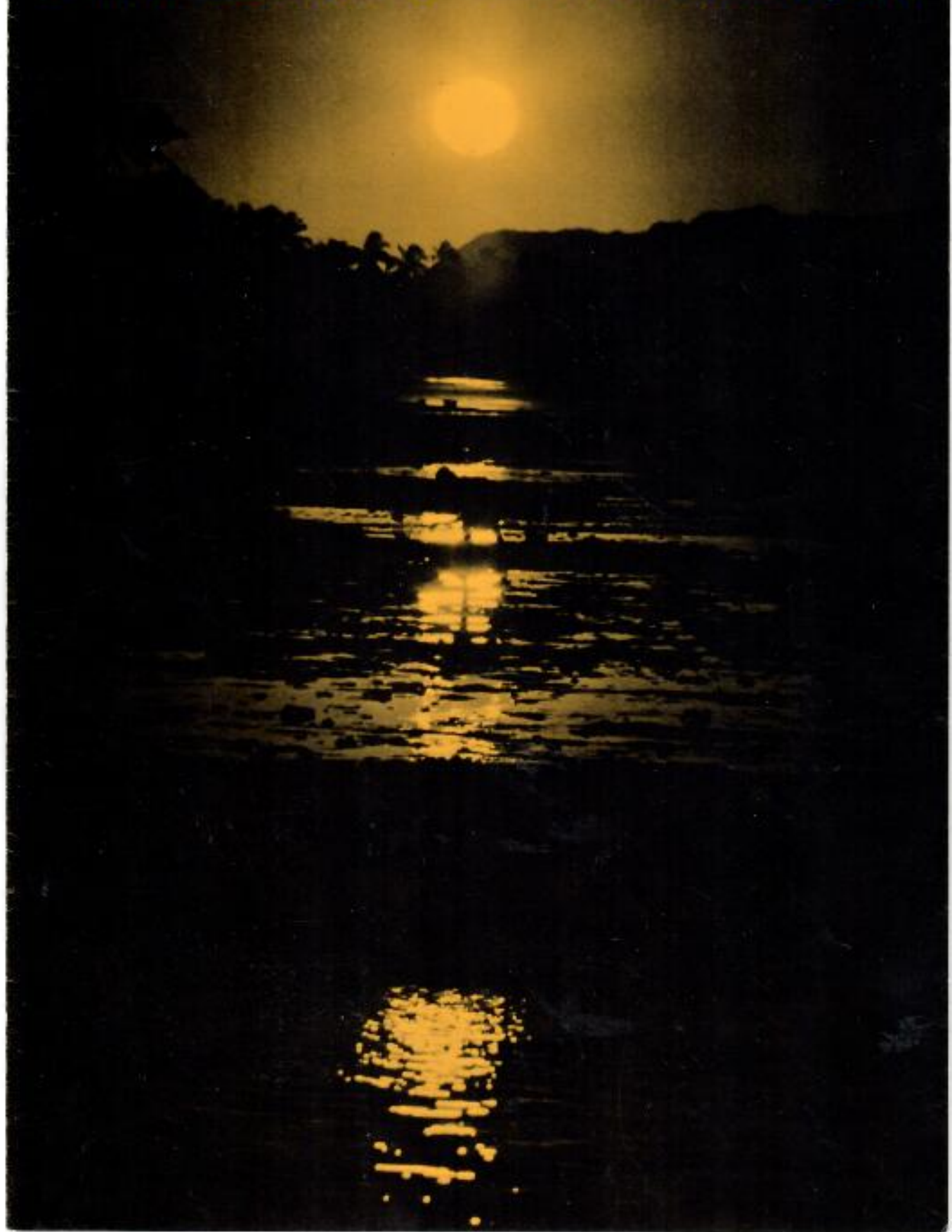


ANCIENT HAWAI'I IN HARMONY WITH THE SEA



IN HARMONY WITH



The early Hawaiians, living on islands born from the sea, existed in perfect harmony with the ocean that surrounded them. In old Hawaii, most of the people lived along the coast and were in constant touch with the sea. They were excellent swimmers, navigators, and fishermen.

The ancient Hawaiians divided their land so that parcels extended from the mountain to the outer edge of the reef. The ocean was relied upon as a highway, a playground and as the main source of food. The majority of the population's protein came from i'a or marine life, with only a small amount coming from the animals of the land. Fish was the favorite food of the early Hawaiians; they ate everything that was edible from the sea.

In those olden days, everyone from the keiki to the kupuna fished, either as play, as sport, or as work. The keiki played in tide pools, catching crabs and pipipi, learning the ways of fishing by imitating

their elders; the ali'i made a great sporting event of fishing for the man-eating shark, Niuhi, and wahine spent days wading on the reef collecting fish and limu in calabashes. In old Hawaii fishing was a way of life.

It is hard for us to comprehend today that these early Hawaiians fed a population of well over 200,000 persons with the food they harvested from the sea.

The Hawaiians' relationship with the sea and the i'a was also a spiritual one. They worshipped Kū'ulakai, the god of fishing, and erected fishing shrines or ko'a along the shore. In addition to Kū'ulakai, fishermen also had personal fishing gods called 'aumakua. The 'aumakua usually took the form of a specific plant or animal such as a shark or an eel. A fisherman would give prayer and tribute to his 'aumakua and offer his first fish to the god at the simple ko'a shrine.

In important ceremonies, priests offered certain

H THE SEA



fish to the gods. Red and white fish were used most frequently. Since all land animals had counterparts in the sea, the fish that were the sea equivalent of pigs, called pua'a-o-kai, were offered to secure the gods' favor.

Before the coming of the Europeans to Hawaii, there was an abundance of fish resources in the surrounding sea. Although we will never know how rich these resources actually were, the few reports we have from those times indicate that there was an enormous supply of seafood. Some records report of feasts with tens of thousands of fish. Others tell of hundreds of aku being caught in a single day with the bait from one small malau or live bait canoe. Still others report of net fishing expeditions that would fill as many as twenty canoes with fish; sometimes fish supplies were so plentiful that they were fed to pigs and dogs, or used as fuel for the fire.

The question we must ask is, "How were the

Hawaiians able to continually harvest so many fish, generation after generation, and feed such a large population?" The answer—the Hawaiians had a thorough knowledge of the sea and its living resources, and they knew exactly how to manage those resources.

In old Hawaii, the experts of fishing were the po'olawai'a or professional fishermen. A po'olawai'a could be a chief or a commoner, but in either case he was a man of great knowledge and was highly respected. With knowledge covering all aspects of fishing, such as gear manufacture, fishing techniques, fish behavior, spawning cycles, schooling behavior, and sea bird and ocean state interpretation, the po'olawai'a was extremely important to the ohana. Since nothing was written, the knowledge of the po'olawai'a was handed down verbally and through personal instruction to his apprentice, whom he chose very carefully. Each new po'ola-

STONE IDOL OF KU'ULAKAI

This stone idol, located on the island of Molokai, represents Ku'ulakai the god of fishing. In old Hawaii the conservation of marine resources was considered to be the will of the gods.



wai'a would learn new things about the sea and the fish from personal experience, and so the body of knowledge would grow.

The Hawaiian's thorough knowledge of the sea life was one factor that enabled them to harvest so much from the sea. The real secret of their success, however, was that they applied their extensive knowledge to the *management* of the islands' fish resources. *The early Hawaiians were the great conservationists!*

In old Hawaii, the conservation of marine resources was acknowledged as the will of the chiefs as well as the will of the gods. The Hawaiians recognized that all sea life was a resource that had to be carefully managed and conserved. To do this, they developed a complex kapu and morés system concerning the harvesting of i'a. One type of kapu regulated the amount of fish and the size of the catch that a fisherman should take. Recognizing that there was a limit to the amount of fish that could be taken from



KO'A FISHING SHRINE

This fishing shrine, or ko'a, is located at Hale o lono on Molokai. Fishermen, in ancient Hawaii, would give prayer to 'aumakua, or personal fishing gods, at simple ko'a shrines such as this.

Kahuna photo
from Kōsal Tomarou, 1975,
Hawai'i Committee for the Humanities.



an area before it was no longer productive, fishermen often would enrich a fishing hole by spreading pumpkin or sweet potato in the water to enlarge and fatten the stocks. Then, when the hole was fished, only a few fish were taken at a time to make certain the resource was not over-harvested and destroyed.

Other kapu prohibited the taking of certain fish during their spawning season. Fish such as 'ōpelu, aku, mullet, and squid (mollusk) each were made kapu during their spawning seasons until their young had been born.

In some cases, whole areas were managed by the Hawaiians. It is reported that in Ka'u, for example, the inshore reef area was kapu during the winter while the deep-sea was open for fishing. During the summer, the reef and inshore area was then open, and deep-sea fishing was kapu. By managing entire areas like this (and having the kapu cover all living things, fish, shellfish, and limu), the Hawaiians would allow the whole system to regenerate itself.

At the end of the kapu period, the kahuna would carefully study the growth of the plants and animals in the area to determine if they were again ready for harvesting. If he found that the area had been properly rejuvenated, he would so inform the chief who would then lift the kapu.

Fishing kapu rarely was broken in old Hawai'i where discipline was strict and punishment often severe. If a man violated a kapu and was detected, he quickly would be punished by the konohiki or chief's agent. The penalty for even small offenses often was death. Strict enforcement was not the only reason that few fishing laws were broken. People knew that even if their unlawful act went undetected by the konohiki, the gods (or their personal 'aumakua), from whence came their good luck, would be aware of the violation and would take offense.

The conservation and management of resources was one of the main principles of Hawaiian society.

Perhaps this was true because the finite limits of the island society's resources were obvious to all. Unlike other areas of the world, where societies could expand into new regions, and leave behind them exhausted and despoiled resources, the Hawaiians had to develop management and conservation practices that recycled and renewed their finite resources. As a result, the Hawaiian culture produced a body of conservation ethics hundreds of years before the western world.



REPLICAS OF ANCIENT FISHING ARTIFACTS

These replicas of ancient Hawaiian fishing artifacts were crafted by the crew of the Ho kule'a. The three knives (right, left, and left center) are made from shark's teeth and koa, while the fishing lure (right center) is crafted from the jaw bone and tail hair of a pig, and mother of pearl. The artifacts are carried in the gourd container above.



THROW-NET FISHERMEN

Many new fishing techniques were brought to Hawaii with the influx of different cultures. The throw-net was unknown in Hawaii until the Japanese introduced it in the 1890's.

—HVB photo

What then has happened to our marine resources here in Hawaii, once providing food for over

200,000 now scarcely enough to provide sport for recreational fishermen?

With the influx of new cultures into Hawaii during the 1700's and 1800's, the Hawaiians experienced a cultural upheaval and a breakdown of their old social systems. In this new society that was created, the Hawaiians were no longer in perfect tune with their environment and the sea; they had lost much of their ocean orientation. The great sum of knowledge embodied in the po'olawai'a was lost as the old generations passed away and kupuna no longer taught apprentice. This new hybrid society also signaled the breakdown of the tried and true kapu systems and the spiritual beliefs that complemented them.

The first new government regulations that replaced the old kapu system were not as effective in conserving the marine resources because they weren't based on an intimate knowledge of the sea and its creatures as was the old system.

Many of the new racial groups which had become a part of the Hawaiian society had high competitive and commercial instincts and lacked the conservation ethics that were so engrained in the Hawaiian people.

As a result of these drastic changes in Hawaiian society, fish stocks were over-harvested, new fishing techniques depleted fishing grounds, and many fish that were once plentiful were now uncommon. By the early 1900's, the supply of fish in Hawaiian waters had been seriously depleted.

The present day residents of Hawai'i have only a fraction of the knowledge and the understanding of the sea and the i'a that the Hawaiians of old had. The relationship between today's Hawaiian society and the sea has deteriorated greatly. We have become land-oriented and have lost touch with the ocean. We no longer live in harmony with the sea as part of its ecosystem. Instead, we have attempted to remove ourselves from the system and as a result have become strangers to the sea.

We destroy our shorelines, pollute our waters with sewage, and kill our reefs with silt coming from



CITY OF HONOLULU

Massive urban development of many of Hawaii's coastal areas has resulted in the deterioration of marine resources throughout the state. Hawaii no longer lives in harmony with the sea.



STONE QUARRY, KILAUEA, KAUAI

The destruction and overharvesting of Hawaii's marine resources need not continue. Hawaii's people can regain the conservation ethics of ancient Hawaii and hand down to tomorrow's keiki a rich and well-managed resource.

housing and hotel development. We have lost the management and conservation beliefs of the old Hawaiians. The respect for the old ways is gone. As a result our marine resources, the i'a, are being rapidly depleted. We can no longer feed our population from our waters and we must import most of the seafood that we consume.

The over-harvesting and destruction need not continue. Our waters once again can be plentiful with fish, and we can hand down to our keiki a rich and well managed resource.

To do this we must regain the conservation ethics of the old Hawaiians. We must carefully obey the fishing laws of the land and develop new and better

laws as our knowledge grows, for it is these laws that represent today's kapu system.

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.

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ANCIENT HAWAII: IN HARMONY WITH THE SEA

Jeremy Harris

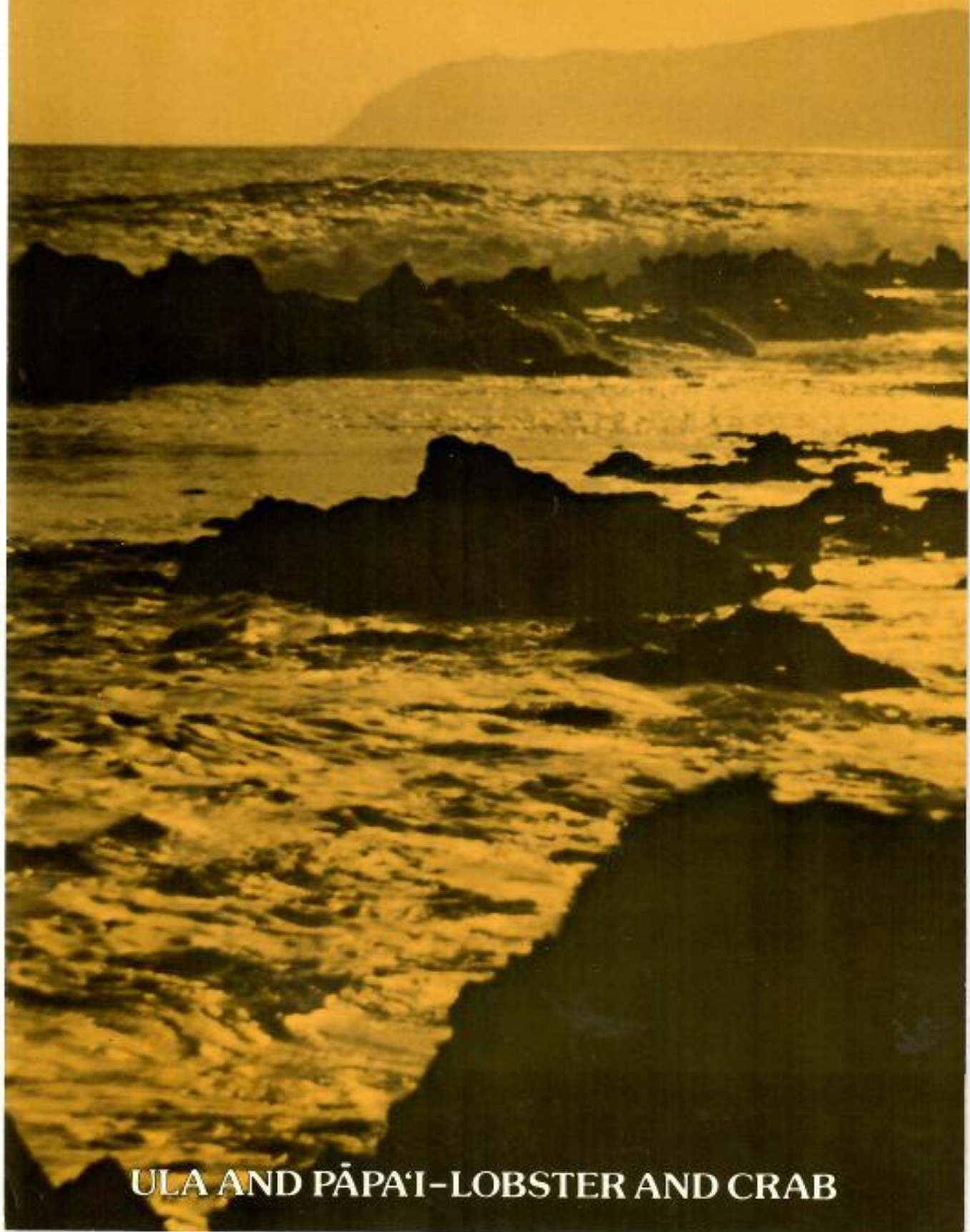


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ANCIENT HAWAII

HAWAI'I IN HARMONY WITH THE SEA



ULA AND PĀPA'I-LOBSTER AND CRAB

I'A O HAWAII' I - ULA



LEGAL SIZE SPINY LOBSTERS

Lobsters can be harvested in Hawaii during all months except June, July, and August. Lobsters must weigh at least 1 lb. on Oahu, Maui, and Hawaii, and $\frac{3}{4}$ pound on Kauai to be taken legally.

Lobsters and crabs have always been a very popular food item for residents of Hawaii. These animals, called crustaceans, have a hard external skeleton, or shell, and jointed legs. In fact, the ancient Hawaiians referred to them as "i'a that have feet like prongs."

Although the hard shell of the crustaceans provides them with an excellent defense, it also presents some difficulties for the growth process. In order to grow, the crab or lobster must shed its hard shell, called "molting," and then grow quickly while the new shell is still soft. Once the new shell hardens, further growth is impossible until the next molt. For this reason, and because so much energy must be expended in shell production, growth of crabs and lobsters is generally very slow. This is very unfortunate since these delicious crustaceans are prized by most fishermen, and the demand for them continues to rise. *In order to protect the stocks, there are fishing regulations for five different kinds of crabs and lobsters in Hawaii.*

Ula or Spiny Lobster

The ula or spiny lobster of Hawaii (*Panulirus penicillatus*) and (*P. marginatus*) live in holes and crevices in the coral reef and come out at night to feed. These lobsters are scavengers as are most crustaceans; they are omnivorous, which means they eat both algae and animal food. The ula are highly valued as food and are caught by fishermen with gill nets and traps or by divers with a gloved hand.

The season for ula is closed from June 1 through August 31, and possession of lobster during that time is considered prima facie evidence in court of a

A AND PĀPĀ'I

violation. It is also illegal to take ula with eggs during any time of the year. The eggs, which range in color from orange-red to grayish, when ready to hatch, can be seen as a large mass on the underside of the female's abdomen. *Fishing laws strictly prohibit the spearing of lobster, and any serious puncture wound found on a bagged lobster is considered evidence in court of a violation.* There are also size restrictions on ula. In Honolulu, Maui, and Hawaii counties, spiny lobsters must be at least 1 pound to be taken for home consumption. On Kauai, they need only be $\frac{3}{4}$ pound. The minimum size for sale is 1 pound in all counties.

During the closed summer season, dealers may sell ula, and restaurants may serve it if the lobster was caught lawfully during the open season. To do this, however, dealers and restaurants must first obtain a special license from the Division of Fish and Game office.

These regulations to protect ula are very important and must be obeyed by all of us if we are to have



SPINY LOBSTER

It is always illegal to take lobsters with eggs. The eggs appear as a large orange-red to grayish mass, when they are ready to hatch. If a lobster with

eggs is taken, it is destroying thousands of lobsters before they even have a chance to hatch and grow, and he may be destroying his lobster grounds for 5 years in the future.

Ula Papapa or Slipper Lobsters

The ula papapa or slipper lobster (*Scyllarides squammosus*) is another popular lobster in Hawaii that is protected by fishing laws. Ula papapa like ula, live in rocky areas of the reef and hide in crevices during the day, coming out at night to feed. Although there are several different types of slipper lobsters in Hawaii, only one of the species is large enough to be of interest to fishermen, growing to a length of about

ILLEGAL SIZE SLIPPER LOBSTER

Slipper lobsters or ula papapa must weigh at least 1 lb. to be legal for sale in Hawaii.



CRAB WITH EGGS

Eggs on the underside of the female's abdomen, and range in color from white to yellow. If a crab with eggs is inadvertently caught it should be released immediately.

12 inches. As with ula, ula papapa is caught with gill nets, in traps, and by hand.

The laws regarding the taking of ula papapa are the same as those for ula, except that there is no minimum size for home consumption.

Samoan Crab or Serrate Swimming Crab

The Samoan crab or Serrate Swimming crab (*Scylla serrata*) was introduced into Hawaii from Samoa during the 1920's, giving it its common name. This crab grows to be very large, sometimes over 9 inches in width, and is very aggressive. It can easily be recognized by its brown coloration on the upper parts of its body and claws. The last pair of legs on these species are flattened and thus adapted for swimming.

The Samoan crab inhabits muddy bottoms in brackish water along the shorelines, in river mouths, and estuaries. Fishermen catch these delicious creatures with baited circular nets that are pulled up quickly every 15 or 20 minutes.

Although the season for Samoan crabs is open all year round, there are size regulations. Crabs must be at least 6 inches in width, measured across the back of the carapace. As with lobster, it is illegal to spear crabs at any time.

Kona Crab or Pāpa'i kua loa

The Kona crab, sometimes called the Red Frog Crab (*Ranina ranina*) is the most prized of all the crabs, and is certainly the most unusual. This crab is perfectly adapted for burrowing backwards into the sand. Its carapace is wide in front and tapers towards the rear. Its abdomen is small, and it is not folded beneath the body, as it is in so many other crabs. The Kona crab is reddish in color with large white areas on its lower side, and it grows to be at least 6 inches wide.

Pāpa'i kua loa lives in sandy bottoms in approximately 10 to 400 feet of water, where it usually keeps the posterior portion of its body burrowed in the sand. It is caught by fishermen with circular baited nets, or nets that are spread over sandy bottoms.

The fishing regulations to protect the Kona crabs were revised and strengthened in 1977. Since it appears that the spawning season for the crabs is during June, July, and August, the season for Kona crab has been closed for these months, just as it is for



KONA CRAB, PAPA'I KUA LOA

It is illegal to harvest Kona crab during the months of June, July, and August.

lobster. As with lobster, it is always illegal to take Kona crab with eggs, and spearing is prohibited at all times. Kona crab must be at least 4 inches in length or in width across the carapace in order to be legal for sale.

Kuahonu Crab or White Crab

The Kuahonu crab (*Portunus sanguinolentus*) is a relatively large crab that lives on sandy and muddy bottoms from shallow water to depths of over 100 feet. The carapace of the crab is smooth with a large spine on each side. Like the Samoan crab, the Kuahonu crab is a swimming crab, with its last pair of legs flattened for that purpose. This crab also is caught by fishermen with baited circular nets and traps.

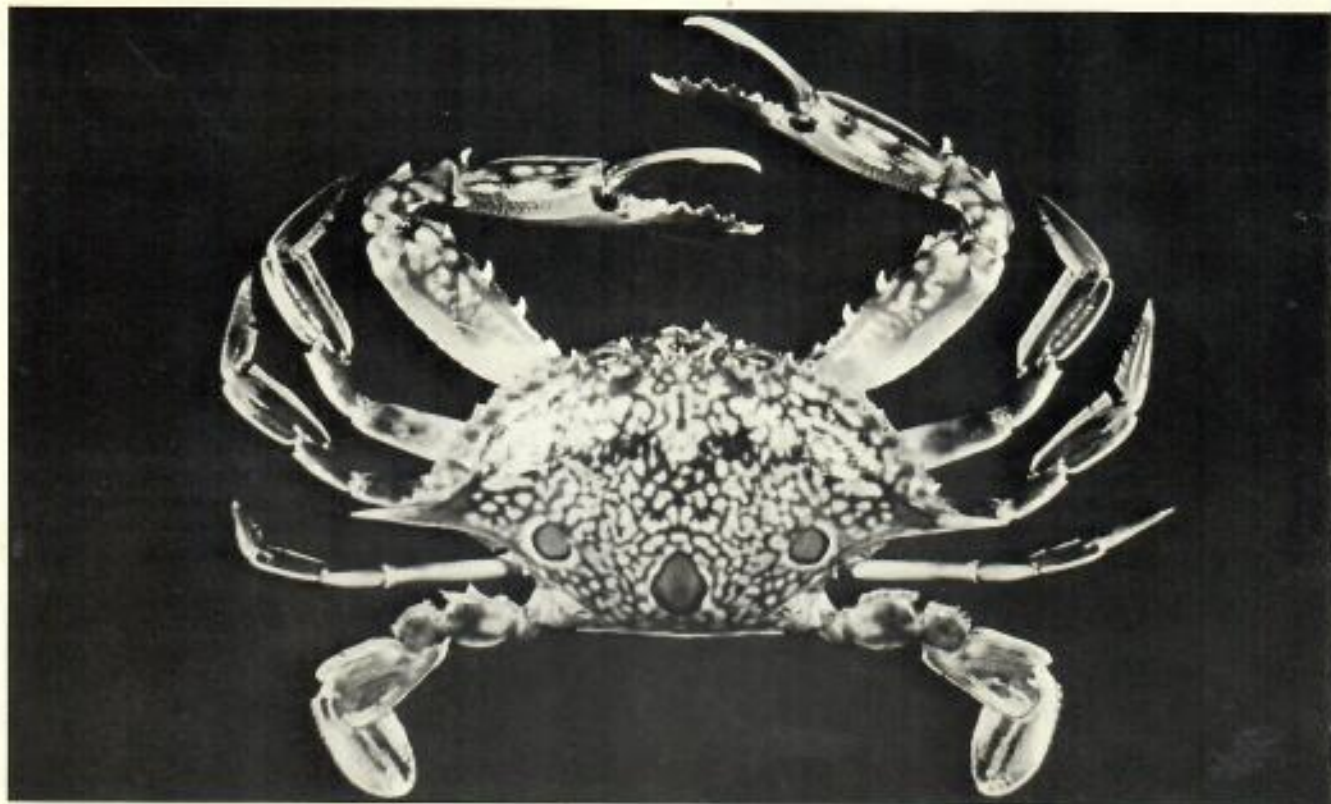
While the season for Kuahonu crab is open all year, crabs must be at least 4 inches in carapace width in order to be legal for sale. It is illegal to take Kuahonu crabs with eggs at any time of the year, and as with other crustaceans, the spearing of them is strictly forbidden.

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 lobsters and crabs to catch tomorrow.



CIRCULAR CRAB NET

Many types of crabs are caught by using baited circular crab nets, such as the one in the photograph to the right.



KUAHONU CRAB

The Kuahonu crab is often called Haole crab or Blood Spotted crab. It is always illegal to spear any crab or lobster in Hawaii, including the Kuahonu crab.

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

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HAWAII IN HARMONY WITH THE SEA

Jeremy Harris



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ULA AND PAPA'I—LOBSTERS AND CRABS

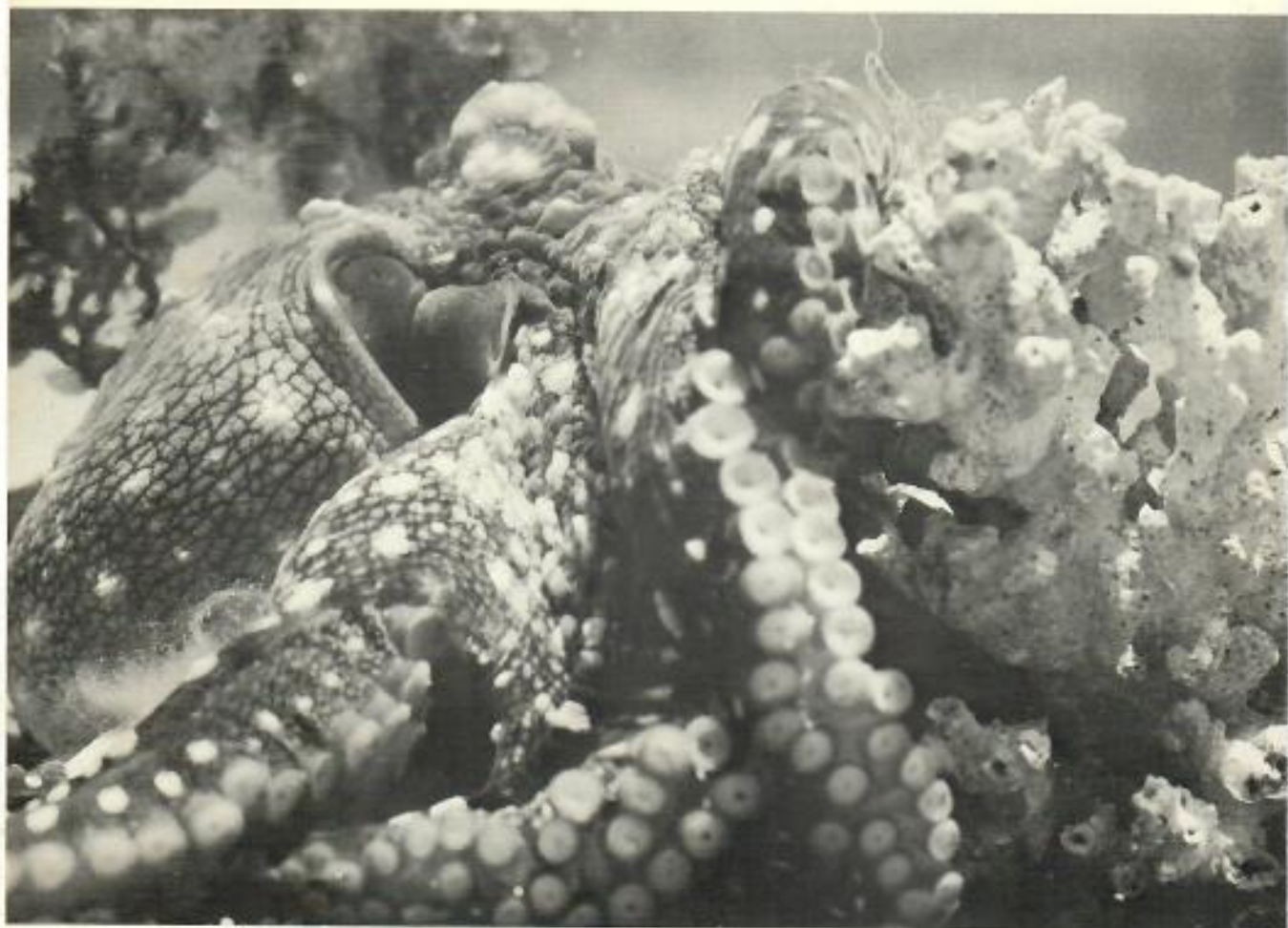
HAWAI'I IN HARMONY WITH THE SEA



NO
CLAMMING
IN THIS
AREA

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 mūhe'e.

He'e and He'e pūloa

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 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,

HE'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 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.



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.

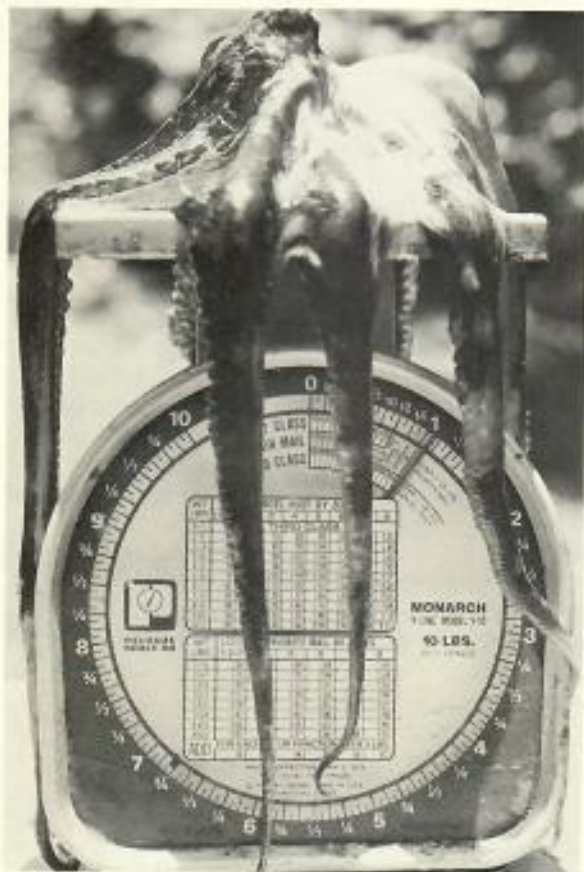
The octopus protects itself from predators in a very unusual manner. When the he'e is threatened it will emit a large amount of purple-black ink which clouds the water and provides camouflage for its escape.

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-ing" 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.

OYSTER BEDS

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



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 Hawaii 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 Oahu, 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, clams must measure at least one inch across the widest part of the shell. Fishermen can only take one gallon of clams with shells per person per day, and they can not 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 (*Mercenaria 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 'olepe to catch tomorrow.

CLAMMING IMPLEMENTS

At the present time clamming is closed year-round on Oahu, 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.

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.

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

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HAWAII IN HARMONY WITH THE SEA

Jeremy Harris



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