not eaten raw.

*He'e* has always been such a popular food item that comments about it are easily obtained. Aukai tells us that one of the best places for catching *he'e* was the Ko'olau shore of Oahu, along Kaneohe Bay and beyond. *He'e* were caught and dried by the thousands. There are good *he'e* banks at various spots in the bay. Sometimes *he'e* were taken to the islands in the bay, Kapapa or Ahu-o-Laka (Sand Island), to be dried on racks. Sometimes the vital organs were not cut away but were left hanging onto the slashed and flattened head (*pi'i*). The stomach was opened to remove the contents; the intestines were thrown away. The people of
Ewa made excursions to the Ko'olau side for the *he'e* fishing season, using a path over the mountains.

Beckley (1883: 3) describes octopus fishing: "In shallow water the spear is used. Women generally attend to this. Their practised eye can tell if an octopus is in a hole whose entrance is no larger than a silver dollar ..." Those caught in shallow waters vary from one to four feet in length, but the larger kinds live in deep water always and are known as *he'e-o-kai-uli* (deep-water *he'e"). She continues with a description of catching *he'e* with cowry shell lures (see the section on Cowries).

Garrett also described the process of catching octopus: "The natives capture them [octopus] with a baited hook, above which are firmly attached 3 or 4 cowery [sic] shells, (C.---*mauritiana*) upon which the animal fastens its cups [suckers on tentacles] while feeding upon the bait, and is easily drawn up in that position."

Kamakau (n.d.: chap. 4:19) speaks eloquently of the use of *he'e*: "Squid fishing and *aku* fishing were aristocratic sports. It was not necessary to go into the sea or out to the ocean, for the fish came close to shore." He tells us that the fisherman let down the cowry shell on a line to lure the *he'e*, and waved it to and fro "as in a dance." No bait was used. Kamakau (n.d.: chap. 4:25–29) continues:

The squid of the shallows and rocky ledges were, in the old days, a famous seafood. They were countless; the air was foul with them [when many were caught]. It was a *tapa* seafood. The tapu varied in various places ...  

[In squid season] when the tide was high, the squid moved along the edge of the sea in files, like schools of mullet, and when the tide was low, the whole floor was furrowed as if rooted up by hogs, with the burrows scattered in every direction, and the squid would be lying spread but flat, like lumps of dark earth, moving the head about slightly. If they saw a man they would squirt and he had to run to escape.

In the morning came the squid spearing. Men and women went down to the sea ... a multitude .... The spearing went on until the tide came in. Then the squid fishers went ashore .... The squid were portioned out, 50 to 100 to each ... If a man was evil-minded he hid his catch in the sea. After the division was over, he hurried out in a canoe to gather them up.

There were numberless thus collected, and they made a great stench. They were salted and dried on drying frames, ten to a house.

The squid today [1869?] number about fifty percent ... from old times. When they were dry, the ends of the tentacles were braided until they stiffened ... they were worked over and thumped [pounded against a stone] until the tentacles curled over. Then they were salted until they turned pink. The salt was rinsed off with water, the head and neck were cut open, and the squid left to dry. A squid so treated was tender, the salt would whiten it, and it could be kept a long time without spoiling.

If it was to be eaten at once, it should be rinsed with wood ashes and worked with a very little water until the tentacles curled. Then the tentacles should be drawn through the hand to remove the slime, and thumped again vigorously until they curled and the skin drew up about the head and neck, and the tentacles broke off easily, and the flesh, if pinched [pricked?] with the fingernail, tore easily. [The directions are]: Then turn it upside down, exposing the teeth; use a quantity of salt where the teeth are; turn it right side up, grasp it by the head, and thump until the salt goes between the teeth into the head. Then place it, slime and all, into a gourd, and cover it over. This helps to turn it pink. For eating immediately, the tentacles should be drawn through the hand to remove the slime and salt, and it is thick and tender. It should be cut up in pieces in a gourd dish and some liver (*ala'ala*) worked in, and some juice of the *lipa'akai* [a seaweed] to make the dish fragrant.

This is what the people did in the old days to win the favor of their masters.

Kamakau (n.d.: chap. 4) also says that "it was a tapu seafood, and the tapu was not alike in all places; in some it might last four or five or six months after setting up the *hau* branch [kapu sign] some time in January or February. In other places it might be shorter ...." This is evidently a seasonal taboo to protect the young octopus. There were also chiefly taboos. On fishing grounds owned by the chiefs, some fish or shellfish were tabooed for chiefly revenue; on good *he'e* grounds this animal was often the chosen one.

Kepelino (n.d. I:43) describes the food-gathering habits of the *he'e*: "The tentacle called the 'ave-puhi' is used to entice fish. ... The *he'e* hides itself in a burrow or in the sand and when a fish grabs at the tempting
Figure 20. Poki, a sow bug. (Courtesy of Bernice P. Bishop Museum.)

ave-puhi the fish is killed .... When it is among seaweeds, it takes the appearance of seaweeds; if a red stone is at its place, it assumes that color ... the he'e is changeable ...."

Hawaiians often used habits of fish as bases for proverbs. Such a proverb is "He mūhe'e ke hoalike, ka iʻa hololua o ka moana," which means "You are like the mūhe'e, the reversible creature of the sea," that is, you are double-dealing (Kinney, informant).

The name he'e means to flee. It also means a miscarriage. This latter meaning came from the custom of feeding female dogs the slime of the he'e mixed in their food for a month or so before they were to give birth.

Crustaceans—Copepods, Mysids, Amphipods

Copepods, mysids, amphipods, and other small forms with similar habits and appearance to the untrained eye; sea lice, sea hoppers: 'ami-kai, mahiki, 'uku-kai (literally, sea bug), 'uku-limu (literally, seaweed bug) (Pukui and Elbert 1957). No data on uses available, although they were undoubtedly noted by the Hawaiians.

Cirripedes—Barnacles

'Ōkohekohe: acorn barnacles (Pukui and Elbert 1957).
Piʻoe, piʻoeʻoe: goose barnacles (Pukui and Elbert 1957).
Una'oa: "the barnacle on the outer plank of a ship" (Andrews 1865). Probably acorn barnacles, as Pukui and Elbert (1957) say uma'oa is an alternate name for kauna'oa, Vermetidae.

No data on uses of barnacles have been found.

Isopods

Sow bugs, pill bugs: pokipoki, poki (Figure 20; Pukui and Elbert 1957). Parasitic on fishes (family Cymothoidae). Eaten when there were enough of them gathered; cooked in ti leaves (Alona, informant).

Stomatopods—Mantis Shrimps

Family Squillidae, called aloalo (Maui name), also alowalo (Figure 21); lohelohe-kai (Hawaiian name) (Wiggin and Reist). Large species especially were prized highly as food. Kawelo (informant) reported that they were plentiful in Kaneohe Bay, Oahu, in season; they were also abundant at Molokai.

Stomatopods are difficult to catch. Those who know how follow their own technique carefully. The animal has to be lured out of its hole before being grasped. The hole is as wide as is the animal, but it cleverly builds a false front across most of the hole which can be broken down. A male and a female live in the same burrow. If the female is caught first, the male is sure to follow her out; if the male is caught first, there is little use in waiting for the female to emerge.
The aloalo is particularly delicious, tender, and full of flavor.

**Decapods—Shrimps, Lobsters, Crabs**

**Shrimps**: Generally known as ‘ōpae (Figures 22, 23, 24). Mahiki was used to mean any shrimp used ceremonially. We gather that shrimps were used ceremonially to cast out evil spirits (Pukui and Elbert 1957: 202).

According to Bryan (1933:157), the Hawaiians did not have separate names for many of the shrimps and prawns. They called most prawns aloalo, and shrimps were called ‘ōpae.

Distinctions among some kinds of ‘ōpae were noted, however:

‘Ōpae-hiki (literally, shrimp that appears): Halocaridina rubra, a cave-dwelling shrimp.

‘Ōpae-huna, ‘ōpae-hune, ‘ōpae-‘ohuna, ‘ōpae-‘ōhune (literally, small shrimp): applied to sea shrimps (e.g., Stenopus hispidus, the bandana shrimp, and Enoplometopus occidentalis) as well as to various shrimps and prawns almost transparent in color, found in brackish waters (e.g., Palaemon debilis, Figure 23B). In writing of Moanalua, Oahu, Mokumaia (1922) speaks of the ‘ōpae-huna: “The lips felt the sharpness of the shell but it warded off hunger when moved downward by the lehua poi of Iemi.” Kawelo says ‘ōpae are good to eat, raw or boiled.

‘Ōpae-iwi-nui (literally, shrimp with large chelae): Conchothytes meleagrinus (Wiggin and Reist). Undoubtedly the name would be used for many large-clawed shrimps.

‘Ōpae-kai: any sea shrimp.

‘Ōpae-kākāla: a spiked shrimp (Pukui and Elbert 1957)—that is, one with a rostrum.

‘Ōpae-kala-‘ole (literally, spineless shrimp): Atya bisulcata, Ortmannia henshawi (Pukui and Elbert 1957), for example.

‘Ōpae-kapaka: unidentified shrimp (Pukui and Elbert 1957).

‘Ōpae-ke’oke’o (literally, light-colored shrimp): given as the name for a light-colored shrimp but not identified.

‘Ōpae-kolo (literally, creeping shrimp): for example, Atya bisulcata, Ortmannia henshawi (Pukui and Elbert 1957).

‘Ōpae-kuahiwi (literally, mountain ‘ōpae): forms living in mountain streams.

‘Ōpae-lōlō (literally, stupid shrimp), may have originally been ‘ōpae-loloa (literally, long shrimp), Penaeus marginatus. Juveniles are found in shallow inshore water, adults in deep water (Cordover, informant). According to the story of Kawelo (Green and Pukui 1936), ‘ōpae-lolo is an introduced sea shrimp. Chinese people are very fond of it. It is seen 2 or 3 months after a period of flooding rain; it then rises to the surface and can be caught.

‘Ōpae-luahine (literally, old-lady shrimp): saltwater shrimp (Pukui and Elbert 1957).
FIGURE 22. 'Opae, shrimps. A–C, 'Opae-'ula, snapping shrimp, Alpheus lotini. (Courtesy of Bernice P. Bishop Museum.) D, 'Opae-huna, bandana shrimp, Stenopus hispidus. (Courtesy of S. W. Tinker.)

FIGURE 23. A, B, 'Opae-'oeha'a, clawed shrimp, Macrobrachium grandimanus. C, D, 'Opae-huna, Palaemon debilis. The same name was sometimes applied by Hawaiians to a plant or animal if the likeness was striking, as in the two 'opae-huna shown here. (Courtesy of John Maciolek.)
‘Opae-‘oeha’a (literally, crooked-walking shrimp): clawed shrimp, *Macrobrachium grandimanus*, found in streams and taro patches (Figure 23A; Pukui and Elbert 1957). ‘Opae-‘ōlulo: variety of soft (‘ōlulo) fresh-water shrimp (Pukui and Elbert 1957).
‘Ōpae-'ula (literally, red shrimp): snapping shrimp, family Alpheidae. Sometimes eaten but not in Ka‘u (Wiggin and Reist). Small, reddish shrimp (including Alpheus lottini), used for ʻōpelu bait (Pukui and Elbert 1957). Omsted (1937b:30) says, in speaking of Wai‘anapanapa, Maui, “in the spring the stones are said to be of a redder hue caused by the gathering of the ‘ōpae-'ula—red shrimp.” This would be Halocaridina rubra according to Devaney (see ʻōpae-hiki above).

Women usually gathered ʻōpae, finding freshwater ʻōpae under stones in the mountain streams. Beckley (1883:5) describes how they did it—moving through the water with a basket shaped something like a coal scuttle and made of ʻieʻie vines: “They move along in a crouching position, moving the stones and sticks under which the ʻōpae hide, driving them to a spot where vegetation overhangs the water. Here the woman places her basket underneath the leaves and lifts out the ʻōpae, dumping them into a calabash which, attached by a string, floats behind her. Fern leaves were placed on top of the ʻōpae to keep them from jumping out.”

In a note for the story of Kawelo (Green and Pukui 1936:36), there is mention of gathering sea shrimps: “Hoku-kau-ʻōpae, also called Ka-hau, was the shrimp star. At certain seasons of the year, it rises early in the morning, followed by Hoku-hoʻo-kele-waʻa, or star for guiding canoes, and then by Hokuloa, the morning star. Shrimps for bait can be gathered easily from the surface of the water if collected early when the ‘shrimp star’ is rising.”

Kamakau (n.d.) speaks of “the fine-fleshed shrimp, the coarse-fleshed shrimp, such as come from the sea into the inland ponds.”

Stewart (1831:II, 228–229) relates an incident describing a rather novel way of eating shrimp:

After the meats were removed, Madam Boki drew the casters and sallad [sic] bowl near her, as I at first supposed, to give us a specimen of her tact in sallad dressing; but, on seeing a servant approach with a parcel handsomely done up in green leaves, dripping with water, and observing a smile of archness playing on the features of her ladyship as she received it from him, I began to suspect it was only in preparation for some bonne bouche, peculiarly epicurean in its character.

Such it proved to be; for on carefully untying it, while her eye brightened more and more with pleasantry, she suddenly scattered the contents—a quantity of live shrimp, as pure and transparent as could be, and as sprightly as crickets—over the cresses, and dashing the cruet of vinegar upon the whole, caught up a half dozen of the delicate creatures in the leaves of the sallad, and tossed them, with a laugh, into her mouth, by way of encouragement to us to join in the course.

The Hawaiians probably designated the mud shrimps, Callianassidae, as aloalo. They inhabit burrows in sandy and muddy shores and crevices of porous rocks on the reefs (compare the section on Stomatopods).

Crayfish (in Hawaiian parlance, “lobsters”), SPINY LOBSTERS: Generally known as ula (Figure 25).

**Ula iki kua lenalena** (literally, small lobster with a yellow back): name given by Fornander (1917–1918:4, 584–585).

**Ula koa'e**: *Panulirus* spp. (Pukui and Elbert 1957). Full of good flesh.

**Ula maka'ele**: an all-black form, considered by Galbraith (informant) to be the best eating of all lobsters; probably *Panulirus pencillatus*. (Personal experience has shown that the flesh of lobsters varies from delicious to unpalatable. A marine zoologist, D. P. Fellows, has found some correlation between tastiness and stage of the individual lobster's molt cycle, the meat being least palatable immediately before and after molting.)

**Ula malule** (literally, limp lobster): probably denotes a lobster that has recently shed its hard shell (compare Pukui and Elbert 1957).

**Ula papa**: translated as “red rock lobster” (Fornander 1917–1918:4, 584–585). Probably “reef lobster” (Pukui and Elbert 1971 ed.: 376). Cf. *kualoa* in crabs section, wherein *ula papa* is listed as an alternate name for *Ranina ranina*, the “Kona crab.”


**Ula pehu** (literally, swollen lobster): slipper lobsters (e.g., *Paribacus antarcticus, Scyllarides squammosus*). Has a tail smaller than that of the *koa'e* (Kilinahe, informant).

**Ula poni** (literally, purplish *ula*): Kilinahe (informant) described it as light brown with blue markings, about a hand in length, caught with a net and eaten as are crabs. *Spirontocaris marmoratus*?

Other names that have been used to denote lobsters are ‘*apa'apa’a, hāwa'ewa'e*, and *ninole* (Pukui and Elbert 1957).

Kepelino (n.d. I:38) makes a noble effort to describe the *ula*:

The *ula* has a long, hard shell covering its entire back. The front part where the head is located is thick with some sharp pointed growths and then an irregular depression that seems to divide the front from the back. It is not a joint but a part of the whole shell, extending from the eyes to the back portion (of the body). On the portion in front, near the eyes, are hard projections, long and sharp in that place. Among other sharp projections there are the feelers, some that are an inch in length standing among shorter ones. The lower half of the *ula* is smoothly jointed, six joints marked by tooth-like spikes, like the teeth of a saw turning downwards. In front of these rows of saw-like teeth are four divisions in a row, standing between the four saw-like teeth. Four leaf-like growths stand between the first saw-like teeth, extending from one end to the other. They are located on the second joint and by second teeth. These divided, leaf-like sections are purplish in color and soft. The side toward the back, where it joins, is rimmed in red and then a white rim around the leaf-like projection, and then it finishes off by dividing into minute branches. The inner side or the forward side, is only bordered in white. The row of saw-like teeth and the projections lie equally from one end to the other. If the *ula* is a female, the egg clusters are found in these leaf-like projections standing in rows from the first joint down to the tail. The number of egg clusters is eight, four on each side. At the ends of the leaf-like projections are rows of leaf-like growths that separate them between the borders. When the first portion is separated, there are two more joints left before the tail is reached. The tail is composed of four leaf-like parts and the base of each of these leaf-like growths is rough and lumpy. And so it is at the end of the last (leaf-like growth) that separates (the egg clusters).

There are ten legs in all, that is, five on each side and each of these legs is irregularly jointed because the bony sections are unequal, some longer than others. At the tip of each leg is a claw like a bird's and hairy on the side toward the front. And each foot on either side has three sections. On some of the sections are sharp points and at the end of these legs, close to its teeth are some very short legs, two inches in length when the *ula* is a small one. These hairy legs are called *kihele'ai* (food gatherers) for they serve as hands. Because it is these legs that reach for the food. Next to these, on the inner side are appendages, perhaps, that are short and flat called *pu'ili* (holders) because these hold the food which the teeth chew. These things are flat, broad, and hairy. On the outside of the teeth, on each side are two thin, long, soft bones called the *kāmau* (helpers) because these help the *pu'ili* to hold the food. Directly in front of the teeth are some tiny rounded bones with hairy tips called *kōnikōmi* (presses) because these bones press in the food and hand it to the teeth while eating. At the base of the teeth are some thin, hairy and flat bones called *pani* (shutters) because these are the things that shut in the food and it rests on these before the chewing begins. The teeth are hard and strong. In front of the teeth are short thin curtains called *pale niho* (teeth curtains). They are flat bones attached to a circle called the *hena niho* (teeth center). Inside of the *hena niho* are three sharp needle-like bones, the center one being the longer. Adjoining those are some short bones. At the sides of these bones, away in under the back shell are droopy things called the 'ōhelo (ever-moving) because they move constantly. The eyes are long and purple, with a streaked knob at the tip attached to a thin base. The feelers are long, rounded,
and prickly, tapering to a thin base. There are some thin, sharp feelers in front of its eyes near the large feelers. Next are some small, rounded feelers which taper and divide into two thin branches. One of the branches is short, hairy, and very flexible at the tip. The intestine of this creature lies in a straight line from front to tail. There is its voiding vent, close to the long tail. This is a delicious “fish,” and full of meat. The ula is found in rocky hollows.

Ula was a source of food for the ancient Hawaiians, as it is today, being a much sought-after catch for local fishermen and divers.

PREPARATION: For eating raw, ula is removed from the shell and the digestive system is removed; the meat is cut into pieces, salted, and put away. When the time comes to eat it, some wana (sea urchin) juice and meat are added. If wanted cooked, ula is broiled over coals. Some Hawaiians like it half cooked, some like it well done. Some like it in a decomposed state, running out of the shell.

Lobsters were sometimes used to represent pig in sacrifices to the gods, as related in the following story (Anonymous 1923):

Ke’oahimakaokakua was seen going directly toward the goddess Haumea with two crayfish of the ponī variety in his hand. . . . Haumea took the two crayfish . . . and went with them to the pile of stones erected by Kahinini’ula as he was directed by the chiefs of Kahoupo-a-Kane. This was the heiau that he named Ka’enakilolani. Haumea uttered these words, “The flesh of the crayfish from which the shell is stript is the sacrificial ‘hog’ to the hosts of the night. Here is the ‘fish’ from Ho’okokohipapa, for the hosts of gods of Laumiha.” . . . She threw the crayfish on the pile of stones and no sooner had they touched them when their shells turned red like the crayfish we see broiled over the coals, and there they lay motionless.

CRABS: As is the case with gastropod mollusks, we have a quantity of Hawaiian names for crabs, indicating that this group was economically important. Habitat as well as general appearance and behavior seem to have been major features in distinguishing different kinds of crabs (Figures 26, 27).

Pāpā’i is the all-inclusive name for crabs. Again, as in the gastropods, we find groupings of crabs: kukuma, ‘elekuma, ‘ōhiki, pokipoki, and unauna are examples. We also find names used for particular species of crabs, names whose applications are each limited to a specific kind of crab. These limiting names are sometimes composed of an inclusive group name followed by a word or phrase that serves to limit the group name to a particular species.

The use of specific names for particular species of crabs does not necessarily mean that those kinds were more important economically than were those designated solely by the more inclusive group names. Rather, as was pointed out earlier, we think that the presence of limiting names suggests simply that definite differences in use as well as striking differences in appearance existed and that these naturally had to be clearly distinguished. Crabs for which no restricted or different uses existed did not have to be sharply separated from the others; group names—or even the word pāpā’i—sufficed.

‘A’ama: Grapsus tenuicrustatus, the black grapsid crab, probably the most common crab found along rocky shores (Figure 28A). Eaten raw, that is, salted, but seldom cooked, although some say it is delicious broiled. It was a favorite crab of Ka’u, eaten extensively when the sea was rough. To salt and keep ‘a’ama, the carapace was pulled off and the au sac (digestive gland) was removed. The legs were broken off the body and the meat was removed from them and salted; the resulting liquor, kai ‘a’ama, was added to the body of the crab, which was salted well and then stored. ‘A’ama kept a long time so prepared.

The ‘a’ama is said to have been a special or favorite sacred food for certain priests; care was taken to see that the crab was whole—no missing legs, etc. It was also used in medicine, usually to finish off a course of treatment in certain diseases. The ‘a’ama crab was offered in sacrifices so that the gods would loosen (‘a’ama) and grant the request (Pukui and Elbert 1957). Kepelino (n.d.) tells us that the “claws close to the mandibles are called niho-ki lou [hooking teeth].” Probably the term was applied to that apparatus in all crabs.

‘A’ama kua lenalena (literally, ‘a’ama with a yellow back): Grapsus tenuicrustatus. Yellow form, found with the black ‘a’ama along rocky shores.

‘Ala’eke: an edible portunid crab, sand-
colored, found in shallow water (Pukui and Elbert 1957), as *Portunus granulatus, P. orbicularis, Charybdis orientalis, C. erythroductyla* (Figure 28B).

‘Alakuma: *Carpilius maculatus*, the seven-eleven crab. Eaten in some localities, but in others such as Puna, not eaten. Some ate it cooked. There is a legend of this crab (Ward 1937:215):

> On the reefs of ancient Hawaii the sea god was wont to search for delicacies to assuage his divine hunger,
and one fine morning he espied a fine, big crab, fat of body, smooth, shining, and of a uniform, yellowish-pink shade, very beautiful to behold. Seized with a desire to add this delectable morsel to his repast, the god grasped the crab. This sudden attack surprised the crab, and, seizing the god by the fingers, it drew blood. The god, in surprise and pain, dropped the crab, leaving a row of red finger marks on its back. Quickly overcoming the shock of the first encounter, the god seized the crab again, only to relinquish his hold of the powerful creature a second time, leaving a second set of finger prints. For the third and last time the god caught the crab, which had no doubt been greatly weakened by this contest with divinity, and killed it. The descendants of this beautiful tropical species, *Carpilius maculatus*, all display the red imprints of the god’s fingers.

‘Alamihi (also ‘elemihi, ‘elepi, Pukui and Elbert 1957; see also kūkūau): *Metopograpsus messor*. A very common little square-backed grapsid crab of muddy, flat reefs near the mouths of rivers. “It dwells in the foul smelling sand,” says Kepelino (n.d. I:62), however, differs: “It resembles the ‘a’ama, is slightly larger than the ‘elekuma, its legs are hairy. The back is reddish and the front [undersurface] is white. In general appearance and habits it is like the ‘a’ama . . . short legs.” Perhaps *Geograpsus crinipes*; see paiʻea below.

Hihi-wai: identified in Pukui and Elbert (1957) as *Planes minutus (= cyaneus)*, a pelagic form typical of the open ocean and only occasionally drifting close to shore. However, Pukui says that *hihi-wai* is smaller than ‘a’ama, yellowish with black spots, found along rocky shores in the same habitat as ‘a’ama. On the basis of the latter information, we are inclined to disagree with Pukui and Elbert (1957) that *Planes minutus* is the *hihi-wai*, but rather suggest that another grapsid crab is the *hihi-wai*. 

“It is fond of mud and likes to make tunnels,” says Pukui, “and [it] can be detected by the smacking noise it makes” (air bubbles and movements of the crab in the mucky substrate in which it burrows make this noise). It sometimes travels as much as 100 ft inland. ‘Alamihi used to be plentiful at Kalia (now Ala Moana Park, Honolulu). The author remembers seeing a Chinese peddler take kerosene cans full of ‘alamihi to sell to Hawaiians living near the old Lunalilo Home on Piikoi Street and come home with empty cans every time.

‘Ā-loa: same as maka-‘ā-loa, but compare kualoa, alternate name ‘āloa.

‘E’eke: hard-shelled crab (no data) (Pukui and Elbert 1957); given as alternate name for ‘ala’eke.

‘Elekuma: small xanthid crabs, as *Pseudocarpilius caystrus* (according to Pukui and Elbert 1957).

‘Elekuma āko‘ako’a (literally, coral ‘elekuma): *Phymodius laysani* (according to Wiggin and Reist).

‘Elekuma ‘ele’ele: *Chlorodopsis areolata* (Wiggin and Reist), a small xanthid. One of the most abundant forms under stones and in the crevices of rocks near shore.

‘Elemihi: same as ‘alamihi and ‘elepi (Pukui and Elbert 1957).

‘Elepi: same as ‘alamih and ‘elemihi according to Pukui and Elbert (1957). Kepelino (n.d. I:62), however, differs: “It resembles the ‘a’ama, is slightly larger than the ‘elekuma, its legs are hairy. The back is reddish and the front [undersurface] is white. In general appearance and habits it is like the ‘a’ama . . . short legs.” Perhaps *Geograpsus crinipes*; see paiʻea below.

---

**FIGURE 27. Crabbing at Waikōle, district of Ewa, Oahu. (Courtesy of Bernice P. Bishop Museum.)**
Kualoa: *Ranina ranina*, the Kona crab, variant Hawaiian names: ‘āloa, ula papa. A deep-water crab. Figure 29 shows two drawings, top and underside, the first drawings of a crab from Hawai'i. For a time it was thought to have disappeared from Hawaiian waters, but it became abundant again and was frequently captured off the Kona coast of Hawaii in 1938 and later. It is considered one of the best crabs to eat.

Kuapa: a crab of the species *pai‘ea*, but with a hard shell (Andrews 1865).

Kuapa‘a: *Chlorodopsis areolata* (Wiggin and Reist), *Zozymodes biunguis*, *Xantho crassimanus*, and perhaps others.

Kūhonu: *Portunus sanguinolentus*, a large
Portunid crab (Pukui and Elbert 1957). Also called kuahonu and kuohonu. Its habitat is the coral reefs, where the crayfish live. It is caught in nets and is eaten raw or cooked. Kuohonu is a favorite relish. It is not very common in Ka‘u or Puna, but is common on Oahu, where it used to be on sale in the market frequently, tied up with a bullrush.

It was liked several hours old when the flesh inside the legs began to shrink away from the shell, called poholoholo [fitting loosely]. It was then prepared as any other crab. If eaten raw, the legs were broken off and the meat sucked out—with quite a bit of noise. The meat was not actually running out of the shell but was loosened enough to make sucking easier. It is a good eating crab, raw or cooked, but does not keep as well as others.

Kuhonu and pokipoki crabs often were found in the same area. Kūhonu are best when fat. They spoil after 24 hours, even if salted, whereas mo‘ala, for example, last a month or so when salted.

Kūkūau: Metopograpsus messor (Forskal). Kepelino (n.d. II: 12) agrees that kūkūau is in the same class as the ‘a‘ama,” but his description does not match Metopograpsus messor: “Pale dots are all over it. There are several little white dots right on top of its back, as though imprinted there with the point of a nail. It has small, red eyes. Its claws are like hard and strong pincers. Its actions are exactly like those of the ‘a‘ama. Its legs are small, thin and smooth. The posterior is irregularly narrow. The kūkūau is edible.”

Another informant says that the kūkūau is a large, deep-sea crab with brown spots. “A large crab (probably Carpilius convexus)” is another identification (Pukui and Elbert 1957).

Kukuma: as nearly as can be determined, any of various species of grapsid crabs, as Palicus maculatus and Sesarma spp. (Figure 28E; Wiggin and Reist). Pukui and Elbert (1957) say perhaps Aphanodactylus edmondsoni, but as this is a small species commensal in the shelly tube of a terebellid worm, this identification is doubtful.

Kukuma kea: Aphanodactylus edmondsoni (Wiggin and Reist), but compare comments.
under *kukuma*. It is believed that the name was attached to what the informants thought was a white grapsid.

*Kukuma*-ōhulu-hulu: *Sesarma obtusifrons* (Wiggin and Reist), and presumably others similar in appearance.

*Kūmimi*: *Lophozozymus intonsus* (Owen 1839: 77–78, Edmondson 1933: Fig. 154e), *Eitisus splendidus* (BPBM specimen, Edmondson 1933: Fig. 153f).

*Kūmimi-māka‘o*: *Petrolisthes coccineus* (Figure 28D; Pukui and Elbert 1957). Also called *na maka o Kaha‘i* (the eyes of Kaha‘i, Pele’s oldest sister). Used in sorcery.

*Kumimi-pua*: *Lybia edmondsoni* (Figure 28C; Pukui and Elbert 1957). Used in sorcery.

While the identities of *kumimi-māka‘o* and *kumimi-pua* seem undisputed, we have conflicting identifications for the third kind of *kumimi*. Owen obtained the Hawaiian name for *Lophozozymus intonsus* (= *Xantho eudora* Owen, see Rathbun 1906) from the natives of Oahu. This species is grayish white, mottled with reddish brown or dull orange. However, notes on *kumimi* recorded by the author indicate that Pukui describes it as being large, bright red, and living in the deep sea at the outer reef. A specimen of *Etisus splendidus* in the Division of Invertebrates at the Bishop Museum is labeled (by whom we do not know) *kumimi*. Pukui thinks that this same specimen is *pāpa‘i-‘au-moana* (pers. comm. to Fellows, 1964). Pukui also indicated during the same conversation that *Lophozozymus intonsus* (Owen’s *kūmimi*) is *‘ala‘eke*; *kūmimi* is the same shape “but is all one color on the tips of the claws.” But compare *‘ala‘eke* as defined by Pukui and Elbert (1957)—a portunid!

*Kūmimi* were considered inedible by the Hawaiians and in fact are reportedly poisonous at certain times of the year when the water is murky. Confusion about crabs being poisonous stems from inaccurate translations of the words *‘awa* and *‘awa‘awa*, which Mrs. Pukui and other informants use in describing various invertebrates: *‘awa* and *‘awa‘awa* mean bitter, sour, poisonous (Pukui and Elbert 1957). Pukui describes the *au* (gall sac; in invertebrates, the digestive gland) as being *‘awa*, meaning bitter, sour—not poisonous, for personal experience has demonstrated that the digestive gland of these animals is definitely not poisonous. *Kūmimi-māka‘o* and *kūmimi-pua* were used in sorcery (Pukui and Elbert 1957). Tabrah (1967) has heard that “these small creatures, squeezed in the hand, produce enough toxic substance to poison a man.” Pukui indicates that the large red *kūmimi* (*E. splendidus*) was “highly poisonous, very bitter, and was used in medicine, sometimes as a heart stimulant.”

*Kumu-lipoa* (literally, *lipoa* source), also called *maka-o-ka-lipoa, pāpa‘i-limu, pāpa‘i-lipoa* *Simocarcinus simplex*, commonly found in *lipoa* seaweed (*Dictyopteris* spp.), one of the three most popular kinds of edible seaweeds (Pukui and Elbert 1957). Eaten raw as they were found—it was considered too much bother to gather and prepare them for a meal.

*Ku-moana*, also called *pāpa‘i-‘au-moana*, *‘au-moana* connoting the open ocean, as opposed to *kai*, inshore waters. Hawaiian informants say it is very large, as large as the Samoan crab, with chelipeds powerful and sharp enough to “bite a coconut.” Its carapace is light or yellowish gray with reddish or yellowish spots. It is a deep-water crab. It is considered delicious and is always eaten cooked.

*Kuohonu*: see *kuohonu* above.

*Maka-ā-loa* (literally, long, bright eyes), also *ā-loa, ʻōhiki-maka-loa*: an ocypodid crab, *Macrophthalmus telescopicus*, found on mud flats (Pukui and Elbert 1957). This crab is not common everywhere: it is not found in Puna or Ka‘u; it was found at Kalia Beach, Ala Moana, Honolulu, and near Hau‘ula, Oahu. It was plentiful at Kalia before that area was dredged to make Ala Moana Park, but since the dredging was done they have all disappeared. Eaten (Wiggin and Reist).

*Makua-o-ka-lipoa*: see *kumu-lipoa* above. Also, sponge crabs, *Dromia dromia* (Wiggin and Reist).

*Moʻala*: *Podophthalmus vigil*, the sentinel crab, a large portunid. Found in ponds and shallow water. In Puna it is brownish black; on Oahu its color is reddish, blue, and purple. In Puna it comes up on the beach
FIGURE 30. 'Ohiki, ghost crab, *Ocypode ceratophthalmus*. (Courtesy of D. P. Fellows.) Burrows and sand mounds made by large male *O. ceratophthalmus*. (Photograph by M. Titcomb.)
at night; in Moanalua (Oahu) it frequents muddy places. (It may be that the same name is applied to different crabs in these two places.) It is eaten raw or cooked (now, usually boiled); as late as 1946 it was considered to have considerable economic importance, as it was then used extensively as food, and large numbers were sold in the Honolulu fish markets (Edmondson 1946: 283). In Puna it was cooked and was a favorite. Webb said: “This was the crab that the mountain or inland people got when they came to the shore, ‘crab hungry’. This lasts longer than the kuahonu, which is another common crab but which has to be eaten right away. They would take a goodly number with them back to the mountains, and eat one a day. The *mo'ala* lasts a month or so, lightly salted and packed in a calabash.”


'Ohiki: ghost crabs, *Ocypode ceratophthalms, O. laevis* (Figure 30). These crabs are very common on many sandy beaches, although the pressure of increased human and dog populations along the beaches has very noticeably decimated the crab populations. Some people eat the *'ohiki*, raw or cooked, but too generous amounts will cause stomach upsets. At Laie, Oahu, *'ohiki* are sometimes soaked in a pail of fresh water for an hour or so before being prepared as are other crabs—that is, the backs and legs are pulled off and the crabs are salted. They are then ready to eat raw or broiled.

'Ohiki-au-moana (literally, ocean-swimming *'ohiki*): possibly *Planes minutus (= cyanea)* and/or *Pachygrapsus marinus* (Pukui and Elbert 1957).

'Ohiki-maka-loa (literally, long-eyed *'ohiki*): see *maka-‘a-loa* above.

'Ounauna: same as unauna, hermit crabs (Pukui and Elbert 1957).

Pai'ea: *Plagusia depressa tuberculata* (Wiggin and Reist), a grapsid crab associated with the *'a'ama*. Kepelino (n.d. I: 59) points out the differences between the two kinds: “The *pai'ea* is reddish while the *'a'ama* is black. The legs of the *'a'ama* are long while those of the *pai'ea* are short. The bones of the *'a'ama* are soft and those of the *pai'ea* are hard. The habits are the same. This is a delicious creature.” Pukui and Elbert (1957) indicate that, compared to *'a'ama*, *pai'ea* has a harder shell and shorter legs fringed in front with short, stiff hair. Pukui says it is good to eat when it is raw. The flesh is lighter in color than that of the *'a'ama*.

Pākiki: a variety of poisonous crab, said to be the same as *kūmimi* (Pukui and Elbert 1957).

Pāpā: *Percnon planissimum* (Figure 28F, Pukui and Elbert 1957, Wiggin and Reist). Also *pāpa'i pāpaua* (Pukui), *Planes cyaneus*. Considered good to eat—a favorite food in Lahaina, Maui, where it was plentiful; found in Puna, Hawaii, but not appreciated there. Eaten raw; it has the fragrance of seaweed (Pukui).

Pāpā'i: general name for crabs (Pukui and Elbert 1957).

Pāpā'i āko'ako'a (literally, coral-dwelling *pāpā'i*): *Charybdis erythroactyla* (Wiggin and Reist), a coral reef inhabitant. Compare *'ala'eke* above. Eaten raw or cooked; one informant indicated that it was usually eaten raw, although another said it was not often eaten at all.

Pāpā'i-‘au-moana: *Ethisus splendidus* (Pukui). Compare discussions on *kūmimi* and *ku-moana* above.

Pāpā'i holu: soft-shelled crab (Pukui and Elbert 1957).

Pāpā'i-iwi-pūpū (literally, bone-shell crab): modern name for hermit crabs (Wiggin and Reist). Also called *'ounauna, unauna* (Pukui and Elbert 1957), *pāpā'i-una, pāpā'i-pūpū* (Pukui). Most Hawaiian informants say they were not eaten, but Kepelino (n.d. II: 28) claims they were, and describes their habits:

This creature will not run at the sight of man. If it sees one of its many enemies it will quickly draw back into the inside of its bony shell (the old shell of a *pūpū, pipipi, kūpe'e, leho, pu*, etc.), and so will escape .... It lives in pools along the shore. When it wants to kill some tiny *i'a* it keeps half its body within the shell, leaving the big pincher outside and keeps opening and shutting it like a blacksmith's "pincers." If it sees *i'a* swimming along before it, it will eject some food from its mouth quickly. When the *i'a* see this they swim closer to get it and then the pincers snap together immediately, holding fast a little fish.
Pāpā'i-kua-lenalena: yellow-backed crab (Pukui and Elbert 1957).
Pāpā'i-Lāna'i: a kind of crab (Pukui and Elbert 1957).
Pāpā'i-limu, pāpā'i-lipoa: see *kumu-lipoa* above.
Pāpā'i malule: crab in the soft shell stage (Pukui).
Pāpā'i pāpaua: see pāpā above.
Pāpā'i-una: see pāpā'i-īwi-pūpū above.
Pāu: a rare crab (Pukui and Elbert 1957).
Pē'eone (literally, sand-hiding): *Hippa pacifica* (Pukui and Elbert 1957). See also discussion under *pokipoki* below.
Pōhaku-hali (literally, stone fetcher): crabs perhaps of the family Leucosiidae (Pukui and Elbert 1957).
Poki: also called *pokipoki*, see the section on Isopods.
Pokipoki: box crabs, family Calappidae, including *Calappa calappa*, *C. gallus*, *C. hepatica* (Pukui). Also called papaki (Owen 1839), popoki (Pukui and Elbert 1957). Considered edible; not particularly enjoyed as food according to Pukui and Elbert (1957), but by other sources considered as excellent cooked but never eaten raw. Kepelino (n.d. 1:65) states: “It crawls in the sand and lets waves lift it from among the stones. When the wave recedes then it returns to its place. When the tide recedes and the sea floor is exposed it sinks under the sand . . . .” Often found in the same area as the kuahonu crab (Pukui); they live in the “wet sand” (Kamakau n.d.).

We believe that *Hippa pacifica* was also designated by the name pokipoki: “This is the pokipoki that lives in the sand where the sea washes up to the shore. We used to pin a piece of fish down on the sand with a long stick, using several sticks. The pokipoki came out of the sand to get the fish. Many came at once from every direction and were easily picked up and dropped into the buckets. They were washed and wrapped in *ti* leaves and cooked over hot coals” (Titcomb notes, source not given).
Marine Invertebrates in Old Hawaii—Titcomb and Collaborators 371

FIGURE 31. Hawaiian woman collecting wana (sea urchins). (Courtesy of Bernice P. Bishop Museum.)

Ina ‘ele’ele, ‘ina-‘uli (black ‘ina): Echinometra oblonga.


Sometimes a sauce is made of ‘ina by breaking the tests into large pieces and adding just enough water to cover them and enough salt to suit the taste. After several hours the liquid is carefully drained off. The liquid is called kai ‘ina and is well liked with raw fish. As the color of the juice of the ‘ina is reddish lavender, that color also is called kai ‘ina.

Wana group: Echinothrix spp., Diadema paucispinum. Not usually gathered with the bare hands, as the spines are too sharp and the large spines are intermingled with smaller, slender, hollow spines that have a poison sac at the base (Figure 31). The spines cause deep, painful puncture wounds.

Wana hāulu: Diadema paucispinum, a species with longer spines than the “regular” wana (Pukui and Elbert 1957).

Wana kauila (literally, kauila wood wana): form with spines the color of kauila wood (Kepelino n.d. 1:40).

Wana were evidently considered the most delicious eating of the urchins. Kepelino says (n.d. 1:40) that all kinds of wana are good to eat raw, and are also good cooked or dried in the sun. “It keeps the diaphragm moist” [Hawaiian equivalent for “tickling the palate” (Pukui)]. He says the spines on the underside of the wana are short, so it is easy to touch them there, but all kinds require a stick to turn them over in order to pick them up. A stick was also used to knock off spines.

Wana were apparently quite seasonal, as indicated by the saying Pala ka hala, momona ka hā’uke’uke (“When the hala flowers are ripe the sea-eggs are fat”) (Judd 1930). Sea urchins were apparently not “edible” when they contained no gonads.

To prepare wana for eating, the spines are removed, usually by knocking them off or rubbing them against stones. They are opened by crushing part of the test, or by putting salt on the mouth of the urchin and leaving it thus overnight, then making a little crack all around the mouth area and lifting it off. The five orange-colored tongues of gonads (elelo) clinging to the test may then be scooped out. This is the choice “meat” sought for, but the fluid, kai, is well liked too. It is always drained from the body cavity and the mouth parts. The kai and elelo combined make a relish that is well liked with poi or sweet potatoes. A little salt is added to the relish and it is ready to eat when the salt is dissolved. In large wana, the elelo are about 2 inches across and as thick as a child’s tongue. The combination of crayfish and wana was a favorite; wana was also combined
with raw fish or 'opihi, and, in modern times, with salt salmon.

Hāwa'e group: pincushion urchins, Tripneustes gratilla, Pseudoboletia indiana, and heart urchins, Brissus latecarinatus. Hawaiians noted their presence in both deep and shallow water, and in rocky and sandy areas. The spines are fine and short. They were not considered as tasty as other sea urchins. On Maui many fishermen take Tripneustes only, even though Echinothrix are available.

Hāwa'e maoli (literally, natural hāwa'e): probably Tripneustes gratilla, which has purplish-black spines or gray spines.

Hāwa'e po'o hina (literally, gray-headed hāwa'e): perhaps Pseudoboletia indiana, a species with delicate pink spines.

Hā'uke'uke group: also called hā'uke, hā'uku'e, hā'uke, hā'ue'ue. Species with short or flattened spines, as in Eucidaris metularia, Colobocentrotus atratus, and Heterocentrotus mammillatus. Considered delicious but not as good as the wana. Qualifying terms were used to differentiate among the species (compare the Kepelino system above). Hā'ue'ue is the name for Heterocentrotus, at least on Maui (Abbott, personal communication; Pukui and Elbert 1957).

Colobocentrotus atratus: hā'uku'e, hā'uku'e (Pukui and Elbert 1957), hā'uke, hā'uke'uke (Kauai name, according to Pukui), hā'uke'uke kaupali (Kepelino n.d.).

Heterocentrotus mammillatus: the slate-pencil urchin, was also called pūnoku (Figure 32; Pukui and Elbert 1957), and hā'uke'uke 'ula'ula denoted the brilliant red-orange specimens. The spines of this species were often actually used as "pencils." "Five carved spines have been found on Kahoolawe" (Buck 1957: 503; see also Figure 33).

Eucidaris metularia: hā'ue'ue (Hawaii name), peni (Maui name, Wiggin and Reist). This species was not large enough or common enough to have had any importance as food.

Other Hawaiian names for sea urchins include hailimoa (Kepelino n.d. I: 40) and hulu'anai (Pukui and Elbert 1957). See Figure 34.

Holothuroids—Sea Cucumbers, Bèche-de-mer

These are generally known by the Hawaiian name loli. Kepelino (n.d. I: 49) and Pukui
and Elbert (1957) give the following names for various kinds of loli:

- **Hulalilali** (shiny), also **hulali**. Same as **kūnounou**.
- **Kāhuli** (literally, changeable).
- **Kūnounou** or **kūneuneu**, also called **hulali**.
- **Loli-ka’e** (literally, edged loli).
- **Loli-kohola** (literally, reef loli).
- **Loli-lu’au** (literally, taro-tops loli).
- **Loli miikoko**, **loli-koko** (literally, blood-red loli).
- **Ma’i-hole**.
- **‘Unae**.
- **Weli, weliweli**.

Another source adds **auloli** (a white variety). Synonym: **kūkaeloli** (Pukui and Elbert 1957).

**‘Aha-huluhulu** (hairy ‘aha), **huluhulu**. Aside from Pukui and Elbert (1957:6, 84), Kepe­li­no (n.d. II: 73) is the only source of Hawaiian information about this animal. He says:

This is a creature without eyes. It resembles the *loli* in appearance. It is bumpy and entirely a whitish red in color. It is not classed with edible fishes nor is it classed with the *loli*. Its whole body appears hairy and very ugly to the sight. It dwells under water-worn rocks and drinks sea-water until it is full. If it is tossed on dry land, the water runs out of it and it dies. It is so bad that it is never eaten but its deeds are very good. It sucks in all the filth in the sea until it fills its belly. Its length is about four inches and its girth about the size of a finger. But when it sucks in the sea and filth it attains the length of nine feet and more. Therefore it is an ugly creature but good in deeds. It cleans the filth under water that the lives of fishes and man may be spared.

While Pukui and Elbert (1957) give the identification as *Eurythoe pacifica*, an annelid worm, the description of its appearance and habits agrees with that of *Opheodesoma spectabilis*, a holothurian familiar on mud flats as are found in Pearl Harbor and Kaneohe Bay.

**Loli okuhi kuhi**: *Holothuria atra* (West Maui name), identified by Devaney from a specimen collected at Ka’a Beach, near Wailuku, Maui. Not eaten by local residents. Probably also *Holothuria difficilis, H. hilla*.

Because preserved *loli* fail to resemble living specimens and the pictures available to show informants also fall short of resembling living holothurians, we have in most cases been unable to equate satisfactorily scientific species with the Hawaiian names.

We have learned, though, that the *loli-pua* was the favorite for eating.

**PREPARATION**: As soon as one is caught, the slime is rubbed off, leaving the skin a purplish color. Then the *loli* is washed, cut open, and entrails removed, washed again, cut into small pieces, salted, and stored in a container until wanted. It is not eaten cooked. Sometimes pounded *limu ‘a’ala-‘ula* is added, or *‘ina*, meat and fluid (Alona, informant). The *loli-ka’e* was also considered good eating, either raw or cooked (Bryan 1933:152). The *loli-koko*, which is reddish and will discharge its Cuverian organs on very slight stimulus, was not eaten (Bryan 1933:152).

*Loli* are evidently not equally good at all seasons: "When you longed for the *loli* of Kaupo, the prophet told you that it was not the best time to get *loli* to eat. The *loli* were in the sand and were bitter" (Anonymous 1894). *Loli* are found on rocks or in holes in...
Figure 34. Sea urchin motif in a Hawaiian tapa design. (Courtesy of Bernice P. Bishop Museum.)
the rocks of the reef. They may sometimes be seen in very shallow water. "You see the inert slugs, red, brown, black, white and speckled, lying around plentifully (in waters of Lana'i)" (Anonymous 1873).

The legendary origin of the loli is related in a story of Hema (Anonymous 1920). The tale, in brief, is that Hema went to sea to catch a certain kind of fish. Instead, he caught a person, Kaukawehi, who dwelt at the bottom of the sea. Hema scooped out Kaukawehi's eyes for bait, as the particular fish he wanted (to satisfy the craving of his wife) would take no other kind of bait. Borne by the current, the sightless, but not lifeless, body of Kaukawehi was washed ashore at Keonepoko, Molokai, and remained caught among the pohuehue vines. Above this spot was a spring and a sweet potato patch. The owner of the patch, coming to fill his water bottle at the end of the day, cleared away some of the sweet potato vines, throwing them on the pohuehue vines where the body lay. The vines falling into the eye sockets of Kaukawehi restored his vision. (Because Kaukawehi's sight was restored, medical kahunas have used the sweet potato as a medicine for blindness and failing sight, hence the expression, "If the eyes are blinded, the potato will heal them.") He moved to and fro, assuming an earthly form of a big caterpillar, ate of the sweet potato leaves, and made himself free with those of the patch itself. Kaukawehi's body rolled over and over on the sand, and, carried high by the tide, was carried back to the sea and stranded on a rocky ledge. This was the origin of the loli.

There is a saying, "You have caught a loli, the sightless creature of the sea." Following the Hawaiian line of thought that linked sea and land creatures showing some resemblance, Kepelino (n.d.) says: "The caterpillar is the 'parent' of the loli. When the caterpillars move seaward they turn into loli. When a caterpillar changes into a loli, then the end of the caterpillar becomes the head of the loli, and, again, the loli is the parent of the eel. The loli gives birth to baby eels. The loli-ka'e māku'e is the parent of the pūhi vela (eel); the loli-koko (mākoko) is the parent of the pūhi-kaula, the loli-ka'e ʻōpikapika is the parent of the kāpā (eel)."

The loli is kapu to some families because it is their 'aumakua, or family god, and is actually poisonous to those who transgress the kapu and eat it, according to our informants.

**Ophiuroids—Brittle Stars**

As is the case with the asteroids (star fishes), the brittle stars were of no economic importance to the Hawaiians. Pe'a and pe'ape'a (Wiggin and Reist) are the only old Hawaiian names we have found for them; i'a hōkū is the modern translation of star fish and is used for brittle stars as well.

**SUMMARY**

The native Hawaiians made full use of marine invertebrates as food. Regardless of appearance, habitat, or life style, all types were considered edible if no adverse effects were experienced upon eating them. Uses of the various forms as tools, ornaments, and medication evolved from experimentation and close observance to supplement materials available from the land.

The Hawaiians lived as an integral part of the island ecosystem, utilizing their marine resources fully but refraining from exploiting them, ensuring that there would be enough for the future.

**INFORMANTS**

ABBOTT, ISABELLA. Professor of Biology, Stanford University, and Wilder Chair in Botany, University of Hawaii.

AKANA, LILY. Hilo, Hawaii.

ALONA, CHARLES. Waimanalo, Oahu.

AUKAI, KAAUWANA. A conferred name; true name was Hong Kong Yu, a citizen of Punaluu, Oahu, well-versed in Hawaiian lore. In this paper he is referred to by his second name, Aukai, by which he was affectionately known. In December 1936, A. F. Judd recognized his ability and knowledge and asked him to name specimens of marine animals recorded in a curator's copy of Edmondson (1933).
CORDOVER, R. D. Through D. M. Devaney.
EMORY, KENNETH P. Archaeologist, Bishop Museum.
GALBRAITH, GEORGE MANUIA. Kaalaea, Oahu.
IHARA, VIOLET. Bishop Museum and State of Hawaii Department of Education.
KAWELO, JOSEPH. Kaalaea, Oahu.
KAY, E. ALISON. Malacologist, University of Hawaii.
KENN, CHARLES. Oahu. Long-time authority on Hawaiiana.
KILINAHE.
KINNEY, WILLIAM.
KONDO, YOSHIO. Malacologist, Bishop Museum.
MACIOLEK, JOHN. Senior Advisor, Hawaii Cooperative Fishery Research Unit, Honolulu.
MAHUIKI, RACHEL. Haena, Kauai, and Oahu.
OMSTED, EMMA. Hana, Maui.
REIST, BIRDIE. Associate of Paahana Wiggin.
RYAN, EDWARD P. Formerly a graduate student in the Zoology Department, University of Hawaii.
WEBB, LAHIHALI. Former receptionist, Bishop Museum, Lady-in-waiting to Queen Liliuokalani.
WIGGIN, PAAHANA. Mother of Mary Kawena Pukui.

LITERATURE CITED

GEORGE, R. W., and L. R. HOLTHUIS. 1965. A

GREEN, L. C., and M. C. PUKUI. 1936. The legend of Kawelo. Published privately, Honolulu. 185 pp.


STEWART, C. S. 1831. A visit to the South Seas in the U.S. Ship *Vincennes*, 1829 and 1830 ... Vols. 1–2. John P. Haven, New York.


<table>
<thead>
<tr>
<th>Term</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>abrasives</td>
<td>332</td>
</tr>
<tr>
<td>Acanthochiton viridis</td>
<td>337</td>
</tr>
<tr>
<td>acorn barnacles</td>
<td>356</td>
</tr>
<tr>
<td>actinarians</td>
<td>330</td>
</tr>
<tr>
<td>adzes</td>
<td>347</td>
</tr>
<tr>
<td>Alpheidae</td>
<td>360</td>
</tr>
<tr>
<td>Alpheus lottini</td>
<td>358, 360</td>
</tr>
<tr>
<td>Amphineura</td>
<td>337</td>
</tr>
<tr>
<td>amphipods</td>
<td>356</td>
</tr>
<tr>
<td>annelids</td>
<td>332, 335</td>
</tr>
<tr>
<td>Antheopsis papillosa</td>
<td>330</td>
</tr>
<tr>
<td>Antheoploea nigrescens</td>
<td>330</td>
</tr>
<tr>
<td>Anthozoa (anchozoans)</td>
<td>330, 336</td>
</tr>
<tr>
<td>Antipathes grandis</td>
<td>330</td>
</tr>
<tr>
<td>Aphanodactylus edmondsoni</td>
<td>366</td>
</tr>
<tr>
<td>Aplysia</td>
<td>345</td>
</tr>
<tr>
<td>Aplysia juliana</td>
<td>345</td>
</tr>
<tr>
<td>Arca reticulata</td>
<td>351</td>
</tr>
<tr>
<td>Arca sp.</td>
<td>349</td>
</tr>
<tr>
<td>Architectonica perspectiva</td>
<td>347</td>
</tr>
<tr>
<td>Architectonicidae</td>
<td>345</td>
</tr>
<tr>
<td>Argonauta argo</td>
<td>353</td>
</tr>
<tr>
<td>asteroids</td>
<td>370, 375</td>
</tr>
<tr>
<td>Atina saccaita</td>
<td>350</td>
</tr>
<tr>
<td>Atya bisulcata</td>
<td>357</td>
</tr>
<tr>
<td>auger shell</td>
<td>337, 345, 346</td>
</tr>
<tr>
<td>bait</td>
<td>353, 356, 375</td>
</tr>
<tr>
<td>banana</td>
<td>330</td>
</tr>
<tr>
<td>bandana shrimp</td>
<td>357, 358</td>
</tr>
<tr>
<td>barnacles</td>
<td>356</td>
</tr>
<tr>
<td>Béche-de-mer</td>
<td>372</td>
</tr>
<tr>
<td>bivalve shells</td>
<td>335, 348, 349, 351</td>
</tr>
<tr>
<td>black coral</td>
<td>329, 330, 331</td>
</tr>
<tr>
<td>bonito</td>
<td>349</td>
</tr>
<tr>
<td>borer</td>
<td>353</td>
</tr>
<tr>
<td>box crabs</td>
<td>370</td>
</tr>
<tr>
<td>Brachidontes cerebristratus</td>
<td>334, 335, 348, 350</td>
</tr>
<tr>
<td>Brissus latcarinatus</td>
<td>372</td>
</tr>
<tr>
<td>brittle stars</td>
<td>375</td>
</tr>
<tr>
<td>bubble shells</td>
<td>347</td>
</tr>
<tr>
<td>Bulla sp.</td>
<td>346, 348</td>
</tr>
<tr>
<td>Bullina scabra</td>
<td>347</td>
</tr>
<tr>
<td>Bursa granularis</td>
<td>347</td>
</tr>
<tr>
<td>Calappa calappa</td>
<td>370</td>
</tr>
<tr>
<td>Calappa gallus</td>
<td>370</td>
</tr>
<tr>
<td>Calappa hepatica</td>
<td>370</td>
</tr>
<tr>
<td>Calappa spp.</td>
<td>356, 370</td>
</tr>
<tr>
<td>Calappidae</td>
<td>370</td>
</tr>
<tr>
<td>Callianassidae</td>
<td>360</td>
</tr>
<tr>
<td>cancer</td>
<td>332</td>
</tr>
<tr>
<td>canoes</td>
<td>332</td>
</tr>
<tr>
<td>Cardium</td>
<td>348</td>
</tr>
<tr>
<td>Carpiulus convexus</td>
<td>366</td>
</tr>
<tr>
<td>Carpiulus maculatus</td>
<td>363, 364</td>
</tr>
<tr>
<td>Castra cornutus</td>
<td>346, 347</td>
</tr>
<tr>
<td>caterpillar</td>
<td>375</td>
</tr>
<tr>
<td>Cellana exarata</td>
<td>339, 343</td>
</tr>
<tr>
<td>Cellana sandwichensis</td>
<td>343</td>
</tr>
<tr>
<td>Cellana talcosa</td>
<td>342, 343</td>
</tr>
<tr>
<td>cephalopods</td>
<td>353</td>
</tr>
<tr>
<td>Ceriantharia</td>
<td>336</td>
</tr>
<tr>
<td>Cerithiidae</td>
<td>345</td>
</tr>
<tr>
<td>Cerithium columnna</td>
<td>345</td>
</tr>
<tr>
<td>Cerithium nesioticum</td>
<td>345</td>
</tr>
<tr>
<td>Chama isotoma</td>
<td>348, 349</td>
</tr>
<tr>
<td>Chamidae</td>
<td>335, 350</td>
</tr>
<tr>
<td>chambered nautilus</td>
<td>354</td>
</tr>
<tr>
<td>Charonia tritonus</td>
<td>346, 347</td>
</tr>
<tr>
<td>Charybdis erythrodactyla</td>
<td>363, 365, 369</td>
</tr>
<tr>
<td>Charybdis orientalis</td>
<td>363</td>
</tr>
<tr>
<td>chitons</td>
<td>337</td>
</tr>
<tr>
<td>Chlorodopsis areolata</td>
<td>364, 365</td>
</tr>
<tr>
<td>cirripeds</td>
<td>356</td>
</tr>
<tr>
<td>clam</td>
<td>335, 348, 350, 351</td>
</tr>
<tr>
<td>clawed shrimp</td>
<td>358, 359</td>
</tr>
<tr>
<td>coconuts</td>
<td>330, 354</td>
</tr>
<tr>
<td>Codakia</td>
<td>351</td>
</tr>
<tr>
<td>Coelenterata (coelenterates)</td>
<td>330, 336</td>
</tr>
<tr>
<td>Colobocentrotus atratus</td>
<td>372</td>
</tr>
<tr>
<td>Colubraria sp.</td>
<td>345</td>
</tr>
<tr>
<td>columbellid</td>
<td>346</td>
</tr>
<tr>
<td>conch shell</td>
<td>346</td>
</tr>
<tr>
<td>Conchodytes meleagrinæ</td>
<td>357</td>
</tr>
<tr>
<td>cone shell</td>
<td>346, 347</td>
</tr>
<tr>
<td>Conidae</td>
<td>346</td>
</tr>
<tr>
<td>Conus leoparidus</td>
<td>347</td>
</tr>
<tr>
<td>Conus millepunctatus</td>
<td>346</td>
</tr>
<tr>
<td>Conus quercinus</td>
<td>347</td>
</tr>
<tr>
<td>Conus sponsalis</td>
<td>346</td>
</tr>
<tr>
<td>copepods</td>
<td>356</td>
</tr>
<tr>
<td>coral</td>
<td>329, 331, 332</td>
</tr>
<tr>
<td>coral, black</td>
<td>330</td>
</tr>
<tr>
<td>cork shell</td>
<td>347</td>
</tr>
<tr>
<td>cowries (cowry)</td>
<td>327, 340, 345, 355</td>
</tr>
<tr>
<td>cowry, snakehead</td>
<td>340</td>
</tr>
<tr>
<td>crab</td>
<td>362</td>
</tr>
<tr>
<td>crab, black graspid</td>
<td>362</td>
</tr>
<tr>
<td>crab, box</td>
<td>370</td>
</tr>
<tr>
<td>crab, ghost</td>
<td>368, 369</td>
</tr>
<tr>
<td>crab, graspid</td>
<td>362, 364, 366, 369</td>
</tr>
<tr>
<td>crab, hard-shelled</td>
<td>364</td>
</tr>
<tr>
<td>crab, hermit</td>
<td>369, 370</td>
</tr>
<tr>
<td>crab net</td>
<td>363</td>
</tr>
<tr>
<td>crab, ocypodid</td>
<td>367</td>
</tr>
<tr>
<td>crab, poisonous</td>
<td>369</td>
</tr>
<tr>
<td>crab, portunid</td>
<td>362, 366, 367</td>
</tr>
<tr>
<td>crab, Samoan</td>
<td>326</td>
</tr>
<tr>
<td>crab, sand</td>
<td>329</td>
</tr>
<tr>
<td>crab, sentinel</td>
<td>367</td>
</tr>
<tr>
<td>crab, seven-eleven</td>
<td>363</td>
</tr>
<tr>
<td>crab, soft-shelled</td>
<td>369</td>
</tr>
<tr>
<td>crab, sponge</td>
<td>367</td>
</tr>
<tr>
<td>crab, xanthid</td>
<td>364</td>
</tr>
<tr>
<td>crab, yellow-backed</td>
<td>369</td>
</tr>
<tr>
<td>crabs</td>
<td>357, 362, 363, 364, 366</td>
</tr>
<tr>
<td>crayfish (lobsters)</td>
<td>357, 360, 362, 366, 371</td>
</tr>
<tr>
<td>crustaceans</td>
<td>356</td>
</tr>
</tbody>
</table>
Marine Invertebrates in Old Hawaii—Titcomb and Collaborators 379

Crena, 351
Crena bella, 351
currency, 341
Cuscuta sandwichiana, 336
Cymatiidae, 346
Cymatium nicobaricum, 347
Cymatium pyrum, 345, 346
Cymothoidae, 356
Cymatium nicobaricum, 347
Cymatium pyrum, 345, 346
Cymothoidae, 356
Cypraeidae, 327, 340
Cyprea caputserpentis, 340, 341
Cyprea cameo/a, 342
Cyprea cicercu/a, 340
Cyprea granu/ata, 340
Cyprea he/vola, 340
Cyprea isabella, 340
Cyprea leviathan, 342
Cyprea macu/ifera, 341, 341
Cyprea mauritiana, 340, 341, 342, 355
Cyprea moneta, 340
Cyprea tigris, 340, 341
decapods, 357
Diadema paucispinum, 371
Dictyopteria, 367
diseases, 330, 362
dizzy shell, 347
dodder (vine), 334, 336
dog, 331, 356, 369
Do/abella auricularia, 345
Do/abrifera, 345
drill points, 346
drills, 346
Dromia dromia, 367
Drupa, 347
Drupa morum, 339, 345
Drupa ricina, 339, 345
Dynomene hispida, 369
ear shells, 345
echinoderms, 332, 370
Echinoida (echinoids), 327, 370
Echinometra mathaei, 371
Echinometra oblonga, 371
Echinometra spp., 370
Echinometra spp., 371, 372
echiurids, 332
eel, 330, 375
egg mass (case), 334, 336, 347
Enoplometopus occidentalis, 357
Epitonium spp., 344, 347
Etisus splendidus, 367, 369
Euchelus, 345
Eucidaris metularia, 372
Euplica varians, 345, 346
Euprymna scolopes, 353
Eurythoe pacifica, 373
fish, 326, 331, 335, 349, 350, 353, 355, 356, 372, 375
fishhooks, 349
fishing, 349, 353, 355
fish pond, 350
Fissurellidae, 342

Food, 346, 349, 350, 351, 354
Fungia scutaria, 332
Fusinus sandvicensis, 346
Gastropoda (gastropod), 327, 336, 337, 338, 339, 344, 346, 362
Geograpus crinipes, 364
ghost crab, 368, 369
gonads (sea urchin), 371
goose barnacle, 356
gourd, 328, 337
grapcid crab, 362, 364, 366, 369
Grapsus tenuicrustatus, 362, 365
Halocaridina rubra, 357, 360
Haminoea spp., 346, 347
heart urchins, 370, 372
Helicus sp., 345
Heliatus variegatus, 346
helmet shell, 346, 347
hermit crabs, 369, 370
Heterocentrotus mammillatus, 372
Hippa pacifica, 370
Hippomix, 343
Holothuria atra, 373
Holothuria cinerescent, 373
Holothuria difficilis, 373
Holothuria hila, 373
Holothuroidea (holothuroids), 327, 332, 372
hooks, 349, 350, 352
Hydatinidae, 347
Hydatina amphistre, 347
hydrozoans, 330
Isarachnanthus bandanensis, 330, 334, 336
Ischnochiton petaloicida, 337
Isognomon perna, 350
Isognomon spp., 350
Isognomonidae, 350, 352
isopods, 356, 370
Janthina spp., 346, 347
Japanese littleneck clam, 351
Kogomea sandwichiensis, 344

Lanice conchilega, 332, 333
Latiurus nodatus, 346
Leiodermatium, 329
Leptothyrna, 345
Leptothyrna verruca, 345
Leucosiiidae, 370
limpets, 342, 343
Lioconcha hieroglyphica, 348, 351
littleneck clam, Japanese, 351
Littorina pintada, 339, 344
Littorina spp., 344, 345
lobsters (crayfish), 357, 360, 361, 362, 367, 369, 371
long-mouthed shell, 347
long shrimp, 357
Lophostozymus intinsus, 367
lung trouble, 330
lures, 350, 355
Lybia edmondsoni, 365, 367

Macarthurial grandinamamus, 358, 359
Macrophthalmus telescopicus, 367
mantis shrimp, 356, 357
marginellids, 344
Martesia striata, 351
medicine, 330, 332, 343, 362
Melampus, 346
Melampus castaneus, 345
Metopograpsus messor, 364, 366
Mitra consanguinea, 344
Mitra litterata, 344
miter shells, 344, 347
Mollusca (mollusks), 327, 336, 337, 338
moon shell, 334, 335, 336, 345, 347
morning glory, 336
Morula granulata, 338, 345, 346
Morula spp., 345
mother of pearl, 335, 349, 350
mountain apple, 330
mud shrimp, 360
muricid, 345, 347
mushroom coral, 332
mussels, 335, 350, 352
mysids, 356
Mytilidae (mytilid), 334, 350

Nassa, 347
Nassa sert a, 345
Natica guateriana, 334, 336, 347
Nautilus pompilis, 354
nematodes, 332
nemerteans, 332
Nerita picea, 339, 344
Nerita plicata, 340
Nerita polita, 336, 338, 339, 340
Neritidae (nerites), 338, 343
Neritina granosa, 338
Neritina spp., 343

octopus, 342, 353, 354, 355
Octopus cyanea, 353
octopus fishing lures, 340
Octopus marmoratus, 353
Octopus ornatus, 353
Octocerode ceratophthalmus, 368, 369
Octopus laevis, 369
cycopid crab, 367
Odostomia spp., 347
old lady shrimp, 357
Oliva sandwicchensis, 344
olive shells, 344
Onchidium sp., 346
onion bulbs, 330
Opheodesoma spectabilis, 373
ophiuroids, 375
opisthobranchs, 345, 346
ornaments, 340, 341, 346
Ortmannia henshawi, 357
Ostrea edmondsoni, 365, 367
Ostrea sandwicchensis, 350

PACIFIC SCIENCE, Volume 32, October 1978

Ostrea sandwicchensis, 350
octopus fishing lures, 340

Pachygrapsus marinus, 369
Palaeon debilis, 357, 358
Palicus maculatus, 365, 366
Palythoa toxica, 330, 331
Panulirus penicillatus, 360, 361
Panulirus spp., 361
paper nautilus, 353
parasitic, 356
Paribaccus, 361
Paribaccus antarcticus, 361
partridge tun (shell), 346
Patellidae, 342
pearl oyster, 352
pears, 352
pearl shell, 349, 350
Peasiella tantilla, 345
pelcyrop mollusk, 335, 348
Penaeus marginatus, 357
Peripatus, 330
Percnon planissimum, 365, 369
Periglypta reticulata, 350, 351
Petrolithes coccineus, 365, 367
phasinellids, 345
Phymodius laysani, 364
Physalia, 330
pigs, 331, 332, 362
Pinctada margaritifera, 348, 349, 351
Pinctada nebulosa, 349
Porites, 342, 352
pincushion urchins, 370, 372
Pinnidae, 350
Pliogorgia depressa tuberculata, 369
Planaxis labiosus, 345, 346
Planaxis sandwicchensis, 345
Planes cyaneus, 364, 369
Planes minutus, 364, 369
Plectotrema striata, 344
Pleurobranchus, 346
Podophthalmus vigil, 367
poisonous, 331, 346, 347, 369, 371
dolichoae worms, 332, 335
Porites, 329, 332
Portuguese man-of-war, 330
portunid crab, 362, 366, 367
Portunus granulatus, 363
Portunus orbicularis, 363
Portunus sanguinolentus, 365
prawns, 357
Pseudopecten lusoria, 372
Pseudozius caystrus, 364
Pteria nebulosa, 349, 353
pumice, 329
Purpura aperta, 345, 347
Pyramidella sulcata, 346
Quidnipagus palatam, 348, 350
Ranina ranina, 365, 366, 369
red shrimp, 360
Marine Invertebrates in Old Hawaii—Titcomb and Collaborators

*Rhinoclavis sinensis*, 345  
*Rocellaria*, 351  
rock oyster, 335, **348, 350**

sabellid worm, **334**  
saltwater shrimp, **357**  
Samoan crab, **326**  
sand crabs, 329  
scrapers, shell, **337, 341, 344, 346**  
*Scylla serrata*, 326  
*Scyllarides squammosus*, 361  
*Scyllarurus*, 361  
sea anemones, **330, 334**  
sea cucumbers, **346**  
sea hares, 345  
sea hoppers, 356  
sea lice, 356  
sea urchin eggs, **371**  
sea urchin, slate-pencil, **372**  
sea urchins, **327, 362, 370, 371, 372, 373**  
seaweed, **327, 331, 334, 343, 354, 355, 356, 367**  
sea worms, 334  
sentinel crab, 367  
*Sepioteuthis arctipinnis*, 353  
serpulid worm, **335**  
*Sesarma obtusifrons*, 367  
*Sesarma spp.*, 366  
shell, auger, **337, 345, 346**  
shell, bivalve, **335, 348, 349, 351**  
shell, bubble, 347  
shell, conch, 346  
shell, cone, 346, 347  
shell, cork, 347  
shell, dizzy, 347  
shell, ear, 345  
shell, helmet, 346  
shell, long-mouthed, 347  
shell, moon, 334, 335, 336, 345, 347  
shell, miter, 344, 347  
shell, olive, 344  
shell, partridge tun, 346  
shell, pearl, **349, 350**  
shell, scrapers, **337, 341, 344, 346**  
shell, spindle, 346  
shell, staircase, 347  
shell, sundial, 345, 347  
shell, triton, 346, **347**  
shell, trumpet, 346  
shell, worm, 336  
shellfish, **327, 345, 346, 355**  
shrimp, bandana, **357, 358**  
shrimp basket, **359**  
shrimp, clawed, **358, 359**  
shrimp, long, 357  
shrimp, mantis, **357**  
shrimp, mud, 360  
shrimp, old lady, 357  
shrimp, red, 360  
shrimp, saltwater, 357  
shrimp, snapping, **358, 360**  
shrimp, star, 360  
shrimp, stupid, **357**  
shrimps, **357**  
sickness, 353  
*Simocarcinus simplex*, 367  
*Siphonaria normalis*, **343**  
*Siphonaridae*, 342  
slate-pencil sea urchin, **372**  
snapper, 317, 338, 344  
soft coral, 330, 331  
soft-shelled crab, 369  
sorcery, 353, 367  
sow bug, **356**  
spaghetti worm, **332, 333**  
spindle shells, **346**  
spery lobsters, **360**  
*Spiontocoecus marmoratus*, 361  
*Spondylus tenebrosus*, **348, 349, 350**  
sponge crab, 367  
sponges, 329  
squid, **328, 342, 353, 355**  
*Squilla oratoria*, **357**  
*Squillidae*, 356  
staircase shell, 347  
star fishes, 370, 375  
*Stenopus hispidus*, **357, 358**  
*Stomatopod*, 356, 360  
stoppers, 346  
*Strombus mackulatus*, 346  
sugar cane, 330  
sundial shells, 345, 347  
sweet potato, **331, 343, 354, 371, 374**  
tapa, **346, 374**  
*Tapes philippinarum*, 351  
techibranch, 346  
terebellid worm, **332, 366**  
*Terebra maculata*, 346  
*Terebra spp.*, 345, 348  
*Terebridae*, 345, 346  
*Teredo spp.*, 353  
*Thais*, 347  
*Thais intermedia*, **339, 345**  
*Theodoxus cariosus*, 338  
*Theodoxus neglectus*, 344  
*Theodoxus vespertinus*, **338, 339**  
thrush, 330  
tobacco, **336**  
*Tonna perditix*, 346  
tools, **343, 347**  
*Trachycardium orbita*, **348, 351**  
*Trichola variabilis*, 345  
*Tripneustes gratilla*, 372  
triton shell, **346, 347**  
trochids, 345  
*Trochus histros*, 345  
trumpet shell, 346  
*Turbo sandwichensis*, 345  
*Umbraculum sinicum*, **345, 346**
INDEX TO HAWAIIAN NAMES FOR MARINE INVERTEBRATES

A collection of Hawaiian names for marine invertebrates, along with their English translations and scientific names. The list includes various types of marine organisms such as crabs, snails, worms, and crinoids, each with both Hawaiian and English names provided. The document is a part of the Pacific Science, Volume 32, October 1978 issue.
Marine Invertebrates in Old Hawaii—TITCOMB AND COLLABORATORS

huʻehuʻe-kai, 329
huilali, 373
hulaliilani, 373
hulu'nenai, 372
hulu'enua, 373
hiwai, 373
i'a, 326, 334, 369
i'a a me poi, 326
i'a koku, 370, 375
i'a kulelima a 'Ewa, 352
i'a kulelima, 335
i'a maile, 343
i'a mane'o, 345
i'a hamau leo a 'Ewa, 352
i'a hoku, 370, 375
i'a kulelima a 'Ewa, 352
i'a /i'i/i'i, 335
i'a make, 343
i'a make, 343
iwa moe one, 345
ka i'a hamau leo a 'Ewa, 352
ka i'a kulelima o 'Ewa, 352
kahele-lani, 345
kahele-lani 'okala, 345
kahele-lani ula ula, 345
kahului, 373
kai, 343, 362, 367, 371
kai a'ama, 362
kai 'ina, 371
kali, 350
kamau, 361
kamoa, 346
kanoa, 345
kanio, 339
kāʻope, 350
kapua'ilo, 345
kaunoa, 332, 333, 336, 337, 356
kau no'a, 332, 336
kaunolua, 345
kāuri, 345
kāwā'ewa'e, 332
kilele'āi, 361
kiki, 345
kio, 332, 333, 334, 334, 335, 336, 337, 345, 350
kio-nahāwale, 334, 335, 350
kio-noho-ona, 330, 334, 335, 336, 347
kio-pōpo'ai, 332, 334, 334, 335
kio-pōhaku, 337
kō'a, 331
kō'a, 361
kō'a kea, 331
kō'a ko'a, 331
kō'a-koh, 332
kō'e, 332
kō'e kai, 332
kō'e-le, 342, 343
kohe-lelewela, 373
kohe-lewalewa, 373
ko howia, 345
kōhola, 345
dôkele, 344
kōlealea, 344
kōmikōmi, 361
kōnalelewela, 373
konalewalewa, 373
kuahonu, 366, 369, 370
kuakakai, 345
kualoa, 361, 364, 365, 366, 369, 370
kuanaka, 345
kuapa, 365
kuapa'a, 337, 365
kuapo'i, 343, 345
kūai, 345
kuhi, 365, 366, 367
kuiki, 341
du'i 'opiihi, 343
du'kaka-kōle, 344, 345
du'kakeloli, 373
du'kiuau, 364, 366
du'kukuma, 362, 365, 366, 367
du'kukuma kea, 366
du'kukuma'ō Hulu Hulu, 367
du'mahime, 367, 369
du'mahime-māka'o, 365, 367
du'mahime-pua, 365, 367
du'moana, 367, 369
du'mopo'a, 367, 369, 370
du'muneneu, 373
du'munenou, 373
du'o, 340
du'okumona, 366, 367
du'opapa, 342
du'opē, 338, 339, 339, 340, 340, 343, 344, 369
du'opē dūmenue, 339
du'opē 'e'ele, 339
du'opē lei, 336
du'opē mahiolo, 339
du'opē niho, 340
du'opē 'ula, 339
du'opē 'ula, 340
leho, 327, 336, 337, 338, 340, 341, 341, 342, 369
leho-ahe, 340, 341, 342
leho-kiko, 340
leho-kolea, 340, 341
leho-kupa, 340, 342
leho-kūlele, 340, 341
leho-lei, 340
leho-maoli, 340
leho-nuku, 340
leho-ōkala, 340
leho-ōma'o, 340
leho-ōpule, 340
leho-ōpu'upu'u, 340
leho-pa'a, 340
leho-palaoa, 340
leho-pouli, 340
leho-puna, 340
leho-ula, 340
leho-ula, 340
lei palaoa, 336
lepelepe-o-Hina, 345
limu-make, 330, 331
limu-make-o-Hina, 330, 331, 331
limu-make-o-Ma'alea, 330
loholehe-kai, 356
loiloa, 327, 372, 373, 375
loiloa 'e, 373
loiloa-makuku'e, 375
loiloa-okihi, 373
loiloa-pua, 373
loloa, 345
mahamoe, 350
mahiki, 356, 357
mahina, 345
mahiole, 339
ma'i-hole, 373
maka'aha, 345
maka'aha-aloa, 364, 367, 369
maka'aha-awa, 345
maka-haliili, 345
maka-aliili, 343
maka'ia-aliili, 343
makaloa, 329, 345, 347
maka o Kaha'i, 367
maka-o-ka-kai, 346
makapipipi, 344
maka-paweo, 349
maka-aloa-aloa, 367
mamaki, 346
mau iwi kuapo'i, 335
moa, 346
mo'alii, 366, 367, 369
moamoa, 353
moamoa-wa'a, 353
mole, 335
momé, 346, 347
momé ke'oke'o, 346
mi, 369
māhe'e, 353, 354, 356
māhe'e-kea, 353
māhe'e-mākoko, 353
muiona, 332
nahanawele, 350
nahanawele, 334, 335, 348, 350
nahanawele-līli'i, 350
naka, 337, 346
naka-huluwulu, 346
naka-kua-poi, 343
naka-'ōi'o, 346
na maka o Kaha'i, 367
naukilo, 353
naunau, 345, 346
nene, 346
nīho-kīlou, 362
nīnole, 361, 369
nukuloa, 346
nunūi, 346
nūa'ōa'akua, 350
 obey, 346
ōhēlo, 361
ōhikī, 362, 368, 369
ōhikī-ahu-moana, 369
ōhikī-makaloa, 367, 369
ōi'oi, 337, 346
ōkala, 330
ōkohekohe, 356
ōkola, 330
ōkole, 330
ōkole-emi, 330
ōkole-ha'elele, 330
ōkole-oi'oi, 346
ōkupe, 348, 350
ōlē, 346, 357
ōlē-kiwi, 346
ōlē-ōle, 346
ōlepe, 334, 335, 348, 348, 350, 351
ōlepe-kupe, 351
ōlepe-kupe 'ōpiopio, 351
ōlepe-naka-loa, 351
ōlepe-pāpua, 349, 351
ōlepe-waha-nui, 351
olu palaha, 342
ōnohi-awa, 346
ōpae, 357, 358, 360
ōpae-hina, 357, 360
ōpae-hun, 357, 358
ōpae-hune, 357
ōpae-ivi-nui, 357
ōpae-kai, 357
ōpae-kākala, 357
ōpae-kalale, 357
ōpae-kapaka, 357
ōpae-kō'oke'o, 357
ōpae-kolo, 357
ōpae-kua, 357
ōpae-lua, 358, 360
ōpae-lua, 358, 360
ōpae-pala, 357
ōpae-luahine, 357
ōpae-ōhe'a, 358, 359
ōpae-ohu, 357
ōpae-ōhune, 357
ōpae-ōhulo, 359
ōpae-ula, 348, 350
ōpe'a-ke'a, 370
ōpihi, 338, 339, 342, 343, 344, 372
ōpihi-āinalina, 343
ōpihi-awā, 343
ōpihi-kapua-i-lio, 343
ōpihi-kā'ali, 343
ōpihi-kō'ele, 342, 343
ōpihi-kō'ele māku'e, 342
ōpihi-ma-kai-uli, 343
ōpīhi māka'aili, 343
ōpīhi māka'ili, 343
ōloa, 345
PACIFIC SCIENCE, Volume 32, October 1978
Marine Invertebrates in Old Hawaii—Titcomb and Collaborators

'owā'owaka, 350
pā, pa, 348, 349, 351, 353
pa'a, 370
pā hau, 352
pahikaua, 350
pāi, 346
pā'iea, 364, 365, 369
pā'imalau, 330
pākīki, 369
"Pala ka hala, momona ka hā'uke'uke," 371
pālala, 330
palaoa, 339
pale nīho, 361
pā mau, 352
pana-pana-puhi, 350
panapuhi, 346
pāni, 361
papa, 336
pāpā, 365, 369
pāpā'i, 362, 365, 369
pāpā'i 'ako'ako'a, 369
pāpā'i-au-moana, 367, 369
pāpā'i hula, 369
pāpā'i-ʻiwī-pāpā, 369, 370
pāpā'i-kua-lenalena, 370
pāpā'i-kua-loa, 370
pāpā'i-Lānā'i, 370
pāpā'i-limoa, 367, 370
pāpā'i-maluo, 370
pāpā'i-pāpua, 369, 370
pāpā'i-pūpū, 369
pāpā'i-una, 369, 370
papa+kī, 370
pāpapa, 343
pāpāua, 348, 349, 351, 352
pāpāua-momi, 349
pāua, 348, 349, 351, 353, 370
pāuhi, 342
pe'a, 370, 375
pe'ape'a, 370, 375
pe'elua, 337
pe'zone, 370
peni, 372
pi'o, 356
pi'o'o, 356
pīpi, 350, 352
pipi, 338, 339, 343, 344
pipipi-ʻākōlea, 344, 346
pipipi-ʻākōlea-ihiola, 346
pipipi-kai, 344
pipipi-ʻākōlea, 344, 346
pipipi-kōlea, 344, 346
pipi-kōlea-ihiola, 346
pipi-wai, 338
pō'apo'ai, 346
pōhaku 'ana, 330
pōhaku-hali, 370
pōhaku-pele, 346
pōhaku puna, 332, 332
pōho-kūpele, 346
poki, 356, 370
pokipoki, 356, 362, 366, 370
pokipoki-au-moana, 370
pokipoki-kua-pa'a, 370
poleholeho, 340
pololi, 330
po'opalaoa, 346
popoki, 370
pū, 346, 347, 353, 354, 369
pua-kala, 370
pūhali, 346
pū ho'okani, 346
pu'ilu, 361
pūleho, 341, 346
pūleho-kōlel, 341
pūleho-kā'ina'o, 341
pūleholeho, 340, 341
pūleho-palaoa, 341
pūleva, 346
pū-loa, 353
puna, 332, 339
puna kea, 331
pūnōhu, 372, 372
pūʻoniʻoni'o, 346
pūpū, 327, 336, 338, 344, 369
pūpū-ʻalā, 346, 347
pūpū-alapa'i, 347
pūpūa, 347
pūpūʻava, 345
pū puhi, 346
pūpū hōhopu, 347
pūpū kamoa, 347
pūpū-kōleoa, 344, 345
pūpū-kui, 347
pūpū-kupa, 351
pūpū kupe, 351
pūpū-leholohe, 347
pūpū-leholohe ʻōnīʻoni'o, 347
pūpū-lei-'aha'aha, 347
pūpū-lei-hala, 347
pūpū makaloa, 339, 346, 347
pūpū-momi, 350
pūpū-mo'o, 337
pūpū-Niihau, 347
pūpuʻu, 347
pūpū-ʻolepe, 351
pūpū-ʻoniʻoni'o, 347
pūpū-pani, 346, 347
pūpū-pe'elua, 337
pūpū-pō'ai, 347
pūpū-poni, 347
pūpū-pōniu, 346, 347
pūpū-puhi, 345, 347
pūpū-waha-loa, 347
pūpū-winiwini, 348
ua e'e ka pūpū, 338
uhi, 335, 349, 350, 353
ʻuku-kai, 356
ʻuku-limu, 356
ula, 360, 360, 361, 362
ula hiwa, 360
ula ʻiki kua lenalena, 361
ula koa'e, 361
ula maka'ele, 361
ula matule, 361
ula papa, 361, 370
ula-papa, 361
ula pehu, 361
ula poní, 361, 362
uli, 348
'unae, 373
unahi-pipi, 352
una'a, 332, 336, 356

unauna, 362, 369, 370
'unii, 329
wana, 327, 362, 370, 371, 371, 372
wana hālula, 371
wana kauila, 371
wāwāhi-wo'a, 353
weka, 354
weli, 373
weliweli, 373
wī, 338