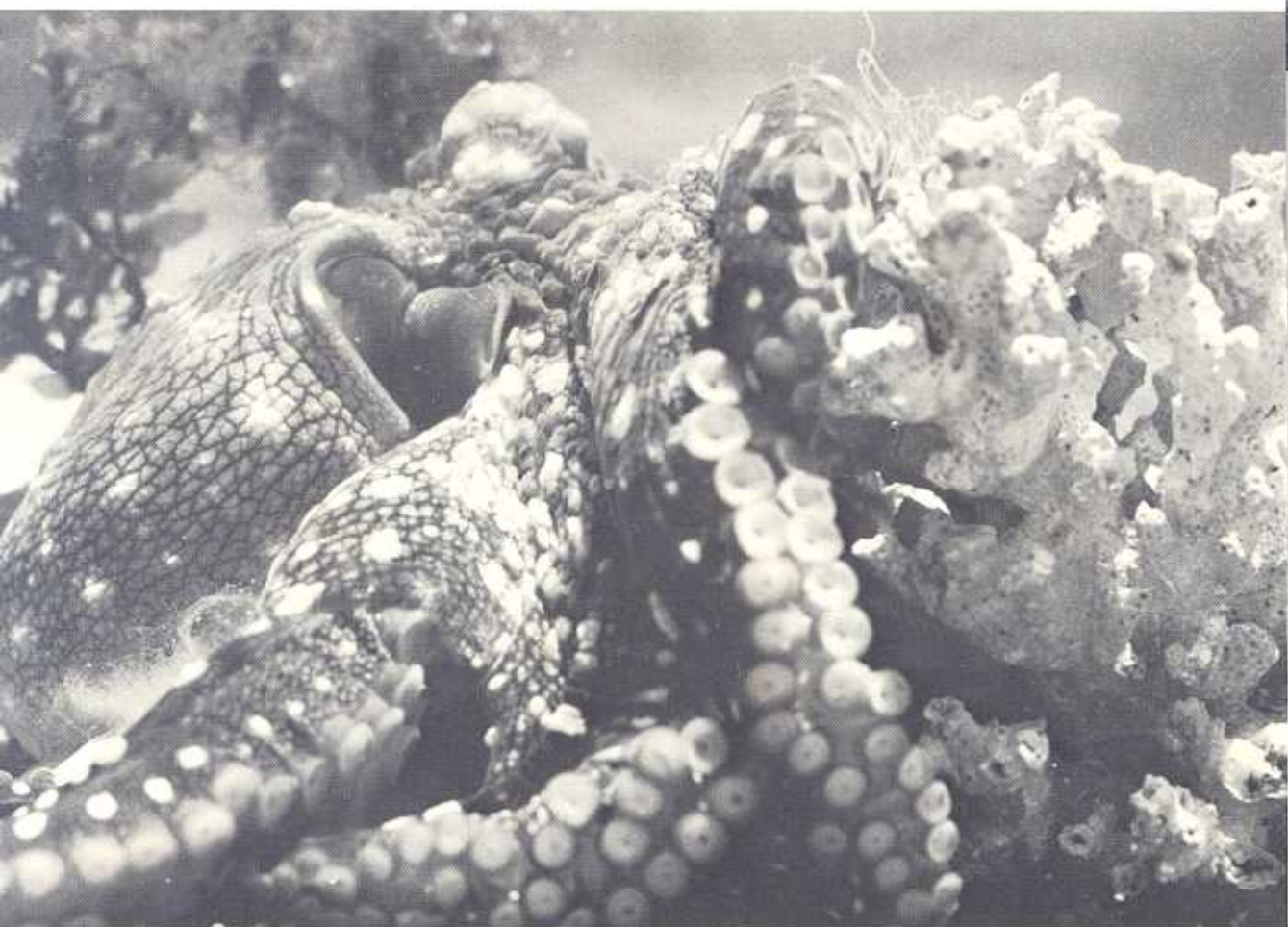


HAWAI'I IN HARMONY WITH THE SEA



HE'E AND 'OLEPE - OCTOPUSES AND SHELLFISH

I'A O HAWAI'I - HE



OCTOPUS ON CORAL HEAD

The octopus is a master of camouflage and can change its color to blend in with its background.

There are three main types of mollusks in Hawaii that are protected by fishing regulations. These are the octopuses, or he'e, the clams, and the oysters. It is surprising to many that these three seemingly very different animals are related at all, but indeed they are all mollusks belonging to the phylum Mollusca.

The ancient Hawaiians had hundreds of different uses for the mollusks they found in the local waters. Some were used as food and others for medicine, while shells of many were made into jewelry. There is no doubt, however, that one of the most important mollusks to the ancient Hawaiians was the he'e or octopus.

He'e in Old Hawaii

Present day Hawaiians often make the mistake of referring to the he'e as squid. It is, in fact, not a squid at all but an octopus. The squids, although closely related to the octopuses, are quite different

animals that usually live in the open ocean and are free swimming, unlike the octopus which lives on the bottom and hides in holes in the rocks and coral. The ancient Hawaiians knew the difference between these two animals quite well, and called the squid by the name mühe'e.

He'e and He'e puloa

There are two common species of the he'e that live on the reefs here in Hawaii. These are he'e, (*Octopus marmoratus*) often called 'day squid,' and he'e puloa, (*Octopus ornatus*), referred to as 'night squid'. The he'e is usually a grayish brown color, while the he'e puloa or long headed he'e is usually a dull reddish color with white stripes on his head and white spots on his tentacles. Both types, however,

'E AND 'ŌLEPE

can change their color to blend in with their backgrounds.

There has recently been discovered a new species of octopus found on the Hawaiian reef flats. It is small in adult form with a crescent shaped dark brown and white mark below the eyes, with star shaped suckers. It is as yet unnamed.

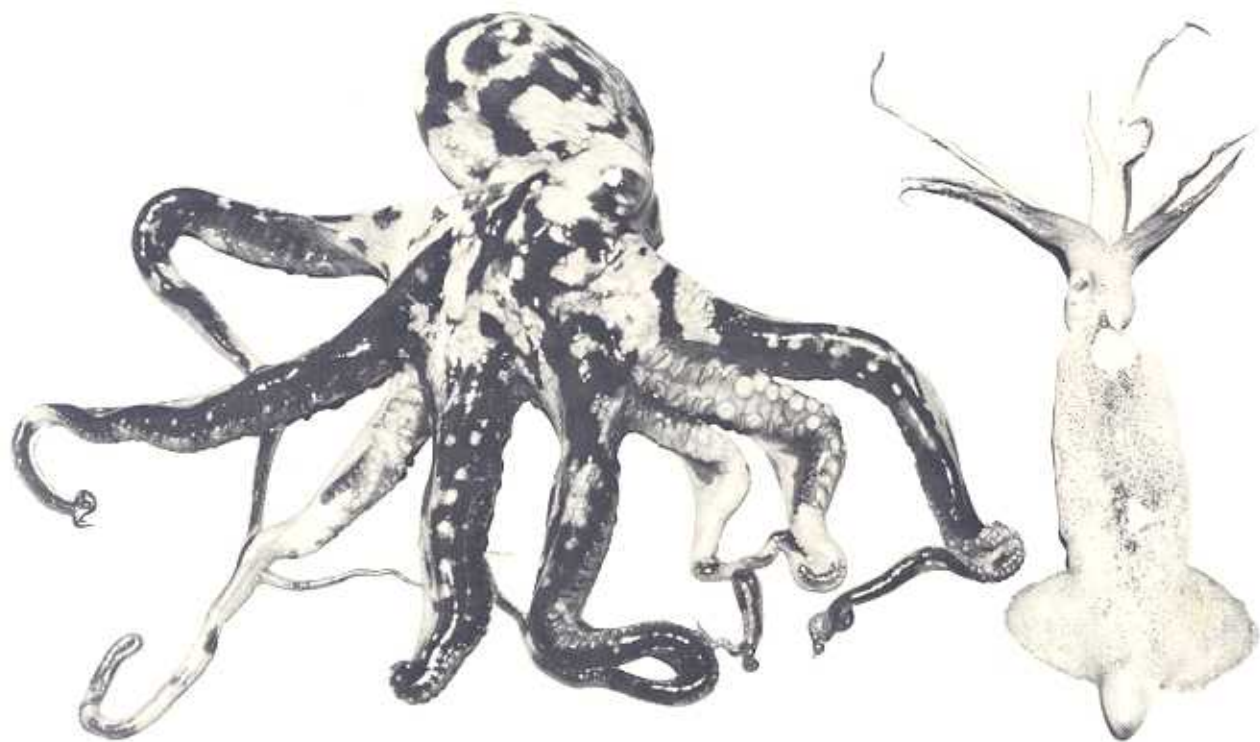
Both the he'e and the muhe'e were very important to the ancient Hawaiians, and they were often made 'aumakua or personal gods. Octopuses were also frequently used as medicines in those times. The name he'e, in fact, means to dissolve or to drive away, such as to drive away a malady. Many of the chants of the old kahuna contain references to this amazing creature, the he'e.

Both kinds of he'e live in holes in coral heads on the reef or in shelters built from loose pieces of coral. Often the octopus will crawl into its hole and then place a piece of coral across the opening. The shelters that the he'e build are usually found where the bottom is of coral rubble and sand.

The he'e will collect broken pieces of coral and pile them in such a way that there is a cavity in the middle. Both the he'e and the he'e pūloa are extremely intelligent creatures.



FISHING FOR OCTOPUS



OCTOPUS AND SQUID

The octopus is often mistakenly called "squid" in Hawaii. The differences between these two animals are obvious in the above photograph. The creature on the left is an octopus while the one on the right is a true squid.

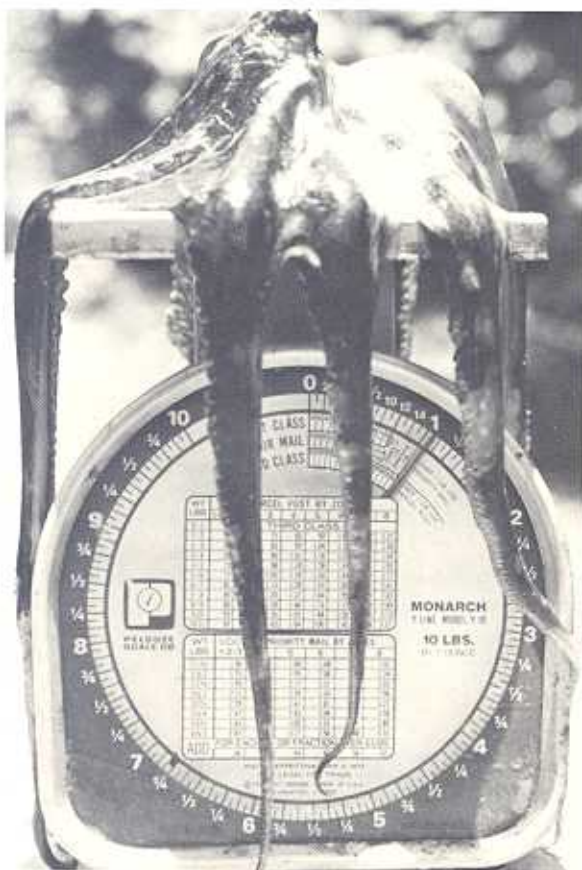
The octopus protects itself from predators in a very unusual manner. When the he'e is threatened it will emit a large amount of purple-black ink which clouds the water and provides camouflage for its escape.

The maximum life span of the two common species is about 1-1½ years of age. Females die after hatching eggs.

Fishing for He'e

The best time to fish for he'e seems to be between the months of June and December, with the months of September and October being particularly good. In the daytime, the he'e is caught by walking along the reef and looking for holes with crab shells cluttering the entrance. When a he'e hole is found a stick is jabbed into it. If the he'e is inside, he will come out and can be grabbed or speared if he is of large enough size.

At night, he'e pūloa can be caught by torching on the reef. In this manner, octopuses can often be found sitting exposed on the bottom where they can be grabbed or speared. The fisherman should exercise care in grabbing octopus with bare hands, since they may bite. Once the he'e is caught it can be killed in the old Hawaiian method of biting it between the eyes or its head can be turned inside out.



KILLING AN OCTOPUS

One of the most efficient methods of killing an octopus is to bite it between the eyes.

Conservation of He'e

Because the he'e is such an important resource, we must be careful to conserve it. Although the season for he'e is open year round, there are regulations on the minimum size that can be caught. *Both he'e and he'e pūloa must be at least 1 pound before they can be taken!* By letting the animals mature before they are caught, the fisherman is allowing them to reproduce and insuring a constant supply of octopus in the future. Although there are no regulations on the number of he'e that can be taken, the wise fisherman will follow the practices of the ancient Hawaiians and only take a few he'e from the "squid-grounds" at a time.

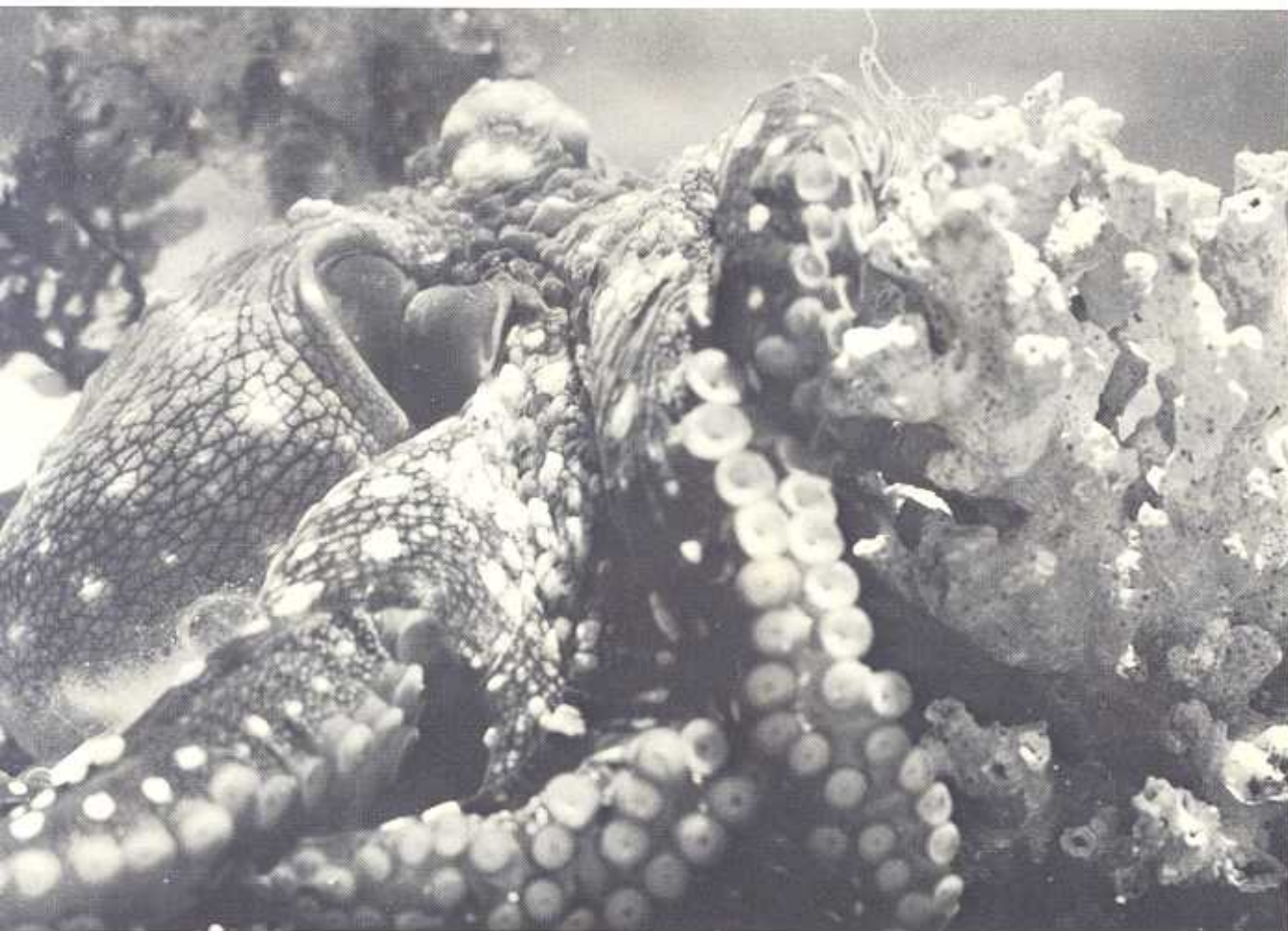
'Ōlepe—Clams and Oysters

The clams and oysters found in the Hawaiian waters are all bivalves having two shells that can be opened on a hinged point. These bivalves or 'ōlepe

LEGAL SIZE OCTOPUS

An octopus must weigh at least 1 lb. to be of legal size for harvesting.

I'A O HAWAI'I - HE



OCTOPUS ON CORAL HEAD

The octopus is a master of camouflage and can change its color to blend in with its background.

There are three main types of mollusks in Hawaii that are protected by fishing regulations. These are the octopuses, or he'e, the clams, and the oysters. It is surprising to many that these three seemingly very different animals are related at all, but indeed they are all mollusks belonging to the phylum Mollusca.

The ancient Hawaiians had hundreds of different uses for the mollusks they found in the local waters. Some were used as food and others for medicine, while shells of many were made into jewelry. There is no doubt, however, that one of the most important mollusks to the ancient Hawaiians was the he'e or octopus.

He'e in Old Hawaii

Present day Hawaiians often make the mistake of referring to the he'e as squid. It is, in fact, not a squid at all but an octopus. The squids, although closely related to the octopuses, are quite different

animals that usually live in the open ocean and are free swimming, unlike the octopus which lives on the bottom and hides in holes in the rocks and coral. The ancient Hawaiians knew the difference between these two animals quite well, and called the squid by the name mûhe'e.

He'e and He'e pûloa

There are two common species of the he'e that live on the reefs here in Hawaii. These are he'e, (*Octopus marmoratus*) often called 'day squid,' and he'e pûloa, (*Octopus omatus*), referred to as 'night squid'. The he'e is usually a grayish brown color, while the he'e pûloa or long headed he'e is usually a dull reddish color with white stripes on his head and white spots on his tentacles. Both types, however,

If you are interested in learning more about Hawaii's marine life and its conservation and management, *Native Use of Fish in Hawaii* by Margaret Titcomb is an excellent place to start. The following

selected reading list will provide you with additional information on various aspects of the marine environment.

SELECTED READING LIST

Anikouchine, Wm. A. and R.W. Sternberg, *The World Ocean, An Introduction to Oceanography*. New Jersey, Prentice Hall, 1973. 338 p.

Cousteau, J.Y. and P. Dirole, *Octopus and Squid. The Soft Intelligence*. New York, Doubleday, 1972. 302 p.

Edmonson, C.H. *The Ecology of the Hawaiian Coral Reef*, New York, Kraus Reprint Co., 1971. 38 p.

Gosline, W.A. and V.E. Brock, *Handbook of Hawaiian Fishes*, Honolulu, University Press of Hawaii, 1960. 372 p.

Hawaii, Dept of Land and Natural Resources, *Digest of certain saltwater fishing laws and regulations*. Honolulu, Division of Fish and Game, 1971.

Hawaii, Dept of Land and Natural Resources, *Excerpts from revised laws of Hawaii, 1955, as amended pertaining to fish, wildlife, and related subjects*. Honolulu, Division of Fish and Game, 1968.

Hawaii Revised Statutes: *Comprising the Statutes of the State of Hawaii, Consolidated, Revised and Annotated, Fishing Rights and Regulations, Chapter 188*, Honolulu, 1974.

Hobson, E.S. and E.H. Chave, *Hawaiian Reef Animals*, Honolulu, University Press of Hawaii, 1973. 135 p.

Hosaka, E.Y., *Shore Fishing in Hawaii*, Hilo, Petroglyph Press, 1973. 176 p.

Jordan, D.S. and B.W. Evermann, *The Aquatic Resources of the Hawaiian Islands*. U.S. Fish Commission Bulletin Vol. 23, Part 1, 1903.

Jordan, D.S. and B.W. Evermann, *Preliminary Report on an Investigation of the Fishes and Fisheries of the Hawaiian Islands*. U.S. Fish Commission Report, 1900-1901: 353-382.

Jordan, D.S. and B.W. Evermann, *The Shore Fishes of Hawaii*, Tokyo, Charles E. Tuttle Co., 1973. 392 p.

Mackellar, J.S., *Hawaii Goes Fishing*, Graphic Books, New York. 1956. 160 p.

Tinker, S.W., *Pacific Crustacea*, Tokyo, Charles E. Tuttle Co., 1965. 134 p.

Titcomb, Margaret, *Native Use of Fish in Hawaii*, 1972. 175 p.

von Brandt, A., *Fish Catching Methods of the World*, London, Fishing News Ltd., 1972. 240 p.

HAWAII IN HARMONY WITH THE SEA

Jeremy Harris



This pamphlet is produced by the State of Hawaii Department of Land and Natural Resources, Division of Fish and Game, and the University of Hawaii Marine Advisory Program, funded through grants from the State of Hawaii Marine Affairs Coordinator, Governor's Office and by the N.O.A.A. Office of Sea Grant, Department of Commerce under Grant No. 04-158-44114. The U.S. Government is authorized to produce and distribute reprints for governmental purposes notwithstanding any copyright notations that may appear hereon.

Sea Grant Advisory Pamphlet
UNIHI-SEA GRANT-AB-77-07

HE'E AND 'OLEPE—OCTOPUSES AND SHELLFISH

Hawai'i in Harmony with the Sea

He'e and 'Ōlepe-- Octopuses and Shellfish

UNIHI-SEAGRANT-AB-77-07

1977

Revised - February 1980



University of Hawaii
Sea Grant College
Marine Advisory
Program

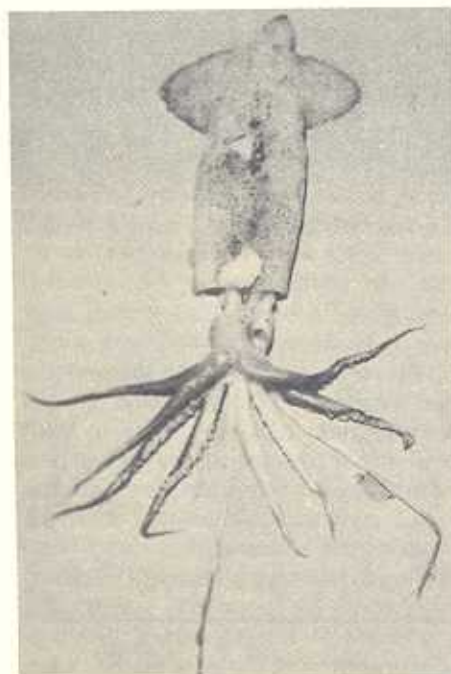
by Jeremy Harris

There are three main types of mollusks in Hawai'i that are protected by fishing regulations. These are the octopuses, or he'e, the clams, and the oysters. It is surprising to many that these three seemingly very different animals are related at all, but indeed they are all mollusks belonging to the phylum Mollusca.

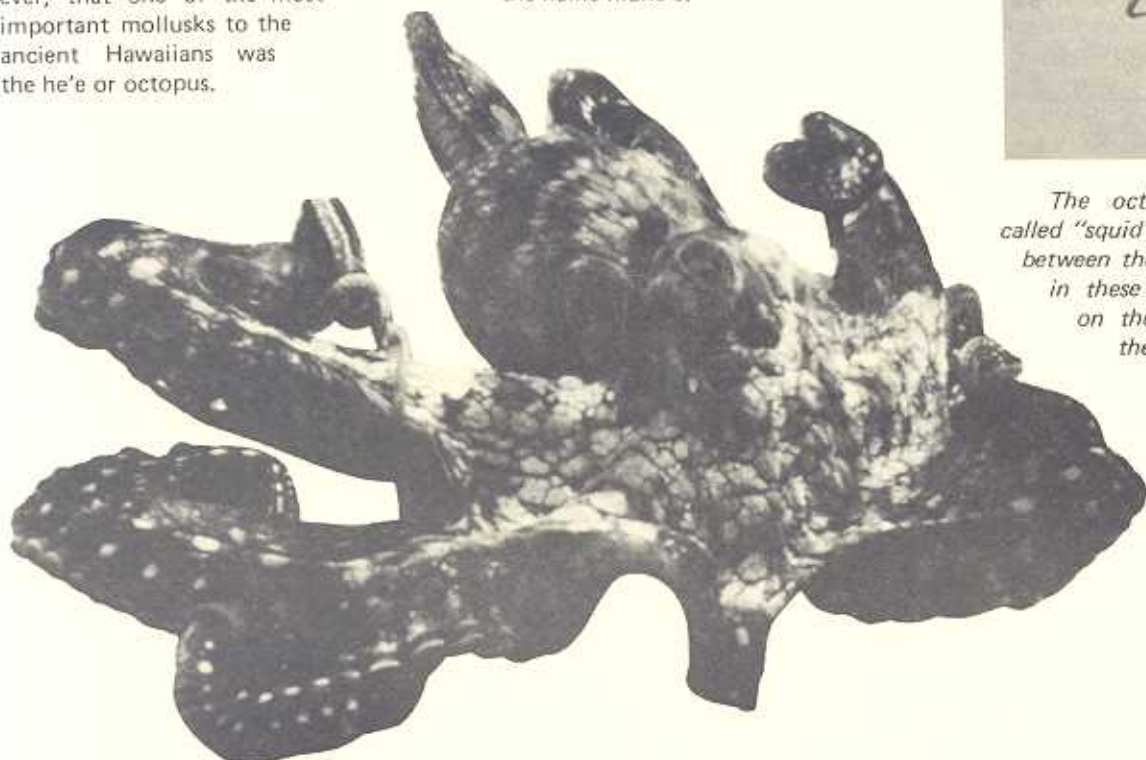
The ancient Hawaiians had hundreds of different uses for the mollusks they found in the local waters. Some were used as food and others for medicine, while shells of many were made into jewelry. There is no doubt, however, that one of the most important mollusks to the ancient Hawaiians was the he'e or octopus.

He'e in Old Hawai'i

Present day Hawaiians often make the mistake of referring to the he'e as squid. It is, in fact, not a squid at all but an octopus. The squid, although closely related to the octopus, are quite different animals that usually live in the open ocean and are free swimming, unlike the octopus which lives on the bottom and hides in holes in the rocks and coral. The ancient Hawaiians knew the difference between these two animals quite well, and called the squid by the name mūhe'e.



The octopus is often mistakenly called "squid" in Hawai'i. The differences between these two animals are obvious in these photographs. The creature on the left is an octopus while the one above is a true squid.



He'e and He'e pūloa



Day squid, *Octopus marmoratus*

There are two common species of the he'e that live on the reefs here in Hawai'i. These are he'e (*Octopus marmoratus*) often called "day squid," and he'e pūloa, (*Octopus omatus*), referred to as "night squid." The he'e is usually a grayish brown color, while the he'e pūloa or long headed he'e is usually a dull reddish color with white stripes on his head and white spots on his tentacles. Both types, however, can change their color to blend in with their backgrounds.

There has recently been discovered a new species of octopus found on the Hawaiian reef flats. It is small in adult form with a crescent shaped dark brown and white mark below the eyes, with star shaped suckers. It is as yet unnamed.

Both the he'e and the mūhe'e were very important to the ancient Hawaiians,

and they were often made 'aumakua or personal gods. Octopuses were also frequently used as medicines in those times. The name he'e, in fact, means to dissolve or to drive away, such as to drive away a malady. Many of the chants of the old kahuna contain references to this amazing creature, the he'e.

Both kinds of he'e live in holes in coral heads on the reef or in shelters built from loose pieces of coral. Often the octopus will crawl into its hole and then place a piece of coral across the opening. The shelters that the he'e build are usually found where the bottom is of coral rubble and sand.

The he'e will collect broken pieces of coral and pile them in such a way that there is a cavity in the middle. Both the he'e and the he'e pūloa are

extremely intelligent creatures.

The octopus protects itself from predators in a very unusual manner. When the he'e is threatened it will emit a large amount of purple-black ink which clouds the water and provides camouflage for its escape.

The maximum life span of the two common species is about 1 to 1-1/2 years of age. Females die after hatching eggs.

Fishing for He'e

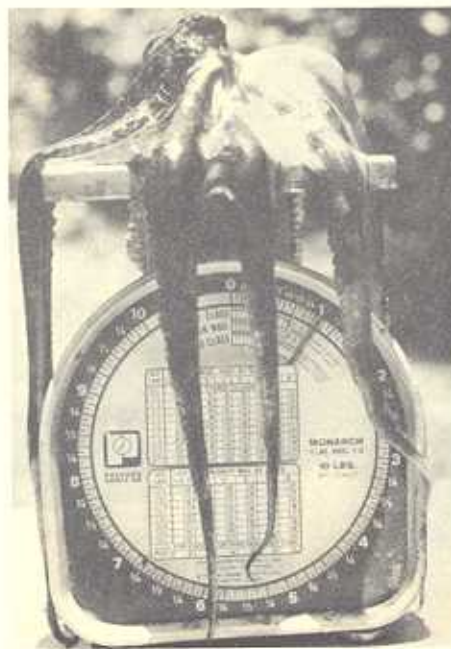


One of the most efficient methods of killing an octopus is to bite it between the eyes.

Conservation of He'e

Because the he'e is such an important resource, we must be careful to conserve it. Although the season for he'e is open year round, there are regulations on the minimum size that can be caught. *Both he'e and he'e pūloa must be at least one pound before they can be taken.* By letting the animals mature before they are caught, the fisherman is allowing them to reproduce and insuring a constant supply of octopus in the future. Although there are no regulations on the number of he'e that can be taken, the wise fisherman will follow the practices of the ancient Hawaiians and only take a few he'e from the "squidding" grounds at a time.

An octopus must weigh at least 1 lb. to be of legal size for harvesting.



The best time to fish for he'e seems to be between the months of June and December, with the months of September and October being particularly good. In the daytime, the he'e is caught by walking along the reef and looking for holes with crab shells cluttering the entrance. When a he'e hole is found a stick is jabbed into it. If the he'e is inside, he will come out and can be grabbed or speared if he is of large enough size.

At night, the he'e pūloa can be caught by torching on the reef. In this manner, octopuses can often be found sitting exposed on the bottom where they can be grabbed or speared. The fisherman should exercise care in grabbing octopus with bare hands, since they may bite. Once the he'e is caught it can be killed in the old Hawaiian method of biting it between the eyes or its head can be turned inside out.

'Ōlepe -- Clams and Oysters

The clams and oysters found in the Hawaiian waters are all bivalves having two shells that can be opened on a hinged point. These bivalves or 'ōlepe use their muscular foot to burrow into the soft mud or sand bottoms of Hawaiian bays. These animals are filter-feeders, in that they suck in and expel a continual stream of water and filter out the tiny organisms and food that it contains. Because they are so popular with the residents of Hawai'i these tasty animals have had a great deal of fishing pressure put on them and, therefore, they are protected by regulations.

Conservation of Clams and Oysters

The season for clams is presently closed year-round on the island of O'ahu, and will remain so for an indefinite period of time until the populations can rejuvenate themselves. In all the other counties the clamming season is only open from 7:00 a.m. on the first Monday of September through the last day of October. In order to be of legal size,



Because of reduced populations, there is presently no open season for taking the native pearl oyster (Pinctada galtsoffi).

clams must measure at least one inch across the widest part of the shell.



At the present time clamming is closed year-round on O'ahu, but open two months annually on the neighbor islands. Clammers may not use digging implements that are longer than 18 inches or wider than 6 inches.

Fishermen can only take one gallon of clams with shells per person per day, and they cannot use any digging implement that is longer than 18 inches or wider than 6 inches. All of these restrictions, of course, only apply to clams in the wild and not to those raised in private ponds or aquaculture farms.

The native pearl oyster (*Pinctada galtsoffi*) is also protected by fishing regulations. There is no open season for this oyster and it is unlawful to take them at any time.

Introduced Shellfish

Several different kinds of shellfish have been introduced into Hawaiian waters, and it is unlawful to take, sell, or be in possession of any of them from state waters without a special permit.

These are: Eastern oyster (*Crassostrea virginica*), Japanese oyster (*C. gigas*), Coral rock oyster (*C. amasa*), Top shell (*Trochus* sp.), Abalone (*Haliotis* sp.), Cherrystone clam (*Merccenaria mercenaria*).

Be certain to learn and follow these basic conservation rules and practices the next time you go fishing. Remember, only if you obey today's kapu system will you have he'e and 'ōlepe to catch tomorrow.

If you are interested in learning more about Hawaii's marine life and its conservation and management, *Native Use of Fish in Hawaii* by Margaret Titcomb is an excellent place to start. The following selected reading list will provide you with additional information on various aspects of the marine environment.

Selected Reading List

Anikouchine, W.A., and R.W. Sternberg. 1973. *The World Ocean, An Introduction to Oceanography*. New Jersey: Prentice Hall. 338 pp.

Cousteau, J.Y., and P. Diol. 1972. *Octopus and Squid, The Soft Intelligence*. New York: Doubleday. 302 pp.

Dept. of Land and Natural Resources, State of Hawaii. 1971. "Digest of certain saltwater fishing laws and regulations." Division of Fish and Game, Honolulu.

Dept. of Land and Natural Resources, State of Hawaii. 1968. "Excerpts from revised laws of Hawaii, 1955, as amended pertaining to fish, wildlife, and related subjects." Division of Fish and Game, Honolulu.

Edmonson, C.H. 1971. *The Ecology of the Hawaiian Coral Reef*. New York: Kraus Reprint Co. 38 pp.

Gosline, W.A., and V.E. Brock. 1960. *Handbook of Hawaiian Fishes*. Honolulu: University of Hawaii Press. 372 pp.

Hawaii Revised Statutes, State of Hawaii. 1974. Comprising the Statutes of the State of Hawaii, Consolidated, Revised, and Annotated, Fishing Rights and Regulations, Chapter 188. Honolulu.

Hobson, E.S., and E.H. Chave. 1973. *Hawaiian Reef Animals*. Honolulu: University Press of Hawaii. 135 pp.

Hosaka, E.Y. 1973. *Shore Fishing in*

Hawaii. Hilo: Petroglyph Press. 176 pp.

Jordan, D.S., and B.W. Evermann. 1903. "The aquatic resources of the Hawaiian Islands." *U.S. Fish Commission Bulletin*, Vol. 23, Part 1.

Jordan, D.S., and B.W. Evermann. "Preliminary report on an investigation of the fishes and fisheries of the Hawaiian Islands." *U.S. Fish Commission Report, 1900-1901*, pp. 353-382.

Jordan, D.S., and B.W. Evermann. 1973. *The Shore Fishes of Hawaii*. Tokyo: Charles E. Tuttle Co. 392 pp.

Mackellar, J.S. 1956. *Hawaii Goes Fishing*. New York: Graphic Books. 160 pp.

Tinker, S.W. 1965. *Pacific Crustacea*. Tokyo: Charles E. Tuttle Co. 134 pp.

Titcomb, M. 1972. *Native Use of Fish in Hawaii*. 175 pp.

von Brandt, A. 1972. *Fish Catching Methods of the World*. London: Fishing News Ltd. 240 pp.



The findings and views expressed in this pamphlet do not necessarily reflect those of the University of Hawaii or the University of Hawaii Sea Grant College Program. Any commercial product or tradename mentioned herein is not to be construed as an endorsement. This pamphlet was produced by the State of Hawaii Department of Land and Natural Resources, Division of Fish and Game, and the University of Hawaii Sea Grant College Program. Funding was provided by the Office of the Marine Affairs Coordinator and by NOAA Office of Sea Grant, Department of Commerce under Grant Nos. 04-158-44114 and 04-8-MO1-178 (revised version).

University of Hawaii
Sea Grant College
Marine Advisory Program
2540 Maile Way, Spalding 252
Honolulu, Hawaii 96822

Ms. Rose Pfund