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COMMERCIAL FISHERIES OF THE HAWAIIAN ISLANDS.

BY

JOHN N. COBB,

*Agent of the United States Fish Commission.*

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NATIVE FISHERMAN WITH DIP NET.



CARRYING FISH IN BASKETS.

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## INTRODUCTION.

On May 1, 1901, the writer was detailed to accompany the party which was to make an investigation of the fish and fisheries of the Hawaiian Islands under the direction of Dr. David Starr Jordan and Dr. Barton Warren Evermann, in order to make a thorough canvass of not only the present condition of the commercial fisheries of the islands, but also of their past history and "the changes in the methods, extent, and character of the fisheries in historic times, as shown by records or traditions, particularly since the coming of Americans, Europeans, and Asiatics." The history of fishery legislation and the possibility of improvements in the present laws were among the questions which received careful consideration.

The investigation of these subjects at the islands occupied a period of three months, during which all of the larger inhabited islands were visited. A careful perusal of all available official and private documents, newspapers, and publications relating to the islands was made, and oral statements were gathered from the older fishermen and others conversant with the subjects in question. I am greatly indebted to the early files of the Honolulu newspapers for much of the historical matter in this report, and especially to *The Friend*, *The Sandwich Islands Gazette*, *The Polynesian* and *The Pacific Commercial Gazette*.

Every courtesy was extended by the officials and citizens of the islands, among whom I would mention the following: Governor Sanford B. Dole, Secretary H. E. Cooper, who was acting governor during the greater part of my stay in the islands; Attorney-General E. P. Dole, Prof. Albert Koebele, territorial entomologist; Dr. J. B. Pratt of the board of health; Prof. W. D. Alexander, of the Coast Survey; Mr. E. R. Stackable, collector of customs at Honolulu; Mr. Joseph Swift Emerson and Mr. W. E. Wall, of the Coast Survey; Miss M. A. Burbank, librarian of the Library Association and of the Historical Society of Honolulu, who placed at my disposal the large collections of both societies; Mr. E. L. Berndt, inspector of the fish market at Honolulu; Mr. F. G. Smith, of the Oahu Railway and Land Company; the officials of the Inter-Island Steam Navigation Company and the Wilder Steamship Company; Mr. S. M. Damon, Mr. Thos. G. Thrum, and Hon. Henry H. Waterhouse, of Honolulu; Mr. W. S. Wise, Mr. J. M.

Hering, and Mr. Carl S. Smith, of Hilo; Mr. J. Storan Moloney and Mr. George H. Dunn, of Lahaina; Mr. E. H. Bailey and Mr. William T. Robinson, of Wailuku; Mr. Francis Gay, of Makaweli, Kauai, and Mr. Thorwald Brandt, of Waimea, Kauai.

Mr. A. H. Baldwin, one of the artists accompanying the expedition, made the pen-and-ink sketches used. All but two of the photographs were taken by myself.

Mr. M. Sindo, of Stanford University, a member of the party, rendered valuable assistance as interpreter with his own countrymen.

#### PHYSICAL AND GEOGRAPHICAL FEATURES.

The Hawaiian Islands proper comprise a group of twelve islands lying between latitude  $19^{\circ}$  and  $22^{\circ} 20'$  north and longitude  $155^{\circ}$  and  $160^{\circ}$  west. Eight of these—Hawaii, Maui, Oahu, Kauai, Molokai, Lanai, Kahoolawe, and Niihau—are inhabited, while Molokini, Lehua, Kaula, and Nihoa are uninhabited, but are occasionally visited by the fishermen. There are a number of small islands and reefs running to the northwestward, which are temporarily occupied by workmen of the guano companies, who collect the eggs and manure deposited upon them by the myriads of sea birds and turtles which resort there. These smaller islands and reefs have a melancholy celebrity in the annals of the islands from the wrecks which have occurred upon them.

The Hawaiian islands have been called the "Key of the Pacific," owing to their location. From Honolulu, the capital, on Oahu, the distance to San Francisco is 2,100 miles; to Auckland, New Zealand, 3,810 miles; to Sydney, New South Wales, 4,484 miles; to Yokohama, Japan, 3,440 miles; to Hongkong, China, 4,893 miles, and to Tahiti, 2,380 miles. There is no land, except a few small islands close to the mainland, between the Hawaiian Islands and the American continent. The islands thus have an immense strategical importance in case of war. Owing to their convenient situation they have become ports of call for numerous steamship and sailing lines running from the mainland to Australia, China, and Japan.

*Hawaii.*—This island has an area of 4,210 square miles, nearly double that of all the other islands combined. It is 90 miles long from north to south, and 74 miles wide from east to west. This island, which is said by geologists to be the youngest of the group, is composed principally of three enormous volcanoes, two of which are still active. The highest point on the island is Mauna Kea, which is 13,825 feet in height, while Mauna Loa is 13,675 feet high. Both are capped with snow during most of the year. The coast line is regular, sometimes precipitous, but with few bays and no regular harbors. On the eastern or windward side, Hilo Bay is a rather open harbor, which is partly protected from heavy seas by a sunken coral reef. This is the only harbor on the eastern side, as the others are merely landings which can be made only in fairly pleasant weather. On the westward



side are the small bays of Kailua and Kealakeuka, which are safe so long as the winds prevail from the west, which they do most of the year. On the northwest is Kawaihae Bay. Arable land is scattered over a good part of the island, though the frequent volcanic eruptions destroy considerable quantities of good soil by their lava flows.

*Kahoolawe*.—This island, 6 miles west of Maui, has an area of 65 square miles and is devoted to sheep-raising. Its highest point is 1,130 feet above the sea.

*Kauai*.—This island is the northernmost of the group, and, according to geologists, is the oldest. It is 63 miles from Oahu, the nearest large island. It has a length of 25 miles, with a breadth of 22 miles, and an area of 590 square miles. In the center is the basaltic mountain called Waialeale, 5,000 feet high. Its northern portion extends nearly to the ocean in lofty ranges, while its southern end slopes gradually to the sea. The northwestern portion of the island has a line of lofty cliffs 7 miles long. The soil is very fertile, as the lava has nearly all decomposed. It is supplied with numerous streams and cascades and has some superb valleys. It has well been named by the inhabitants the "Garden Isle." There are several small bays around the island, but none of them is safe in bad weather.

*Lanai*.—This is a small island, about 9 miles west of Maui, and is used mainly for sheep-raising. It is 21 miles long and 8 in breadth, and has an area of 150 square miles. At the southeast end there is a mountain 3,000 feet high.

*Maui*.—This island, lying 25 miles northwest from Hawaii, is the second in size, with a length of 46 and a breadth of 30 miles, and an area of 760 square miles. It is composed of two mountains, connected by a sandy isthmus 7 or 8 miles long by 6 miles across, and so low that the depression of a few feet would make Maui into two islands. Halakala, the mountain to the northwest, has a height of 10,032 feet, and the volcanic crater at its summit is the largest inactive one in the world. Eaka, the mountain at the southeast of Maui, is 5,820 feet high.

*Molokai*.—This is a long, narrow island, 40 miles in length and 9 miles wide, with an area of 270 square miles. The western half is an elevated plain 1,000 feet above the sea, without running streams, but covered with grass. At the eastern end are several deep valleys, with streams of water during the wet season. The northern coast is generally precipitous, but near the center is a tongue of land about a mile broad and 10 miles long, projecting into the ocean. In 1865 this was selected as the site for the leper settlement. It is especially well located for this purpose, as behind the point of land is an almost impassable cliff over 1,000 feet high. There are about 6,000 acres in the tract, most of it fertile soil. The Government provides quarters, clothing, and provisions. By law every leper is sent to this place, and none is permitted his freedom. There are two settlements on this point, Kalaupapa and Kalawa.

*Molokini.*—This island has an area of but a few square acres and is uninhabited. It is situated about midway between Maui and Kahoolawe. Fish are said to congregate around the island in large numbers and it is visited frequently by the fishermen from Maui.

*Niihau.*—This, the most westerly inhabited island of the group, is 15 miles from Kauai. It has an area of 97 square miles. Two-thirds of it is a low plain composed of an uplifted coral reef and matter washed down from the mountains. The hilly portion is destitute of peaks and ridges. On the side toward Kauai the coast is formed of high cliffs, and from the similarity of the structure of the rocks on the two sides of the strait it is thought that the islands were once united. It is used exclusively for a sheep ranch. Shells of great beauty are found on the shores, which is unusual on the other islands, as there are but few violent storms to throw them up on the beach.

*Oahu.*—This island is the third in size, but the first in population and importance. It is 46 miles long by 25 miles broad, but has an irregular quadrangular form, with an area of 600 square miles. It is traversed from southeast and northwest by two parallel ranges of hills separated by a low plain. The highest point on the island is Kaala, 4,030 feet. The greater part of the coast is surrounded by a coral reef, often half a mile wide. In several localities an old reef has been upheaved, sometimes to the height of 100 feet, and now forms part of the land. Honolulu, the capital of the islands, is built upon such a reef. The harbor of Honolulu is the only improved one of the coast. It has a depth of 30 feet to the wharves. It had originally a shallow bar at the entrance to the harbor, but a passage through this was dredged some years ago. Pearl Harbor, 12 miles to the west of Honolulu, was ceded to the United States in 1876 upon the execution of the reciprocity treaty with the islands, and is capable of being made one of the best and safest harbors in the world. It has a narrow entrance, and a short distance inside of the entrance the harbor is divided by a narrow strip of the mainland running down the center, into two arms, or branches, which extend back into the island a distance of 10 miles. The depth of water in the harbor is from 6 to 18 fathoms. Just outside the entrance to the harbor is a shallow bar which must be dredged before large vessels can enter.

#### HISTORY OF THE ISLANDS.

According to Prof. W. D. Alexander, the Hawaiian historian, "there is little doubt that these islands were discovered by the Spanish navigator Juan Gaetano in the year 1555." The Spanish guarded the secret well, as the first intimation the world at large had of their existence was in 1742, when Commodore Anson, of England, captured a Spanish ship and found on board her a map on which was marked a group of islands in their present vicinity. The visits made to the islands in 1778 and 1779 by the English navigator Captain Cook first

brought them prominently in the public eye. He called the group the Sandwich Islands, in honor of his patron, the Earl of Sandwich. Cook visited several of the islands. On his second visit to Kealakekua Bay, Hawaii, in 1779, he was killed on February 14.

At the time of Cook's visit each island had one or more chiefs or kings. Shortly after the death of Cook a chief named Kamehameha succeeded to the position of high chief of Hawaii, made vacant by the death of the former occupant. He was a man of enlarged views and great force of character. He was quick to see the advantages to be derived from the visits of merchant vessels, and encouraged them in every way possible. He secured firearms from these traders and gradually instructed his people in their use. He also had a small fleet of vessels built, so that he could transport his army rapidly and quickly from island to island. When his plans were ripe he invaded and conquered all the other islands except Kauai, which latter came under his sway through a peaceful cession from the reigning monarch. He established his capital at Honolulu, on Oahu. He died in 1819 and was succeeded by his son, a mild and well-disposed prince, but destitute of his father's energy. One of his first acts was to abolish tabu and idolatry throughout the kingdom. A portion of the people rebelled, but they were soon brought into subjection, and the peace of the islands has been scarcely broken since.

On March 30, 1820, the first missionaries landed at Kailua, Hawaii, from the brig *Thaddeus*, of Boston. The result of their work in the islands has been wonderful. They found the islanders steeped in savagery of the most revolting character. They clothed and taught them, and to-day the average Hawaiian, so far as education and general deportment goes, will compare very favorably with the average citizen of the States. The vices inseparable from civilization, however, have had their effect on the race and it is rapidly dying out.

The government of the islands was monarchical until 1893, when Queen Liliuokalani was deposed. A provisional government was formed on January 17, 1893, with Sanford B. Dole as the head, and this government held power until superseded by a republic on July 4, 1894, Mr. Dole continuing at the head as President. The republic continued in existence, with several slight revolts on the part of the Queen's friends, until annexation to the United States was accomplished on August 12, 1898. On June 14, 1900, the islands were formally organized as a Territory.

#### FISHERMEN.

Owing to their location between the continents of Asia and America the islands have been securing recruits from each direction as well as from the numerous islands to the south. As, for certain reasons, a sufficient number of suitable immigrants could not be secured from the countries bordering on the Pacific Ocean, Europe has been drawn upon at times, until at present the islands present quite a cosmopolitan

appearance. An idea of the extent of this admixture may be gained from the fact that public notices in the fish markets and other places are usually printed in five languages—English, Hawaiian, Chinese, Japanese, and Portuguese.

In numbers the native Hawaiian fishermen surpass all the others combined, but this is partly because so many women and children engage in the hand fishery for octopus, algæ, etc., and these have been counted in the total. Some of the natives are at the head of quite important fisheries. The Japanese occupy second position in the general total of fishermen and are very ingenious and industrious. They are especially numerous on Oahu and Hawaii, most of them being engaged in deep-sea line fishing, which they virtually monopolize. They have several companies at Honolulu, Lahaina, and Hilo for carrying on fisheries, and in this way control certain lines of fishing, thus enhancing the cost of the products to the general public. Only six Americans have a direct connection with the fisheries, and they principally as managers of the large fishery rights on Kauai and Maui. The few Chinese fishermen confine themselves to the fisheries immediately along the shores. A few years ago they began leasing the fish ponds still in use on most of the islands, and now have practically a monopoly of this part of the industry. They also quite generally control the selling of fish in the markets. A number of South Sea Islanders, mainly from the Gilbert, Caroline, and Marquesas islands, are engaged in fishing, principally at Honolulu and Lahaina. They are more industrious in this business than the natives and are quite expert. They are the principal users of fish baskets. The Portuguese are not largely engaged in fishing. The Italians have made some efforts in this pursuit, but none is now thus employed.

#### LAY OF THE FISHERMEN.

When fishing the natives usually make an equal division of the fish taken or of the proceeds among all engaged in it. In a few instances they are hired and paid regular wages.

At Hilo, on Hawaii, in the gill-net and line fisheries the Japanese work on the following basis: The owner of the boat furnishes the boat, lines, nets, etc., and takes 22 per cent of the gross proceeds for the use of these. The balance is then divided equally between the owner and others who participate in the fishery. Should the owner not go out in the boat he does not get anything in the final division.

In the seine fishery at Hilo the owner of the boat and net receives from 30 to 35 per cent of the gross proceeds, this being regulated by the size of the net and boat, while the balance is divided equally among the fishermen, the owner, if he accompanies them, receiving his share with the rest. Should the fishermen work on salary they receive \$15 per month, together with their board and lodging.

At Honolulu, among the Japanese fishermen, the owner of a boat used in the fisheries takes 15 per cent of the gross proceeds, the rest

being divided equally among the fishermen. The owner of the boat supplies everything except food, and generally accompanies the boat and gets his regular share with the others.

#### RELIGIOUS BELIEFS AND SUPERSTITIONS OF THE FISHERMEN.

The Hawaiians are a superstitious race, and at the time of the advent of the first missionaries they had many customs and beliefs which were common to all the islands, while there were others which were local to certain islands and even districts. The fishermen had many which were peculiar to themselves and they formed almost a distinct community. Their small heiaus (temples), often called ku-ulas, stood on almost every promontory, while they could not use a new net, fishing rod, or canoe without prayer and sacrifice to their patron god. Each fisherman had his fetiches, or gods, and these are frequently found from time to time in secret places where they had been hidden in 1819, when idol worship was abolished.

In all the great ceremonies of the state and church the fishermen occupied a prominent place. The following is a description of the part played by the fishermen in the dedication of a new temple:\*

On the fourth night another great *aha* (hoowilimoo) was performed by the king and the priest of Lono, while another priest, with a large company of fishermen, put to sea to fish for *ulua*.

*Offering of the ulua.*—The idols were now invested with white kapa and received their several names, the principal one being called *Moi*; and a great sacrifice was made of hogs, bananas, cocoanuts, red-fish, and white kapa, besides several more human victims, which were placed on the *lele*. If the fishermen failed to catch any *ulua* that night they killed a man in the village and dragged his body to the heiau with a hook in his mouth as a substitute for the fish.

As the *ulua* priest approached, chanting an incantation and carrying his hook and line, everybody fled, and even the priests retired within the drum house. When he had finished chanting his *aha* behind the lananuu, he reported to the king the omens which he had observed, and the fish was offered up to the god. If he had broken his rod or line, or if the bait had all been eaten, it was a bad omen.

The chief god of the fishermen was *Kuula*, whose worship extended throughout all the islands, and to whom they looked for abundant supplies of fish and other products of the sea. His son *Aiai* was the first to locate the deep-sea fishing grounds for the fishermen.

On Lanai two large stone images, personifying *Laeapua* and *Kaneapua*, deities who were supposed to preside over the sea, were much honored by the fishermen.

On Molokai a shark named *Moalii* was famous as the marine god. Many temples were built on promontories for his homage, and to them the first fruits of the fishermen's labors were dedicated. When victims were required in honor of this god, or it was supposed to be hungry, the priests would sally out and ensnare with a rope anyone whom they could catch, who was immediately strangled, cut in pieces,

\* A Brief History of the Hawaiian People. By W. D. Alexander, pp. 57, 58; 12 mo., New York, n. d.

and thrown to the voracious animal. Another mode of entrapping the unwary was by uttering piteous cries like a wounded or sick individual. Those attracted to the spot were seized and sacrificed.

A large *pubi* (eel), called *Koona*, whose residence was said to be at *Wailau*, on the *Koolau* side of *Molokai*, was deified by the people of that place. It achieved celebrity by killing a large shark which had attacked it, but it was eventually killed by *Aiai*, the son of *Kuula*.

*Lonoakihi* was the *pubi* god of all the islands. *Hinabele* and her daughter *Aiaikuula* were goddesses of the fishermen of *Hawaii*.

The fishermen of the islands also had a god, *Maikahulipu*, who assisted them in righting their canoes when they were upset.

The god of the canoe-makers was *Mokualii*.

The fishermen, to a certain extent, believed in transmigration, and frequently cast their dead into the sea to be devoured by the sharks which infested the shores. Their souls were supposed ever after to animate those fishes, and incline them to respect the bodies of the living should accident or design ever throw them into their power.

The shark occupied a unique position among the people. It was quite generally worshipped on all the islands, each one having a special shark or sharks as their "aumakuas" or ancestral god. The following is a clear and concise account of shark worship in olden times:\*

The shark was perhaps the most universally worshipped of all the *aumakuas*, and, strange to say, was regarded as peculiarly the friend and protector of all his faithful worshippers. In the case of the *puco*, all birds of that species were equally considered as representatives of the *aumakua*, known as "*Puco nui o Kona*." They were not worshipped as individual owls, and when one died the life of the *aumakua* was in no wise affected. Not so with sharks. Each several locality along the coast of the islands had its special patron shark, whose name, history, place of abode, and appearance were well known to all frequenters of that coast. Each of these sharks, too, had its *kahu* [keeper], who was responsible for its care and worship. The office of *kahu* was hereditary in a particular family, and was handed down from parent to child for many generations, or until the family became extinct. The relation between a shark god and its *kahu* was oftentimes of the most intimate and confidential nature. The shark enjoyed the caresses of its *kahu* as it came from time to time to receive a pig, a fowl, a piece of *awa*, a *malo*, or some other substantial token of its *kahu's* devotion; and in turn it was always ready to aid and assist the *kahu*, guarding him from any danger that threatened him. Should the *kahu* be upset in a canoe and be in serious peril, the faithful shark would appear just in time to take him on his friendly back in safety to the nearest shore. Such an experience, it is said, happened to *Kaluahinenui*, the *kahu* of a certain shark, while voyaging in the *Alenuihaha* channel. The schooner was overtaken by a severe storm and was lost with most on board. In her distress *Kaluahinenui* called upon her shark god, *Kamohoalii*, who quickly came to her rescue, taking her upon his back to the neighboring island of *Kahoolawe*.

This story of shark intervention and many similar to it are extensively believed at the present day. In Professor Alexander's History, however, where the real facts of this case are carefully stated, no allusion is made to any aid rendered by a shark. His statement is as follows:

"At noon on Sunday, the 10th of May, 1840, the schooner *Keola* foundered and sank a considerable distance west of *Kohala Point*. As there was a strong current

\* The Lesser Hawaiian Gods. Read before the Hawaiian Historical Society April 7, 1892, by J. S. Emerson, esq., vice-president of the society. Papers of Hawaiian Historical Society, No. 2.

running to the northward, the passengers and crew, seizing on oars, boards, etc., swam for Kahoolawe, then about thirty miles distant. A Mr. Thompson, of Lahaina, was drowned, but his wife and two young men reached Kahoolawe the next day. Mauae, of Lahaina, and his noble wife, Kaluahinenui, swam together, each with an empty bucket for a support, until Monday afternoon, when his strength failed. His wife then took his arms around her neck, holding them with one hand and swimming with the other, until she found that he was dead, and was obliged to let him go in order to save her own life. After sunset she reached the shore, where she was found and taken care of by some fishermen, having been thirty hours in the sea." It is interesting thus to learn the facts connected with this modern instance of a case illustrating the popular belief.

The largest and most celebrated of the Hawaiian shark gods was *Kuhaimouna*, a male, whose mouth was said to be as large as an ordinary grass house and could take in two or three common sharks with ease. Most of the channels around the islands of Maui and Oahu were too shallow for his huge bulk. More than once he had the misfortune to get aground, and to avoid this fate he spent most of his time in the deep waters off the island of Kaula.

Second to him in size and power was the shark called *Kamohoalii*, older brother of the goddess *Pele*. Like many of the other shark gods, he was able at pleasure to assume the human form. In that form he dwelt in profound solitude in a most sacred spot called the *Pali Kapu o Kamohoalii* [the sacred precipice of *Kamohoalii*], overlooking the fires of the volcano of Mokuaweoweo.\* Another *Pali Kapu o Kamohoalii*, with a likè tradition, is similarly situated with reference to the crater of Kilauea. Even *Pele*, fiercest of gods, dared not allow the smoke from her furnaces to trespass on the awful sanctity of her brother's abode. He was also said to make his home in the highest cone in the crater of Haleakala. From time to time he walked among men, when he claimed the well-known prerogative of an Hawaiian god to discard his malo. In his shark form he is still said to roam at large in the deep waters about the island of Maui, and is claimed by many as their *aumakua*.

One reason for the affection shown to the shark *aumakua*s was the fact that so many of them claimed human parentage, and were related by ties of kinship to their *kahus*. Such was the case with *Kaahupahau* and her brother, *Kahi'uká*, the two famous shark gods of the Ewa Lagoon, on this island.† Their birth and childhood differed in no essential features from that of other Hawaiian children up to the time when, leaving the home of their parents, they wandered away one day and mysteriously disappeared. After a fruitless search their parents were informed that they had been transformed into sharks. As such they became the special objects of worship for the people of the districts of Ewa and Waianae, with whom they maintained the pleasantest relations, and were henceforth regarded as their friends and benefactors. After a time the man-eating shark *Mikololon*, from the coast of the island of Maui, paid them a visit and enjoyed their hospitality until he reproached them for not providing him with his favorite human flesh. This they indignantly refused to give, whereupon, in spite of their protest, he made a raid on his own account upon the natives, and secured one or more of their number to satisfy his appetite. *Kaahupahau* and her brother promptly gave warning to their friends on shore of the character of this monster that had invaded their waters. To insure his destruction they invited their unsuspecting guest to a feast made in his honor at their favorite resort up the Waipahu River. Here they fed him sumptuously, and at length stupefied him with the unusual amount of *awa* with which they supplied him. While he was in this condition their friends, who had come in great numbers from the surrounding country, were directed to close up the Waipahu River, which empties into the Ewa Lagoon, with their fish nets, brought for the purpose, while they attacked him in the rear. In his attempt to escape to the open sea he broke through

\*The summit crater of Mauna Loa, on the island of Hawaii.

†Oahu.

one net after another, but was finally entangled and secured. His body was then dragged by the victorious people on shore and burned to ashes, but a certain dog got hold of his tongue and after eating a portion dropped the remainder into the river. The spirit of the man-eater revived again and, as a tongue, now restored and alive, made its way to the coasts of Maui and Hawaii, pleading with the sharks of those waters for vengeance upon the sharks of the Ewa Lagoon. They meantime secured the aid of *Kuhaimoana* and other notable sharks from the islands of *Kaūa*, *Niihau*, *Kauai*, and *Oahu*.

A grand sight it was to the numerous spectators on shore when these mighty hosts joined combat and began the great shark war. It was a contest of gods and heroes whose exploits and deeds of valor have long been the theme of the bards of the Hawaiian Islands. We can not enter into the details of this story, which, if wrought out, would be worthy of being called an epic. We will only say that in the first great battle the friends and allies of the cruel man-eater were routed by the superior force of their opponents, while the good *Kaahupahau* and her brother long continued to enjoy the affectionate worship of their grateful people. It is said that she is now dead, while her brother *Kahi'uká* still lives in his old cave in the sea, where he was visited from time to time by his faithful *kahu*, *Kimona*, now deceased. Sometimes *Kimona* missed his fish nets, when he was pretty sure to find that *Kahi'uká* had carried them to a place of safety, to preserve them from destruction by hostile sharks.

By some authorities *Kaahupahau* is represented as the mother of *Kahi'uká*, but as there is always an uncertainty in these matters of shark relationship I will not attempt to settle the point.

When we reflect on the amphibious habits of the Hawaiians and their familiarity with and exposure to the dangers of the sea, it is no longer a matter of surprise that they should propitiate certain sharks, and cultivate the pleasantest relations with them, as a defense against other sharks with whom they may not be on friendly terms.

*Apukohai* and *Uhumkaikai* were evil shark gods who infested the waters of *Kauai*, and fishermen were compelled to propitiate these with offerings. *Ukanipo* was the shark god of the island of *Hawaii*.

The *leho* (cowry) was also a beneficent "aumakua." During the reign of *Umi*, on *Hawaii*, over four hundred years ago, the discovery was made of the attraction the cowry had for the *hee* (octopus), and to this day it is quite generally used in fishing for the latter. The *leho* will also help its devotee to shore should he be shipwrecked. Should the keeper of a shark god send him on an errand of mischief to one who has a *leho* god, the *leho* will blind the shark by clinging to his eyes so that he can not do any harm.

One of the commonest mollusks around the islands is the *opihī* (limpet). This is sometimes an "aumakua" to a few people, and defends its followers against sharks in the same manner as the *leho*. It is also supposed to calm the raging surf, thus aiding the fishermen in bringing their canoes to the shore in safety.

An "aumakua" of evil was the *enuhe* (worm). He was supposed to be a monster living in a cave in the district of *Kau*, on *Hawaii*. He fell in love with the daughter of a prominent chief, and would visit her in the evening when his real character could not be discerned. When the fraud was discovered her friends resolved upon his destruction, and with her help succeeded in their design. From his dead body the



loli (sea cucumber, or *bêche-de-mer*) and other allied forms of marine life were supposed to spring.

The following fishes were also worshipped as *aumakuas*:

The *aawa*, the *oopuhue* [puffer], the *ohua*, the *opao* (shrimp), the *uu* [squirrel-fish], addressed in prayer as *Uu kani po*; the *kohala*, addressed as *Kane i Kohala*; the *humuhumu-nuku-nuku-a-puaa*, one of the forms in which the hog god, *Kanapuaa*, took to the sea when *Pele* made it too hot for him to remain on land; the *hee* (squid), addressed as *Haalua*; the *pao* [blenny], and the *puihi* (eel). With them we may also mention the *wana* (echinus) and the *loli* (sea-cucumber) already referred to. I give this without claiming it to be a complete list.\*

Other sacred fish were the *aku* and *opelu*. They became so because when the high priest *Paa*o was fleeing from his native land (probably Samoa) to escape the wrath of his brother, who had sent a violent storm to destroy him and his companions, the *aku* assisted in propelling the canoes against the storm, while the *opelu* swam around them and broke the waves against his body. After a long voyage *Paa*o landed in *Puna*, on the coast of Hawaii, and in thankfulness to the two fish which had assisted him he made them sacred.

A few of the stars were worshipped by fishermen. "Sirius, called *Newe* or *Hoku kau opae*, determined the best time for catching shrimp by her rising or setting." *Newe* and *Keoe* were known as *Na-hoku-hookele-waa* (boat-steering stars). The Milky Way, or a portion of it, was called *Na ia* (the fishes), and the expression "Ua huli na ia" (the fishes are turned) indicated the near approach of morning.

Should a fisherman by an unlucky accident injure or destroy any animal held sacred by his family, he was bound to make a feast to the god of such articles as "awa, a pig, fowls, squid, the fishes called *aholehole*, *anae*, *kala*, *kumu*, and *palani*, together with *kalo*, potatoes, bananas, and sugar cane."

When the *uiui* appears it is taken by the fishermen and people generally as a sure precursor of the death of a very high chief. The same is also said of the *alalauwa* of Maui. It is possible that this latter is the same fish under a different name.

When fishermen are ready to embark they are greatly exasperated should a person come along and stand indolently gazing at them with his hands behind him. They believe it gives them bad luck.

On Kauai the Japanese fishermen buy most of the turtles taken by the natives in their bag nets and, inscribing some Japanese characters on their backs, let them go free. They claim that turtles so treated will guide them back to land should they be lost at sea at any time.

The *anaeholo*, one of the mullet family, and the *aholehole* are not eaten by expectant mothers, as they fear dire consequences to the child should they do so. Nor are they given to children until they are able to pick and eat them of their own accord.

\*The Lesser Hawaiian Gods. Read before the Hawaiian Historical Society, April 7, 1892, by J. S. Emerson, esq., vice-president of the society. Papers of the Hawaiian Historical Society, No. 2, p. 13.

## BOATS.

*Canoes.*—The native Hawaiians use the canoe exclusively in fishing. Some of these, particularly the older ones, are very handsome in design and workmanship, the old-time native boat-builders having been especially expert in their manufacture. The present generation has sadly deteriorated, however, and the canoes made now by natives rarely show very much skill in design and workmanship.

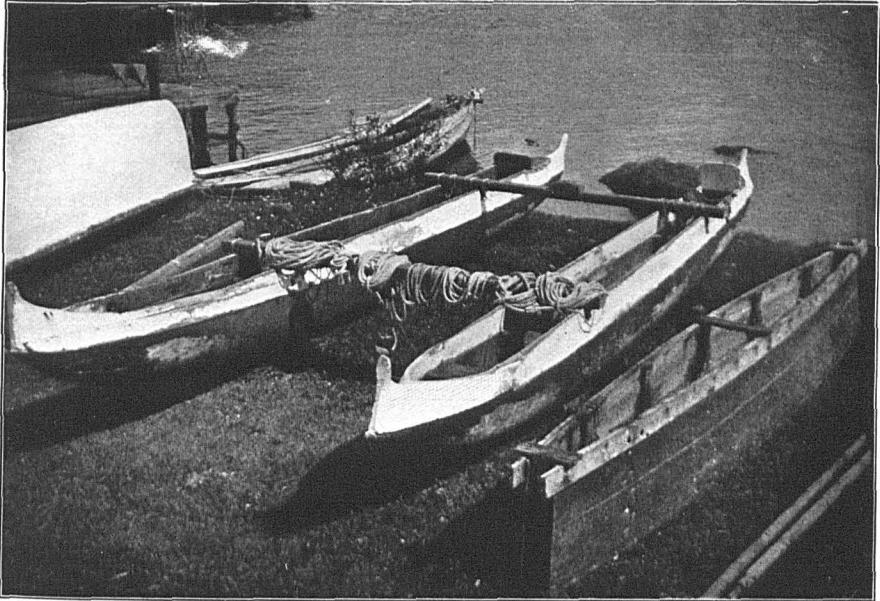
The body of the canoe is usually hollowed out of the trunk of a koa tree (*Acacia koa*). This tree, formerly quite common, is now rather scarce, owing to the excessive demands made upon the supply for canoe-building and other purposes. It averages from 50 to 60 feet in height. The tree is first cut down, the branches stripped off, and then the trunk is cut to the length desired for the canoe. This trunk is roughly hewn to the shape desired and then brought down to the shore, where the final shaping is done. After the body is finished a rim about 6 inches in height is fastened to the upper part by means of wooden nails. The holei (*Ochrosia sandwicensis*), a tree from 6 to 12 feet in height, is preferred for this, but the ahakea (*Bohea elatior*), a tree 20 to 30 feet in height, is sometimes used.

Each canoe is fitted with an outrigger, made by laying two long, slender poles, slightly curved at one end, across the canoe at about one-fourth of the distance from each end of the latter, and so arranged that on one side they extend a few inches over the side of the canoe, while on the other they run out from 6 to 8 feet. The curved part of the poles is on this side. These poles are firmly lashed to the body of the canoe where they cross it by stout twine. A sapling, about 12 feet long and 6 inches in diameter, is then lashed to the under side of these poles near the extreme ends, the sapling lying parallel to the body of the canoe and extending slightly beyond the cross poles at each end. The wiliwili (*Erythrina monosperma*), a tree 20 to 25 feet in height, is generally employed in constructing the outrigger. The object of the outrigger is to balance the canoe, which is very narrow, when in the water. With ordinary care it is almost impossible to capsizc a canoe fitted with an outrigger. The natives often make long journeys in them, frequently in quite stormy weather, and seem perfectly at home in them.

An ordinary canoe for one person would be about 18 feet long and about 17 inches wide, while a three-seated canoe would average 33 feet in length and 21 inches in width.

The paddles have a long, slender handle, usually about 46 inches in length, with an oblong blade about 23 inches long by 13½ inches wide. The wood of the paihi tree is frequently used, especially on Hawaii, in making the ordinary paddles, while the wood of the koaia (*Acacia koaia*) is generally used in the manufacture of the fancy ones.

The Gilbert Islanders on the Hawaiian islands use a slightly



DOUBLE CANOE AND LIVE-BAIT BOX.



DOUBLE CANOE RETURNING FROM FISHING.

different arrangement of the outrigger. At the ends of the cross poles short forked sticks are lashed with the closed part of the fork upward. The long sapling is then lashed to the lower ends of the forks, but does not enter the V-shaped openings. It does not appear to be as effective an arrangement as the one previously described.

Some of the canoes use sails, but most of them depend upon their paddles for motive power.

During the aku (ocean bonito) fishing season two canoe owners frequently combine forces. In that event the outriggers are removed from the canoes, which are placed parallel to each other at a distance of about 6 feet, and are then held in this position by two cross-pieces running from canoe to canoe at about one-third of the distance from each end and firmly lashed in this position. The sail is operated in only one of the canoes.

Mr. Henry Weeks, of Kona, Hawaii, uses a canoe in the bottom of which is inserted a square piece of thick glass, so that he can locate the bottom fishes and hee (octopus), as he slowly paddles along.

*Sampan.*—The Japanese use the sampan, a style of boat in general vogue in the fisheries of Japan. These boats are clumsy and awkward-looking, and are poor sailers, although very seaworthy. A sampan to be operated by two men is usually about 20 feet in length on top, with about 6 feet on the keel. The beam is usually about 4 feet 5 inches, while the depth averages 20 inches. They are made of pine. Their most peculiar feature is an overhanging, partly inclosed stern, in which the rudder is worked. The width of the stern is about 3 feet. The gunwale, from the bow for about two-thirds of the length on each side, overhangs nearly 12 inches, and has a plank about 6 inches in height extending above the gunwale. In the bow is a large cubby-hole raised even with the top, in which fishing lines, sails, etc., are stored when not in use. In the center are about 8 compartments—4 on a side, 12 to 15 inches deep, with plugs which can be pulled out in order to allow the entrance of water, thus making live wells. These small holes—about 6 inches long by 3 inches wide—are crossed with small twigs or wire netting to keep the fish from escaping.

Sculling from the stern is the method invariably used by the Japanese. The oar, which is about 13 feet long, is lashed to a handle about 6 feet in length; this gives the oar a slight angle, which makes sculling much easier than if it was all one solid piece. On the handle is a pin, on which a rope is slipped, so that the scull is held down to a uniform height while being worked. The sweep of the stock at the hand end is nearly 2 feet. The fisherman, planting his left foot on an inclined board, sways his arms and body at right angles to the boat.

Quite large sampans, with crews of from 4 to 6 men, are employed in the deep-sea line fishing off Molokai.

The small sampans cost about \$75 to \$80, without sails; the largest

cost about \$150 in the same condition. The sails for the smaller ones average about \$7 per boat, and for the largest ones about \$15.

*Whaleboats.*—A few whaleboats are used in the fisheries of certain of the islands, principally by the Chinese. These are of the regulation whaleboat pattern, and have evidently been modeled after boats left behind by the whalers who used to frequent the islands. They average about 25 feet in length, about 5½ feet in width, 26 inches deep, and are sharp at both ends. They cost about \$125 each.

*Rowboats.*—These are of all sizes and shapes, from a small, rectangular pine-board boat, worth \$2 or \$3, to a handsome, well-built boat costing \$25. They are used principally in the rivers, fish ponds, and small bays, where the water is smooth.

*Scows.*—A few scows are employed in the seine fisheries on Oahu, and are of a rough, cheap character which requires no description.

*Seineboats.*—These are very much of the same pattern as the best rowboats, only larger and more valuable.

#### APPARATUS AND METHODS OF OPERATING SAME.

Owing to the proximity of the sea to all of the habitable portions of the islands, and the natural dependence of the people upon the products obtained from it for a considerable part of their sustenance, the natives early developed into expert fishermen and fisherwomen, and as time went on gradually evolved newer and more effective forms of apparatus to take the place of, or to aid, the more primitive forms. The advent of foreigners hastened this development by the introduction of forms of apparatus in use in their own countries and heretofore unknown in the islands. The earlier American settlers, coming as they did principally from New England, where fishing had been brought to a higher state of perfection than elsewhere in the United States, were especially helpful in this regard.

The writer has endeavored to give as complete a list as possible of the forms of apparatus in use, together with the methods of operating the same. As many forms bear native names, while others have names different from those by which they are commonly known on the mainland, every effort possible was made to see each form and witness the methods of operation, and where this could not be done the statements of reliable fishermen and others were taken.

#### SEINES.

At Hilo the large seines used on the beach average 250 feet in length, with bag 7 feet deep, and mesh of one-half inch. The wings average 4 feet in depth and have a mesh of 1 inch. They are usually made from No. 9 to No. 8 cotton twine.

On Maui seines 150 feet long, 8 to 12 feet deep, with 1¼ inch mesh, are used. They have no bag, and several of them are often laced together and used as one net. They are usually hauled up on the shore.

At Pearl Harbor, Oahu, the Chinese use what is practically a purse seine, which is 50 fathoms long, 20 fathoms deep, with a mesh of 1 inch in the center and  $1\frac{1}{2}$  inches in the wings. The bottom of the net has rings, with a rope running through them. After the fish are surrounded the lower line is pulled up by the fishermen. The bottom comes up together, thus forming a bag or purse on each side, and this is pulled in until the fish are all in a small bag on each side of the boat, whence they are dipped out by means of small scoop nets.

The bait seines average from 10 to 60 yards in length, with one-half inch mesh or less. They are quite generally used by all classes of line fishermen in securing their bait. No. 3 cotton twine is generally used in the manufacture of these seines.

#### GILL NETS.

The gill-net is a popular form of apparatus in the fisheries at the present time. They are either set or hauled; rarely, if ever, being drifted. When set they are generally stretched, at high tide, across the shallow openings in the coral reefs. As the tide goes out the fish rush for these openings and become meshed in the net. The fishermen are on the seaward side of the net and pass to and fro, removing the fish as fast as caught. This fishing is carried on at night, and the nets are of varying lengths and depths, according to where fished.

In fishing around clusters of rocks the natives generally surround them with a gill-net. This is held to the bottom by means of leads or pebbles attached to the lower line, while the upper line is supported at the surface by pieces of wood of the hau (*Ilibiscus tiliaceus*) and kukui (*Aleurites triloba*), which are very light. The fishermen then dive down to the bottom, inside of the net, and drive the fishes from the crevices of the rocks, and as they dart away in all directions they are meshed in the net. In this kind of fishing nets about 55 feet in length and 7 feet deep are used. When this net is not long enough one or more nets are laced to it.

Gill nets are also used at times along the beaches on the leeward side of the islands, where the surf is not heavy, the same as seines. Two men take hold of one end of a long net and wade out from the shore in a straight line for a considerable distance. The land end of the net is held by a man on the beach. After they have gone out a sufficient distance, the two men make a big sweep to one side and then pull their end of the net to shore a short distance from the other man. The net is then carefully pulled in, the same as a haul seine, until it comes out on the beach, fish and all. These nets are usually 20 fathoms in length, 9 feet deep, with 2-inch mesh, and are fitted with leads and corks. Several of them are usually joined together. No boats are employed when fishing in this manner.

When fishing for ula (crawfish), the same style of net, with a 7-inch mesh, is frequently set around a rock or cluster of rocks in the early evening and allowed to remain there all night. As the ula come out to

feed during the night they become entangled in the meshes of the net. The net is raised in the morning.

Another method is to join a number of nets together, putting in the center the smallest mesh net of all. These are then placed on two canoes, which are rowed to the usual fishing-ground, which is generally not far from the shore. One man stands upright in order to more clearly see where the schools of fish are. As soon as a school has been sighted the boats are paddled to the seaward of it, and when this has been accomplished, they begin paddling in opposite directions, paying out the net at the same time from each boat. After sweeping out a little way the boats are paddled to shore, hauling the net after them. The net is then hauled in, the various sections being removed as they are landed, like a seine, until it is about 50 feet from the beach. The fishermen then spring into the water and draw the two ends together, thus making a circle. One end of the net is then pulled around until the end of a section is reached, when it is removed. This is continued until the fish are all inclosed in a small circle formed by the fine-meshed section. At certain fisheries the net is then anchored and the fish allowed to remain in it until they are wanted for shipment, when they are removed by means of a small seine, swept around inside of this improvised pound; and when the fish have been bagged in this they are removed by small dip nets. The principal species taken in this fishery are the oio (lady-fish), kala (hog-fish), nenue (rudder-fish), and large awa-kalamoho (milk-fish).

A variation of this method is for the boats to move in a circle, and when they meet for one to pass inside of the other; and thus they keep on until there are several rings of netting around the fish. This is so that if they break through the inner ring they will surely be caught in one of the other rings. After the school has been sufficiently encircled the fishermen jump into the inner circle and, beating the water with their canoe poles, frighten the fish into the nets, where they are meshed.

Another method is to drop the nets in a half circle, with a man at each end to hold it thus. The other fishermen then make a wide sweep to the opposite side of the opening, from whence they begin advancing toward the net, beating the water violently with their arms, which drives the fish toward the net. When the beaters have advanced a sufficient distance the men holding the ends of the net advance toward each other with it. When they come together all the fishermen take hold, and the circle is gradually reduced as the net is hauled in and section after section removed. The fish which have become meshed are taken out of each section as it comes in. When the inner circle is small enough the fishermen remove those which are not meshed with dip nets. This fishing is done either in the day or night.

When fishing for akule unusually long nets are frequently employed. At Hilo nets 208 fathoms long, 4 fathoms deep, with mesh of 4 inches,

are used. These are made of No. 12 linen twine and are worth about \$100 each. Most of the nets, however, are of about one-half the above dimensions and are worth about \$50 each.

On Hawaii, when the school of akule (goggler) arrives a man is posted on the high bank with two flags, one in each hand. When he waves the one in the right hand the canoes on that side move to the right; when he waves the left-hand flag those on that side move to the left, and when he drops both it means to let the net go. From his elevated position he can observe the movements of the school, which owing to the color of the fish looks like a red bank, better than those in the canoes.

Nearly all the seine and gill nets are barked before being used, as otherwise they would soon rot out. The bark of the koa tree is used for this purpose. It is first pounded up somewhat fine and then put in a tank with water, where it is allowed to remain for two weeks. The water is then drawn off into a water-tight box and the nets are slowly drawn through this water.

In drying the nets a method introduced from China is employed at several places, particularly Hilo. Throughout an open field a number of slender poles about 12 feet in height are planted. At the top of each is nailed a crosspiece of wood about 3 feet in length, which is supported by two short pieces running from the pole to the outer ends of the crosspiece. Large hooks are attached to the ends of the cross sections. A short piece of rope is slung over each of these hooks, and when the net is ready for drying one end of this rope is attached to the lines of the net and it is pulled up sufficiently to clear the ground, and held in this position by tying the free end of the rope to the pole close to the ground. This also facilitates the repairing of nets.

#### BAG NETS.

Bag nets are used on all of the islands, being the form of apparatus in most general use. They are of all sizes and styles, according to the particular species the fishermen are in search of and the condition of the fishing-ground.

Several of the more important private fisheries are worked by means of bag nets. At Kahului, Maui, a net 180 fathoms long, with ropes 250 fathoms long attached on each side, is used. The wings of this net have a mesh of 4 inches, while in the center the mesh is 1 inch. It is operated from the shore by means of two windlasses. The net is laced in the center, and when drawn near the shore a bag 15 feet wide, 18 feet high, 35 feet long, with meshes from 1 inch to 1½ inches, is attached to the center of the net, after which the net is unlaced and the ends drawn back to the sides of the bag. This is done by divers. If there is only a small haul the bag is drawn directly up on the beach. If many fish have been taken the bag is placed in a canoe and the rope at the bottom of the bag unlaced and the fish allowed to fall into the boat. This net is made of cotton twine.



The bag net in general use is about 20 feet in depth in the bag, 12 feet wide at the mouth, and runs to a point. Wings about 30 feet each in length and about 5 feet deep, with meshes of three-fourths to 1 inch, are attached to each side of the mouth of the bag. Floats made from wood of the hau tree, which is very light, are strung along the upper line of the wings and the bag. Leads are attached to the bottom line. The end of the bag is generally open when on shore, but is tied with a piece of twine before being put overboard; the fish are removed from the bag at this end. The nets are made of Manila hemp, which costs \$1.25 per pound, and 9 pounds are required to make a net of the above dimensions. Cotton twine is also used at times. Sections of rope, from 15 to 20 fathoms in length, fastened together with hook and loop, with the dried leaves of the ki plant braided on these ropes by the stems, with the blade ends of the leaves hanging loose and free, are taken out, along with the net, to a favorable spot, the sections of rope are joined together, and men taking hold of each end, and moving in opposite directions, begin to make a sweeping circle. The others follow behind to keep the rope near the bottom, and when it catches on rocks or coral dive down and release it. When the persons holding the ends of the line meet, one steps over the line of the other, and so they keep on going round and round, gradually narrowing the circle, until it has become sufficiently small. In the meantime the various sections not needed in the narrowing circle are unhooked piece by piece and allowed to float on the surface. The bag net is then taken out of the canoe and attached to the ends of two of the sections. They continue narrowing the circle until the fish are all driven into the net, which is then closed up, one of the canoes paddled close to the net, which is lifted into it, the string holding the point of the bag untied, and the fish allowed to drop into the bottom of the boat.

A variation of the above net, but on a larger scale, has been invented by Mr. E. H. Bailey, of Kahului, Maui. A smooth spot of bottom, inside of the reef, in a fairly shallow place, is selected. On this spot the net is arranged. The net is the same as described above, except that it has a net platform in front, which is attached to the mouth of the bag and also to the wings. Two lines of ki leaves are put together so as to make them thicker and thus more effective. Buoys are attached to the rope by means of short lines, and the ropes sunk by leads until the tips of the leaves just scrape the reef. The ropes are run out in a half circle and then pulled over the reef, after which the ends are swung around until they encircle the bag. The ropes are then carried round and round until all of the fish are over the platform, when the latter is raised up and the fish forced back into the bag. As soon as the platform reaches the surface the ropes are withdrawn. The canoes then form a triangle and the mouth of the bag is drawn up between them and the fish taken out with dip nets.

Opelu nets (upena aai-opelu) are arranged on two half-hoops con-

nected at each end; the hoops lap over each other and are tied together so as to keep the bag open when in the water. A rope runs from each of these and meets a short distance above the bag, from which junction there is only one rope. The bag itself is very deep, usually about 40 feet, with a diameter of about 12 feet at the mouth and tapering slightly at the bottom. They are made of imported flax, so as to be as light as possible. The bag is taken out to deep water in a canoe, and when the fishermen reach what they consider a favorable spot they lower the bag into about 8 fathoms of water. Bait, composed of cooked squash or pumpkin, small ground-up fish mixed with sand, and cooked papaia and bananas mashed up fine, is dropped into or over the bag. When the fish are gathered over and in the bag it is carefully and rapidly drawn up, and when it reaches the surface the ropes on the side are unloosed and the mouth closed up. The bag is then emptied into the canoe and the operation repeated until the fish become shy. The opelu, when eaten raw, is said to prevent seasickness.

The native sometimes constructs the above net from twine made from the bark of the olona (*Toucardia latifolia*) bush or shrub. The bush grows in large shoots. These are cut down and the bark stripped off in bundles and put into running water, so that it will not ferment and in order that the pulpy matter, etc., will decompose. It is kept there for four or five days, until it becomes thoroughly clean. It is then taken out and spread on boards of hard wood—kauwila wood generally—made expressly for this kind of work. This wood is very scarce and valuable now. These boards are 6 feet long and 8 or 10 inches wide. The strips of bark are spread on the boards and a man cuts out pieces of the inside with a bone,  $2\frac{1}{2}$  inches wide and 10 inches long, with one side beveled to an edge. This bone is held tightly in the hands, and with it the natives scrape the bark lying on the board. Everything is scraped away, leaving the fiber perfectly clean. It is then dried and twisted by hand by the women. It is stripped into fine threads, and two threads are twisted together by women rolling them on their bare thighs. This fiber is stronger than linen and will last for generations.

For catching nehu (anchovies and silversides), very small fish much used for bait and for drying as food, a bag net (upena nehu) is made from a piece of netting about a fathom square, attached on two sides to sticks about 3 feet in length, and furred in the bottom rope shorter than the upper one and forming an irregular square opening to a shallow bag, which is supplemented by a long, narrow bag about 6 feet deep. Ropes hung with dried ki leaves are attached to each side of the net, and these ropes are run around the school, thus driving them into the net.

Nehu fishing is generally carried on in deep water.

A bag net (upena pua) made in the same manner is used for catching amaama, young mullet. Instead of ropes with ki leaves, the "sea

*Convolvulus*, generally found growing on the beach, is twisted, leaves, branchlets and all, into two thick bushy ropes some 15 to 20 feet in length, and these are attached on each side of the net to the kuku (side sticks); these lines are then drawn forward in a semicircle, sweeping the shoals of fry before them till enough are partly inclosed, when the two free ends are rapidly drawn together in a circle, which is gradually reduced till the fry are all driven into the bag."

A bag net very similar to the above is used in fishing for ohua, a small fish very highly prized by the natives, which lives in and on the limu kala, a coarse alga that grows on coral in shallow water. Long ropes with dried ki leaves are employed, and the method of operation is the same as already described.

A bag net called kapuni nehu is also used in catching nehu. This bag is about 6 feet deep and 3 feet wide at the mouth. Two parallel sticks are used to keep the mouth open. When a school of nehu are seen working their way along close inshore, two men go out with the net, each holding one of the sticks. Others get in the rear of and on the sides of the school and frighten it into the bag. When the fish have gone in, the sticks are brought together, thus closing the bag, which is then hauled ashore or put into a canoe and emptied. These bags are of exceedingly fine mesh and are made of a certain kind of Chinese netting, which is said to be exceedingly strong.

A bag net, called upena uhu, is employed in catching the uhu, some highly prized Labroid fishes, chiefly species of *Calotomus*. This is made of a square piece of netting which has been gathered slightly on the ropes and attached at the four corners to slender strong sticks tied together at the middle in such a way that they will cross each other at this spot and can be closed together when wanted. A string is tied at the crossing place of the sticks and the net is manipulated by this string. When these sticks are crossed they spread the net open in the form of a shallow bag. The fisherman first catches an uhu of the variety to be fished for by means of hook and line. He secures this to a line run through its gills and mouth, and then lowers it at a spot where the uhu congregate and gently works it back and forth. The uhu in the vicinity are attracted and angered by the strange antics of the decoy and swim up close to observe it. The net is gently lowered to a little distance from the decoy, and the latter is then slowly drawn into the net. The others rush into the net after the decoy, when, by a peculiar twitch and pull on the string, the fisherman causes the sticks to swing around and lie parallel, which closes the mouth of the bag, and it is then drawn to the surface and emptied into the canoe and the operation repeated with a fresh decoy.

There are two varieties of uhu, one of a reddish color and the other green. The red variety is preferred by the natives, who eat it raw. This same net is used for other species of rock-fish, in such cases a decoy of the species sought being used.

A similar bag net (*upena opule*), about a fathom in length and with an oval mouth about 2 or 3 feet in width, is used for catching the *opule*, a decoy *opule* being used in the same manner as described above.

Another kind of decoy fishing is with the *lau melomelo*, the decoy used being a billet of *kauwila* wood, one of the hardest in the islands. This is something like a club, being rounded at the ends, with one end smaller than the other, and a little ringed knob on the smaller end to tie a string to. It varies in length from 13 inches to 3 feet. After the proper incantations have been performed over it by a sorcerer or *kahuna*, it is charred slightly over a regulation fire. Having once attained its power great care must be taken by the fisherman that it does not lose it. If a woman should step over it or enter the canoe in which it is placed the stick would lose its power. *Kukuinut* (candle-nut) and cocoanut meat in equal quantities are baked together. They are then pounded up and tied in a wrapping of cocoanut fiber (the sheath around the stem of a cocoanut leaf). Fishing is usually done in water of not more than 5 fathoms in depth. On arriving at the fishing-ground the stick is covered with the oily juice of the baked preparation and allowed to hang suspended a few feet from the bottom. The scent of the baked nut meat, in the opinion of the fishermen, has an attraction for certain kinds of fish, which soon surround the stick and smell or nibble at it. In a short time a small bag net is dropped overboard, and maneuvered until its mouth is toward the suspended stick. The latter is then moved slowly into the bag, the fish following it. Two of the natives then dive and approaching the net gently, quickly close its mouth and give the signal to those in the canoe to haul it up. Should the fishing prove poor it is ascribed to the imperfect performance of the incantations. This manner of fishing was formerly quite common on the west coast of Hawaii, but is not often practiced now.

One of the common species around the island of Oahu is the *malolo*, or flying-fish, although but few of these are found around the other islands. There are two species, the large *malolo* and the small *puhikii*. In catching them a large bag net with a flaring mouth and very fine mesh is employed. In fishing the net is piled on a large single canoe, or sometimes a double canoe, and the start is always made early in the morning. A number of canoes usually go out together, many of the occupants being women, as no particular skill is required on the part of the general hands. The work is directed by the *kilo*, or spy, who is generally in a light canoe manned by two or three hands. He stands up on the cross-ties of his canoe, and shading his eyes with his hand, watches for signs of the school. As soon as he discerns a strong ripple, which appears to indicate that the school is there, he signals to the rest of the canoes, which at once surround it. The best place for dropping the net is quickly decided upon and it is then put overboard at the spot indicated by the *kilo*. When the net is all ready the canoes paddle very quickly in toward it, splashing the water with

their hands and poles, and driving the school before them into the open net. The malolo will not dive to any depth, and are always found swimming very near the surface, so that, when completely surrounded by the canoes, they can be driven wherever wanted. This fishing is called lawaia-o-kaiuli, "blue-sea fishing," by the natives as they frequently have to go several miles out to sea after the fish. A favorite spot is off Waikiki beach. The malolo is frequently pounded up fine by the natives and then mixed with other substances and eaten raw.

The iheihe (a species of halfbeak, *Euleptorhamphus*), a long, thin fish, usually a foot and a half in length, with a very sharp-pointed snout, that generally arrives at the islands about the same time as the malolo and the akule, are sometimes captured in a similar net and in the manner described.

The largest bag net in use is the upena kolo, and owing to its size it can only be used at a few places around the islands, Honolulu Harbor being the principal place. It is an immense bag, from 16 to 24 fathoms in depth, which is very narrow at the extreme end, but widens out into an immense flaring mouth. The bag is fine-meshed, so that the small fishes will not escape. Attached to the mouth of the bag, on each side, are wings 16 to 20 fathoms deep. This net is swept around the harbor by natives in canoes, who pull the net with ropes, and it scoops up everything in its path, the principal species taken being the hahalalu, the young of the akule, and the amaama, or mullet.

Upena poo is a small bag net, with a light supple pole cut from the pohuehue (*Ipomea pes-capræ*) vine for the mouth. This pole forms three-fourths of a circle when not in use. When in operation the fisherman draws the two ends together, crosses them, and holds them tight in his hand. A small stick, with pieces of rag or lau hala leaves attached to the end, is also used. When fishing the native paddles his canoe along until it is immediately over a rocky bottom where holes are numerous, takes the bag in his left hand and the small stick in his right hand, and dives to the bottom. He pushes the bag close up to one of the holes and with the stick brushes the fish from the holes into the bag. He then allows the two ends of the stick to slide down in his hand until the ends lie parallel, and this nearly closes the mouth of the bag, after which he ascends to the surface and empties the bag into his boat.

Another style of net is arranged with two pieces parallel to each other, about 6 inches apart, the bag being about 2½ feet in depth and width. One stick is supple, while the other is rigid. When in use the fisherman pushes the pliable stick along the other until it is about the middle of the latter, and holds it in this position, thus bowing it out and making an opening for the fish. When he wants to close it he merely lets the stick slide back until it is even with the other, when he holds both tight.

Mr. J. S. Emerson, of Honolulu, furnishes the following account of a fishing expedition he made with a native, using a bag net somewhat similar to the two just described.

We started at sunrise from the shore in a little canoe capable of holding two persons. The native had only a malo (breech clout) for his dress. He had with him some of the candlenut (kukui). This he chewed up in his mouth and spat the chewed material on the surface of the water. This produced a film so that he could look down from the now calm surface of the water to a depth of 6 fathoms or more and locate the little caves and holes in the coral where the fish were. When he had discovered the proper location of these fish holes, he laid his paddle down in the boat and took a hand net in one hand. The bag of this hand net was like a purse. There were two sticks to hold it open and these were upon two sides of a triangle; the mouth of the net was tied to the sticks. In the other hand he had a fish brush, a rude fly brush about 3 feet long, composed of a stick to which were tied bits of bark, etc., to make a brush to drive the fish. He sprang into the water—in one hand the net and in the other the fish brush. I noticed sometimes he had it in one hand and sometimes in the other, it apparently did not matter which. He dove down, propelling and guiding himself entirely with his feet, with his eyes wide open, and approached the spot at the bottom, 6 or 8 fathoms deep, with the brush in one hand and the net in the other, ready for work. Then with the one hand he stirred up the fish from their resting-places and drove them into the net as one would drive little chickens. Having secured all the fish from that particular spot he closed his net, held the net and brush in the same hand and used the other hand to paw his way to the surface. On arriving there he blew the water out of his mouth and nose, threw his head back and got into the canoe. He remained below the surface about two minutes. There were in the net 3 or 5 fishes about 6 or 7 inches in length. He then chewed up some more of the nut and proceeded for a few rods ahead, spat out the nut on the water, looked down, and went through the same operations again, finding a few more fish there. This he did for several times, say possibly at a dozen places.

Certain methods of bag-net fishing which were in vogue years ago have been entirely abandoned, or at most are but rarely used. Among these is Lau Kapalili, which was called the "Fishing of Kings," as they only could command a sufficient number of canoes, men, and lau. The late Kamehameha V, whose favorite residence was at Waikiki, frequently ordered it. The following is a description of this fishery:\*

Lau Kapalili is the use of a large bag net, smaller than the kolo but larger than the ohua or iiao net, but of the same general shape, and called a papa. Two rope laus of 300 or 400 fathoms in length, with ki leaves attached, the same as in lau ohua, and generally the lau of two or more ohua nets joined, are piled on to a large double canoe, which is taken out 2 or 3 miles from shore, attended by a fleet of from 60 to 100 single canoes. The head fisherman always goes on the canoe containing the net and lau. Arrived at the proper distance, which must be just opposite the final drawing-place, the end of one rope is joined to that of the other, and two canoes, manned by 8 or 10 strong men, take the other end of the rope or lau, one each, and start in opposite directions and exactly parallel with the shore, whilst the double canoe remains stationary till all the lau is paid out. In the meantime the rest of the canoes have divided into two companies and follow the leading canoes, stationing themselves at certain distances on the lau and helping to pull it.

\* Hawaiian Fisheries and Methods of Fishing, with an Account of the Fishing Implements used by the Natives of the Hawaiian Islands. By Mrs. Emma Metcalf Beckley. Pp. 18, 19.

When the lau is all paid out the two leading canoes then curve in to form a semi-circle, at the same time always moving toward the shore. When a perfect semicircle has been made by the lau the double canoes and all the others move gradually forward with it, while the leading canoes are pulling with all their might straight into the shore. When either end is landed the men immediately leap out, and taking hold of the line pull on it, at the same time going toward each other, which has the effect of narrowing the semicircle, whilst most of the canoes keep backing on to the double canoe, which always keeps the center. Arrived at a suitable place, always a clean, sandy one a few rods from shore, the laus are untied and attached to each end of the papa net. Men, women, and children now gather closely on the lau, especially where it joins the net, and make a great disturbance with their feet, which drives all the fish into the net. Lau and net are finally drawn ashore.

Lau Kapalili (trembling leaves) fishing can only be carried on on a clear, bright, sunny day, so that the shadows cast by the leaves can be seen and serve to drive the fish inland.

#### DIP AND SCOOP NETS.

It is frequently difficult to distinguish between a dip net and a bag net, as certain forms of each are very similar in construction and methods of operation, and in some cases an arbitrary distinction has been made.

In fishing for maikoiko, a dip net about 6 feet deep and 4 feet in diameter is used. A bag of bait tied to the end of a stick is pushed into the water near the holes in which the fish live, and when they are drawn out by the scent of the bait the dip net is carefully slipped under the bait and fishes and then raised up slowly until it reaches the surface, when it is lifted or drawn ashore.

Another method is to chew up bread fruit and taro and spit these upon the surface of the water. As this slowly sinks below the surface the fish are attracted in large numbers and fall easy victims when the dip net is slipped below them and then quickly raised to the surface.

A common form of dip or scoop net, which is generally used in removing fish from seines and bag nets, is made by bending a flexible piece of wood into an oval shape and tying the ends together at the junction. To this the net, which has a bag about 2 feet deep, much narrower at the bottom than at the top, is attached. When not in use the lower end of the bag is left open, but when used it is gathered together and tied with a piece of twine.

On Kauai a dip net with a bag about 2 feet deep, attached to an iron ring 2 feet in diameter, is used in catching papai or crabs. This net is attached to a long pole by means of four ropes running from the ring to a common center about 2 feet above the ring, and thence by a single rope. The bait is either tied to a rope attached to and hanging down a short distance below the junction of the four ropes, or else weighted down in the bottom of the net. April, May, and June are the principal months for this style of fishing. It is usually done at night. Somewhat similar dip nets are occasionally employed in fishing for ula (crawfish).



SQUID FISHING WITH SPEAR.



PAPAI DIP NET.



The Chinese use a form of dip net on the Waiawa River, near Pearl City, Oahu, which was probably introduced by themselves, as it does not appear elsewhere on the islands. The river is narrow, about 40 feet in width. Four poles are planted, two on the edge of the bank, and the other two about two-thirds of the distance across the river, thus forming a square. All of these poles are slanted outward, so much so that the tips of the outer ones almost extend to the opposite bank. A large, square, fine-meshed net is attached to these poles by ropes. On the shore a windlass is constructed, which is connected with the net by a rope, and this is used in raising and lowering it. When fishing, bait is thrown into the net, which is then lowered down into the water until it almost touches the bottom. It is allowed to remain there until a number of fish have congregated over the net, eating the bait, when it is raised above the surface and the fish removed.

A scoop net is made by tying a square fine-meshed net to two slender sticks, laid parallel to each other and about 5 feet apart. One side of the net is then gathered together until the ends of the sticks on that side are within about a foot of each other, when it is secured in this position. This forms a rude sort of bag at the gathered end. In operating it the two ends of the sticks at the bag end are held in one hand and the flaring end is pushed around stones, etc., in shallow water, thus scooping up the fish, papai, and opai. By lifting the flaring end out of the water the catch falls back into the bag, from whence they are easily removed with the hand. This net is quite generally used around the leeward side of Oahu.

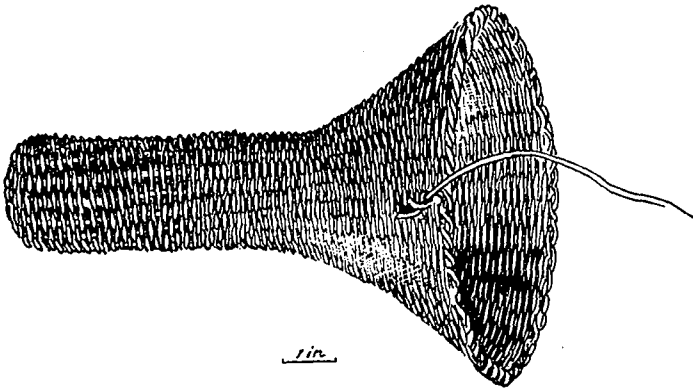
#### CAST NETS.

The cast net (*upena poepoe*) is a comparatively recent introduction in the islands, having, so it is reported, been brought in by the Japanese about ten years ago, although this is somewhat doubtful. The nets, which are circular, average about 25 feet in circumference and have 1½-inch mesh. They have leads all around the sides and are made generally of No. 10 cotton twine. They are worked from the shore. Unlike the fishermen in the States, the Japanese hold no part of the net in the mouth, but manipulate it entirely with the hands. About two-thirds of the outer edge of the net is gathered up in the hands of the fishermen, and when he sees a school of fish he throws the net with a sort of twirling motion, which causes it to open wide before it touches the water. The leads draw the outer edges of the net down very rapidly, and as they come together at the bottom the fish are inclosed in a sort of bag. The net is then hauled in by means of a rope attached to its center, the weight of the leads causing them to hang close together, thus preventing the fish from falling out as the net is hauled in. The fish are shaken out of the net by merely lifting the lead line on one side.

## BASKETS.

With the exception of baskets (hinau) used in catching opai (shrimps) the natives do not do much in this line, the South Sea Islanders being the principal users of this form of apparatus.

In opai fishing two varieties of baskets are used. One, the hinau opai, sometimes called apua opai, looks somewhat like the coal-scuttle bonnets in vogue some years ago. It is woven from the air roots of the icie (*Freycinetia arborea*). This is employed when shrimping in the mountain streams, and the work is generally done by the women. When fishing the women hold the basket in one hand, a short stick in the other, and moving in a crouching position through the water, they drive the opai from under the rocks, etc., to a suitable spot, which is always some place where the grass, ferns, or branches of trees droop

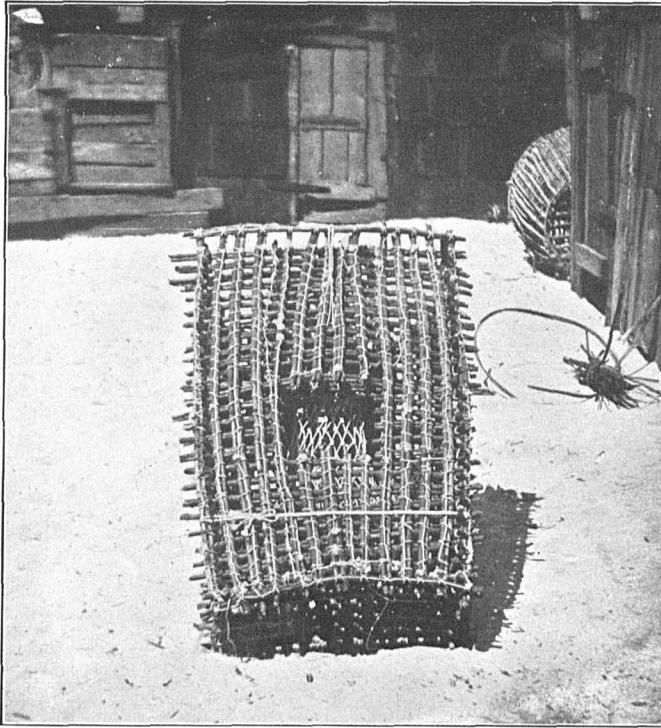


Basket for Catching Opai.

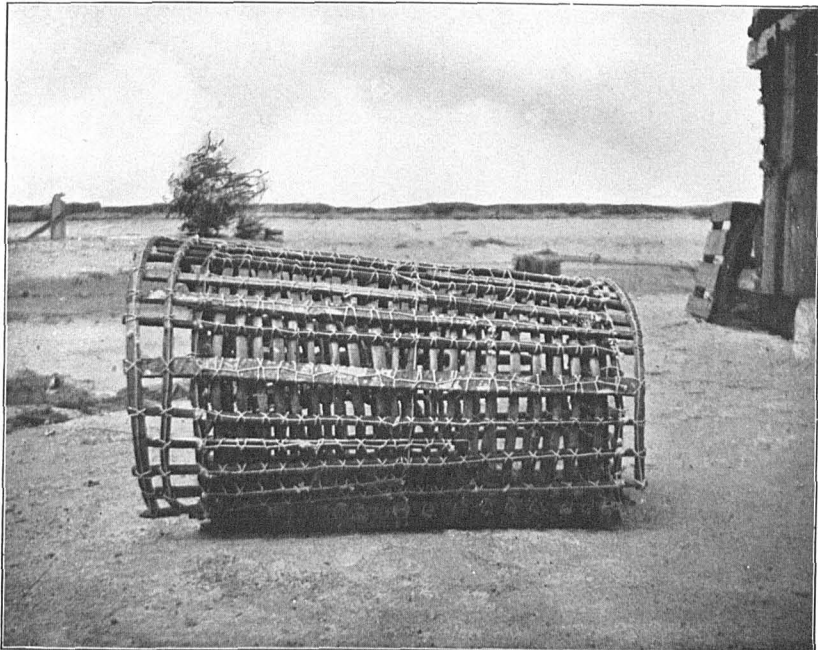
over on the water. The opai take refuge in or under these and the fisherwoman, placing her basket under the leaves, lifts them out of the water, when the opai drop off into the basket, from whence they are removed to a gourd, with a small mouth, which the woman has been dragging behind her in the water by a string tied to her waist.

Another method of fishing in the streams is to take a fairly deep basket with a large mouth, and putting this in a favorable spot in the water, build a mud wall on both sides of it and extending out a short distance. The fisherwoman then goes a little ways upstream and by beating the water drives the opai into the basket, which she removes and empties, going on to another place and repeating the operation.

When fishing for opai in salt and brackish water a basket is used with a wide flaring mouth, gradually sloping toward the center, a few inches from which it suddenly branches off into what looks like a long circular spout inclosed at the extreme end. These baskets vary in size and are usually operated by women. Holding the basket in the left hand they wade out in an almost nude condition to a suitable spot,



PUHI BASKET TRAP.



FISH BASKET TRAP.

when they sink down until only the head is visible, and pushing the right hand under the rocks, drive the opai into the basket, which is so manipulated as to partly envelop one side of the stone. The mouth of the basket is closed by drawing the sides together and holding them in this position. The opai are then transferred to a gourd floating alongside, which the fisherwoman keeps from drifting away by a rope tied around her neck and attached to it. The women are expert in this method of fishing and rarely fail to make good catches.

The hinai hooluuluu is used in hinalea fishing, and is a small basket made from the vines of the awikiwiki, a *Convolvulus*. After a light framework of twigs has been first tied together, the vines, twigs and all, are wound in and out, round and round, until of the requisite size, 3 or 4 feet in circumference and about 1½ feet deep. Opai pounded and inclosed in cocoanut fiber is occasionally placed at the bottom of the basket for bait, but usually the scent of the bruised and withering leaves seems to be sufficient. Women always attend to this kind of fishing. They wade out to suitable places, generally small sandy openings in coral ground or reef, and let the baskets down, suitably weighted to keep them in position, the weights attached in such a way as to be easily detached. Each woman then moves away from her basket to some distance, but from where she can watch the fish enter the basket. When all the fish that are in sight have entered, they take the basket up and, transferring the fish to a large small-mouthed gourd, move the basket to a fresh place. Fishing in this way can only be carried on on a calm, sunny day and at low tide.

Baskets made from the awikiwiki must be renewed from day to day. Some are made from the ieie vine, while still others have been made from the weeping willow since its introduction some years ago. These latter can be used over and over again.

Sometimes these baskets are placed in fairly deep water, where stones are piled around them to keep them in position. For bait the wana (sea egg), with the shell broken to expose the meat, is put in it. The basket is left for a day or two before being taken up.

The hinai uiui is used when fishing for the uiui (*Platophrys pantherinus*), a small flat-fish, said to make its appearance at intervals of from ten, fifteen, to twenty years. Its appearance is taken by fishermen and the people in general as a sure precursor of the death of a very high chief. The basket is shallow, of about the same size as the hinai hooluuluu, but wider-mouthed. The following is a description of the methods of fishing followed on the last appearance of this fish:\*

At the last appearance of the uiui the imported marketing baskets were generally used by those who could not obtain the old-fashioned kind, as any old cast-away basket would do, with a little patching, occupying perhaps five minutes, and two sticks bent over the mouth or opening from side to side, and at right angles to each

\* Hawaiian Fisheries and Methods of Fishing, with an Account of the Fishing Implements used by the Natives of the Hawaiian Islands. By Mrs. Emma Metcalf Beckley.

other, for a handle to which to tie the draw-string. It should be twisted round and round above the jointure with a little of the sea convolvulus (pohuehue) with the leaves on, so as to throw a little shade in the basket to keep the fish from being drawn up to the surface of the water. In these baskets cooked pumpkins, half-roasted sweet potatoes, or raw ripe papayas were placed for bait. The canoes, thus provided, would sail right into the midst of a school of these fish; the basket being lowered a few feet into the sea, the fish being attracted by the scent of the bait would rush into the baskets and feed greedily. As soon as the baskets were full of fish they would be drawn up and emptied into the canoe and then lowered again, with more bait if necessary, and this would go on till the canoe was loaded or the fisherman was tired. These fish are very good eating when they first arrive, as they are fat, with liver very much enlarged; after a month they become thinner, not perhaps procuring their proper food here, and then taste strong and rank.

The following describes a basket occasionally used by the natives:

The *ie kala* basket is the largest kind of basket used in fishing by the Hawaiians. These are round, rather flat, baskets 4 to 5 feet in diameter by  $2\frac{1}{2}$  to 3 in depth, and about  $1\frac{1}{2}$  across the mouth. A small cylinder or cone of wicker is attached by the large end to the mouth and turned inward toward the bottom of the basket. This cone or cylinder is quite small at the free end, just large enough for the *kala* to get in. Immediately below the end of this cone, on the bottom of this basket, is placed the bait, properly secured, which in the case of the *kala* is *limu kala* (a coarse, brownish-yellow alga on which this fish feeds and from which it takes its name), ripe breadfruit, cooked pumpkins, and half-roasted sweet potatoes, and papayas. This basket is called the *ie lawe* (taking basket). The fishermen generally feed the fish at a given place for a week or more before taking any, using for this purpose a large basket of the same kind, without the inverted cylinder, and wider in the mouth, to allow the fish free ingress and egress. After a week or two of feeding they become very fat and fine flavored, as also very tame, and baskets full of fish can be drawn up in the taking basket without in the least disturbing those which are still greedily feeding in the feeding baskets. These baskets are occasionally used for other kinds of fish, substituting the bait known to attract that particular kind, but never with the same degree of success as with *kala*. (Ibid.)

The Gilbert Islanders living at Honolulu and Lahaina have introduced two new types of baskets. The larger of these has a flat bottom, while the rest is the shape of a half circle, the top gradually sloping to the rear end. These baskets are about 3 feet long, 2 feet high in front, and  $1\frac{1}{2}$  feet in height in the rear. The outer framework of the basket projects about 2 inches beyond the front and back. They are made of flexible twigs lashed together with twine. A cone or funnel, 6 to 8 inches in diameter and about 12 inches long, with the end cut off, is inserted at the larger end, the body of the cone being inside of and opening into the basket. At the end of the cone a trap door of wicker-work, about 4 inches square, is fixed in such a manner that it will open by a touch from the outside, but can not be pushed open from the inside. The basket is weighted down by stones or two pieces of old iron run lengthwise of the basket on the bottom and lashed there. In the rear of the basket is a small trap door for removing the fish. In fishing, the basket is taken to a good sandy place in 2 to 4 fathoms of water, where there is plenty of coral or stones handy. The fisherman then dives and places the basket in a good spot, after which he

takes pieces of coral rock and builds them up and around the basket until it is completely inclosed so as to form an artificial dark retreat for the fish. The entrance to the funnel is left exposed, however, and the fish seeing an inviting entrance to a dark place, go on an exploring expedition till they find themselves inside. The basket is left here for from two days to a week, when the stones are displaced, the basket and its contents hauled up into the canoe and emptied out by means of the back door, and the basket replaced in its former position.

Himai pubi is the other form of basket used by the Gilbert Islanders. It is oblong, about 25 inches wide, 18 inches high in front, and 3 feet long. The top gradually slopes to the rear, where it is only about 12 inches high. A funnel, or cone, about 8 inches in diameter and 10 inches in depth, extends into the basket in an upward direction. This funnel has an opening on its under side which leads down into a square space about one-half the width of the basket. This space, which begins about halfway of the length of the funnel, runs about 5 inches farther into the basket. From this space another funnel, with a narrow slit opening, leads into the body of the basket. The mouth of this funnel is held taut by lines run from it to the sides. Both funnels are constructed of netting, while the rest of the basket is made from the branches of the guava tree. Bamboo is sometimes used for the top, owing to its lightness. The branches are lashed together with stout twine, no nails being employed. It takes about a week to make one of these baskets, but they will last a long time. This form of basket is used for the capture of the pahi, or moray, an eel-like fish quite common around the islands.

#### FISH TRAPS OR PENS.

On Pearl Harbor, Oahu, two fish traps are used for catching sharks and large akule, opelu, weke (goat-fish), and kawakawa (bonito). The larger, near Puuloa, has two walls which, for a short distance, run out from the shore in parallel lines. Then one of them sweeps out and around, forming a large and almost oval space. A wall is built parallel to the shore and the outer portion of the oval meets it close to one end. The other line from the shore comes out almost to this parallel line and then turns sharply inward for a few feet, and the space between the two, about 4 feet, forms the entrance into the trap. The walls are built of coral. The end of the oval farthest from the entrance is almost bare at low water, while the side next to the gate has about 5 feet of water. At high tide the whole trap is under water. Fish enter the trap at high water and are caught in it as the water recedes, and they are taken out of it at low water by means of a small seine.

#### SPEARING.

The natives are very expert with the spear in fishing and use it with equal facility either below or above the surface of the water. The spear is usually a slender pole 6 to 7 feet in length, made of very hard

wood, and tipped with a thin piece of iron 1½ to 2 feet in length. Most of the tips are perfectly smooth, but a few have a very slight barb. The spearing of fish is called "Ia O" by the natives.

The spearing of the species inhabiting the rocks in shallow water is carried on under water. Diving to a favorable spot amongst the rocks, the fisherman braces himself in a half-crouching position and waits for the fish to come along. He only notices fish in two positions, those passing before and parallel to him and those coming straight toward him. He aims a little in advance of the fish, as by the time it is struck its motion has carried it so far forward that it will be hit on the gills or middle of the body and thus secured, but if the spear were aimed at the body it would be apt to hit the tail or entirely miss the fish. The spear is generally sent with such force that it goes right through the fish, thus bringing the latter up to the upper part of the spear, where it remains whilst the fisherman strikes rapidly at other fish in succession, should they come in single file as they usually do.

The above-water spearing is generally for oopuhue (the swell-fish, *Tetrodon hispidus*), which is said to be poisonous, hee (octopus), and honu (turtle). The oopuhue is either speared from the walls of the fish ponds or in the open sea.

In the deep-sea line fishing spears with short poles are frequently employed in killing certain species brought to the surface on the lines.

In fishing for puhu the latter are attracted out of their holes with bait and are then speared.

Spears are frequently used in fishing for the hee (octopus), principally by women. This animal generally makes its home in small circular holes in the rocks on the reefs. When the fisherwoman finds a hole that she thinks is occupied she runs the spear into it gently. Should a hee be there it comes out to see what is the matter. When entirely out of the hole the spear is run through it and it is brought to the surface. A smaller spear is usually carried, and with this she pricks or hits it in the head until the animal is stunned or killed, otherwise it might twine around her arms or legs and do some damage.

Honu (turtle) are generally captured by means of spearing from the rocks along the shore where the honu congregate.

#### DYNAMITING.

Probably one of the most destructive methods of fishing is with dynamite, or giant powder, as it is generally called in the islands. This explosive was first used for this purpose in 1870. A stick of dynamite weighing about a quarter of a pound is capped and arranged with a fuse about 10 inches long. The fisherman usually selects a deep hole, and paddling to within a short distance of it, he lights the fuse and when it has almost burnt to the cap he throws it from him into the hole. When it explodes every living thing within a considerable radius of where it struck is either killed or stunned by the shock. Many fish rise to the surface and are picked up by the fisherman. An

especially destructive feature of this style of fishing is the number of young fishes killed. This method of fishing is prohibited by law, but very little attention is paid to this enactment, as nobody seems to bother about enforcing it.

#### POISONING.

The law also prohibits the catching of fish by means of stupefying drugs and plants placed in the water. This is called by the natives "hola hola," and is still practiced in many places.

The ahuhu (*Cracca purpurea*), a poisonous weed which grows on the mountain side, is the one generally employed in this fishing. It is gathered and pounded up with sand; the sand is to make it heavier so that it will sink in water. All over the reefs, running a short distance from and generally parallel to the shore, are numerous caves, holes, etc., which form the habitat of many species of fishes. The fishermen take along a small seine and a quantity of the poisonous mixture in one of their canoes. When they arrive at a suitable spot the seine is put into the water and run around the mouth of a cave, or, in the case of an isolated rock, completely around it. This is to prevent the fish from escaping. The fishermen then place some of the mixture into a small bag, and, diving down to the bottom, flirt some of it into the holes. In about ten or fifteen minutes the fish seem to become stupefied and rise to the surface and are lifted into the canoe by means of small scoop nets. They soon recover from the effects of the drug if allowed to remain in water.

The seeds and leaves of the shrub akia (*Diplomorpha sandwicensis*) are also used for the same purpose.

#### WEIRS.

While weirs are not of commercial importance in these islands, some are used in the mountain streams during the rainy season for taking the oopu, a small fresh-water goby found mostly in these streams, the catch being consumed principally by the fishermen and their families. During the dry season a platform of large logs, placed side by side, is built and placed in the stream at about or just above high-water mark. During the rainy season the streams get very full and the water becomes so muddy with the wash from the sloping ground adjoining the banks that the oopus, who make their homes in water holes, under large rocks, etc., are driven out and carried downstream by the hurrying waters. As the oopus do not like muddy water, they endeavor to keep in the surface water, which is comparatively clear, and are thus swept in immense quantities onto the platform, and from there into a ditch leading out to a plain, where they are gathered up in large quantities. At this season of the year the oopus are highly prized by the natives, as they have a very delicate flavor. This method of fishing is practiced mainly on the islands of Oahu and Kauai.



## TORCHING.

Considerable fishing is done with torches at night. The torches are usually made of split bamboos secured at regular intervals with ki leaves or twigs of the naio (*Myoporum sandwicense*). They are sometimes made of a number of kukui nuts strung on rushes, or the stems of cocoanut leaves, which are then wrapped around with ki leaves so as to make the torch round like a candle. These latter will burn in almost any kind of weather. The natives have a notion that if the torch burns with a pale flame the fishing will be poor, but if it burns with a bright red flame it will be very good.

In shallow water the fish are frequently speared or taken in a small scoop net by the fisherman as he wades around with the lighted torch in one hand and the spear or net in the other.

Sometimes, while the fish is blinded or dazzled by the light, a scoop net is slipped in front of it by one of the fishermen; a companion then gently tosses a stone just back of the fish, which causes it to dart forward into the net, and it is captured. This manner of fishing is called by the natives "lamalama."

Another popular method is to put in the bow of a boat a can filled with inflammable fuel and covered with oil. At night the boat is rowed to a favorable spot, when the fuel is set on fire. When the amaama and others come up to look at the fire, and are fascinated or dazzled by the light, a stick is suddenly brought down on them, stunning or killing them. They are then picked up and put into the boat, which is rowed a little farther on and the operation repeated.

## SNARING.

The use of the snare in fishing seems to be confined to Hawaii, the writer not hearing of its use on the other islands. Puhī and ula (crawfish) are the usual species taken in this manner.

In snare fishing for puhī (ahele puhī) a long stick is employed, with a noose arranged at the end, the string working the noose reaching clear to the end of the pole. A bait made of almost any kind of pounded fish or crab is thrown into the water in favorable spots, especially around rocks, where the puhī live in holes and crevices. The noose is slipped up close to one of these holes and when the puhī sticks its head through it in order to reach the bait the line in the hand is pulled, which draws the noose tight to the end of the pole, pinning the puhī's head there and choking it to death, after which it is drawn to the surface.

In fishing for ula (ahele ula), a long pole (to which dead bait has been tied, about 3 inches from the bottom) is put down in the water in front of a hole in the rocks. As the ula comes out of its hole to get the bait, another pole, with a crotch or fork at the end, to both ends of which a noose is fastened, is slipped under its tail and suddenly jerked, which tightens it, and the animal is brought to the surface.

## FISHING WITH THE HANDS.

The native men, women, and children are perfectly at home in the water, spending a good portion of their time there. As a result of this they have become exceedingly expert in diving and swimming. Frequently they catch the various inhabitants of the water with their hands, and in some places this has become quite an important source of revenue to them. It is a common sight, in the less densely inhabited regions, to see a stark-naked native man or woman crouching down in the shallow water and feeling around the coral and lava rocks for fish, papai (crabs), and opai (shrimp). Some of the fishermen dive to the haunts of certain species of fishes, and thrusting their arms into holes or under rocks bring out the fish one by one and put them into a bag attached, for the purpose, to the malo or loin cloth. Opai, oopus (gobies), and gold-fish are frequently taken by women with their hands in the fresh-water streams and taro patches, and form a considerable part of their food supply.

In fishing for octopus the native dives to the bottom, and with a stick pokes around in the small holes in which the hee lives. When he touches one it seizes the stick and allows him to draw it out of the hole. When he reaches the surface the native grabs it with his hands and bites into the head, thus killing the animal.

The ula is also frequently taken by the diver with his hands. The fisherman first provides himself with a small bag, which he attaches to his malo. His right hand he carefully wraps up in a bag or a long piece of cloth. This is to prevent the ula from biting him. Diving down to the bottom, he feels around in the crevices and holes among the rocks with his bandaged hand, pulling out the ulas he finds and putting them in the bag, returning to the surface whenever necessary. Frequently he will bring up two or three at a time. Sometimes the fishermen are severely bitten by puhis, which at times make their home in the ula holes.

Nearly all the mollusks are gathered by hand. The opihi (limpet), which attaches itself to rocks, is detached by knives. The bêche-de-mer (sea slug), wana and ina (sea eggs) are also taken by hand.

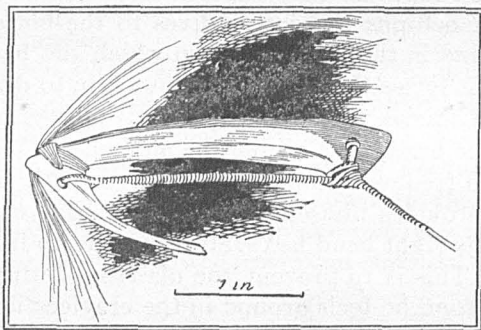
The varieties of limu (algæ) which are eaten by the natives are all gathered by hand, and this forms quite a profitable business for a number of women and children on the various islands.

## LINE FISHING.

Fishing with rod, hook, and line (called by the natives "Paeaea") is not practised to any considerable extent commercially, except for aku (bonito). In this fishing, mother-of-pearl hooks, made from the shell of a mollusk, now quite rare, are used. These hooks are called pa, and as they glisten with an iridescence like the shimmer from the scales of the smaller kinds of fish on which the aku lives, no bait is needed.

The shell portion of the hook is barbed on the inner side with bone, and two tufts of hog's bristles are attached to the barbed end at right angles to it, for the purpose of keeping the inner side up, so that the shell will lie flat on the surface of the sea. The bone portion of the hook is usually a dog tusk, but sometimes a piece of human bone, ivory, or tortoise shell is used. An iron hook, with the curved portion bent over so far that the point runs almost parallel with the shank, is sometimes used. Brass hooks are also employed at times. In this fishing double canoes are generally employed, as it is easier to fish with them, and much safer, as the fishing is done a considerable distance from shore.

The first object when the fishing-ground is reached is to find a school of aku. The fishermen usually do this by watching the sea gulls. When they hover steadily over one spot it is a pretty sure sign that there is a school of aku there. It is the habit of the fish to run against the tide, and as soon as the school has been sighted the



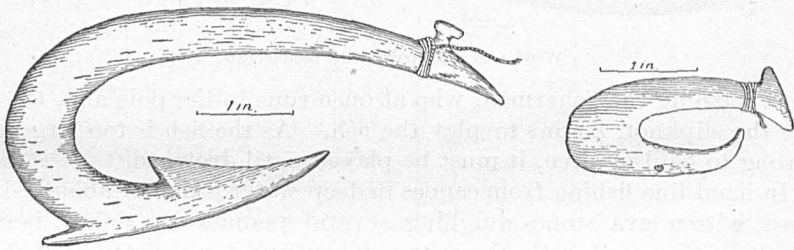
Pearl Hook used in Aku Fishing.

canoes are worked around in front of it, and the fish are drawn close to the boat by the fishermen throwing out a handful or two of the small live bait they have with them. These small fish are usually the nehu, iiao, and the young of various species. There are three men in each canoe, but only one man in each engages directly in fishing, the others managing the canoes. These two men stand up in the stern of their boats, holding in their hands a bamboo pole about 12 feet long, with a line of the same length attached. The pearl hook is tied to the end of this line. By a quick movement the line and hook are slapped violently on the surface of the water and then drawn toward the boat. The aku are attracted by the noise, and seeing the glittering hook, which looks like a young fish, make a spring for it. As soon as the fish is hooked the line is swung up over the fisherman's head so as to make almost a complete revolution. It is very necessary that the line should be kept taut, as, owing to the fact that the hook has but a slight barb, the fish would shake itself loose should the line slacken in the least. As the hooked fish is describing this revolution the fisherman

swings around to meet it, and as it nears him he bows out his right arm, and as the fish comes between his arm and side, closes them up and the fish is caught, unhooked, and dropped into the boat. If he perceives that the fish is coming toward him in such a shape that it will be difficult to hold it in the manner described, he moves out of the way and allows the fish to make another revolution and catches it on its return. The fishing must be done in from ten to fifteen minutes' time, as the school soon gets frightened and disappears.

In paeaea fishing for other species besides the aku, opai, earthworms, and live fry of fish are used as bait. Hooks of varying sizes and kinds, made from ivory, tortoise shell, and human and animal bones are used. Frequently the fisherman takes a handful of opai and, after baiting his hook, bruises the remainder, and, wrapping it up in cocoanut fiber, ties it with a pebble on the line and close to the hooks. The bruised matter spreads through the water when the line is dropped and serves to attract the fish to the vicinity of the hook.

In uhu fishing the gall bladder of the hee is dried and then cooked



Bone Hooks used in Fishing.

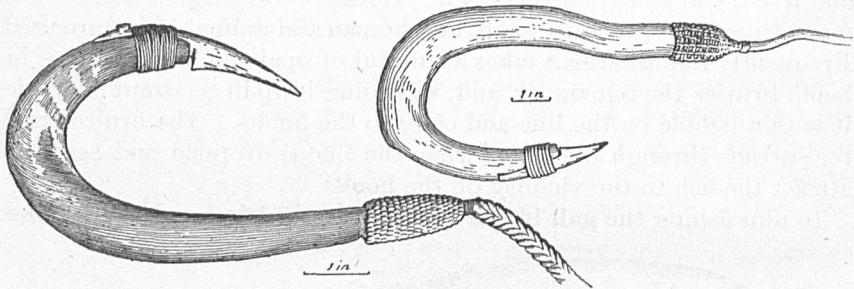
until it becomes a jelly. This is placed in a small calabash or bowl and tied to the hook as bait. A pole is used in this fishing.

In fishing for aama (crabs) from cliffs or high rocks a long bamboo pole with line, to the end of which is tied an opihi, is used. The fisherman dangles this bait in front of the crab as it looks out from its home in the rocks, and the latter at once seizes it. By a quick jerk the line is swung up and the aama caught.

In the deep-sea fishing hooks and lines are used without rods, except for the aku. Fishing is carried on here to depths as great as 600 feet. The older native fishermen are familiar with all the reefs and rocky elevations for miles in every direction from the shore, and know well the different species of fishes to be found in each place. Frequently they go entirely out of sight of the lowlands and mountain slopes, and take their bearings, for the purpose of ascertaining the reef or rock which is the habitat of the fish they are after, from the relative positions of the different mountain peaks.

On Hawaii an ingenious method of fishing for ulua is practiced. A long pole is planted on the shore in such a position as to lean decidedly

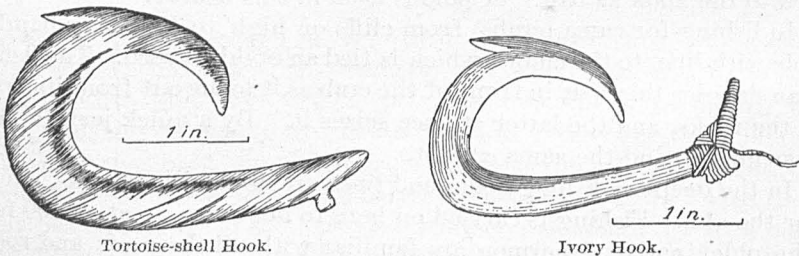
toward the water. On the top of this a bell is arranged so that it will swing clear of the top of the pole. In olden times a calabash with shells inclosed took the place now occupied by the bell. A block and fall is also attached to the pole close to the top, and a long line, with hook at the end, is run through the block and allowed to float out to sea, the land end being tied in a slipknot to the bottom of the pole and the surplus coiled at the foot. A small dead fish is used as bait. In order to attract the fish, puihi are mashed up with sand and thrown into the ocean. As soon as a fish is hooked his struggles cause the bell to ring,



Wooden Shark Hooks, with Bone Joints.

thus warning the fisherman, who at once runs to the pole and, loosening the slipknot, begins to play the fish. As the fish is too large and strong to haul in alive, it must be played until drowned.

In hand-line fishing from canoes in deep water a line of about  $\frac{3}{8}$ -inch cord, with a lava stone weighing several pounds as a sinker, is used by the natives. A little above the sinker, and for a distance of about 6 feet, there run out from the line little bamboo canes about a foot in length, in a horizontal position, and from the outer ends of these canes



Tortoise-shell Hook.

Ivory Hook.

a short piece of line, with a hook at the end, dangles. The bait is put over the point of the hook and the upper portion of it tied to the shank by means of two small threads from the line and tied just above the hook. This line is used in water as deep as 200 fathoms. As soon as the sinker reaches the bottom the native, by a peculiar jerk, disengages the stone and draws the line about a fathom from the bottom, where it is allowed to remain until a certain number of bites have been felt, when it is drawn to the surface, the fish removed, the



hooks rebaited, a new sinker put on, and the line run overboard again. Ulaula is the principal species captured.

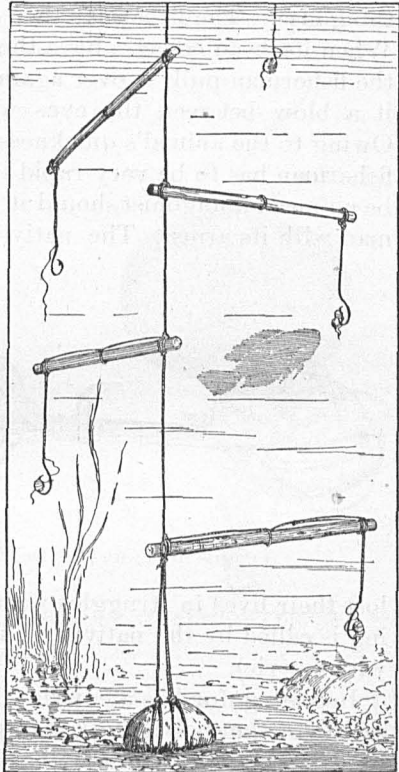
In deep-sea fishing the Japanese generally use but one hook on a line, and this is attached to the end of it.

In fishing for mahimahi (dolphin) the Japanese use a rope about 2,000 feet in length. At intervals of 60 feet are attached branch lines about 60 feet in length, with a hook attached to each. Akule are used as bait. When fishing, the line is paid out from the boat, the main line being kept on the surface by buoys made from the cotton tree, while the branch lines hang downward. The line is set in the morning and taken up at noon, the fishermen lying off in their boats in the meanwhile. This fishing is carried on about 10 miles offshore.

A line with a piece of lead tied in a horizontal position to the end of the line, at each end of which is attached a short line with a hook, is used principally for catching kole. The gall of the hee, prepared in one of the numerous ways given under the heading of "Baits," is used for bait. This manner of fishing is called by the natives "okilo hee."

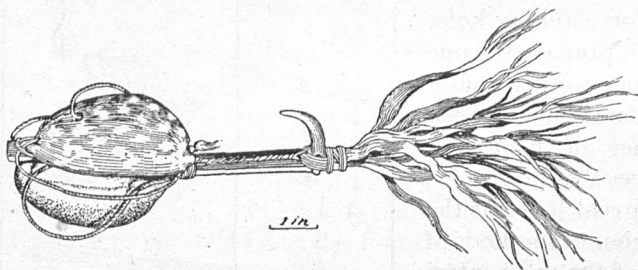
The native is a great lover of the hee, and has a number of methods of capturing it, one of the most interesting of which is with the cowrie shell. One or more cowrie shells of the Mauritiana or Tiger varieties are attached to a string. When only one is used an oblong pebble of about the size of the shell is tied to the face of it, a hole is pierced in one end of the back of the shell, through which a line is passed, and

after being fastened here a few inches of the line is allowed to hang below the shell, to which a hook, whose point stands almost perpendicular to the shaft or shank, is attached. Only shells with small red spots breaking through a reddish-brown ground have an attraction for the hee, and they will not rise to any other kind. Whenever the natives have a shell with suitable spots but with a wrong-colored back-ground, they secure the desired hue by slightly steaming the shell over a fire of sugar-cane-husks. On arriving at the fishing-ground

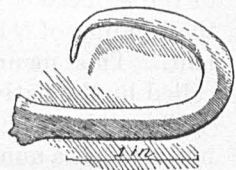


Deep-sea Fishing Line.

the fisherman either chews up and spits on the surface a mouthful of candlenut meat, which renders the surface of the water glassy and clear, or uses the water glass, which is described elsewhere. He then drops the shell into the water, and by means of the line swings it back and forth over a place likely to be occupied by a hee. The moment the greedy animal perceives the shell an arm is shot out and the shell seized. If of a kind attractive to the animal, after a few moments' hesitation another arm is placed around it, and this is continued until at last the animal withdraws itself entirely from its hole and hugs the shell closely to its body, and seems oblivious of everything else. The fisherman then draws it rapidly up through the water. When its head comes above the surface the animal raises it, and then the fisherman pulls it over against the edge of the canoe where he hits it a blow between the eyes with a club, which generally kills it. Owing to the animal's quickness with its eight tentacles or arms, the fisherman has to be very rapid in his movements, as the animal would be no mean antagonist should it have an opportunity to seize the fisherman with its arms. The natives say that a number of persons have



Cowrie Hook with Shell for catching Hee.



Hook made from iron nail.

lost their lives in struggles with these animals. This method of fishing is called by the natives "Lawaia hee me ke leho" (squid catching with cowrie).

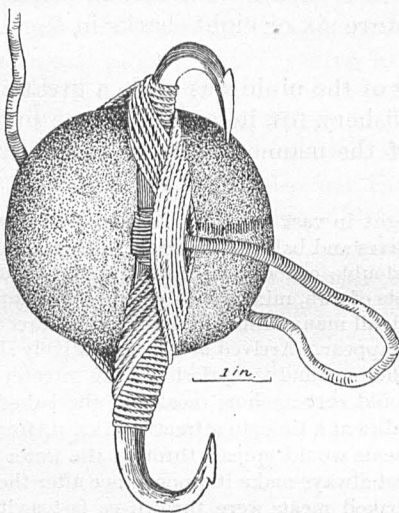
In fishing for hee a cowrie shell, with a metal hook laid across the mouth of the shell and fixed in position with melted lead, is sometimes used; and, again, a line with a piece of lead attached to the end in a horizontal position, a hook with the point up being lashed to one of the ends of the lead, is employed.

Water glasses are frequently used along the Hawaiian coast. An oblong, square box with a piece of glass fixed in the bottom, is put on the water, with the glass end downward, and the fisherman, by placing his face in the open end, can distinctly see the bottom although the surface may be broken with ripples outside of the water glass. The water glasses now in use could be much improved if the box were wide enough to allow the entrance of the whole head instead of merely the face. By inserting the whole head the sunlight is cut off, thus much improving the seeing. A water glass similar to that used in the sponge

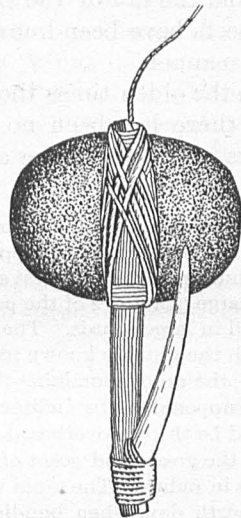
fisheries of Florida would be very effective. This is an ordinary bucket with the bottom removed and a pane of glass substituted.

In fishing for honu (turtle) a flat stone with two hooks lashed to the upper part, and running out in opposite directions, is used. This is attached to a long line. Hee are also caught with this style of apparatus occasionally.

In fishing for papai (crabs) the younger generation frequently use short lines, with a small wooden buoy at the top and a piece of bait (meat, fish head, or any other dead bait) at the end. These are set in shallow water close to the shore, and are frequently lifted by the children who wade out to them, and who grasp with their hands the crabs clinging to the bait before they become frightened and let go.



Hooks used in catching Turtle and Squid.



Hook with Ivory Barb and Wooden Shank.

#### SHARK CATCHING.

The shark has always occupied a unique position in not only the religious but in the daily life of the native. Its connection with the people in a religious sense is treated of in another part of this report, this present chapter being devoted to methods of shark catching by the fishermen.

The natives distinguish the sharks frequenting Hawaiian waters into five species. The *mano-kihikihi* (hammer-headed shark) and the *lalakea* (white fin) are considered edible. The hammer-headed shark is the one most frequently seen in the markets. The others are the *mano kanaka* (man shark), the shark god of the ancient Hawaiians; the *mano*, a large white shark, and the *niuhi*, the largest and fiercest of all. The last two are but rarely seen in Hawaiian waters. The *niuhi* is said to be seen a long way off at night by the bright greenish light of its eyeballs. It is much feared by the natives.



The mano-kihikihi and the smaller lalakeas are generally taken in gill nets, seines, or bag nets, together with other fishes. The larger lalakea and the other species are taken with hook and line, as no net would be strong enough to hold them. Shark hooks are generally made of a piece of hard wood carved in the shape of a hook, with a piece of sharp-pointed bone lashed to the end of it in order to form the tip. But few of the hooks seem to have a barb, and it speaks well for the dexterity of the fishermen that they succeed so well in fishing with these.

Sometimes the native seeks the shark in coves and caves below the surface after the fish has gorged itself and sleeps with its head forced into the sides of its resting-place. The diver gently slips a noose around the tail of the shark, which is then hauled up and dispatched. Experts have been known to capture six or eight sharks in one day in this manner.

In the olden times the catching of the niuhi was made a great event, but there has been no regular fishery for it for nearly one hundred years. The following account of the manner of its capture is especially interesting:\*

The common kind of shark was caught in vast quantities, and the liver, with a little of the flesh, was wrapped in ki leaves and baked underground, then from fifty to a hundred of the largest single and double canoes were loaded with baked meat and large quantities of the pounded roots of awa, mixed with a little water, and contained in large gourds. The fleet would sail many miles out to sea in the direction in which the niuhi is known frequently to appear. Arrived at a comparatively shallow place, the canoe containing the head fisherman and the priest and the sorcerer—who was supposed to be indispensable—would cast anchor; meat and the baked liver would be thrown overboard, a few bundles at a time, to attract sharks. After a few days the grease and scent of cooked meats would spread through the water many miles in radius. The niuhi would almost always make its appearance after the third or fourth day, when bundles of the baked meats were thrown as fast as it could swallow them. After a while it would get comparatively tame and would come up to one or other of the canoes to be fed. Bundles of the liver with the pounded awa would then be given to it, when it would become not only satiated, but also stupefied with awa, and a noose was then slipped over its head, and the fleet raised anchor and set sail for home, the shark following a willing prisoner, the people of the nearest canoes taking care to feed it on the same mixture from time to time. It was led right into shallow water till it was stranded and then killed. Every part of its bones and skin was supposed to confer unflinching bravery on the possessor. The actual captor, that is, the one who slipped the noose over the niuhi's head, would also, ever after, be always victorious. This shark's natural home is, perhaps, in the warmer waters of the equator, as the Gilbert Islanders, now here, make the assertion that it is very frequently seen and captured at their group. The tradition here is that it is only seen just after or during a heavy storm, when the disturbed waters perhaps drive it away from its natural haunts.

The use of human flesh as bait was in great vogue among the Hawaiian chiefs. It was cheaper than pig, was equally acceptable to

\* Hawaiian Fisheries and Methods of Fishing, with an Account of the Fishing Implements used by the Natives of the Hawaiian Islands. By Mrs. Emma Metcalf Beckley.

the shark, and gave the chief an opportunity to kill anyone whom he disliked. The victim was cut up and left to decompose for two or three days in a receptacle. Kamehameha I was a great shark-hunter and kept his victims penned up near the great heiau (temple) of Mookini, near Kawaihae, Hawaii.

#### NEW FORMS OF APPARATUS PROPOSED.

It is probable that the beam trawl could be used to advantage in the deeper waters around the islands. This apparatus, which is an immense bag, with wide flaring mouth, the bag running to a point at the end, could be worked from the deck of a sail or steam vessel. In working it long cables are attached to the sides of the mouth, and the trawl dropped overboard while the vessel is in motion. The trawl sinks to the bottom, and as the vessel moves forward it is drawn along the bottom and scoops up everything in its path. When it has been down a sufficient length of time the vessel is brought up into the wind, the trawl raised to the deck, where it is emptied, and then dropped overboard for another trial. Sharks are very destructive to nets used in the deeper waters, and also eat the fish out of them; but with the beam trawl it would be impossible for them to do any harm.

Pound nets made of fine wire could be used to advantage on the leeward side of the islands and in the bays. Netting could not be used, as the sharks and larger fishes would tear it to shreds while struggling to get in or out.

Fyke or hoop nets would probably prove profitable in the bays and rivers. They could be set and left without further attention until it was convenient for the fisherman to raise them.

#### BAIT.

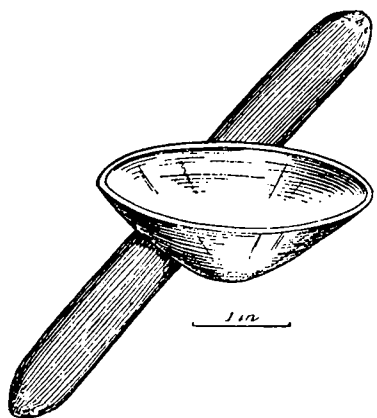
*Catching of bait.*—The natives generally use live bait in the line fisheries, and their method of catching it is rather interesting. In the morning a medium-length fine-mesh seine is loaded in the canoe or canoes, each containing two or three men. Those in the canoe paddle along about 40 or 50 feet from the shore. One man is left on the land, and he runs along the rough, rocky shore with a small pail of dried opai. Every little while he takes out a few of these, and chewing them in his mouth a few moments spits them into his hand and then throws them on to the surface of the water, a short distance from the shore. If no fish rise to the bait thrown out, it is quite certain none is there, and he runs on a little farther and repeats the operation. When fish rise to the surface and nibble at the bait he signals to the canoemen, who immediately paddle in close to the spot, and all but one, who is left in the boat to maneuver it, drop overboard with the seine and sweep it around the spot, inclosing the fish.

On most of the islands the nehu is the principal species of bait fish taken, while on Hawaii the piha is also used for the same purpose. The young of many other species are also taken in these seines and used as bait, thus working great havoc to the general fisheries.

*Bait used.*—Live opai are very frequently used for bait in the line fisheries.

All species of young fish are used as bait, both alive and dead, though the former are preferred. In fishing for mahimahi (dolphin) young akule (called agi by the Japanese) are used.

The natives are very expert in the preparation of palu, or baits, from various substances. In making these a small section of the sharp end of a cocoanut shell, about  $1\frac{1}{2}$  inches in height, and a small stick of hardwood are used. These two objects are used in the same manner as a mortar and pestle.



Mortar and pestle for mixing palu (or bait).

The following methods of preparing such baits with the ink bag of the bee, or octopus, as the principal ingredient were given to me by Mr. Joseph Swift Emerson, of Honolulu, who has made a thorough study of the native customs: Alaala hehe (the ink bag of the common octopus) is roasted on the coals in the leaves of a ki plant, and when well cooked is ground into a paste in the mortar. Usually it is flavored with something that is supposed to attract the fish. Great care

is taken in compounding the mixture, and every fisherman has his favorite recipe.

The following are some of the more common mixtures used, alaala hehe forming the base in every case:

1. Pound up a little alaalapuloa root in the mortar, throw away the fiber, leaving only a few drops of juice in the mortar, then mix in the alaala hehe, working it thoroughly with the pestle.
2. Mash up a red pepper and throw seeds and pulp away, leaving only a few drops of juice adhering to the mortar.
3. Obtain juice from puakala (the prickly plant, the thistle) seeds. Mix in a little salt and proceed as in No. 1.
4. The same with ilima flowers and salt, always using an exact number of flowers, say 4 or 8. The fishermen have a superstitious idea that if an odd number is used it will have no force.
5. The same with salt and young noni leaves slightly roasted.
6. The same with salt and maile kaluhea.
7. The same with salt and leaves of the paina (poha—cape gooseberry).
8. The same with salt and very young leaves of koko.
9. The same with the bark from the root of pilo (plant growing near the sea shore with beautiful flower of foul smell).
10. The same with salt and the bark from root of naunau.
11. Mix with kukui (candle nut) nuts, well roasted, the kukui nuts to be well ground first and then the alaala hehe to be worked in.
12. Mix with old hard cocoanut burnt to a crisp, a little kukui nut rarely done and salt.
13. Mix with a little cinnamon.

14. Mix with fruit of mokihana, which grows on Kauai.
15. Mix with a few drops of brandy or other intoxicating liquors.
16. The same with Perry Davis pain killer.
17. The same with kerosene oil.
18. The same with tobacco juice.
19. The same with juice from ahuhu seeds.
20. Mix with salt and coal from burning a little mahuna kapa.
21. Mix with salt and coal from the sugar cane of the variety known as ainako.
22. Salt the alaala hehe before roasting.

The bait, when prepared, is applied to the tip of the hook and is very attractive to fish. Fishes caught with it are usually small ones found near shore.

In fishing for opelu, cooked squash, pumpkin, papaia, and bananas, also fish ground up fine and mixed with sand, are employed.

The following additional varieties of bait are used in fishing for different species: Kukui and cocconut meat baked together in equal quantities, chewed bread fruit and taro, opai dried and pounded, wana with shell broken to expose the meat, half-roasted sweet potatoes, raw ripe papaia, pounded papai, fresh and dried opai, earthworms, opihi, the gall of the hee, puhi pounded up fine with sand, nehu, iiao, akule, scraps of meat, fish heads, etc.

*Bait boxes.*—As live bait is generally used in the fisheries, suitable boxes for keeping it are necessary. The following are the styles in general vogue:

When two canoes are joined together for the aku fishing, a bait box about 20 feet long, 2 feet high the whole length, and about 16 inches wide in the center, and running to a sharp point at each end, is used. It is perforated with numerous small holes on both sides for the free admission of water. When ready to leave for the fishing-grounds the fishermen swing this box beneath the cross-pieces holding the two canoes together and lash it there. In this position about two-thirds of the box is under water. On the return homeward, as it is empty, the box is unlashd and placed on top of the cross pieces, thus making it easier to carry, as it does not impede the progress of the canoe as when swung below. When the aku fishing is over it is either hauled out on the land until the next season, or moored close to shore in a sheltered position and used for keeping bait in temporarily, but is not taken out to the grounds, as it is too big and unwieldy for one canoe to handle. Much smaller boxes of the same general style are frequently employed, also square and oblong boxes of varying sizes, perforated, or with slats set close together.

The Japanese frequently use small boxes about a foot long by 8 inches wide by 8 inches deep, perforated on the sides and ends with small holes. These are attached to the boat by a short piece of twine and allowed to tow alongside.

Some of the Japanese also use one of the smaller of the wells in the bottom of their sampans for carrying the bait.

## VESSEL FISHING.

When one considers the fine fishing-grounds in deep water and on the reefs and shoals within reasonable distance of the islands, it is surprising that there are no vessels engaged in the fisheries at the present time. Several attempts have been made to establish vessel fisheries, but for various reasons they have met with failure.

The last attempt was in 1898, when a number of persons in Honolulu formed a company and had the gasoline schooner *Malolo* built, at a cost of \$6,600, to engage in this business. She was fitted out with six seines and one bag net, at a cost of \$1,000, and carried a crew of four men, the captain, John M. Sass, of Honolulu, an engineer, and two sailors. The fishermen were Japanese, who were hired at Honolulu. They had their own boats and lines, and the schooner towed them to the fishing-grounds. A station was established at Palaaau district, on Molokai. An old fish pond was purchased there, the purpose being to clean it out and use it for catching fish which came in through the entrance. The intention of the company was to hire fishermen on the islands to work the nets, while the Japanese would engage in line fishing, and the schooner would make regular trips to Honolulu with the catch. The fishing was to be done on the reefs about the west and south sides of the island of Molokai. The Japanese were very unreliable, as when the vessel was away they would go to Lahaina and other places and sell their catch.

Another fishing crew, composed largely of white men, mostly beach-combers, was gathered together and taken out to the fishing-grounds to work the nets principally. As they knew nothing of the business, they were a failure from the very beginning.

The third fishing crew, composed of native Hawaiians and South Sea Islanders, was secured at Lahaina. Twelve of these men were put on the island of Lanai, and were supplied with boats, nets, lines, and provisions by the vessel. After a few hauls the vessel left for Honolulu with the catch, the understanding with the fisherman being that they were to continue fishing until the vessel returned, so that she would have a cargo to take back to Honolulu. When the vessel returned half of the fishermen had deserted and the few remaining were carried to Lahaina. The whole business was abandoned in August, 1899, after the failure of an effort to get another gang on Maui.

Captain Sass says there was no lack of fish at any time, and if the fishermen could have been properly trained to the work the experiment would have been a brilliant success. Most of the fishing was done with trolling and hand lines, as the nets would not work well on the coral reefs, frequently tearing, while the numerous sharks about the reefs would do much damage to them.

## FISH PONDS.

The most interesting of the fishery resources of the islands are the fish-ponds. This is the only place within the limits of the United States where they are found on such an immense scale and put to such general and beneficent use. The time of the building of many of these ponds goes back into the age of fable, the Hawaiians, for instance, attributing the construction of one of the most ancient, the deep-water fish-pond wall at the Huleia River on Kauai, to the Menehunes, a fabled race of dwarfs, distinguished for cunning industry and mechanical and engineering skill and intelligence. Many of the very old ponds are still in practical use and look as though they would last for centuries yet. As the ponds were originally owned by the kings and chiefs, it is very probable that most of them were built by the forced labor of the common people. There is a tradition amongst the natives that Loko Wekolo (Wekolo pond), on Pearl Harbor, Oahu, was built about 250 years ago, and that the natives formed a line from the shore to the mountain and passed the lava rock from hand to hand till it reached the shore where the building was going on without once touching the ground in transit. As the distance is considerably over a mile, this speaks well for the density of the population at that time.

The ponds are found principally in the bays indenting the shores of the islands, the common method of construction having been to build a wall of lava rock across the narrowest part of the entrance to a small bay or bight of land and use the inclosed space for the pond. They were also built on the seashore itself, the wall in this case being run out from two points on the shore, some distance apart, in the shape of a half-circle. Most of the Molokai fish ponds were built in this manner. A few were constructed somewhat interior and these are filled by the fresh-water streams from the mountains or by tidal water from the sea carried to them by means of ditches. Most of the latter are on Oahu, near Honolulu. The Nomilo fish pond at Lawai, on Kauai, is formed from an old volcanic crater with an opening toward the sea, across which a wall has been built, and as the opening is below the surface of the sea the tide plays in and out when the gates are opened.

In the sea ponds the walls are about 5 feet in width and are built somewhat loosely in order that the water can percolate freely. The interior ponds have dirt sides generally, although a few have rock walls covered with dirt, while others have rock walls backed with dirt. The sea ponds generally have sluice gates which can be raised or lowered, or else which open and close like a door. In the interior ponds there are usually two small bulkheads with a space about 8 feet square between them. Each of these has a small door which usually slides up or down. When the tide is coming in both doors are opened and the fish are allowed to go in freely. When the tide turns the doors are closed. When the owner wishes to remove any of the fish he generally opens the inner door when the tide is ebbing. The fish rush

into the narrow space between the bulkheads, from which they are dipped out by means of hand dip nets. In the sea ponds the gate is opened when the tide is coming in and when it turns it is closed.

There is usually a small runway, built of two parallel rows of loosely piled stones from the gate to about 10 feet into the pond. As the fish congregate in this runway when the tide is going out, it is very easy to dip out the supply needed for market. Seines and gill nets are also swept around the inside of the ponds at times in taking fish from them, and as they are quite shallow this is done easily.

The sea ponds usually contain only the amaama, or mullet, and the awa. In the fresh and the brackish water ponds gold-fish, china-fish, oopu, opai, carp, aholehole, and okuhekube are kept. Practically no attempt at fish-culture is made with these ponds. Besides the fish which come in through the open gates, the owner usually has men engaged at certain seasons of the year in catching young amaama and awa in the open sea and bays, and transporting them alive to the fish ponds. They are kept in the ponds until they attain a marketable size, and longer frequently if the prices quoted in the market are not satisfactory. They cost almost nothing to keep, as the fish find their own food in the sea ponds. It is supposed that they eat a fine moss which is quite common in the ponds.

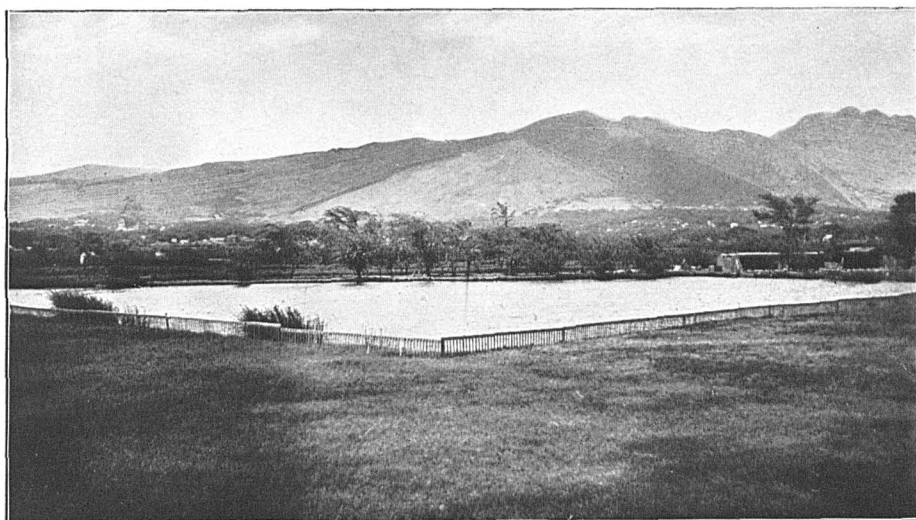
There are probably not more than one-half the number of ponds in use to-day that there were thirty years ago. There are numerous reasons for this, the principal ones being as follows:

1. The native population is dying off rapidly, and where there were prosperous and populous villages in the early years of the last century there is practically a wilderness now. Owing to this depopulation there would be no sale for fish in the immediate neighborhood of the ponds there, the only place where it could be sold owing to the difficulty in transporting fish any distance without the use of ice, and the ponds would naturally be allowed to go to decay, the walls breaking down from the action of storms, and the sea filling them with sand when they are located on the immediate shore. This condition of affairs is especially prevalent on Molokai.

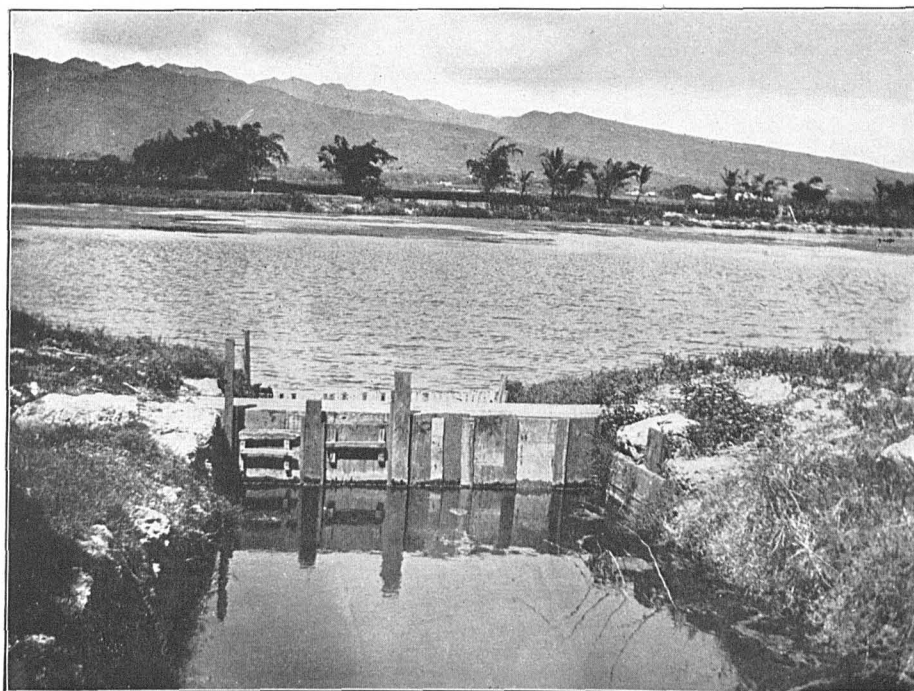
2. Two of the important crops of the islands are rice and taro. As both must be grown in a few inches of water, and are very profitable crops, a number of the interior ponds were turned into rice fields and taro patches. Oahu has shown the greatest changes in this regard.

3. On Hawaii ponds were filled up by the volcanic lava flows of 1801 and 1859. The Kamehameha fish pond, which was filled up in this manner in 1859, was said to have been the largest on the islands. Only traces of it are now to be found on the beach.

4. At Hilo, on Hawaii, some ponds, mostly quite small, are so filled with the water hyacinth that it is impossible to work them any more. This year a few of the best of these were cleaned out, but as there is



INTERIOR FISH POND, WAIKIKI, OAHU.



SLUICWAY LEADING INTO INTERIOR FISH POND, WAIKIKI, OAHU.



very little money to be made out of them, and their ownership is in dispute, there is but little desire to do much to build them up.

5. Other ponds have been filled up to make way for building operations and for other purposes. This is especially true of ponds in and around Honolulu and Lahaina. There used to be a number of fish ponds on Lanai, but they have all been allowed to fall into decay.

A number of ponds are kept up by their owners merely as private preserves, as it were, the fish taken from them being either consumed by the owner's household or given to friends. These are scattered all over the islands.

The following is a rough list of the fish ponds still in existence, or traces of which remain, together with their area and a statement so far as possible of their present condition. There is no great claim to accuracy in this list, as many of the ponds are in inaccessible regions of the islands, and in such cases the writer was obliged to depend upon others for reports as to their present condition:

*Island of Oahu:*

Koolau Bay:	Area in acres.
*Heela Pond, near Heela.....	88
*Halekou, near Mokapu.....	92
*Nuuia, near Mokapu.....	215
*Kaluaupihl.....	24
*Name not known, in Keaalau.....	3
*Name not known, in Mahinu.....	11
*Mikioia Pond, adjoining Mikioia.....	1.8
*Loko Keana, at Waikalua.....	3.5
*Loko Waikalua, at Waikalua.....	11
*Punaluu Loko.....	12.5
*Pond adjoining Jim Old's.....	2
*Waikapoki (Alapai), wall broken.....	4
*Kanoihululwi.....	2.5
*Kalokohahāhāhou, at land of same name.....	7
*Kikiwelawela, in Kikiwelawela.....	4.5
*Mokoli Pond, adjoining Kuaioa.....	124.5
*Name not known, in Kahana.....	14
*Kaelepulu, fresh-water pond, in Kailua.....	216
*Maanalua, in land of same name, partly filled.....	523
*Waiupe, in land of same name.....	41.5

*Pearl Lochs:*

*Pouhala, in Waikele, remnant leased.....	22
*Kaauiuu, in Waikele.....	41
*Maaha, in Waikele.....	48
*Mokuola, in Waikele.....	23
*Eo, in Waipio, partly filled.....	137
*Name not known, in Waipio.....	5.7
*Hanaloa, in Waipio.....	196
*Moo, in Waiala.....	13
*Kuhialoko, in Waiala.....	133
Nameless pond.....	28
*Apuu, in Waiala.....	76
*Paaui, in Waiala, partly filled.....	320
*Weloko, in Waimano.....	21
*Kukouu, in Waimano.....	27
*Lūakahaole, in Waiuu.....	1
*Paakea, in Waimalu.....	12
*Opū, in Kalaupaa.....	10.5
*Palaau, in Kalaupaa.....	2.3
*Kunana, in Halawa, partly filled.....	25
*Loko Muliwai.....	4
*Kahakupohaku, in Halawa.....	3
Amama, in Halawa, filled up.....	
Pohaku, in Halawa, partly filled.....	2.5
*Name not known, in Halawa, partly filled.....	5
*Okioioloipe, in Puuloa.....	6
*Kapamuku, in Puuloa.....	3
*Waihuo, in Halawa.....	32

*Moanalua and Kahauiki:*

Lelepaau, in Moanalua, mostly filled up.....	332
*Kaliikapu, in Moanalua.....	258
*Kaloaioa, in Moanalua.....	36
*Awaawaloa, in Moanalua.....	8.8

*Island of Oahu—Continued.*

Moanalua and Kahauiki:	Area in acres.
*Mapunapuna, in Moanalua.....	40
*Kalkikapu, in Moanalua.....	20
*Well, in Kahauiki.....	30
Kalihi and Kapalama:	
*Apli, in Kalihi.....	28
*Pahou nui, in Kalihi.....	26
*Pahou iki, in Kalihi.....	14
*Auiki, in Kalihi, partly filled.....	12
*Ananoho, in Kalihi.....	52
*Kuwili I, in Kapalama.....	10.5
*Kuwili II, in Kapalama.....	17.7
Kewulo and Waikiki:	
Ponds, in Kewulo proper, all being filled up.....	7
Opū, in Miki, now used as rice field.....	1.31
*Kuwili, in Kalia.....	9.7
*Name not known, in Kalia.....	2.5
*Name not known, in Kalia.....	1.4
*Name not known, in Kalia.....	1.5
*Kaipuni Pond, in Kalia.....	1.5
*Kaipuni Pond 2, in Kalia.....	1.8
*Pawee 1, in Kalia.....	13.1
*Pawee 2, in Kalia.....	2.9
*Kapuuiki, in Kalia.....	1.5
*Kaliikapu, in Kalia.....	12.2
*Pau Pond.....	1.45
*Maalahā, fresh water, Waikiki.....	2.1
*Opukaala, fresh water, Waikiki.....	1.7
*Kapaakea, Waikiki, fresh water.....	6.0
Waialua:	
*Ea Pond, in Kamananui.....	2.48

*Island of Molokai:*

Nameless pond at Waikane, in Kalua-kol, about.....	15
Nameless pond near Waikane, in Kalua-kol, about.....	16
Pakanaka, in Iioi.....	43
Nameless extensive pond, in Hooiehua, filled with mud.....	
Nameless extensive pond, in Palaau, filled with mud.....	
*Panalau, in Naliwa.....	20
Oola, in Naliwa.....	15
Kaluapuhi, in Naliwa.....	22
Kahokai, in Kalamaula.....	20
Ohaiho, in Kalamaula.....	39
Nameless pond, in Kalamaula.....	2
Nameless small pond inland, in Kalamaula.....	.9
Kalokoeli, in Kamiloilo.....	27.6
Nameless pond, in Makakupaia 1.....	46
Kaoiini, in Makakupaia 2.....	9.3
Kanua, in Kawela.....	50
Hokahāia, in Kawela, partly filled up.....	31
Uluuani, in Makoleiau, partly filled up.....	6.5
Kawii, in Makoleiau, partly filled up.....	15

\* Used commercially.

<i>Island of Molokai—Continued.</i>	<i>Area in acres.</i>	<i>Island of Kauai—Continued.</i>	<i>Area in acres.</i>
Panahaha', in Makolelau, walls broken.	36	*Nameless fish pond, in Lihue.	
Karukuawa, in Kapuaokoolau, walls broken.	30	*Nameless fish pond, in Lihue.	
Pahiomu, in Keonekuino.	20	*Nameless fish pond, in Lihue.	
Nameless pond, in Keonekuino.	10.6	*Nameless fish pond, in Hanalei.	
*Kamahuehue, in Kamalo'.	37	*Nameless fish pond, in Hanamaulu, area small.	
Nameless old pond, in Wawala, wall broken.	40	<i>Island of Maui:</i>	
Kalokoiki, in Wawala, partly filled.	6	Kanaha' Pond, near Kahului, not used.	37
Palaola, in Puaahala.	35	Mokuhina in Lahina, mostly filled up, not used.	11.4
*Kainaohē, in Kaamola, wall partly broken, but used.	17	Nameless pond, in Waiokama, near the last, not used.	1
Papalilili, in Kaamola, walls broken.	6.5	Puuolu, in Pauwala, Koolau, used as rice field.	1.5
*Hinau, in Keawanui.	54.6	<i>Island of Hawaii:</i>	
Nameless old pond, in Keawanui, walls broken.	35	<i>In Hilo:</i>	
Nameless old pond, in Keawanui.	13	Nameless pond, in lower part of Kukuau.	.5
Nameless old pond, in Ohia 1.	8	Waiolama Pond, in lower part of Kukuau.	10
*Puhaloa, in Manawai.	6	Nameless pond, in lower part of Kukuau, filled with water hyacinth.	
*Nameless old pond, in Ualapue.	8	*Honkimau, in Waiakea.	1.9
*Nameless old pond, in Ualapue.	19	*Waiakea, in Waiakea.	25.5
*Nameless old pond, in Kaluaaha.	11	*Mohouli, in Waiakea.	4.5
*Nameless old pond, in Kaluaaha.	9	*Kalepolepo, in Waiakea.	1.5
*Kaopeahina, in Kaluaaha.	20.5	*Waihole, in Waiakea.	.5
*Naiapala, in Kaluaaha.	33.6	*Kanaka, in Waiakea, sea pond.	2
*Piplo, in Mapulehu.	14	*Lokowaka, in Waiakea, sea pond, almost as large as Waiakea.	
Panahaha', in Pukoo, wall broken.	15	<i>In Puna:</i>	
*Iae's Pond, in Pukoo.	25	Name not known at Waiakolea.	18
*Nameless pond, in Kupeke.	30	Ponds at Kapoho sunk by subsidence of the coast in 1868.	
*Nahole, in Ahaino 1.	1	Ihukapu, in Kula.	3.5
*Kihaloa, in Ahaino 2.	5	<i>In North Kona:</i>	
*Waihihaha, in Kauihala.	3.5	Panea Pond, in Hamanamana, filled up by lava flow of 1801.	
*Kulaalamhi, in Honomuni.	6	Pond in Kiholo, filled up by lava flow of 1859.	
Ipukatole, partly filled up.	1.7	Kaloko Pond, near Kailua, partly filled with lava.	50
Nameless old pond, in Kainalu, walls broken.	19		
Kahinapohaku, in Moanui, walls broken.	4		
Ohalahala, in Kumimi, wall broken.	1.5		
Nameless old pond, in Honouliwai, wall broken.	.6		
<i>Island of Kauai:</i>			
*Nomilo pond, in Kalahoe.	19.5		
*Nameless fish pond, in Waimea.			

\* Used commercially.

NOTE.—I am especially indebted to Prof. W. D. Alexander, superintendent of the coast survey, Honolulu, for valuable assistance in preparing this list.

Owners of ponds rarely have much to do with the practical working of them, as they usually lease them to Chinese who attend to everything. Most of the ponds on Oahu are controlled by two Chinese merchant firms in Honolulu, who work in close harmony. They take particular care that the Honolulu market never becomes overstocked with amaama and awa, and are thus enabled to command almost any price they please during certain seasons of the year when amaama are not to be had. This falls quite heavily on the white population, as they are the principal consumers of the amaama.

The maintenance of these ponds should be encouraged as much as possible, as they are of great assistance in keeping up a regular supply of certain species at all seasons of the year.

The tables following show, by islands and districts, the number and nationality of the persons employed, the number and value of the fish ponds and boats, the number, kind, and value of apparatus employed in the ponds, the catch by species, and the catch by apparatus and species, together with the values of same.

The island of Oahu leads in every particular, having 74 fish ponds valued at \$148,850, and employing 142 persons. The total investment

for the island is \$150,761. Molokai is second, with 15 ponds, valued at \$11,425, 27 persons employed, and a total investment of \$11,709. Kauai and Hawaii follow in the order named. The total investment in the pond fisheries for all of the islands is \$168,943.

The total catch for Oahu is 560,283 pounds, valued at \$139,714; Molokai is second, with 91,919 pounds, valued at \$22,980. The total catch for all the islands is 682,464 pounds, valued at \$167,041, of which 485,531 pounds, worth \$119,202, are amaama.

The gill net is the leading form of apparatus used, 404,537 pounds, valued at \$97,819, being taken in these. Dip nets, seines, and scoop nets follow in the order named.

Table showing, by islands and districts, the persons employed, the number and value of fish ponds, boats, and apparatus used in the pond fisheries of the Hawaiian Islands in 1900.

Items.	Hawaii.		Kauai.						Molokai.			
	Hilo district.		Koloa district.		Lihue district.		Waimea district.		Total.			
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.		
Fish ponds.....	4	\$1,200	1	\$400	4	\$3,900	1	\$800	6	\$5,100	15	\$11,425
Fishermen:												
Americans.....	1											
Chinese.....	8				6				6		20	
Hawlians.....	2		3				2		5		7	
Total.....	11		3		6		2		11		27	
Boats:												
Rowboats.....	4	20	2	90	4	40			6	70		
Whaleboats.....											1	100
Apparatus:												
Haul seines.....											1	50
Gill nets.....	5	25	1	10	4	43	1	5	6	58	14	134
Grand total.....		1,245		440		3,983		805		5,228		11,709

Items.	Oahu.										Grand total.			
	Ewa district.		Kona district.		Koolauloa district.		Koolau-poko district.		Waiialua district.		Total.			
	No.	Value.	No.	Value.	No.	Val.	No.	Value.	No.	Val.	No.	Value.		
Fish ponds.....	24	\$56,480	32	\$58,650	1	\$400	16	\$32,920	1	\$400	74	\$148,850	99	\$166,575
Fishermen:														
Americans.....														1
Chinese.....	28		43		2		38		2		113		147	
Hawlians.....	29										29		48	
Total.....	57		43		2		38		2		142		191	
Boats:														
Rowboats.....	5	100	11	220			5	180			21	500	31	590
Whaleboats.....													1	100
Total.....	5	100	11	220			5	180			21	500	32	690
Apparatus:														
Haul seines.....			3	90			2	80			5	170	6	220
Gill nets.....	26	520	13	260			15	300	1	20	55	1,100	80	1,317
Dip nets.....			16	60	2	8	22	66			40	134	40	134
Scoop nets.....			10	7							10	7	10	7
Total.....	26	520	42	417	2	8	39	446			110	1,411		1,678
Grand total.....		57,100		59,287		408		33,546		420		150,761		168,943

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Table showing, by islands, districts, and species, the yield of the pond fisheries of the Hawaiian Islands in 1900.

Species.	Island of Hawaii.		Island of Kauai.								Island of Molokai.	
	Hilo district.		Koloa district.		Lihue district.		Waimoa district.		Total for Kauai.			
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
Aholehole	200	\$30										
Amaama	1,473	368	2,300	\$345	15,900	\$2,385	3,600	\$540	21,800	\$3,270	89,700	\$22,425
Awa			700	70	3,914	391	495	60	5,109	511	2,219	555
Carp					1,500	150			1,500	150		
Okuhekube	180	18										
Total	1,853	416	3,000	415	21,314	2,926	4,095	590	28,409	3,931	91,919	22,980

Species.	Island of Oahu.												Grand total.		
	Ewa district.		Kona district.		Koolauloa district.		Koolapoiko district.		Waiialua district.		Total for Oahu.				
	Lbs.	Value.	Lbs.	Val.	Lbs.	Val.	Lbs.	Val.	Lbs.	Val.	Lbs.	Val.		Lbs.	Val.
Aholehole													200	\$30	
Amaama	48,525	\$12,131	109,768	\$27,442	1,542	\$385	212,215	\$53,054	508	\$127	372,558	\$93,139	485,531	119,202	
Awa	33,410	8,352	45,380	11,089	115	29	107,864	26,965	64	16	186,848	46,460	194,171	47,526	
Carp													1,500	150	
Gold-fish							80	10			80	10	80	10	
Okuhekube													180	18	
Oopu	492	74									492	74	492	74	
Opai	310	31									310	31	310	31	
Total	82,737	20,588	155,158	38,540	1,657	414	320,159	80,029	572	143	560,283	139,714	682,461	167,041	

Table showing by islands, districts, apparatus, and species the yield of the pond fisheries of the Hawaiian Islands in 1900.

[The data shown in these tables are given in the general statistical tables shown elsewhere.]

Apparatus and species.	Island of Oahu.											
	Ewa district.		Kona district.		Koolauloa district.		Koolapoiko district.		Waiialua district.		Total for Oahu.	
	Lbs.	Value.	Lbs.	Val.	Lbs.	Val.	Lbs.	Value.	Lbs.	Val.	Lbs.	Value.
<b>Seines:</b>												
Amaama			25,000	\$6,250			11,000	\$2,750			36,000	\$9,000
Awa			6,511	1,378			7,000	1,750			13,511	3,128
Total			31,511	7,628			18,000	4,500			49,511	12,128
<b>Gill nets:</b>												
Amaama	48,525	\$12,131	18,000	4,500			120,329	30,082	508	\$127	187,362	46,840
Awa	33,410	8,352	8,000	2,000			60,718	15,179	64	16	102,192	25,647
Oopu	492	74									492	74
Opai	310	31									310	31
Total	82,737	20,588	26,000	6,500			181,047	45,261	572	143	290,356	72,492
<b>Dip nets:</b>												
Amaama			58,000	14,500	1,542	\$385	80,886	20,222			140,428	35,107
Awa			30,260	7,565	115	29	40,146	10,036			70,521	17,630
Gold-fish							80	10			80	10
Total			88,260	22,065	1,657	414	121,112	30,268			211,029	52,747
<b>Scoop nets:</b>												
Amaama			8,768	2,192							8,768	2,192
Awa			619	155							619	155
Total			9,387	2,347							9,387	2,347
<b>Grand total</b>	92,737	20,588	155,158	38,540	1,657	414	320,159	80,029	572	143	560,283	139,714

Table showing by islands, districts, apparatus, and species the yield of the pond fisheries of the Hawaiian Islands in 1900—Continued.

Apparatus and species.	Island of Kauai.							
	Koloa district.		Lihue district.		Waimea district.		Total for Kauai.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
Gill nets:								
Amaama .....	2,300	\$345	15,000	\$2,385	3,600	\$540	21,800	\$3,270
Awa .....	700	70	3,914	391	495	50	5,109	511
Carp .....			1,500	150			1,500	150
Total .....	3,000	415	21,314	2,926	4,095	590	28,409	3,931
Apparatus and species.	Island of Molokai.		Island of Hawaii (Hilo district).		Grand total.			
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.		
Seines:								
Amaama .....	8,000	\$2,000			44,000	\$11,000		
Awa .....					13,511	3,128		
Total .....					57,511	14,128		
Gill nets:								
Aholehole .....			200	\$30	200	30		
Amaama .....	81,700	20,425	1,473	368	292,335	70,903		
Awa .....	2,219	555			109,520	26,613		
Carp .....					1,500	150		
Okukuhe .....			180	18	180	18		
Oopu .....					492	74		
Opai .....					310	31		
Total .....	83,919	20,980	1,853	416	404,537	97,819		
Dip nets:								
Amaama .....					140,428	35,107		
Awa .....					70,521	17,630		
Gold-fish .....					80	10		
Total .....					211,029	52,747		
Scoop nets:								
Amaama .....					8,768	2,192		
Awa .....					619	155		
Total .....					9,387	2,347		
Grand total .....	91,919	22,980	1,862	416	682,464	167,041		

## PREPARATION OF FISHERY PRODUCTS.

With the exception of a small quantity dried for their home use, and, on several islands, for market, the fishermen sell everything in a fresh condition. The Chinese and Japanese, however, buy considerable quantities of fish from the fishermen and prepare these, usually in a dried condition. Most of this work is done on Hawaii, the district of Kona being especially noted for its dried fish.

The nehu, while one of the smallest of the many species found around the islands, is the one usually dried by the dealers. Large pieces of bagging are spread on ground and exposed to the full rays of the sun, and the nehu, in round condition, are laid on these to dry. When prepared they are placed in tubs and carried around the islands on carts, and are generally sold to the Chinese and Japanese for about 25 cents per pound.

The piha, a fish about the same size as the nehu, is frequently prepared in the same way on Hawaii.

The general method of preparing the larger fishes is as follows:

The fish are split open from the back, except in the case of the opelu, which is opened from the belly, and the entrails removed. The fish are not washed before salting, as it softens them and they are apt to spoil. The larger fishes are scored along the side. They are then lightly salted and put in a container, where they are allowed to remain over night. In the morning the fish are taken out, the salt shaken off of them, and they are then put in a pan of fresh water and the salt thoroughly washed off, after which they are placed upon rude racks or boards, covered with cocoanui leaves, and allowed to remain there until the sun thoroughly dries them. They are put under cover at night. When thus prepared they will keep for some time. Opelu, amaama, akule, and aku are the species usually preserved in this manner.

In preparing the ahi (albacore) it is cut up in squares of about a pound each. These pieces are not scored at some places, owing to blowflies, but where the blowfly is not common they are scored. The pieces are kneaded in salt until almost as round as a baseball and are then put out to dry.

A considerable quantity of amaama was dried on Kauai during 1901, but it was all condemned when it reached the Honolulu market, owing to the alleged careless manner in which it had been prepared. It is very probable that with proper care a considerable trade could be built up by the fishermen who live in localities from whence fresh fish can not be shipped.

*Limu (Algæ).*—The natives are great lovers of limu, and the gathering of it for market forms quite a profitable business for numbers of women and children. In preparing it for market it is rolled into a ball 2 or 3 inches in diameter, the water squeezed out, and a little salt sprinkled on it. Many varieties of limu are found around the islands, but only a few are used for food. Among these are limu lipoa, limu elele, limu pakaeleawaa, limu mananca, limu lipeepec, limu lipaakai.

#### FISH MARKETS AND THE HANDLING OF FISHERY PRODUCTS.

There are six fish-market houses on the islands, one each at Honolulu (Oahu), Hilo (Hawaii), and Wailuku (Maui) and three at Lahina (Maui). In addition, peddlers, with small carts and on the backs of jackasses, retail fish throughout the sections of inhabited country which are not convenient to the markets or to the fisheries. There is great room for development in this part of the business, however, as the inhabitants of some of the more inaccessible villages rarely have an opportunity to purchase fresh fish.

#### HONOLULU.

Previous to 1851 the only market for the sale of fish, vegetables, etc., was an open space in the vicinity of the present location of the Honolulu Iron Works. In 1851 the first regular market house for the

sale of fishery products, etc., was erected on the wharf, and by a law passed May 12 of the same year it was provided that this building and the adjacent grounds seaward of Pūlaholaho, belonging to the Government, should be the public market. By a later act, under date of June 25, 1855, the space between the old flour mill and the water, at the west end of Queen street, was reserved for a market.

In 1890 the present market house was erected on the square bounded by Alakea, Richards, Halekauwila, and Allen streets, at a cost, including the value of the land, of \$155,000. It is built almost entirely of iron, and is open on all sides except one of the ends, where there are a number of closed booths for the sale of fruit, vegetables, meat, etc., and is one of the best in design and workmanship in the United States. The stalls all have wooden sides with marble tops. There is always plenty of fresh water, while the drainage facilities are of the very best. It is within about 100 yards of the wharf where the Japanese fishermen land, thus making it very convenient for them to bring their catch to the market. The market is owned by the Territorial government, which pays the salaries of the officials in charge of it. The market keeper, who is also the fish inspector, receives a salary of \$30 per month as keeper and \$60 per month as inspector. There are also an assistant market keeper at \$25 per month, an assistant fish inspector at \$40 per month, and one laborer at \$1.25 per day. All fishery products must be sold in the market house, as hawking through the streets of the city is not permitted. All fish must be inspected before they go upon the stalls, and the market is open every week day and up to 9 a. m. on Sunday.

There are 20 stalls for the sale of fresh fishery products, the rents of which vary from \$15 to \$30 per month, according to the location. Only 15 of these were occupied in 1900. Of these, 11 were run by Chinese, 3 by Japanese, and 1 by natives, the total number of persons employed, exclusive of the market officials, being Chinese 40, Japanese 6, and natives 2. The usual wage of the help is \$12 to \$15 per month, including food and lodging. In addition to these, 6 stalls were occupied by 6 native women on Saturday, and sometimes Sunday morning, for the sale of limu (algæ). The charge of these tables is 50 cents on Saturday and 25 cents on Sunday. Three stalls were also devoted to the sale of dried fish from the island of Hawaii during most of the week, and were run by three native women. On a few days in the week when fish are scarce certain of the dealers also sell pickled California salmon, for which they pay an additional license fee of \$10 per year.

The fishermen bring their catch to the market at whatever hour is convenient to them, and the dealers sell for them on a basis of 10 per cent commission. Fish brought in prior to noon must be sold before the market closes the same evening, but if brought in after noon they

can, if not sold before night, be kept in a cold-storage house close by at a cost to the owner of 2 cents per pound, and placed on the stalls again the next morning; but in that event they must be distinguished by a small placard bearing the words "Iced fish." The inspector is empowered by law to pass upon all fish before being placed upon the stalls, and can condemn any tainted fish either then or afterwards. It is the usual custom to make frequent inspections of the fish after they go upon the stalls, as they soon taint in the trying climate. No ice is used around the market house, largely owing to its high cost.

The larger fish are dressed, while the smaller ones are sold round. There is no loss in dressing, however, as the head, entrails, etc., are sold. All except gold-fish, and sometimes china-fish, are sold dead.

In addition to the fresh fish sold in 1900, about 72,000 pounds of pickled salmon, with a selling value of \$9,000; 9,125 pounds of dried fish, with a selling value of \$1,141, and about 18,000 pounds of limu, worth \$2,340, were sold in the market.

In wrapping up fish only the leaves of the Ki plant (*Dracæna terminalis*) are used. This leaf is from 10 to 15 inches in length and is oblong in shape. A portion of the stem is left on the leaf when cut. In wrapping, the fish are laid across the narrow part of the leaf, and the end of this is turned tightly over the fish and wound around the stem and then tucked in; the stem of the leaf forms a handle by which to carry the package. The wrapping is done so skillfully that it rarely ever works loose. With the larger packages two or three leaves are used. The Ki plant grows on the mountain side near Honolulu, and is cut and brought to town by natives. The dealers pay about 25 cents for a package of 100 of the leaves.

This is the principal market on the islands and has the largest population tributary to it. Quite complete weekly reports of the fish sold are made to the board of health by the inspector.

The following table shows, by months, the numbers and species of fish sold in the market during 1900:

Table showing by months, numbers, and species the fish sold at the Honolulu market in 1900.

Species.	January.	February.	March.	April.	May.	June.
	Number.	Number.	Number.	Number.	Number.	Number.
Aalaihi .....	1,735	2,156	2,013	4,915	7,390	3,460
Aawa .....	1,232	1,144	1,901	1,002	683	1,125
Aha .....			7	155	512	202
Abi .....	15			29	32	24
Aholchole .....	1,900	5,971	9,345	12,998	11,941	4,526
Aku .....				45	52	521
Akule .....	267	636	1,570	1,132	5,762	7,967
Amaama .....	121,054	94,119	93,056	117,027	87,756	56,299
Awa .....	6,659	6,466	13,527	32,161	19,196	20,125
Awaawa .....	162	160	296	1,055	1,412	1,399
Awela .....					8	12
Aweweo .....	125	146	137	149	74	79
China-fish .....	11	15	33	462	36	8
Ea .....	169	138	121	70	19	61
Gold-fish .....			172	4,167	2,217	1,552
Hapupuu .....	2			46		1



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Table showing by months, numbers, and species the fish sold at the Honolulu market in 1900—Continued.

Species.	January.	February.	March.	April.	May.	June.
	Number.	Number.	Number.	Number.	Number.	Number.
Hihimanu		4	8		2	
Hilu	123	240	152	179	23	38
Hinaiea	3,779	7,663	6,631	7,177	1,991	2,260
Humuhumu	126	924	1,204	2,827	506	976
Ihehe			606	429	74	1,832
Kahala	2		13	42	58	33
Kaku		17	71	159	150	155
Kala	279	1,695	732	380	534	1,248
Kalekale.				441	208	12
Kawakawa		11	518	1,844	2,396	2,436
Kumu	622	1,365	939	1,079	688	599
Kupipi.	39			16	30	
Kupoupou		20	6	23	6	9
Laenihl	263	493	591	1,990	979	1,127
Lai		5	32	157	157	234
Laipala						2
Lauhau		15	11	39	7	61
Lolohau			1			
Mahimahi				10	483	48
Maihi	21			62	11	10
Maikoiko		33	118	39	433	65
Makaa	8	200	19	444	145	89
Malamalama				116		4
Malolo				501	24,325	48,403
Mamamo	10	72	216	72	16	58
Manini.	2,125	3,972	4,208	4,559	5,280	2,981
Mano	25	19	12	58	87	202
Maumau	2					
Mikiawa					548	653
Moano	5,291	11,414	11,140	16,952	5,364	5,497
Molihl	177	48	463	973	4,037	896
Nanihu	3					
Nenuc	4	71	134	134	190	37
Nihipali	42					
Nohu			16	9	6	3
Nunu	39	134		743	106	136
Oau				62		1,230
Olo	293	647	685	1,299	2,153	2,472
Olale		19	15		1	
Omakahu				22	2,041	8,964
Omlu	8	40	9	80	95	234
Oopu	2,173	373	474	1,963	660	359
Ooptikai	214	321	111			8
Opakupuka				1,486		
Opelu	2,751	4,291	2,727	1,567	733	1,594
Opule		97	123	64	170	22
Pakalakala			87	20	6	
Pakiki		25				
Pakii	178	45	113	232	521	61
Palani	2	2,116	56	104	337	409
Paopao	798	978	2,922	1,305	597	377
Pilikoa.		191	30	429	106	560
Poou	38	1,025	6	14		16
Poupou				23	23	7
Pualu	55	566	219	524	843	1,073
Puhi	176	127	224	241	157	200
Uhu	156	242	94	91	45	888
Uku	72	86	68	249	137	666
Ulae		34	46	88	82	210
Ulaula	498	1,772	476	790	615	1,738
Ulna	1,684	1,482	1,552	5,871	3,133	3,416
Umaumalei			124			
Uouou					25	
Upapalu	1,537	1,259	264	523	637	1,014
Uu	2,739	6,856	3,268	3,490	5,106	3,481
Uwau						133
Wauwau		1				
Weke	1,879	2,292	2,124	5,789	3,048	2,358
Welea		512	30	350	52	506
Haukeuke					50	
Hee	1,437	1,758	1,377	1,844	570	532
Honu		3	4	12	11	23
Muheu		64	38	15		
Papal	3,975	9,617	7,494	6,983	4,633	5,053
Ula	781	770	735	1,113	1,852	2,473
Wana	197	143	167	470	401	1,348
Total	167,904	177,341	182,541	257,183	216,320	208,919

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Table showing by months, numbers, and species the fish sold at the Honolulu market in 1900—Continued.

Species.	July.	August.	September.	October.	November.	December.	Total for 1900.
	Number.	Number.	Number.	Number.	Number.	Number.	Number.
Aalajih	2,610	6,089	5,994	3,272	7,032	11,518	58,184
Aawa	399	354	744	542	211	807	9,705
Aha	154	41	188	209	408	548	2,424
Ahi	128	14	4	2	2		250
Aholehole	4,899	5,499	4,589	5,708	2,044	2,561	71,781
Aku	1,005	1,845	821	484	137	725	5,633
Akule	12,260	38,494	105,689	13,326	18,761	18,169	224,083
Amama	74,359	52,282	67,112	56,929	79,627	101,951	1,001,571
A'ua'ua	294		3	13			261
Awa	24,508	22,364	19,104	21,294	15,691	7,735	208,830
Awaawa	4,199	4,263	1,403	1,058	701		17,587
Awela	11		12	13	2	2	60
Aweoweo	140	77	114	284	1,319	3,092	5,736
China-fish	8	7	23	19	23	25	670
Ea	2						580
Gold-fish	56	65	1,404	1,634	1,310	795	13,372
Hapuupuu		10	1	18		48	126
Hihimanu	14	2	7	12	3	8	60
Hilu	21	13	40	52	46	6	932
Hinalea	4,356	3,282	4,870	4,596	2,967	4,578	53,950
Humuhumu	1,087	1,064	1,839	793	916	301	12,563
Ihehe	3,094	1,450	271	3,464	667	4,464	16,401
Kahala	13	6	15	3	8	33	226
Kaku	113	101	120	29	54	31	1,000
Kala	922	580	587	445	459	1,788	9,649
Kalekale			80				741
Kawakawa	3,363	1,331		784	378	1,332	15,304
Kole			911		10	52	178
Kumu	1,095	1,335	1,248	908	630	1,111	11,619
Kupipi							275
Kupoupu	33	43	51	19	11	4	87
Laenih	2,514	2,250	2,490	1,403	906	572	15,578
Lai	1,001	176	107	52	112	50	2,083
Laipala							2
Lauhau	9		268	5	1		416
Lolohau							2
Mahimahi	191	60	17	23	26	4	862
Mall	45		34		196	1,216	1,595
Maikoko		149	6	27	20	62	942
Makaa	295	203	287	58	74	26	1,848
Malamalama	12	3	15	23			173
Malolo	78,850	57,789	23,960	16,367	8	2,712	252,915
Mamamo	2	107	87	44	273	196	1,163
Manini	2,639	1,117	1,652	1,679	1,514	6,411	38,137
Maou	224	242	481	54	133	46	1,533
Maumau							2
Mikiawa	1,045	150	640	737	127	391	4,291
Moano	8,537	10,226	10,478	8,415	3,709	5,645	101,668
Moi-lili	745	370	509	919	6,510	5,221	20,858
Mu		4	2	14	1	13	34
Nanihu							3
Nenu	74	248	157	44	43	99	1,235
Nihipali							42
Nohu	4	2	11	6	6	16	78
Nunu	196	239	194	703	141	176	2,977
Oou							1,262
Olo	1,807	2,509	1,929	1,606	1,343	1,060	17,043
Oiale							36
Omakaha	6,201	1,252	785	2,226	1,444	2,929	25,864
Omihi	87	24	12	285	19	14	907
Ono	1	6	1	1			14
Oopu	405	694	1,657	1,833	2,616	3,099	16,306
Oopakai			22			28	704
Opakapaka							1,486
Opelu	270	809	13,284	12,558	6,483	4,966	62,033
Opule	15	29	60	42	100	299	1,021
Pakalakala							112
Pakiki							25
Pakii	14	40	54	39	2	27	1,326
Palani	194	163	139	108	68	808	4,004
Paopao	1,065	1,395	2,811	1,197	1,743	1,628	16,816
Pilikoa	137	83	52	123	19		1,730
Poou	45	45	44	54	63	22	1,865
Poupou		4					57
Pualu	481	490	520	714	856	824	7,155
Puhi	250	110	208	88	238	96	2,115
Uhu	295	58	44	90	104	298	2,405
Uku	362	144	171	145	133	618	2,841
Ulae	1	10	50	32	1		649
Ulaula	1,342	3,034	2,518	1,753	731	484	15,751
Ulua	3,135	3,184	4,630	3,345	1,223	3,347	36,001

Table showing by months, numbers, and species the fish sold at the Honolulu market in 1900—Continued.

Species.	July.	August.	September.	October.	November.	December.	Total for 1900.
	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>
Umaumalei .....					10	108	242
Uouoa .....							25
Upapalu .....	2,571	1,916	3,263	3,133	3,060	6,317	25,494
Uu .....	6,500	12,312	16,434	13,638	4,263	14,409	92,496
Uwau .....	109	1	26	64	25	8	366
Weke .....	2,283	1,949	102,108	11,081	18,680	24,013	177,589
Welea .....	3	13	3	6	6	14	1,493
Haukenke .....							50
Hee .....	638	490	441	596	480	560	10,743
Honu .....	71	16	14	2	19	6	184
Muhie .....				2	2		133
Nalu .....							1
Papai .....	4,871	5,700	4,788	5,638	998	3,065	62,815
Ula .....	3,645	2,205	2,870	2,429	1,939	1,826	22,638
Wana .....	1,194	390	730	603	104	331	6,078
Total .....	273,261	253,019	418,278	209,913	193,979	256,224	2,814,882

The figures on the mollusks, crustaceans, etc., are not complete, but what little was reported has been shown in the table.

The most noticeable feature in this market is the excessively high prices charged for fishery products. As compared with other retail markets of the United States, and possibly of the world, Honolulu ranks first as regards high prices. But few of the better grade of fishes sell for less than 25 cents per pound, some even selling for as high as 35 cents per pound. All fish are sold by number, but they have been reduced to pounds in the general statistical tables, and the prices computed accordingly, so as to conform to data collected in other sections of the United States. Amaama, the commonest species, sells for an average of 25 cents per pound, or 8½ cents each, and ula (crawfish) for 20 cents each or 10 cents per pound. In the *Polynesian*, of Honolulu, under date of September 7, 1844, amaama are quoted at 37 to 50 cents per dozen, other fish 3 to 6 cents per pound, and ula at 6½ cents each. Quite a disparity between the prices of then and now.

There are a number of reasons given to account for this condition of affairs, the principal ones being:

1. Owing to the impossibility of keeping the catch in a fresh condition more than 24 to 48 hours, the fishermen try not to take more than can be easily sold and, because of this, gluts—the principal causes of low prices—rarely occur.

2. Owing to the insufficient transportation facilities there is but little opportunity to bring to one market, where there is a scarcity, the overplus of another. The island of Oahu is much better situated in this regard than any of the others, as there is a railroad which skirts the western and northern shores of the island for nearly one-half of its circumference. This permits of the rapid and cheap transportation of fish from the various places along the railroad to Honolulu, and has been of great assistance in developing the fisheries of these places. But the fishermen on the eastern and southern sides of the island are still com-

pelled to bring their catch to the market in carts and as a result only bring in the higher-priced species, as it would not pay to carry the cheap ones.

3. The fish ponds are principally in the hands of two Chinese firms of Honolulu, and these, by working in harmony and having control of the principal source of supply of the amaama and awa for a considerable part of the year, are enabled to keep up the prices for these species.

4. The Japanese now do the greater part of the line fishing for the Honolulu market, and they have organized a company, including most of the fishermen of that nationality, with the object, among other things, of securing as high prices as possible for their catch.

5. The indiscriminate use of fine-meshed seines has undoubtedly caused a falling off in the catch, although to what extent is a rather difficult problem to solve, owing to the lack of statistical data for previous years.

6. Shortly after the fall of the monarchy a boom began in the islands, especially in Honolulu, and this caused the prices of everything to go up, fish among the others. The price of sugar has largely controlled everything on the islands, and as this has been quite high for some years it has largely affected the prices of other commodities. This boom is on the wane now, and it is probable that matters will settle down to a more normal basis in the course of a few years.

#### HILLO.

The market house at Hilo, which is owned by private parties, was opened for business on April 1, 1899. During 1900 the number of stalls occupied was 27, the rents of which varied from \$5 to \$15 per month. These were not occupied continuously, as frequently a dealer would give up the business after a week or a month's trial, and someone else would start in. There are 32 stalls in all. The number of persons employed around the market were 22 Chinese, 18 Japanese, and 14 natives. During the summer of 1901 a syndicate of Chinese and Japanese bought up the stalls and began to take advantage of their position by shutting out the other dealers and compelling the fishermen to sell to them at a low price, while there was no limit to what they could charge the townspeople, as fish could not be sold on the streets. As a result, a number of the fishermen carried their catch by carts to Olaa, about 11 miles away, and established a temporary market there.

The Territorial government leased the market in August, 1901, which broke up the combination. An inspector was also appointed, who will have complete charge of everything about the market. Previously there was no inspection, and large quantities of tainted fish were foisted upon the people.

As at Honolulu, every effort is made to dispose of the catch the same day that it comes in, as no ice is used. Owing to the heavy surf close to the market house the fishing boats can not land there, and are compelled to go to Waiakea, a suburb of Hilo, about a mile away. The fishing boats usually land here during the morning and are immediately boarded by the dealers, who begin to dicker for the catch. When a boat with a large catch comes in a stranger would think that bedlam had broken loose, as Japanese, Chinese, Portuguese, Hawaiian, English, and variations of these languages are hurled back and forth, each man trying to outstrip every other in the amount of noise made.

Everything is on a cash basis, the successful dealer counting down the money at once and removing the fish, which are carried to the market by carriers with baskets slung over their shoulders on poles, and by carts. The principal selling time at the market is in the afternoon, after the dealers have returned from Waiakea.

#### WAILUKU.

The market house at Wailuku is a small affair with only 5 stalls, which are run by 2 Chinese and 5 natives, and is owned by a private individual. The market house, with land, is valued at about \$1,500. Most of the fish sold here are brought from Kahului, a few miles away, while some amaama come from the island of Molokai. It has no government supervision, which it needs.

#### LAHAINA.

The principal market house at Lahaina is owned by the government and is valued at about \$6,000, including the land. It contains 6 stalls, which rent at \$3 per month. These were run in 1900 by 1 American, 4 Japanese, and 4 natives. Close by are 2 private stalls, which were operated by 4 Japanese. In addition, in 1900, there were 2 private additional fish markets in town, with a total valuation of \$650. These contained 6 stalls, which were run by 4 Chinese, 4 Japanese, and 4 natives. The greater portion of one of these was destroyed by fire in the early part of 1901 and has not since been rebuilt.

There is no inspector at Lahaina, although one is very much needed, as the sale of tainted fish, particularly by the Japanese, is quite common. Lahaina is the principal market for the disposal of the fish taken by the fishermen on Molokai and Lanai.

The number of persons employed at these markets has not been shown in the general statistical tables.

## THE WHOLESALE TRADE.

The wholesale trade in fishery products is carried on in two cities—Honolulu and Hilo. Owing to the constant demand for such articles from the sugar plantations this business is very profitable. A few of the sugar plantations purchase their supplies direct, and these are not included in the following table. None of the firms is engaged exclusively in this business, being principally wholesale grocery firms.

Honolulu leads in this business in every particular. She had 9 firms employing 73 persons, and a total investment, including wages paid, of \$348,380 in 1900, while Hilo had 5 firms, with 30 employees, and a total investment of \$161,745, including wages.

Salmon is the principal product handled, followed by sardines, cod, oysters, lobsters, mullets, and shrimp in the order named. The total value of all products handled amounted to \$359,965.

Table showing the wholesale trade in fishery products of Hawaiian Islands in 1900.

	Honolulu.		Hilo.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.
Firms.....	9		5		14	
Employees.....	73		30		103	
Property.....		\$206,850		\$112,000		\$318,850
Wages.....		30,530		12,445		42,975
Cash capital.....		111,000		37,300		148,300
<b>Total.....</b>		<b>348,380</b>		<b>161,745</b>		<b>510,125</b>
PRODUCTS						
Albacore, pickled.....pounds..	21,250	863			21,250	863
Anchovies:						
Spiced (in 4-lb. jars).....number..	360	113	48	15	408	128
Spiced (in 24-lb. kegs).....do.....	250	1,760			250	1,760
In oils (in 4-lb. jars).....do.....	240	180			240	180
Barracuda, pickled.....pounds..	17,300	692	300	12	17,600	704
Bonito, pickled.....do.....	24,650	1,199	13,800	828	38,450	2,027
Cod, dried and pickled:						
Halifax.....do.....	112,000	8,960			112,000	8,960
California.....do.....	465,036	20,142	147,860	6,052	612,896	26,194
Eels, smoked (1-lb. cans).....number..	120	78			120	78
Finnan haddle (1-lb. cans).....do.....	2,640	715	1,200	225	3,840	940
Herring:						
Fresh (1-lb. cans).....do.....	1,800	270	2,000	450	3,800	720
Bloaters (1-lb. cans).....do.....	12,880	2,308	384	64	13,264	2,372
Kipperd (1-lb. cans).....do.....	10,448	2,540	264	61	10,712	2,601
Pickled (100 lbs.).....half barrels..	180	1,170	35	228	215	1,398
Pickled (16 lbs.).....kits.....	211	369			211	369
Smoked (4 lbs.).....boxes.....	175	36			175	36
Smoked (10 lbs.).....do.....	1,540	538			1,540	538
Mackerel:						
Canned (4-lb.).....number.....	480	80			480	80
Canned (1-lb.).....do.....	4,800	800			4,800	800
Canned (2-lb.).....do.....	2,160	630			2,160	630
Pickled.....kits.....	540	864	163	326	703	1,190
Pickled.....half barrels.....	120	840			120	840
Soured (1-lb. cans).....number.....	480	63	864	113	1,344	176
Mullet (1-lb. cans).....do.....	66,480	10,041			66,480	10,041
Salmon:						
Canned (1-lb.).....do.....	1,213,344	114,151	239,232	22,428	1,452,576	136,579
Canned (2-lb.).....do.....	4,800	1,000			4,800	1,000
Pickled.....half barrels.....	1,455	8,730	835	5,010	2,290	13,740
Do.....barrels.....	4,793	59,913	173	2,076	4,966	61,989
Do.....butts.....	20	340			20	340
Bellies.....kits.....	522	559	37	71	559	630
Do.....half barrels.....	21	105			21	105
Smoked.....pounds.....	102	12			102	12
Steaks (1-lb. cans).....number.....	10,224	1,363			10,224	1,363
Sardines (foreign):						
Canned (4 oils).....cases.....	3,078	27,240	114	848	3,192	28,088
Canned (4 oils).....do.....	35	613			35	613
Canned (12 ozs. oils).....do.....	100	1,175			100	1,175
Canned (4 tomato).....do.....	50	475			50	475

Wholesale trade in fishery products of Hawaiian Islands in 1900—Continued.

	Honolulu.		Hilo.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.
PRODUCTS—continued.						
Sardines (American):						
Canned (½ oils).....cases..	759	\$3,036	682	\$3,069	1,441	\$6,105
Shrimp:						
Canned (1-lb.).....number..	26,064	2,541	2,736	267	28,800	2,808
Canned (2-lb.).....do.....	4,848	901			4,848	901
Dried (400 lbs.).....barrels..	9	277	99	5,940	108	6,217
Dried (100 lbs.).....boxes....	1	18			1	18
Skipjack, pickled.....pounds..	15,000	600			15,000	600
Sprats, canned (1-lb.).....number..	720	270			720	270
Caviar:						
Canned (½-lb.).....do.....	660	206	276	86	936	292
Canned (1-lb.).....do.....	1,224	765	190	113	1,404	878
Clams:						
Canned (1-lb.).....do.....	35,760	3,427	3,120	325	38,880	3,752
Canned (2-lb.).....do.....	672	87			672	87
Chowder (3-lb. cans).....do.....	2,640	462			2,640	462
Juice (1-lb. cans).....do.....	384	29			384	29
Juice (2-lb. cans).....do.....	960	100			960	100
Lobsters:						
Canned (½-lb.).....do.....	19,680	3,034			19,680	3,034
Canned (1-lb.).....do.....	39,936	8,486	4,416	1,012	44,352	9,498
Oysters:						
Canned (1-lb.).....do.....	91,440	9,296	35,184	3,482	126,624	12,778
Canned (2-lb.).....do.....	2,544	604			2,544	604
Curried (½-lb. cans).....do.....	1,200	350			1,200	350
Curried (1-lb. cans).....do.....	902	228			902	228
Terrapin stew (1-lb. cans).....do.....	480	500			480	500
Turtle, green (1-lb. cans).....do.....	192	35			192	35
Tongues and sounds.....kits.....			9	18	9	18
Total.....		306,179		53,119		359,965

Fresh fish is also brought to Honolulu from San Francisco in the cold-storage rooms of the regular steamers. Until last year all of this fresh fish came from Victoria in the Canadian steamers, as the San Francisco steamers had no cold-storage rooms previous to that time.

During 1900 the following products (not shown in the wholesale table) were retailed in a fresh state in Honolulu:

	Pounds.		Pounds.
Cod, herring, smelt, and shad.....	1,323	Salmon trout.....	312
Flounder.....	2,270	Sea bass.....	671
Halibut.....	35,880	Sole.....	606
Salmon.....	27,793	Sturgeon.....	290

IMPORTS OF FISHERY PRODUCTS.

As the domestic fisheries have not been sufficiently developed to supply the large home demand, great quantities of foreign goods must be imported to make up the deficiency. These imports consist principally of salted, smoked, dried, and canned goods, and are very diverse, owing to the unusual mixture of population. The Chinese and Japanese are the principal consumers of dried abalone, cuttle-fish, oysters, seaweed, and shrimp; the dried and salted cod is preferred by the Portuguese and Porto Ricans, while the natives are great lovers of salmon.

An attempt should be made to introduce the abalone, as it would probably thrive well on the rocky reefs and sea walls.

The raising of sugar is the principal industry of the islands, and as large numbers of laborers are required on the plantations, which are frequently not accessible to markets where fresh fishery products can be obtained, these must be supplied with the prepared products.

The United States have always led in the matter of imports, San Francisco of late years being the principal port from which goods were shipped from the United States to the islands. Previous to the opening of the transcontinental railroads most of the shipments came either by vessel to Colon, thence by rail across the Isthmus of Panama, and by vessel from there to the islands, or by means of vessels which came around the Horn. Many of the whalers which rendezvoused at the islands previous to 1875 also brought out considerable cargoes of general merchandise, including cod, mackerel, and other products of the New England fisheries, which met with a ready sale or barter to the natives and the white people settled on the group.

On January 30, 1875, a reciprocity treaty between the Hawaiian Kingdom and the United States was signed. This treaty went into effect September 1, 1876, and was to continue in force for seven years, and for twelve months after notice of its termination. By its terms in compensation for the free entry to the United States of certain natural products of the islands, notably sugar, the government permitted the free entry, among many other articles, of fishery products of American origin. As the same products from other countries were compelled to pay an ad valorem duty of 10 per cent, this gave the United States an immense advantage. By mutual consent this treaty continued in force until the islands were annexed to the United States on June 14, 1900. The treaty proved of great mutual benefit. For some few years previous to 1876 the sugar industry of the islands had been languishing on account of the duty imposed by the United States on shipments to that country from the islands. As a result of this depressed condition and the consequent inability of the people to buy imported goods, shipments of dried and salted fishery products dropped off until in 1876 they amounted to only \$17,891.81. Under reciprocity the imports rapidly increased until in 1899 they amounted to \$120,374.83, the greater part of which came from the United States.

The following table shows the value of dried and salted fish imported into the islands from 1865 to June 14, 1900:

Years.	Value of dry and salt fish imported.	Years.	Value of dry and salt fish imported.
1865	\$58,224.63	1884	\$74,751.85
1866	31,609.04	1885	70,977.04
1867	47,805.61	1886	97,148.12
1868	23,025.69	1887	96,759.83
1869	20,903.08	1888	88,673.17
1870	39,463.16	1889	90,555.23
1871	32,439.51	1890	105,962.91
1872	19,420.60	1891	102,073.65
1873	18,383.52	1892	78,839.93
1874	23,524.30	1893	89,805.02
1875	14,781.74	1894	89,270.24
1876	17,891.81	1895	66,780.80
1877	26,594.82	1896	80,341.34
1878	47,206.95	1897	109,827.68
1879	66,978.33	1898	96,670.23
1880	86,276.72	1899	120,374.83
1881	68,576.95	1900 (to June 14)	59,820.27
1882	66,701.27		
1883	96,630.12	Total	2,268,129.98



The table below shows, by countries, for the years 1897, 1898, 1899, and up to June 14, 1900, the imports of fishery products. This table shows the vast preponderance of the United States over all the other countries combined. A considerable part of the imports from the United States was composed of salmon. Counting complete years, China occupied second place until 1899, when Japan forged the front. The large influx of Japanese laborers during the past ten years is the principal cause of this considerable increase in Japan's shipments. As the Chinese and Japanese prefer to buy fishery products specially prepared to suit their taste, such as abalone, cuttle-fish, oysters, shrimps, and seaweed, and as these could be obtained only in their home countries, this demand has caused a considerable trade with the countries enumerated. Great Britain is fourth, followed by Canada, Australia and New Zealand, Germany, and France in the order named.

Table showing, by countries, the imports of fishery products during the calendar years 1897, 1898, 1899, and to June 14, 1900.

Countries and products.	1897.		1898.		1899.		1900.*	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Australia and New Zealand:								
Fish, miscellaneous, salted, packages.....					150	\$570		
Herring.....cases	1	\$6						
Mullet, canned.....do	475	1,843	925		655	2,432	122	\$475
Do.....dozen			400	\$3,025				
Total.....		1,849		3,025		3,002		475
Canada:								
Cod-fish, salted.....pounds	67,200		40,320		92,200	3,740	72,400	2,850
Do.....drums	400	3,980	400	3,114				
Fish, fresh.....pounds	2,800		25,680	1,124			6,141	426
Do.....pieces	1	102						
Herring.....pounds	1,900							
Do.....kegs	55	166	90	172				
Mackerel, salted.....kifts	10							
Do.....barrels	5	65						
Miscellaneous fish, salted, pounds			2,750					
Miscellaneous fish, salted, packages.....			65	208				
Salmon, fresh.....pounds	1,836				13,950	912	27,669	1,468
Do.....boxes	7		2	1				
Do.....pieces	2	206						
Salmon, salted.....half-barrels	2							
Do.....barrels	1	18			2	35		
Total.....		4,537		4,619		4,687		4,744
China:								
Abalone, dried.....pounds	5,823		6,379		7,811		1,363	268
Do.....packages	25	1,228	2	1,224	9	1,710		
Cuttle-fish, dried.....pounds	42,547		52,478		49,278		18,786	
Do.....packages	46	3,938	25	4,192	70	4,244	2	1,130
Fish, alive.....number					112	8		
Fish, salted.....pounds	306,520		300,300		317,527		42,126	
Do.....packages	285	16,564	190	16,842	324	17,258	49	2,771
Herring.....cases	4	12						
Oysters, dried.....do	327	2,609	360	2,591	413	3,417	123	1,162
Seaweed, dried.....package	44	162	48	198	5			
Do.....cases					32	209	6	27
Shrimps, dried.....pounds	2,370							
Do.....packages	17	101	6	3			9	32
Total.....		24,674		24,990		26,846		5,390

\* As the islands were formally annexed to the United States on June 14, 1900, and no further record was kept of the imports from the United States at the custom-houses, it was thought best to end the records of the other countries at that date, so that they would be uniform.

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Table showing, by countries, the imports of fishery products during the calendar years 1897, 1898, 1899, and to June 14, 1900—Continued.

Countries and products.	1897.		1898.		1899.		1900.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
<b>France:</b>								
Sardines, canned . . . . . cases	2	\$45	1	\$5	160	\$245	245	
Do . . . . . dozen							17	\$1,907
Total . . . . .		45		5		245		1,907
<b>Germany:</b>								
Fish, miscellaneous, salted, packages . . . . .	1	4						
Herring . . . . . kegs	51				1	4		
Do . . . . . cases	1	67						
Sardines, canned . . . . . do	250	966	237	1,244	250	784	1,666	638
Do . . . . . dozen			1,042					
Total . . . . .		1,037		1,244		788		638
<b>Great Britain:</b>								
Fish, miscellaneous, salted, pounds . . . . .					22,400	950		
Herring, canned . . . . . cases	27		22		1		2	
Do . . . . . dozen	428	652	666	714	1,111	994	305	
Do . . . . . kegs							12	251
Mackerel, canned . . . . . dozen			60	68	96	122		
Mullet, canned . . . . . cases	55	188						
Sardines, canned . . . . . do	624		1,057		1,415		133	
Do . . . . . dozen	2,199	4,973	2,016	6,253	1,917	6,032	1,080	4,131
Sponges . . . . . pounds	57							
Do . . . . . cases	6	365						
Do . . . . . bales				102			4	327
Total . . . . .		6,078		7,137		8,098		4,709
<b>Japan:</b>								
Cuttle-fish, dried . . . . . pounds	5,843		7,756		7,211		510	37
Do . . . . . packages	31	647	25	659	47	891		
Fish, miscellaneous, salted, pounds . . . . .	86,454		77,477		191,137		18,215	
Fish, miscellaneous, salted, packages . . . . .	614	6,019	182	5,720	984	16,177	89	1,976
Oysters, dried . . . . . packages	17	66	36	149	96	408	8	25
Sardines . . . . . cases	565	2,189	1,031	5,093	1,423	8,300	260	1,343
Shrimps, dried . . . . . pounds	25						47	6
Do . . . . . packages	1	6	4	14	11	45		
Seaweed, dried . . . . . pounds	1,000		75		6,366		100	
Do . . . . . packages	917	2,415	1,108	2,747	1,613	5,041	232	594
Total . . . . .		11,242		14,382		30,862		3,980
<b>United States:</b>								
Abalone, dried . . . . . pounds	15,575		16,541		22,404	2,025	8,001	
Do . . . . . packages	3	1,474						
Do . . . . . barrels			3	1,461			6	1,069
Barracuda, salted . . . . . pounds	8,200		6,450		2,600		1,000	
Do . . . . . packages	1	277	14	326	17	167	5	82
Bonito, salted . . . . . pounds	4,500		5,600		2,700		250	
Do . . . . . half-barrels	93		114		36			
Do . . . . . quarter-barrels	18	410	8					
Do . . . . . packages			17	737	4		29	
Do . . . . . barrels					87	698	19	236
Caviar, canned . . . . . cases	36	373	13				12	226
Do . . . . . boxes			26		12			
Do . . . . . dozen			25	592	127	360		
Clams, canned . . . . . cases	37		58		60		28	
Do . . . . . dozen	573	1,070	538	1,071	983	1,589	422	789
Cod-fish, salted . . . . . pounds	288,218		276,766		267,087		183,690	
Do . . . . . cases	108		227		210		73	
Do . . . . . bundles	24	11,272	123	11,257	312			
Do . . . . . kits					10			
Do . . . . . packages							1,600	
Do . . . . . barrels					1	13,007	10	11,559
Herring . . . . . kegs	146		163		149		40	
Do . . . . . kits	12		15		29		20	
Do . . . . . boxes	811		1,313		1,608		405	
Do . . . . . packages	194	793	23		266	1,203	132	
Do . . . . . half-pound barrels			100	1,130			88	708
Lobsters, canned . . . . . cases			100		129		124	
Do . . . . . dozen	1,942	4,103	974	3,078	2,308	6,023	636	3,534
Mackerel . . . . . kits	266		818		521		236	
Do . . . . . cases	23		46		47		100	

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Table showing, by countries, the imports of fishery products during the calendar years 1897, 1898, 1899, and to June 14, 1900—Continued.

Countries and products.	1897.		1898.		1899.		1900.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
United States—Continued.								
Mackerel.....packages..	30	\$302			46	\$1,512	17	
Do.....barrels.....			11	\$986			5	\$970
Miscellaneous fish, salted, pounds.....	178,674		212,964		165,604		102,709	
Miscellaneous fish, salted, half-barrels.....	176		3		18		46	
Miscellaneous fish, salted, barrels.....	171		44		4		30	
Miscellaneous fish, salted, kits.....	136				7			
Miscellaneous fish, salted, packages.....	73	13,857	424	13,467	893		522	
Miscellaneous fish, salted, cases.....					10	12,218	18	9,379
Oil, cod-liver.....gallons.....					10	14		
Oil, sperm.....do.....	94	56	1,412		300		251	140
Do.....cases.....			6	480	5			
Do.....barrels.....					3	273		
Oil, whale.....gallons.....	555	215	291	108	256	138		
Oysters, canned.....cases.....	470		245		374		781	
Do.....dozen.....	2,557		3,967		7,427		3,345	8,173
Oysters, fresh.....number.....			2,093		5,600		14,300	
Do.....packages.....	51		94		152		83	
Do.....tins.....	1,355	6,781	1,423	7,956	3,496	14,935	1,745	1,990
Salmon, canned.....cases.....	3,639		4,896		5,249		5,508	
Do.....dozen.....	18,088	29,937	20,020	32,935	56,757	70,896	18,707	37,413
Salmon, fresh.....pounds.....	924		419		6,030		1,193	
Do.....number.....					33			
Do.....packages.....	3	72	7	41		481	1	103
Salmon, split.....half-barrels.....	875		538		552		706	
Do.....barrels.....	4,858		3,813		4,922		3,553	
Do.....kits.....	200		296		617		402	41,255
Do.....lots.....			81		9	43,053		
Do.....cases.....	51	46,495	6	33,934				
Salmon, smoked.....pounds.....	485		403		997		163	17
Do.....cans.....			3	52				
Do.....packages.....	16	145			7	105		
Sardines, canned.....cases.....	261		285		620		705	
Do.....dozen.....	65	1,881	130	1,684	127	6,922	1	3,297
Seaweed.....packages.....	75	469	70	464	64	366	33	306
Shrimps, canned.....cases.....	61		17		23		42	
Do.....dozen.....	224	648	591	989	496	985	448	903
Shrimps, dried.....pounds.....	125,451		130,220		135,181		44,118	
Do.....packages.....	59	16,462	64		10		65	
Do.....barrels.....			49	16,972	53	20,140	2	8,331
Skipjack, salted.....pounds.....	9,800		3,000		2,205		1,100	43
Do.....half-barrels.....			5					
Do.....packages.....	14	810	14		67	344		
Do.....quarter-barrels.....			5	206				
Sponges.....number.....			4,607		12,241		60	
Do.....pounds.....	355		28		664		471	
Do.....cases.....	51		34					
Do.....pieces.....	1,015	1,241						
Do.....boxes.....			5	1,514	67	4,371	2	597
Total.....		139,143		131,441		201,825		131,120
Other countries:								
Sardines, canned.....cases.....			1	3				
Do.....dozen.....	417	186						
Total.....		186		3				

The following table shows, for certain years, the fishery products imported into the islands. Of the ten full calendar years shown, 1899 leads all the others with a value of \$276,149. Although the figures for 1900 are for the year up to June 14, they amount to \$152,963. As no record of the imports from the United States was kept after annexation on June 14, it was impossible to secure complete figures for the rest of the year. In anticipation of annexation large quanti-

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tics of Portuguese and French sardines and New Zealand mullet were imported during the first half of 1900. The tariff in force now on mullet will undoubtedly prevent their importation, as they will be unable to pay the higher duty and compete with the cheaper grades of canned salmon.

Table showing for certain years the imports of foreign fishery products.

Products.	1893.		1894.		1895.		1896.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Abalone, dried . . . . . pounds.	14,078		17,858		11,741		17,865	
Do. . . . . boxes.			3					
Do. . . . . packages.	32		13		10		11	\$2,130
Do. . . . . sacks.			7					
Do. . . . . barrels.	8	\$1,777	3	\$2,365	1	\$1,435		
Albacore, salted . . . . . barrels.			5		16			
Barracuda, salted . . . . . pounds.	600		4,648		12,185	323		
Do. . . . . packages.			16				5	13
Do. . . . . barrels.	4	37	10	229				
Bonito, salted . . . . . pounds.			5,850		200		200	
Do. . . . . bales.			44	301				
Do. . . . . barrels.					10		6	
Do. . . . . barrels.					39		18	
Do. . . . . barrels.	10	43			15	190	5	103
Caviar, canned . . . . . cases.	15		14		28		27	
Do. . . . . barrels.			1					
Do. . . . . boxes.	1							
Do. . . . . dozen.	6	154	10	165	6	302	23	146
Clams, canned . . . . . cases.	14		39		63		65	
Do. . . . . dozen.	393	702	282	671	546	1,082	414	941
Crabs, canned . . . . . do.			2	8	4	9		
Codfish, salted and dried, pounds.	283,627		262,877		239,367		304,761	
Do. . . . . cases.			25		138		17	
Do. . . . . bundles.					9			
Do. . . . . bales.			204					
Do. . . . . drums.							400	
Do. . . . . packages.	325	14,162	261		111		76	13,670
Do. . . . . barrels.			35	14,711	7	10,152		
Cuttle-fish, dried . . . . . pounds.	10,608		21,619		22,482		35,545	
Do. . . . . cases.			2					
Do. . . . . packages.	292	2,705	314	3,357	140	2,402	135	3,961
Fish, sundry, salted . . . . . pounds.	243,285		338,407		236,034		327,356	
Do. . . . . bundles.					11			
Do. . . . . barrels.	258		356		482		253	
Do. . . . . barrels.			111		242		93	
Do. . . . . barrels.	48		129		4		30	
Do. . . . . casks.					15			
Do. . . . . kits.							51	
Do. . . . . dozen.			1,500		90			
Do. . . . . packages.	919		2,340		1,572	23,936	1,155	
Do. . . . . boxes.	1,396	25,491						
Do. . . . . cases.			13	29,106			10	30,716
Halibut, salted . . . . . barrels.			15	75				
Herring . . . . . kegs.	115		142		141		107	
Do. . . . . kits.			12				6	
Do. . . . . boxes.	897		568		825		1,097	
Do. . . . . packages.					89			
Do. . . . . barrels.	30		72				55	
Do. . . . . dozen.	211		74	911	564		228	
Do. . . . . barrels.	2							
Do. . . . . cases.	1,019	1,136	33		36	1,342	62	1,067
Lobsters, canned . . . . . do.			85		54		701	
Do. . . . . dozen.	1,396	3,844	294	1,096	862	2,132	1,142	3,129
Mackerel . . . . . kits.			148		220		189	
Do. . . . . pounds.			5				512	
Do. . . . . cases.	141		83		62		29	
Do. . . . . dozen.	28						12	
Do. . . . . packages.			1					
Do. . . . . barrels.	32		82		47		14	
Do. . . . . barrels.	3		7		1	1,014	13	984
Do. . . . . kegs.	3	1,256	12	1,345				
Mullet, canned . . . . . cases.	523		658	3,008	440	1,868	695	2,744
Do. . . . . dozen.	720	3,338						
Oil, sperm . . . . . gallons.	41,441		1,195		1,864	1,076	195	120
Do. . . . . barrels.	734	15,011	31	1,286				
Oil, whale . . . . . gallons.	706	237			363	117	377	
Do. . . . . barrels.			6	234			4	232
Oysters, canned . . . . . cases.	159		308		286		265	
Do. . . . . dozen.	2,138	3,965	2,003	3,926	2,614	4,550	2,916	4,908

COMMERCIAL FISHERIES OF THE HAWAIIAN ISLANDS. 449

Table showing for certain years the imports of foreign fishery products.—Continued.

Products.	1893.		1894.		1895.		1896.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Oysters, fresh..... number.	31,824		2,800		25,000		700	
Do..... sacks.			2		15			
Do..... packages.	29							
Do..... boxes.			37		35		21	
Do..... cans.	1,477	\$1,481	1,081	\$1,312	1,360	\$1,072	1,593	\$1,050
Oysters, dried..... pounds.	1,570		770					
Do..... packages.	231	1,265	186	1,442	225	1,481		2,134
Salmon, canned..... cases.	1,510		2,833		2,273		4,095	
Do..... dozen.	16,827	20,566	9,062	21,282	13,580	23,071	19,504	32,536
Salmon, fresh..... pounds.	4,794		2,261		2,755		1,806	
Do..... number.	47	589	87		13		5	146
Do..... kits.			45	502				
Do..... boxes.					2	229		
Salmon, salted..... barrels.	823		775		617		618	
Do..... barrels.	3,461		4,207		3,823		3,737	
Do..... kits.	288		265		429		384	
Do..... tierces.	92		26		14			
Do..... cases.	55	39,662	7	8,525	60	24,218	18	26,429
Salmon, smoked..... pounds.	1,097		692		825		1,813	
Do..... boxes.			3	98	4	108	9	240
Do..... cases.	3	140						
Sardines, canned..... do.	489		552		1,343		944	
Do..... dozen.	1,725		696		406	7,008	1,350	5,296
Do..... kegs.	2	4,485	38	3,242				
Seaweed, dried..... pounds.					2,932			
Do..... packages.					380	995	903	2,252
Shrimp, canned..... cases.	1		33		15		19	
Do..... dozen.	210	471	124	444	119	323	274	594
Shrimp, dried..... pounds.	82,546		67,857		69,740		95,090	
Do..... boxes.			1					
Do..... packages.	45		96		47		31	
Do..... sacks.			2		6			
Do..... barrels.	39	12,203	37	11,312	13	9,169	25	2
Do..... cases.							2	11,872
Skipjack, salted..... pounds.	3,300		1,600		5,800		3,400	
Do..... sacks.	5							
Do..... barrels.	3						27	
Do..... barrels.	71	487			14	194	10	186
Do..... bales.			46	331				
Sponges..... number.	6							
Do..... dozen.	18		36		32		55	
Do..... pounds.	1,763		308		96		374	
Do..... cases.	42		36		28		32	
Do..... pieces.			1,796	1,296	1,366	880	2,138	
Do..... bales.	1	1,042					4	1,899
Total.....		156,239		112,580		120,723		149,578

Products.	1897.		1898.		1899.		1900.*	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Abalone, dried..... pounds.	21,398		22,920		30,215		9,364	
Do..... packages.	28	\$2,702	2		9	\$3,734		
Do..... barrels.			3	\$2,684			6	\$1,337
Barracuda, salted..... pounds.	8,200		6,450		2,600		1,000	
Do..... packages.	1	277	14	326	17	167	5	82
Bonito, salted..... pounds.	4,500		5,600		2,700		250	
Do..... barrels.	18		8					
Do..... barrels.	93	410	114		36			
Do..... packages.			17	737	4		29	
Do..... barrels.					87	698	19	236
Caviar, canned..... cases.	56	373	13		12		12	226
Do..... boxes.			26		127			
Do..... dozen.			25	592		360		
Clams, canned..... cases.	37		53		60		28	
Do..... dozen.	573	1,070	538	1,071	983	1,588	422	789
Cod-fish, salted and dried..... lbs.	355,418		317,086		359,287		256,090	
Do..... cases.	108		227		210		78	
Do..... bundles.	24		123		812			
Do..... drums.	400	15,252	400	14,371				
Do..... kits.					10			
Do..... packages.							1,580	
Do..... barrels.					1	16,747	10	14,409
Cuttle-fish, dried..... pounds.	48,390		60,234		56,489		14,236	
Do..... packages.	77	4,485	50	4,851	117	5,136	2	1,166
Fish, alive..... number.					112	8		
Fish, sundry, fresh..... pounds.	2,800		25,680	1,124			6,141	426
Do..... pieces.	1	102						
Fish, sundry, salted..... pounds.	671,648		593,491		696,568		163,050	

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Table showing for certain years the imports of foreign fishery products—Continued.

Products.	1897.		1898.		1899.		1900.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Fish, sundry, salted . . . barrels.	176		3		18		45	
Do. . . . . barrels.	171		44		4		30	
Do. . . . . kits.	136		7		7			
Do. . . . . packages.	978	\$36,444	861	\$36,236	2,351		660	
Do. . . . . cases.					10	\$47,072	18	\$14,126
Herring . . . . . kegs.	252		253		150		52	
Do. . . . . kits.	12		15		29		20	
Do. . . . . boxes.	811		1,313		1,608		405	
Do. . . . . packages.	194		23		266		132	
Do. . . . . ½ pound barrels.			100				88	
Do. . . . . dozen.	428		666		1,111		305	
Do. . . . . pounds.	1,900							
Do. . . . . cases.	33	1,600	22	2,016	1	2,200	2	959
Lobsters, canned . . . do.			100		129		124	
Do. . . . . dozen.	1,942	4,103	974	3,078	2,308	6,023	636	3,534
Mackerel . . . . . kits.	276		318		521		236	
Do. . . . . cases.	23		46		47		100	
Do. . . . . dozen.			60		96			
Do. . . . . packages.	30				46	1,634	17	
Do. . . . . barrels.	5	868	11	1,054			5	970
Mullet, canned . . . cases.	530	2,070	925		655	2,432	122	475
Do. . . . . dozen.			400	3,025				
Oil, cod liver . . . . . gallons.					10	14		
Oil, sperm . . . . . do.	94	56	1,412		300		251	140
Do. . . . . cases.			6	480	5			
Do. . . . . barrels.					3	273		
Oil, whale . . . . . gallons.	555	215	291	108	256	138		
Oysters, canned . . . cases.	470		245		874		781	
Do. . . . . dozen.	2,567		3,967		7,427		3,345	8,174
Oysters, fresh . . . . . number.			2,093		5,500		14,300	
Do. . . . . packages.	68		94		152		83	
Do. . . . . cans.	1,355	6,847	1,423	7,956	3,496	14,935	1,745	1,990
Oysters, dried . . . . . cases.					413		123	
Do. . . . . packages.	327	2,669	360	2,740	96	3,825	8	1,187
Salmon, canned . . . cases.	3,639		4,896		5,240		5,508	
Do. . . . . dozen.	18,088	29,937	20,020	32,935	56,757	70,896	18,707	37,413
Salmon, fresh . . . . . pounds.	2,760		419		19,980		28,862	
Do. . . . . number.					33	1,393		
Do. . . . . pieces.	2							
Do. . . . . packages.	3		7				1	1,571
Do. . . . . boxes.	7	277	2	42				
Salmon, salted . . . . . barrels.	877		538		552		766	
Do. . . . . barrels.	4,856		3,813		4,994		3,653	
Do. . . . . kits.	290		296		617		402	41,256
Do. . . . . lots.			31		9	43,088		
Do. . . . . cases.	51	46,513	6	83,934				
Salmon, smoked . . . pounds.	485		403		997		163	17
Do. . . . . cans.			3	62				
Do. . . . . packages.	16	145			7	105		
Sardines, canned . . . cases.	1,702		2,612		3,868		2,290	
Do. . . . . dozen.	2,631	10,240	3,188	14,282	2,044	22,183	1,817	11,317
Seaweed, dried . . . pounds.	1,000		75		6,366		100	
Do. . . . . packages.	1,036	3,046	1,226	3,350	1,682		265	
Do. . . . . cases.					32	5,616	6	926
Shrimp, canned . . . do.	61		17		23		42	
Do. . . . . dozen.	224	648	591	989	496	985	448	903
Shrimp, dried . . . . . pounds.	127,846		130,220		135,181		44,165	
Do. . . . . packages.	77	16,568	74		21		64	
Do. . . . . barrels.			49	16,989	53	20,185	2	8,368
Skipjack, salted . . . pounds.	9,800		3,000		2,205		1,100	43
Do. . . . . ½ barrels.			5					
Do. . . . . ¼ barrels.			5					
Do. . . . . packages.	14	310	14	206	67	344		
Sponges . . . . . number.			4,607		12,241		60	
Do. . . . . pounds.	412		286		664		471	
Do. . . . . cases.	57		34					
Do. . . . . pieces.	1,015	1,606						
Do. . . . . bales.							4	
Do. . . . . boxes.			5	1,618	67	4,371		
Do. . . . . packages.							2	924
Total . . . . .		188,831		186,846		276,149		162,963

EXPORTS OF FISHERY PRODUCTS.

Owing to the large home demand, the islands have exported but little. The bêche-de-mer and sharks' fins have usually been shipped to China or to the Chinese residents in California, while the gold-fish were sent to California, where they were probably used for ornamental purposes. The exporting was carried on in a small way during the period from 1853 to 1876, in some years nothing being shipped.

The following table shows, by years, the exports of each species:

Years.	Bêche-de-mer.		Sharks' fins.				Gold-fish.		Dried fish.
	Lbs.	Cases.	Lbs.	Cases.	Boxes.	Packages.	No.	Lbs.	Boxes.
1853.....			100						
1854.....			200						
1861.....	6,507								
1862.....	5,809		50						
1863.....	5,500		50	14					
1864.....	7,135								
1865.....			429						
1867.....	4,958			1				400	
1868.....					1		300		
1869.....		1	6	114			650		
1870.....					5		500		
1871.....						4			
1872.....						3	150		1
1873.....						4			
1874.....						4			
1875.....						3			
1876.....	1,125								

INTRODUCTION OF ADDITIONAL SPECIES OF FISHES, ETC.

The fresh waters of the Hawaiian Islands are too limited to justify extensive experiments in acclimatization. The streams are necessarily short and during the rainy season they become raging torrents, while in the dry season they are either totally dry or else a series of stagnant pools. The principal streams are on Kauai, Oahu, and Hawaii. The only native fishes in the streams are species of gobies, known collectively as oopu. These have some value as food, but are not highly esteemed. Opai, or shrimp, are also abundant in the streams.

Although the waters in and adjacent to the islands teem with fishes and other denizens of the sea, numerous efforts have been made to introduce additional species. Among the principal species so far introduced are the following:

*Black bass.*—Black bass would probably thrive in the fresh-water streams, and as the streams are filled with shrimp, there would be an abundant food supply for them. During the summer of 1897 a number of the citizens of Hilo procured a shipment of black bass from the California Fish Commission. In October, 90 of them (about 6 inches in length) were shipped from San Francisco on a Hilo sailing packet, and 55 were living when the vessel arrived. Through some oversight they remained on board several days, 34 of them dying in the mean-

time. The remaining 21 were at last planted in the Wailuke River near Rainbow Falls. The next day there was a heavy freshet in the river, and as the fish were never seen again it is supposed they were too weak to resist, and were swept out to sea and destroyed.

*Carp* (*Cyprinus carpio*) were introduced some years ago, and are now found on the islands of Maui and Kauai. On the former they are quite common in the irrigation reservoirs and ditches near Wailuku, where they were first planted, but are not often sold, as they are not popular with the white people and natives owing to their muddy flavor. The Japanese and Chinese catch and eat them. On Kauai they are found in irrigation ditches and in a few of the fish ponds. They are sold principally to the Japanese and Chinese.

*Cat-fish*.—About ten years ago the late Charles Arnold, of Hilo, introduced the cat-fish (*Ameiurus nebulosus*), which he secured from the mainland. They were placed in various ponds in Hilo, but none has ever been seen since. Another species (*Macropternotus maqui*) was introduced from China a few years ago and is now occasionally found in the fresh waters near Honolulu.

*China-fish* (*Ophiocephalus*).—This species, brought by the Chinese from China, is now fairly common in the vicinity of Honolulu. It is commonly raised in the irrigation ditches and fresh-water ponds and generally sold alive to the Chinese.

*Gold-fish* (*Carassius auratus*).—These were introduced originally from China, but there is no record as to the date. As early as 1867 shipments of them were being made to San Francisco. They are raised principally in the irrigation ditches around Honolulu. A few are also found on the larger of the other islands, especially near Wailuku, on Maui. They are sold alive in the market and are eaten mainly by the Chinese and Japanese.

*Salmon*.—In 1876 some salmon and trout eggs were given to parties in Honolulu by the California Fish Commission in exchange for 100 awas, which it designed planting in California waters. There is no record of what became of the eggs.

*Trout*.—The first introduction of the trout was, as stated above, when the California Fish Commission shipped some eggs to Honolulu parties. In 1894 a consignment of 1,000 brook trout (*Salvelinus fontinalis*) was secured from the California Fish Commission and planted in the Waimea River, on Kauai, but they were soon lost sight of. About 1896 a dozen trout were brought to Hilo and planted in the Wailuke River near Rainbow Falls, but nothing was ever seen or heard of them afterwards. As the streams either dry up entirely in the dry season, or become mere pools, in which the water gets very warm, trout are not suitable for them, as they require pure, cold water.

*Frogs*.—The date of the introduction of the frog is uncertain, but it is known that some were introduced previous to 1867. In the latter



year a shipment from California was placed in the fresh waters around Honolulu. In the Honolulu Pacific Commercial Advertiser, under date of September 4, 1869, appeared the following item:

Mr. C. P. Ward has imported a few frogs and placed them in a pond at "Sunny South," his country residence at Pawaa [Oahu]. Some years since the agricultural society introduced some, which were placed in taro patches near Dr. Hillebrand's residence, and soon disappeared—supposed to have been killed by the rats.

In October, 1899, a shipment of 6 dozen was landed at Hilo, from Contra Costa County, Cal. They were of two varieties—one dark green and the other mottled. They were brought in a barrel with a little water. The frogs were planted in various places around Hilo, and soon became abundant. In 1900 a few were taken for market. This year (1901) a few were shipped to Honolulu, and it is probable that catching them for market will soon prove remunerative.

They were soon introduced on most of the other islands, and are said to have greatly assisted in the decrease of sickness amongst the numerous herds of cattle, particularly on Kauai, by keeping stagnant pools clean and eating the fluke (*Fasciola hepatica*), a worm which infests the grass and slime in and around the pools. Cattle and sheep eating the grass swallow the fluke, which works its way into the animal's liver, sometimes killing the animal itself. Frogs have also assisted materially in thinning out some of the noxious insects which have been introduced.

*Terrapin.*—This animal was introduced by the late Charles Arnold, of Hilo, about 1890. Several have been caught since, but nothing has been seen or heard of them during the last few years.

*Oysters.*—As most of the early white settlers in the islands were from New England and the Middle Atlantic States, they undoubtedly often longed for the delicious oysters of their native States, but very few of them ever expected to enjoy a feast of them unless they should revisit their early haunts. In the course of time the Eastern oyster was transplanted to the Pacific coast, but for a while it was supposed they would not stand transportation so far as Honolulu. However, under date of January 28, 1871, the Pacific Commercial Advertiser, of Honolulu, contained the following article:

*A sensation.*—We had one this week. We received an invitation to partake of fresh oysters, just out of the shell! They were part of a lot received by the steamer from California, and were they not delicious! We understand they can be delivered here for \$7 per bushel. It is proposed, we hear, to plant a bed at Ewa on this island, a good locality having been selected.

It is probable that the attempt at oyster-culture thus mentioned was not carried out, as there is no further mention of it.

On October 28, 1871, there appeared in the Pacific Commercial Advertiser the advertisement of a San Francisco firm offering to furnish transplanted New York oysters in shell at Honolulu during the winter months for \$4 a hundred.

In 1883 Mr. Allan Herbert, of Honolulu, purchased 300 Eastern oysters at San Francisco and, bringing them to Honolulu, planted them at Kalihi, but a heavy freshet from the stream covered them up.

In 1893 the matter was taken up by Hon. John F. Colburn, of Honolulu, who writes as follows regarding his experiments:

In the month of October, 1893, I imported from Mr. M. B. Moraghan, of San Francisco, three cases of oysters for the purpose of planting. Two of the cases contained about 1,000 Eastern transplanted, and one case contained about 3,000 of the native California. They were brought down on the steamship *Australia*, in the ice-house, and arrived in apparently good order. I at once had them removed to my pond at Manana Ewa, and planted in a depth ranging from 1 foot to 2 feet of water.

Some three months after I made a thorough search of the different places where I had planted oysters, and found that the native California were all dead, and of the Eastern transplanted about 50 per cent were still living, though considerably sunk into the soft mud at the bottom of the pond. I had these taken up and put down again, and some three months afterwards I examined them again and found they had started to grow; the new shell forming was easily noticeable. I continued my practice of taking them up at different intervals of time until the early part of 1895, when I was so elated with the prospect of my success that I made arrangements with Mr. Moraghan to send me down more Eastern transplanted, with two objects in view: (1) To have fresh Eastern oysters to supply the oyster-eaters of our city, and (2) to have them answer for the purpose of seed for propagating.

I imported 38,614 from San Francisco by the steamship *Australia*, having them come in five different trips of the vessel. About two-thirds were brought down on the open deck in boxes, and were wet down every morning when decks were being washed down. The balance came in the ice-house. With the former way my loss was more in number, but the latter way was the most expensive. On deck I could get the oysters landed for about \$10 a ton measurement, but through the ice-house the charges were 5 cents a pound for freight.

As fast as the oysters would arrive I would have them sent down to my pond and laid out. In a month or so afterwards they would get very thin and be unfit for the market. However, I allowed them to recuperate by getting acclimated to the conditions of my pond as well as to the food.

In the latter part of 1895 I discovered young oysters clinging to stones and dead oyster shells. I have watched them very carefully and at different intervals of this year I have found more young ones. Of course the young are not as many as I would like to see, still I trust that in time I will be able to boast of a bed of Hawaiian oysters reared from the seed of the American Eastern oyster. From those I have imported I am in a position to furnish to those desiring oysters a mess of them fresh from the water. The last lot has been now about eighteen months in my pond and are in fine and fat condition, having grown twice their original size.

Fresh sea water empties into my fish pond through gates and a large spring of fresh water also runs into it, thereby making the water a little brackish.\*

During the last few years very little attention has been paid to the beds by Mr. Colburn, owing to the pressure of other business, and there are but few oysters left on them now.

This year (1901) there has been considerable agitation of the subject among some of the leading white and native citizens, and it is hoped that the industry will be taken up and established on a paying basis.

\*Report on the work of the Steamer *Albatross*, by Lieut. Com. J. F. Moser, U. S. N. Report of Commissioner of Fish and Fisheries for 1897.

## PRIVATE FISHERY RIGHTS.

Probably the most peculiar feature of the Hawaiian fisheries is the well-developed principle of the private ownership of the fishes found in the open sea and bays to within a certain prescribed distance from shore. In order to clearly understand this condition of affairs it will be necessary to revert to the early history of land tenures in the islands.

Although we know practically nothing of the history of the people for some time after they first settled on the islands, it is probable, reasoning from analogy, that they lived in a patriarchal manner, followed later on by a tribal or communal system. In the meantime certain men by force of character and natural talents had become recognized as chiefs, and these men gradually usurped the rights of the common people and in time came to own everything. When a king or chief died his successor claimed the right, and exercised it in most cases, of redistributing the land amongst his own friends and adherents. This continued during the reigns of many petty chiefs and kings until at last all the islands fell under the sway of Kamehameha I, through conquest. The King at once divided the lands among his principal warrior chiefs, retaining, however, a considerable portion for himself. Each chief divided his lands among his inferior chiefs, who subdivided them again and again down to the lowest class of tenants. When Kamehameha II ascended the throne he wanted to redistribute the lands as of old, but matters had rested so long without change during the long reign of Kamehameha I, and the landed interests had become so strong, that he found it impossible to disturb the existing order of things, except in a few instances. Trading in lands now became common, but it was not until 1839 that the ownership of land became vested in others than the King. In the bill of rights which Kamehameha III issued on June 7 of that year occurs the following rather vague paragraph relating to land tenures:

Protection is hereby secured to the persons of all the people, together with their lands, their building lots, and all their property, while they conform to the laws of the kingdom, and nothing whatever shall be taken from any individual except by express provision of the laws. Whatever chief shall act perseveringly in violation of this declaration shall not longer remain a chief of the Hawaiian Islands, and the same shall be true of the governors, officers, and all land agents. But if anyone who is deposed should change his course and regulate his conduct by law, it shall then be in the power of the chiefs to reinstate him in the place he occupied previous to his being deposed.

It was not, however, until 1848 that land tenure was put upon a solid legal basis by the division of the lands between the King, the chiefs, and the tenants, and vesting the titles in each.

Each island was divided into "moku," or districts. The subdivisions of a "moku" were "ahupuaa," which is really a unit of land in the islands. The "ahupuaas" are generally long, narrow strips, running from the mountain to the sea, and include mountain, the plateau,

the shore, and for a certain distance out to sea. The distance into the sea was to the reef, if there was one; if not, to one geographical mile from shore. The owner of this portion of the sea naturally had the right to control it, so far as the fishing was concerned, the same as he did his land. When he placed a tabu on it branches of the hau tree were planted all along the shore. The people seeing this token of the tabu respected it. With the removal of the hau branches, indicating that the tabu was lifted, the people fished as they desired, subject only to the tabu days of the priest or alii, when no canoes were allowed to go out upon the water.

In accordance with a law which went into effect June 14, 1900, the fishery rights will cease on June 14, 1903. Some of these fishery rights are of considerable value. Close to Honolulu are two fisheries belonging to one person which bring in a yearly rental of \$1,375. The fisheries on Oahu are the most valuable, owing to the excellent market for the sale of fish at Honolulu. On Kauai only a few of the fisheries are of sufficient value to be rented, these being mainly around Waimca and Hanalei. One of these rents for \$200 a year, while another brings in only \$20 per year. A few owners allow the general use of their fisheries to the fishermen, reserving one species for themselves, as they are allowed by law to do.

Practically no effort is made to collect rent for any of the fishery rights of Hawaii. This is largely owing to the sparseness of the population and the consequent lack of markets for the sale of the fish, also somewhat to the disinclination of the people to pay rent. Some years ago the Government leased the Waiakea lands (at Hilo), including the fishing rights, to private parties. The lessees tried to collect rent for the use of the fishery, but without much success, and, as the lease terminated in October, 1899, it became free to everybody, as the new lease exempted the fishing rights.

The principal fishery right on Maui is at Kahului. The rest of them are practically free now. Merely nominal rents are exacted for the use of the fisheries around Molokai. Numerous attempts have been made by the owners to collect rent from the fishermen who frequent the waters around Lanai, but without success.

No effort was made to secure complete data on the value of these fishery rights, as the whole matter would necessarily have to be passed upon by the courts in a short time and the owners did not care to go into the matter fully just now.

For a more complete exposition of the laws concerning private fishery rights, reference is made to the preliminary report of Drs. Jordan and Evermann, pp. 355-380 of this volume. The same paper contains a discussion of the laws regulating the fisheries and of the measures recommended for the further protection and improvement of the industry.

## THE FISHERIES CONSIDERED BY ISLANDS.

Commercial fishing is prosecuted on the islands of Oahu, Hawaii, Maui, Molokai, Kauai, Lanai, and Niihau. Fishing is also carried on about some of the smaller islands of the group, but it is done by fishermen from the above-named islands. While the fisheries are of considerable importance now, they could easily be expanded if the proper efforts and attention were given to them. For many years the native Hawaiians held a monopoly of the industry, but of late years the Japanese have been engaging in it in large numbers. The natives fish spasmodically, as a rule, while the Japanese give to it their whole time and attention, and as a result they are doing much better financially than the former. It is probable that the commercial fisheries will be entirely in the hands of the Japanese on certain islands within the next ten years if they increase at the rate they have during the past six or seven years.

At present but little deep-sea fishing is done by the fishermen, although this fishery could be made very profitable. Formerly the natives did all of this fishing, but the Japanese now monopolize it. Some of the best grounds are off the coasts of Molokai, and quite a fleet of Japanese boats from Honolulu resort to them; they usually leave on Monday and return on Friday or Saturday.

At various places around the islands sponges of a fair quality have been picked up on the beaches, where they had been cast up by storms. The writer secured a few specimens which had been washed up on the beach and found them of an inferior grade, but still marketable. These were secured from Oahu and Hawaii. It is probable that but few of the better quality of sponges would be washed ashore, as they would be too firmly attached to the bottom.

The bubonic plague broke out in Honolulu in December, 1899, and lasted several months. This proved a serious detriment to the sale of fresh fishery products while it lasted, as it was thought by many persons that the disease might be transmitted in this way.

The native fishermen have a habit, in many instances, of calling fishes and other sea animals by different names at various stages in their life, also when there is a slight variation in their appearance. In the commercial tables these are generally shown under the name applied to the adult. In order to prevent confusion and misapprehension among the fishermen of the islands and others a list of the commercial species has been prepared, showing the names used in the statistical tables, and where two or more species have been included under one name the others are shown in the list immediately below and are slightly indented. The common English name and the scientific name are also shown where possible. Only a few of the fishes of the Hawaiian Islands are found in the United States, or where there are English-speaking fishermen, hence but few of them have received

English names. In the following list the English names used are, in most instances, generic rather than specific, or such as are applied to all or several of the species of a genus. Many of the identifications are provisional only and may be changed when the collections come to be studied. The list follows:

*List of Hawaiian fishes.*

Native name.	Common English name.*	Scientific name.
<i>Fishes:</i>		
Aalāhi		<i>Thalassoma duperreyi</i> .
Aawa		<i>Lepidoplois bilunulatus</i> .
Aha		<i>Athlennes</i> (new species).
Ahi	Albacore	<i>Germo sibi</i> .
Ahia		
Aholehole		<i>Kuhlia malo</i> .
Akīlolo		<i>Gomphosus</i> and <i>Thalassoma</i> , species.
Aku	Bonito	<i>Gymnosarda pelamis</i> .
Akule	Goggler	<i>Trachurops crumenophthalmus</i> .
Hahalalu		
Alāhi	Squirrel-fish	<i>Holocentrus diadema</i> , etc.
Alolol		
Amaama	Mullet	<i>Mugil dobula</i> .
Anae	do	<i>Mugil dobula</i> (adult).
Anaehole	do	
Api		
A'ua'u	Mullet	<i>Zebbrasoma guttatum</i> .
Aulūlū		<i>Chanomugil</i> (new species).
Awa	Milk-fish	<i>Chanos chanos</i> .
Awa kalamobo	do	Do.
Awaawa	Big-eyed herring	<i>Elops machnata</i> .
Awela		<i>Thalassoma purpurcum</i> .
Awoeweo	Catalufa	<i>Priacanthus cruentatus</i> .
Carp †	Carp	<i>Cyprinus carpio</i> .
China-fish †		<i>Ophiocephalus</i> .
En		<i>Lepidoplois modestus</i> .
Goldfish †	Gold-fish	<i>Carassius auratus</i> .
Hapuupuu	Grouper	<i>Epinephelus</i> (new species).
Haulūlū		<i>Lennisoma thyrstitoides</i> .
Hihimanu	Spotted sting-ray	<i>Aetobatus marinari</i> .
Hilu		<i>Anampes cuvieri</i> .
Hilūlūlū		<i>Coris leptomis</i> .
Hinalea		<i>Coris Novaculichthys</i> , etc.
Hinalea lolo		<i>Coris gaimardi</i> .
Humuhumu	Half-beak	
Humuhumu meemeē	do	<i>Hemiramphus depauperatus</i> .
Humuhunu	do	<i>Melichthys bipinnosus</i> , etc.
Ielhe		<i>Euleptorhamphus longirostris</i> .
Il		
Iiao		
Kahala	Amber-fish	<i>Seriola</i> , species.
Kaku	Barracuda	<i>Sphyræna nodgrassi</i> .
Kala		<i>Monoceros unicornis</i> .
Kawakawa	Bonito	<i>Gymnosarda alleterata</i> .
Kalekale		
Kawela		
Kikakapu	Butterfly-fish	<i>Chetodon ornatissimus</i> .
Koae		
Koi		<i>Etelis carbunculus</i> .
Koie		
Kuapaa †		
Kumu	Goat-fish	<i>Upeneus porphyreus</i> .
Ahuluhulu		
Kupipi		
Kupoupou		<i>Chellio inermis</i> .
Laenihī		<i>Inilistius, Hemipteronotus</i> , etc.
Lai	Mackerel	<i>Scomberoides toto</i> .
Lāipala		<i>Zebbrasoma flavescens</i> .
Lao		<i>Halictheres lao</i> .
Lauhau	Butterfly-fish	<i>Chetodon quadrimaculatus</i> .
Laula	Parrot-fish	<i>Scarus jordanii</i> , etc.
Lauwilīlī		<i>Forcipiger longirostris</i> .
Laukīpala	Mariposa	<i>Lampris luna</i> .
Lolohau	Flying gurnard	<i>Cephalacanthus orientalis</i> .
Loulu	Moorish idol	<i>Zanclus canescens</i> .
Mahīhī	Dolphin	<i>Coryphæna hippurus</i> .

\* In many instances the common name of a closely related species in the United States is given when the particular species in question is not found here.

† Introduced species.

‡ Reputed to be very poisonous.

List of Hawaiian fishes—Continued.

Native name.	Common English name.	Scientific name.
<i>Fishes—Continued.</i>		
Mahimahi	Dolphin	<i>Coryphæna hippurus.</i>
Mahi	Surgeon-fish	<i>Teuthis nigroris.</i>
Makoiako	do	<i>Teuthis lineolatus.</i>
Makaa		<i>Malacanthus brevirostris.</i>
Malamalama		
Malolo	Flying-fish	<i>Cypsilurus simus.</i>
Puhikii	do	<i>Parexocetus mesogaster.</i>
Mamama	Pintano	<i>Abudefduf abdominalis.</i>
Mamamo	Rudder-fish	<i>Kyphosus fuscus.</i>
Mamamu		<i>Sphærodon grandoculis.</i>
Maneono		<i>Zebrasoma hypselopteron.</i>
Manini	Surgeon-fish	<i>Teuthis sandwichensis.</i>
Mano	Shark	
Heau	do	
Nuhl	do	
Mano kihikihii	Hammer-headed shark	<i>Sphyrna zygnæa.</i>
Maumau		
Mikiawa		
Moa	Trunk-fish	<i>Ostracion camurum.</i>
Moano	Goat-fish	<i>Upeneus velifer.</i>
Mol-iii		
Mol		<i>Polydactylus sexfilis.</i>
Mu		<i>Sphærodon grandoculis.</i>
Muntu	Goat-fish	<i>Upeneus trifasciatus.</i>
Nainai	Surgeon-fish	<i>Teuthis olivaceus.</i>
Nanthu		
Nebu	{ Anchovy	<i>Anchovia purpurea.</i>
	{ Silversides	<i>Atherina (new species).</i>
Nenue	Rudder-fish	<i>Hypohus fuscus.</i>
Nihipali		
Nohu		<i>Scorpenopsis cacopsis.</i>
Nohupinao	Flying-fish	
Nunu	Trumpet-fish	<i>Aulostomus chinensis.</i>
Oau		
Oili	File-fish	<i>Monacanthus spiliosomus.</i>
Oiilepa	do	<i>Alutera scripta.</i>
Olo	Bone-fish	<i>Albula vulpes.</i>
do	do	
Amoomoo		
Okubekuhe		
Olale		<i>Thalassoma purpureum.</i>
Omaka	Herring	<i>Perkinsia (new species).</i>
Omitu		<i>Carangus melampygus and C. bajad.</i>
Uno	Suck-fish	<i>Remora remora.</i>
Oopu	Goby	<i>Eleotris fusca and Gobies of all species.</i>
Oopuhue*	Puffer	<i>Tetrodon hispidus.</i>
Oopukai		
Poopaa		<i>Paracirrhites cinctus.</i>
Opakapaka		<i>Apsilus kelloggi.</i>
Opelu	Mackerel scad	<i>Decapterus pinnulatus.</i>
Opule		<i>Anampses evermanni, etc.</i>
Paapaa		<i>Cirrhites marmoratus.</i>
Paka		
Pakakawale		
Pakalakala		
Pakii	Flounder	<i>Platophrys pantherinus.</i>
Pakiki		
Pakole	Surgeon-fish	<i>Teuthis olivaceus.</i>
Pakukui	do	<i>Teuthis achilles.</i>
Pala		
Palani	Surgeon-fish	<i>Teuthis matoides.</i>
Palukaluka	Parrot-fish	<i>Scarus paluca.</i>
Panuhunhu	do	<i>Scarus gilberti.</i>
Paoo		
Pookauiia		<i>Salaris, species.</i>
Paopao		
Piha		
Pilikoa		<i>Paracirrhites forsteri, etc.</i>
Poou		<i>Cheilinus hexagonatus.</i>
Poupou		
Puaa humuhumu	Trigger-fish	<i>Balistes rectangulus.</i>
Pua-ii		
Pua kahala	Amber-fish	<i>Seriola purpurascens.</i>
Puau	Surgeon-fish	<i>Teuthis dussumieri.</i>
Puhel	Moray	<i>Echidna zebra.</i>
Puhi	do	<i>Gymnothorax (new species).</i>
Puhilamilo	do	<i>Gymnothorax undulatus.</i>
Puhuha	Conger eel	<i>Leptocephalus marginatus.</i>
Puhi wela	Moray	<i>Gymnothorax pectus.</i>
Puwalu		
Puull		

\* Reputed to be poisonous.

## List of Hawaiian fishes—Continued.

Native name.	Common English name.	Scientific name.
<i>Fishes—Continued.</i>		
Ubu .....	Parrot-fish .....	<i>Calotomus sandwichensis</i> , etc.
Uhuula .....	do .....	<i>Scarus ahula</i> .
Uhihiki .....	do .....	<i>Apiron microdon</i> .
Uiui .....	Flounder .....	<i>Platophrys pantherinus</i> .
Uku .....	do .....	<i>Apiron virescens</i> .
Ulae .....	Lizard-fish .....	<i>Synodus varius</i> .
Ulaula .....	do .....	<i>Etells marshi</i> .
Ukikiki .....	do .....	do .....
Ulaula .....	do .....	<i>Apsilus kelloggi</i> .
Ulus .....	do .....	<i>Carangus saurus</i> and other large species of <i>Carangus</i> .
Papio .....	do .....	<i>Carangus</i> (species with yellow fins).
Ulua kihl .....	Thread-fish .....	<i>Alectis ciliaris</i> .
Umaumalel .....	do .....	do .....
Uouoa .....	do .....	do .....
Upapalu .....	do .....	<i>Pogon menesemus</i> .
Uu .....	Squirrel-fish .....	<i>Myripristis murdgan</i> .
Pauu .....	do .....	<i>Myripristis</i> (new species).
Uwau .....	do .....	do .....
Uwiwi .....	File-fish .....	<i>Monacanthus spilosomus</i> .
Walu .....	do .....	do .....
Weke .....	Goat-fish .....	<i>Upeneus</i> (all species with yellow stripe on sides).
Oamu .....	do .....	do .....
Wekepuo .....	do .....	<i>Upeneides vittatus</i> .
Wekeula .....	Surmullet .....	<i>Mulloidés pfugeri</i> .
Wekepahulu .....	do .....	<i>Upeneides vittatus</i> .
Welea .....	Barracuda .....	do .....
Wolu .....	do .....	do .....
<i>Crustacea:</i>		
Opai .....	Shrimp .....	do .....
Papai .....	Crab .....	do .....
Aama .....	do .....	do .....
Ula .....	Crawfish .....	do .....
Aloalo .....	do .....	do .....
Ulaapapa .....	do .....	do .....
<i>Mollusca:</i>		
Conch .....	Conch .....	<i>Purpura aperta</i> .
Haukeuke .....	do .....	do .....
Hee .....	Octopus .....	do .....
Hee pulou .....	do .....	do .....
Pulou .....	do .....	do .....
Ina .....	Sea egg .....	do .....
Leho .....	Cowrie .....	<i>Cypræa carneola</i> , etc.
Muhec .....	(?) Squid .....	do .....
Olepa .....	Clam .....	<i>Tellina rugosa</i> .
Ophi .....	Limpet .....	<i>Neritina granosa</i> .
Pa .....	do .....	<i>Melina costellata</i> .
Pupu .....	Sea snail .....	<i>Ricinula horrida</i> .
Wana .....	Sea egg .....	do .....
<i>Miscellaneous:</i>		
Frogs .....	Frogs .....	do .....
Honu .....	Turtle .....	do .....
Limu .....	Algae .....	do .....
Loli .....	Bêche-de-mer .....	do .....
Nala .....	Porpoise .....	do .....
Ounauna alcalea .....	do .....	do .....



GENERAL STATISTICS.

The three tables below show in a condensed form, by islands, the persons employed and nationality of same, the boats, apparatus, fish ponds, and shore and accessory property used in the business, and the catch by species, together with the value of same.

The island of Oahu leads all the others in almost every phase of the industry, followed by Hawaii, Maui, Kauai, Molokai, Lanai, and Niihau in the order enumerated.

The Hawaiians predominate in the fisheries, followed in the order named by the Japanese, Chinese, South Sea Islanders (people from the Gilbert and Marquesas islands), Americans, Portuguese, and Germans. The total number of persons employed was 2,345. This does not include the persons engaged in the wholesale trade of Honolulu and Hilo, or the persons engaged in the various fish markets, as these have been shown elsewhere.

Oahu leads in the matter of total investment, with \$200,544. Hawaii is a poor second, with \$25,172 of total investment. The total investment for all the islands was \$272,591.

So far as quantity was concerned, the catch of akule leads, but amaama was first in value of catch. Other leading species were malolo, ulua, aku, oio, awa, moano, kawakawa, opelu, opihi, and ula. Oahu leads all the other islands in the quantity and value of catch, followed by Hawaii, Maui, Kauai, Molokai, Lanai, and Niihau, in the order as named. The total catch for all the islands amounted to 6,224,455 pounds, valued at \$1,083,646.

The malolo catch was confined almost entirely to Oahu, only 3,080 pounds being secured on Hawaii and Molokai. Oau and olepa were taken only in the fisheries of the island of Oahu. Lolohau, nohupinao, okuhekuhe, wolu, frogs, ounauna alealea and puwere taken only on Hawaii, while the carp and puuli catch was confined solely to Kauai. Ii, pakaikawale, puwalu, and loli were taken only on Maui.

A remarkable feature of the fisheries is that but five species—aku, oio, uku, ulaula, and ulua—were taken commercially on all of the islands. It is possible that some of the others are also to be found around all of the islands, but are not sought for commercially.

Table showing, by islands and nationality, the number of persons engaged in the fisheries in 1900.

Nationality.	Hawaii.	Kauai.	Lanai.	Maui.	Molokai.	Niihau.	Oahu.	Total.
Americans.....	2	3		1				6
Chinese.....	8	34		3	20		173	238
Hawaiian men.....	318	104	40	151	103	8	471	1,195
Hawaiian women.....	87	16	6	80		4	183	376
Japanese.....	134	50		37	5		259	485
Portuguese.....							2	2
South Sea Islanders.....				25			18	43
Total.....	549	207	46	297	128	12	1,106	2,345

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Table showing by islands the boats, apparatus, fish ponds, and property used in 1900.

Items.	Hawaii.		Kauai.		Lanai.		Maui.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Boats.....	198	\$16,946	51	\$3,215	25	\$2,875	80	\$7,675
Apparatus:								
Seines.....	16	780	1	75	21	435	43	1,550
Gill nets.....	96	2,585	14	103			28	700
Bag nets.....	4	120	5	820			49	2,103
Cast nets.....	100	570	16	160			27	270
Dip nets.....	25	125	28	28			25	63
Scoop nets.....			10	10			6	6
Lines.....		568		94		48		124
Spears.....	67	63	12	12			29	35
Baskets (fish).....	30	300					39	390
Baskets (opal).....	52	26	6	3				
Snares.....	8							
Fish traps or pens.....								
Fish ponds.....	4	1,200	6	5,100				
Shore and accessory property.....		1,887		1,144		120		2,255
Total.....		25,172		10,764		3,478		15,171

Items.	Molokai.		Niihau.		Oahu.		Total.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Boats.....	39	\$2,950	4	\$300	348	\$30,980	745	\$64,940
Apparatus:								
Seines.....	9	250			19	1,195	109	4,285
Gill nets.....	14	134			441	8,871	593	12,393
Bag nets.....	9	1,250			29	1,955	96	6,248
Cast nets.....	43	430			83	1,235	269	2,675
Dip nets.....					68	304	146	520
Scoop nets.....					69	45	85	61
Lines.....		78		12		225		1,149
Spears.....	5	3			51	53	164	106
Baskets (fish).....					54	540	123	1,230
Baskets (opal).....					47	21	105	50
Snares.....								3
Fish traps or pens.....					3	1,500	8	1,500
Fish ponds.....	15	11,425			75	149,060	100	166,775
Shore and accessory property.....		620		10		4,560		10,596
Total.....		17,140		322		200,544		272,591

Table showing, by islands and species, the yield of the fisheries in 1900.

Species.	Hawaii.		Kauai.		Lanai.		Maui.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
Aalahi.....	14,430	\$746					6,270	\$1,568
Aawa.....	900	125				\$54	1,516	439
Aha.....					110	11	1,697	170
Ahi.....	27,484	1,280			735	234	1,000	199
Aholehole.....	4,424	212					8,498	1,049
Aku, fresh.....	179,492	19,171	10,892	\$2,724	38,000	2,111	82,400	7,009
Aku, dried.....	21,000	840						
Akule, fresh.....	293,759	33,952	73,614	7,361	33,000	3,300	188,400	13,840
Akule, dried.....	10,340	620						
Amama (mullet).....	8,598	2,573	60,760	9,115	12,000	4,800	24,000	7,000
A'u'a.....	15	1						
Awa.....	275	26	5,109	511	345	35	1,210	517
Awawa, fresh.....	400	39			365	182	2,850	1,225
Awela.....	1,840	188						
Aweoewo.....	25	6			200	50	12,590	3,208
Carp.....			1,500	150				
Hapuupu.....	441	27			213	21	2,623	268
Haululi, fresh.....	26,020	2,686			8,800	760	6,100	905
Haululi, dried.....	8,200	656						
Hihimanu.....	1,462	96			300	15	513	27
Hilu.....	45	5					7,296	876
Hinala.....	1,194	119					12,713	2,543
Humuhumu.....	14,410	967			1,400	112	6,200	496
Ihehe.....	8,400	530			5,300	1,590	10,348	3,884
Ii.....							2,546	256
Iiao.....	1,500	150			10,625	170	10,700	172
Kahala.....	40,776	5,907			5,300	824	9,686	1,359

COMMERCIAL FISHERIES OF THE HAWAIIAN ISLANDS. 463

Table showing, by islands and species, the yield of the fisheries in 1900—Continued.

Species.	Hawaii.		Kauai.		Lanai.		Maul.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
Kaku	600	\$50			125	\$13	4,050	\$507
Kala	4,399	440			1,800	52	11,809	472
Kalekale	300	30			500	50	1,145	115
Kawelea	1,600	128			700	70	600	60
Kawakawa	47,323	2,837			12,000	1,200	40,300	3,330
Kole	12	1			1,600	400	48,300	9,660
Kuapaa	600	30			1,219	122	3,200	320
Kumu	6,300	588			2,714	1,367	14,400	4,275
Kupoupou	148	15					2,125	850
Laenihl	1,200	118			318	78	3,424	856
Lai	2,522	136					13,266	1,659
Lai-pala	10	1					3,415	854
Lauhau	3,331	158					2,008	402
Lolohau	50	5						
Mahimahi	9,390	728			1,300	78	2,705	163
Mufil	100	10			460	92	2,887	577
Maikolko	146	15					4,900	490
Makaa	146	15						
Malamalama	29	3						
Malolo (flying fish)	1,280	112						
Mamamo	50	4					2,129	532
Manini	5,039	382					6,417	1,478
Mano (shark)	2,186	83			961	80	3,600	274
Maumau					82	8	780	78
Miklawa	275	23					493	49
Moano, fresh	143,460	25,163			5,800	1,450	40,200	10,075
Moano, dried	6,100	805						
Moi-ili	2,000	300	12,400	\$2,480	400	20	6,077	303
Mu	25	3			244	61	500	50
Nanihu	10	1			70	7	150	2
Nehu	2,200	220			12,500	200	77,500	1,270
Nenne	400	40			1,200	300	71,200	17,800
Nihipali	12	1						
Nohu	24	2					603	125
Nohupinao	800	30						
Nunu	885	19					1,675	168
Olo	64,509	9,775	51,974	13,017	3,241	810	118,377	29,594
Okuhekuhc	180	18						
Olale	1,177	88					1,960	294
Omakaha	2,100	210						
Omilu	200	20						
Ono	1,888	134			300	90	260	6
Oopu	350	53						
Oopuhue	709	69						
Oopukai	1,139	93					1,192	478
Opakapaka	412	41						
Opelu, fresh	51,396	1,636					41,156	10,289
Opelu, dried	23,100	805						
Opule	32	3			747	149	4,596	615
Paka	400	32					2,062	206
Pakalawale							1,800	180
Pakalakala	61	5			665	67	542	54
Pakiki	1,745	175			182	18	300	30
Pakii	10,869	560			845	127	11,633	1,745
Palani	5,000	391			1,500	225	8,492	1,274
Paopao							950	95
Piha	945	95			3,500	56	5,585	88
Pillkoa	10	1						
Poou	300	30			200	20	444	111
Poupou	60	6			200	20	260	26
Pua-ii					8,750	143	12,500	200
Pualu	5,595	428			2,182	546	2,065	516
Puhi	19,710	1,386			5,200	1,300	35,519	10,109
Puwalu							4,700	470
Puuli			5,100	153				
Uhu	809	81					875	88
Uku	13,372	928	45,722	25,408	1,800	90	11,715	702
Ulae	714	47			216	48	2,015	403
Ulaula	615	61	26,552	14,841	590	148	800	200
Ulua, fresh	88,675	8,564	88,162	10,016	12,100	3,025	90,725	14,334
Ulua, dried	8,214	246						
Umaumalei	200	20					1,100	110
Uouoa	40	3						
Upapalu	1,524	68			114	11	1,543	154
Uu	34,061	2,136			1,111	167	4,785	908
Uwau	210	17						
Walu					700	70	1,200	300
Weke	1,000	100	11,950	2,820			2,400	860
Welea	600	60			2,854	286	18,412	1,841
Wolu	400	40						
Conchs							700	175
Frogs	380	190						
Haukeuke	10	1						

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Table showing, by islands and species, the yield of fisheries in 1900—Continued.

Species.	Hawaii.		Kauai.		Lanai.		Maui.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
Hee (octopus).....	17,416	\$3,031	3,000	\$750	2,200	\$550	4,198	\$1,050
Honu (turtle).....	800	64				975	49	
Ina (sea eggs).....	620	62			300	75	2,870	718
Leho (cowrie).....	200	10					1,736	435
Limu (alga).....	2,150	188	397	81	720	180	2,680	268
Loli (bêche-de-mer)							1,158	116
Miscellaneous shellfish							150	23
Muhee (squid).....					200	20	3,675	368
Naiia (porpoise).....	300	30						
Olepa (clam).....								
Ounauna alealea.....	720	72						
Opal (shrimp).....	1,118	280	400	200			2,500	625
Opihi (limpet).....	16,150	484					1,327	289
Pa.....	300	30						
Papai (crabs).....	800	200	4,567	650	150	38	1,500	375
Pupu (sea snail).....							515	52
Uia (crawfish).....	15,295	1,758	622	156	6,100	1,525	22,631	5,657
Wana (sea egg).....	1,514	151	800	160	6,600	160	8,800	2,220
Total.....	1,304,311	137,734	403,521	89,993	212,628	29,853	1,159,117	190,929

Species.	Molokai.		Niihau.		Oahu.		Total.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
Aalaihī.....	2,875	\$575			3,876	\$969	27,451	\$3,858
Aawa.....	1,205	181			5,921	1,481	9,722	2,280
Aha.....					2,544	283	4,851	464
Ahi.....	603	60			1,909	241	31,731	2,014
Aholehole.....	1,834	275			12,612	3,155	19,368	4,671
Aku, fresh.....	33,300	3,996	380	\$95	56,589	6,277	401,053	41,383
Aku, dried.....							21,000	840
Akule, fresh.....	33,912	3,391			266,643	19,828	839,328	81,672
Akule, dried.....							10,340	620
Aloloi.....	323	65					323	65
Amama (mullet).....	112,514	28,154			503,794	125,920	721,661	177,562
A'ua'u.....					24	4	39	5
Awa.....	2,219	555			233,877	58,139	243,035	59,783
Awaanwa, fresh.....					2,083	522	5,698	1,968
Awaanwa, dried.....			3,100	465			3,100	465
Awelea.....					26	6	1,866	144
Awewco.....	1,275	446			1,375	590	15,465	4,300
Carp.....							1,500	150
China-fish.....					3,988	1,896	3,988	1,396
Ea, fresh.....					193	48	193	48
Ea, dried.....			800	120			800	120
Gold-fish.....					4,854	607	4,854	607
Haputupu.....	502	50			1,890	237	5,659	598
Hauliuli, fresh.....							35,920	3,651
Hauliuli, dried.....							8,200	656
Hihimanu.....					1,790	179	4,065	317
Hilu.....					995	124	8,336	1,005
Hinalea.....	1,696	170			3,143	472	18,746	3,304
Humuhumu.....	7,191	575			14,876	893	14,077	3,043
Ihehe.....	3,240	810			2,017	404	29,300	6,718
Ii.....							2,516	256
Iino.....							22,825	492
Kahala.....	2,148	215			3,915	781	61,825	9,086
Kaku.....					1,067	215	5,742	785
Kala.....	7,421	594			13,766	688	38,095	2,246
Kalekale.....							1,945	195
Kawelea.....							2,900	258
Kawakawa.....	13,674	1,367			78,135	15,627	191,432	24,361
Koae.....	643	96					643	96
Kole.....					6	1	49,918	10,062
Kuapaa.....							5,019	472
Kumu.....	11,631	1,744			20,925	5,207	55,970	13,171
Kupoupou.....	851	213			219	55	3,343	1,133
Kupipi.....					139	16	139	16
Laenihī.....					1,680	421	6,617	1,473
Laī.....	1,634	163			368	37	17,790	1,995
Laipala.....							8,425	855
Lauhau.....	2,065	310			110	11	7,514	881
Lolohau.....							60	5
Mahimahi.....	1,895	114			3,844	502	18,634	1,580
Maii.....					131	20	3,578	699
Maikoiko.....	429	48			122	13	5,597	561
Makaa.....					195	49	841	64
Malamalama.....					3	1	32	4
Malolo (flying-fish).....	800	200			571,002	142,773	573,022	143,085
Mamamo.....					309	78	2,488	514
Manini.....	4,067	767			10,065	2,484	25,528	5,111
Mano (shark).....	596	30			11,490	219	18,833	686

COMMERCIAL FISHERIES OF THE HAWAIIAN ISLANDS. 465

Table showing, by islands and species, the yield of fisheries in 1900—Continued.

	Molokai.		Niuhau.		Oahu.		Total.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
Maumau							862	886
Mikiawa	391	\$39			842	\$211	2,001	322
Moano, fresh	5,497	825			18,042	4,510	212,999	42,023
Moano, dried							6,100	305
Moi-lili					12,642	1,265	33,519	4,368
Mu					32	9	501	123
Nanihu							230	10
Nenu	300	6					92,500	1,696
Nenu					2,280	339	75,060	18,479
Nihipali					42	11	54	12
Nohu	1,006	161			195	47	1,828	325
Nohupinao							300	30
Nunu	2,051	206			1,021	102	5,132	495
Oau					319	80	319	80
Oio	86,000	9,000	7,200	\$1,800	40,322	10,080	321,623	74,076
Okuhekuhe							180	18
Olale	1,612	161			11	3	4,760	541
Omakaha					8,627	906	5,727	1,116
Omlu					12,276	1,841	12,476	1,861
Ono	1,171	176			560	56	4,179	462
Oopu					3,843	577	4,193	630
Oopuhue					130	20	839	89
Oopukai	694	139			1,948	486	4,973	1,196
Opakapaka					6,056	606	6,468	647
Opelu, fresh	13,842	2,768			9,361	2,340	115,695	17,033
Opelu, dried							23,100	805
Opule	1,739	174			969	243	8,083	1,214
Paka	1,303	139					3,765	368
Pakakawale							1,800	180
Pakalakala					10	1	1,278	127
Pakiki							2,227	223
Pakih	4,129	413			4,372	1,530	31,848	4,375
Pala	9,700	1,455					9,700	1,455
Pulani	2,540	381			2,604	551	20,136	2,822
Paopao	745	75					1,695	170
Piba							10,030	289
Pilikoa					212	32	222	33
Poon					206	31	1,150	192
Poupou					26	2	546	54
Pua-ii							21,250	340
Pualu					1,876	402	11,718	1,892
Puhi	8,064	968			6,582	658	75,075	14,421
Puwalu							4,700	470
Puuili							5,100	163
Uhu	5,674	567			10,505	2,101	17,863	2,887
Uku	2,617	131	4,400	1,100	14,605	1,459	94,231	29,818
Ulae	616	123			97	10	3,658	626
Ulaula	775	116	1,200	480	11,236	2,809	41,768	18,156
Uluu, fresh	16,692	3,338	4,900	490	324,272	67,630	625,626	107,397
Uluu, dried			5,100	510			13,314	756
Umaumalei					40	4	1,340	134
Uouoa					8	2	48	5
Upapalu	314	31			1,983	297	5,478	561
Ui	1,090	131			33,154	8,288	74,151	11,630
Uwau					185	46	395	63
Walu							1,900	370
Weke	2,878	345	600	120	70,713	17,675	89,641	21,420
Weloa	2,422	242			316	64	24,604	2,498
Wolu							400	40
Conchs.							700	176
Frogs							380	100
Haukeke					50	13	60	14
Heo (octopus)	1,700	340			26,085	6,521	54,499	12,242
Honu (turtle)	160	9			2,745	367	4,370	479
Ina (sea eggs)							3,790	855
Leho (cowrie)							1,936	445
Limu (algæ)			145	15	36,672	4,584	42,764	5,316
Loil (bêche-de-mer)							1,158	116
Miscellaneous shellfish							150	23
Muhec (scud)					24	4	3,899	392
Nala (porpoise)					60	2	360	32
Olepa (clam)					827	49	327	49
Ounauna alealea							720	72
Opal (shrimp)					3,694	797	7,712	1,902
Opilal (limpet)			250	65	129,500	19,425	147,227	20,263
Pa							300	30
Papal (crabs)					8,670	2,168	15,687	3,831
Pupu (sea snail)							515	52
Ula (crawfish)			1,200	300	85,334	8,551	131,182	17,947
Wana (sea eggs)			250	63	4,587	1,147	16,681	3,891
Total	376,256	67,599	29,525	5,623	2,737,198	561,915	6,222,455	1,083,646

## THE FISHERIES OF HAWAII.

This island is divided into the districts of Hamakua, Hilo, Kau, Kohala, Kona, and Puna. The districts of Kona and Kohala are also frequently subdivided into North and South Kona and North and South Kohala. The only places of importance on the coast are Hilo on the east, Kailua and Napoopoo on the west, and Kawaihae on the northwest. There have been more railroads completed and projected on this island than on any of the others. The Hilo Railroad Company was incorporated March 28, 1899, and so far has completed its railroad from Hilo to Puna plantation, 23 miles. The Oloo branch leaves the main line near Oloo mill and has been located a distance of 17 miles through Oloo toward the volcano of Kilauea. Work on the Kohala Railroad was begun in 1881 and completed in 1882. This road begins at Mahukona and runs along the shore to Niulii, a distance of 20 miles. Although constructed primarily for the benefit of the sugar plantations, the railroads have been of considerable aid to the fisheries, as they have furnished a regular and fairly cheap medium of transportation from the fisheries to the plantations, many of which were inaccessible to the fishermen before.

The Kohala and Hilo Railway Company was incorporated in June, 1899, and when completed will run from Hilo, through the districts of Hilo and Hamakua, to the port of Mahukona, in the Kohala district. This will tap an especially good fishing region, which is but slightly worked at present, owing to the lack of transportation facilities.

In August, 1901, the Kona and Kau Railway Company, limited, was incorporated. This company intends building in the districts of North and South Kona and Kau.

Along the coasts of the Puna and Kau districts sponges are frequently washed up during storms. It is said by persons who have seen them that, while not of as good quality as the Florida sponges, still they are thought to be suitable for some purposes. No attempt has been made as yet to utilize them commercially, although it is possible there would be considerable money in the business could the sponges be properly prepared for market.

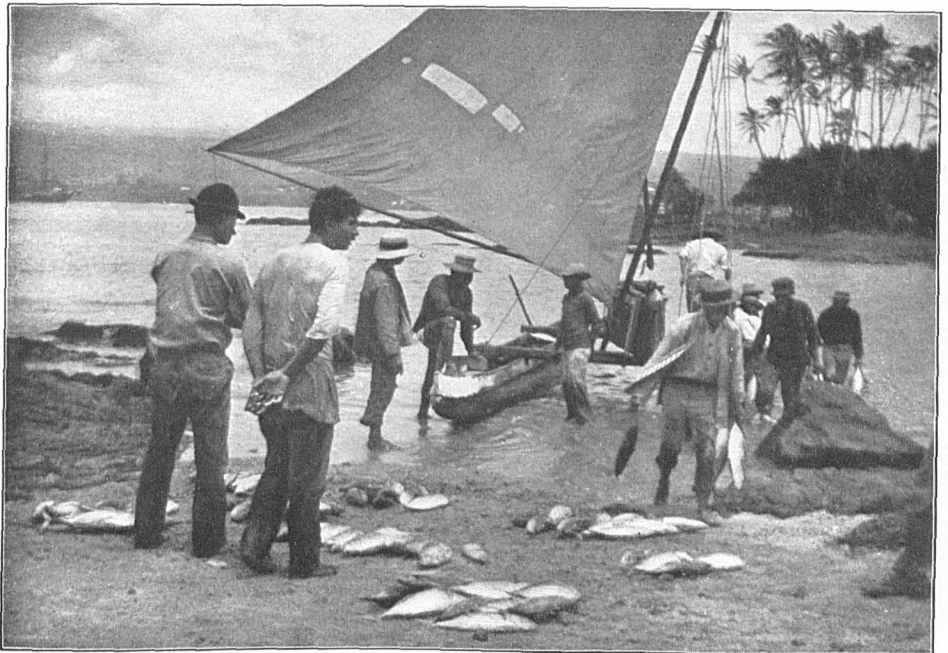
The tables which follow (with those already given) show the general features of the fisheries of the island.

The Hawaiians predominate in the fisheries, 405, counting men and women, being employed. Although the Japanese have only engaged in fishing on this island about ten years, they already number 134, and are rapidly increasing from year to year. Only 8 Chinese and 2 Americans were engaged. The total number was 549. The line fisheries employ the largest number of persons, 408, followed by the cast-net fisheries with 105. The seine and spear fisheries employ the same number of persons, 67.



BANANA PLANTATIONS.

Goldfish, etc., are raised in the trenches.



LANDING FISH (AKU) AT WAIAKEA, HILO.

Canoes, rowboats, sampans, and seine boats were the types of boats in use. The most important form of apparatus in use in the fisheries was the gill net. Lines were second so far as value was concerned. Only four fish ponds were used commercially. The total investment for the whole island amounted to \$25,172.

Hilo district was the most important fishing section, followed by Kona, Kohala, Hamakua, Puna, and Kau districts in the order named. Akule was the leading species, 304,099 pounds, valued at \$34,572, having been secured. Aku, moano, oio, ulua, and hee were the other leading species. The total catch for the island amounted to 1,304,311 pounds, valued at \$137,734.

Table showing, by nationality, the number of persons using each form of apparatus in the fisheries of Hawaii in 1900.

Nationality.	Seine.	Gill net.	Bag net.	Cast net.	Dip net.	Line.	Spear.	Snare.	Basket, fish.	Basket, opai.	Fish pond.	Hand.	Total, exclusive of duplication.
Americans .....		1									1		2
Chinese .....	6										8		8
Hawaiian men .....	41	13	20	78	40	232	67	8	15		2	35	318
Hawaiian women .....				7		12				52		18	87
Japanese .....	20	19		20		114							134
Total .....	67	38	20	105	40	408	67	8	15	52	11	53	549

The line fisheries occupy first position, with 998,916 pounds, valued at \$110,855, more than two-thirds of the total catch for the whole island. The principal species secured in this fishery were akule, aku, moano, oio, ulua, kahala, and kawakawa.

The seine fisheries were second so far as quantity was concerned, but third in the value of same, the gill-net fisheries being second in value and third in catch. The principal species taken in the seine fisheries were akule, opelu, ulua, and iheihe, and in the gill-net fisheries akule, hauliuli, uu, and ulua.

The cast-net fisheries amounted to 61,531 pounds, valued at \$4,292. The principal species were akule, aalaihii, ahia, and pakii.

Opelu alone were taken in the bag-net and dip-net fisheries.

In the basket fisheries manini, puhii, and opai were the principal species obtained.

Hee, kumu, and hihimanu were the leading species secured in the spear fisheries, while ula alone were taken in the snare fisheries.

In the hand fisheries opihi, ula, hee, and papai were the leading species captured.



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Table showing, by apparatus and species, the yield of the fisheries of Hawaii in 1900.

Apparatus and species.	Lbs.	Value.	Apparatus and species.	Lbs.	Value.
<b>Seines:</b>			<b>Gill nets—Continued.</b>		
Aalaiah	355	\$36	Ulua	2,675	\$580
Aawa	700	105	Umaumalei	200	20
Aholehole	1,200	180	Uouoa	40	3
Amama	3,900	975	Uu	7,900	790
Akule	11,400	1,143	Uwau	210	17
Awa	200	20	Weke	500	75
Awaawa	300	24	Welca	600	60
Ihiehē	7,300	365	Haukeuke	10	1
Iiao	1,500	150	Ula	7,825	939
Kahala	290	15	<b>Total</b>	<b>63,312</b>	<b>8,130</b>
Kala	680	68	<b>Bag nets:</b>		
Kawela	1,600	128	Opelu, fresh	13,000	390
Kawakawa	2,600	130	Opelu, dried	14,100	423
Kumu	1,800	138	<b>Total</b>	<b>27,100</b>	<b>813</b>
Laenihi	300	30	<b>Cast nets:</b>		
Lai	400	20	Aalaiah	14,075	710
Mahamalama	29	3	Ahuluhulu	100	10
Malolo	800	64	Amama	1,800	900
Mano	206	4	Ahia	11,579	554
Mikiawa	275	23	Akule	18,136	1,268
Moano	1,400	140	Lauhau	3,251	152
Nehu	2,200	220	Olale	1,132	78
Nunu	385	19	Oopuhue	609	61
Omakaha	2,100	210	Pakii	10,849	559
Opelu, fresh	12,623	407	<b>Total</b>	<b>61,531</b>	<b>4,292</b>
Opelu, dried	7,400	222	<b>Dip nets:</b>		
Pakiki	1,745	175	Opelu	22,700	681
Palani	300	12	<b>Lines:</b>		
Pihā	945	95	Ahi	15,722	708
Puahu	800	80	Aholehole	24	2
Ulae	417	17	Aku, fresh	179,492	19,171
Weke	4,800	696	Aku, dried	21,000	840
<b>Total</b>	<b>71,447</b>	<b>5,939</b>	Akule, fresh	248,114	29,125
<b>Gill nets:</b>			Akule, dried	10,340	620
Aawa	200	20	Awela	1,040	58
Awaawa	100	15	Hapuupuu	441	27
Awa	75	6	Haululi, fresh	18,820	1,506
Ahi	183	18	Haululi, dried	8,200	656
Akule	16,109	2,416	Hihimau	290	29
A'ani'u	15	1	Hinaloa	944	94
Awela	800	80	Humuhumu	13,010	827
Awoowo	25	6	Kahala	40,486	5,892
Haululi	7,200	1,080	Kalekale	300	30
Hilu	45	5	Kawakawa	44,723	2,707
Hunuhumu	1,400	140	Kuapan	600	60
Ihiehē	1,100	165	Kupoupu	148	15
Kaku	500	50	Laenihi	800	80
Kala	2,900	290	Lai	1,612	65
Kole	12	1	Mahimahi	9,390	723
Kumu	1,400	140	Maikoiko	96	10
Laenihi	100	8	Makaa	146	15
Lai	510	51	Malolo	480	48
Laiipala	10	1	Manini	2,039	82
Lauhau	80	6	Mano	1,800	72
Lolohau	50	5	Moano, fresh	142,060	25,023
Maii	100	10	Moano, dried	6,100	305
Maikoiko	50	5	Nohu	24	2
Mamamo	20	2	Nohupinao	300	30
Mano	180	7	Olo	63,109	9,635
Manini	1,300	130	Omilu	200	20
Moi-lif	2,000	300	Ono	1,888	134
Mu	25	3	Oopuhue	100	8
Nanihu	10	1	Oopukal	1,139	93
Nenuē	400	40	Opakapaka	300	30
Nihipali	12	1	Opelu, fresh	2,499	107
Oio	1,400	140	Opelu, dried	1,600	160
Olale	45	5	Opule	82	3
Opakapaka	112	11	Paka	400	82
Opelu	514	51	Palani	2,600	169
Pakalakala	61	5	Puahu	3,295	198
Pakii	20	1	Puhi	17,892	1,113
Palani	1,400	140	Ulae	405	40
Pihikoa	10	1	Uku	13,372	928
Pouu	300	30	Ulua, fresh	81,200	7,288
Poupou	60	6	Ulua, dried	8,214	246
Puahu	1,200	120			
Uhu	809	81			
Ulae	300	30			
Ulaula	210	21			

Table showing, by apparatus and species, the yield of the fisheries of Hawaii in 1900—Continued.

Apparatus and species.	Lbs.	Value.	Apparatus and species.	Lbs.	Value.
<b>Lines—Continued.</b>			<b>Spears—Continued.</b>		
Upapalu.....	1,524	\$88	Palani.....	500	\$50
Uu.....	26,161	1,346	Pualu.....	200	20
Wolu.....	400	40	Puhi.....	418	63
Hee.....	3,142	314	Hee.....	12,674	2,347
Nafa.....	300	30	Honu.....	800	64
Ounatuna alenlea.....	720	72	Ula.....	100	25
Uln.....	3,025	303			
<b>Total.....</b>	<b>998,916</b>	<b>110,855</b>	<b>Total.....</b>	<b>18,964</b>	<b>2,946</b>
<b>Baskets:</b>			<b>Snare:</b>		
Hinalea.....	250	25	Ula.....	600	60
Kala.....	819	82			
Mamamo.....	30	2	<b>Hands:</b>		
Manini.....	1,700	170	Hee.....	1,600	370
Palani.....	200	20	Ina.....	620	62
Pualu.....	100	10	Leho.....	200	10
Puhi.....	1,400	210	Limu.....	2,760	188
Opai.....	818	205	Opihi.....	16,150	484
<b>Total.....</b>	<b>5,317</b>	<b>724</b>	Pa.....	300	30
<b>Spears:</b>			Papai.....	800	200
Hihimanu.....	1,172	67	Ula.....	3,745	431
Kumu.....	3,100	310	Wana.....	1,514	151
			<b>Total.....</b>	<b>27,079</b>	<b>1,926</b>

The fish ponds on Hawaii are of very little importance at present. While there are a number at various places around the island, only four were used commercially. Gill nets alone were used in the fish ponds, and their yield in 1900 was only 1,853 pounds, valued at \$416.

Commercial fishing was carried on in but two rivers, the Wailoa and Wailuke, both in the district of Hilo. In the Wailoa River baskets, spears, and lines were employed. The only commercial fishery for frogs on the islands was carried on in this river. This fishery began in 1900, the year under investigation. Lines alone were used in the Wailuke River, amaama being the species sought for.

The following table shows the yield and value of the river fisheries of Hilo in 1900:

Rivers.	Apparatus.	Species	Lbs.	Value.
Wailoa.....	Baskets.....	Opai.....	300	\$75
	.....do.....	Oopu.....	350	53
	Spears.....	Frogs.....	210	105
	Lines.....	.....do.....	170	85
Wailuke.....	.....do.....	Amaama.....	620	130
	Lines.....	.....do.....	800	200

**KAHOOLAWE.**

This is a small island 6 miles west of Maui. The raising of sheep is the only business of the island, 10 persons being employed. These people have a seine which they use in catching a supply of fish for their own consumption. Formerly they sent the surplus to Lahaina whenever an extra large catch was made, but during the past two years they have evidently done but little, as nothing has been received

there from them. There are said to be plenty of fish around the island, but the owner of it claims the fishery right and refuses to allow the fishermen from the other islands to fish there unless they pay him for the privilege.

#### THE FISHERIES OF KAUAI.

There is little fishing prosecuted from this island, although the adjacent waters are said to teem with fish; but this is largely accounted for by the fact that the efforts of the islanders are devoted almost exclusively to sugar-cane growing, in which more money can be made than in fishing. The writer was informed by numerous white residents that during the greater part of the year it was impossible to purchase fresh fish at any price. Occasionally a few peddlers with horses and small carts make trips through the easily accessible portions of the island with the surplus catch of the fisheries. Those in the vicinity of the fisheries drive to them when they are in operation and thus secure a supply of fish, but as they are operated but a few months of the year, and frequently encounter bad seasons, owing to weather, etc., they can not be counted upon for a steady supply. Kauai is divided into five districts, Hanalei, Kawaihau, Lihue, Koloa, and Waimea. Waimea is the principal town.

The natives predominate in the fisheries, followed by the Japanese, Chinese, and Americans in the order named. The bag-net fisheries employ the greater number of persons with 72, followed by the line fisheries with 64 persons.

*Table showing, by nationality, the number of persons using each form of apparatus in the fisheries of Kauai in 1900.*

Nationality.	Seine.	Gill net.	Bag net.	Cast net.	Dip net.	Scoop net.	Line.	Spear.	Basket, opai.	Hand.	Total, exclusive of duplication.
Americans .....	1		1		1						3
Chinese .....		6	18		10						34
Hawaiian men .....	8	9	53	4	17	10	26	12			104
Hawaiian women .....				6						10	16
Japanese .....				6			38		6		50
Total .....	9	15	72	16	28	10	64	12	6	10	207

The line fisheries yielded the largest returns of any of the forms of apparatus in use. The principal species taken in this fishery were ulua, uku, oio, and ula'ula. The bag-net fisheries occupy second place, the leading species taken in them being akule and amaama. The seine, dip net, scoop net, gill net, spear, and hand fisheries follow in the order enumerated.

Table showing, by apparatus and species, the yield of the fisheries of Kauai in 1900.

Apparatus and species.	Lbs.	Value.	Apparatus and species.	Lbs.	Value.
<b>Seines:</b>			<b>Scoop nets:</b>		
Akule (Hahalalu).....	12, 414	\$1, 241	Puuli.....	5, 100	\$153
Amaama.....	5, 200	780	<b>Spears:</b>		
Oio.....	2, 900	725	Hee.....	3, 000	750
Ulua.....	1, 800	270			
<b>Total.....</b>	<b>22, 314</b>	<b>3, 016</b>	<b>Lines:</b>		
<b>Bag nets:</b>			Aku.....	10, 892	2, 724
Akule (Hahalalu).....	61, 200	6, 120	Oio.....	36, 061	9, 016
Amaama.....	23, 510	3, 527	Uku.....	45, 722	25, 408
Oio.....	13, 013	3, 276	Ulaula.....	26, 552	14, 341
Ulua.....	18, 833	1, 388	Ulua.....	72, 529	8, 363
<b>Total.....</b>	<b>111, 556</b>	<b>14, 306</b>	Weke.....	11, 950	2, 820
<b>Dip nets:</b>			<b>Total.....</b>	<b>203, 706</b>	<b>62, 672</b>
Mol-Ili.....	8, 300	1, 060	<b>Hands:</b>		
Papal.....	4, 567	550	Ilimu.....	397	81
<b>Total.....</b>	<b>12, 867</b>	<b>2, 210</b>	Ulu.....	622	156
<b>Gill nets:</b>			Wana.....	800	160
Mol-Ili.....	4, 100	820	<b>Total.....</b>	<b>1, 819</b>	<b>397</b>

The products of the pond fisheries are of but little importance, as the ponds were few in number and did not receive much attention. Gill nets were used exclusively in fishing them. A few German carp were captured in them, and these were the only ones taken commercially in the fisheries of the islands. The catch aggregated 28,409 pounds and was valued at \$3,931.

The river fisheries of Kauai, like those of the other islands, are insignificant in extent. During 1900 fishing was carried on in the Hanapepe, Waiaula, and Waimea rivers, cast nets and opai baskets being used. Amaama and opai were the only species taken, the aggregate catch being 10,250 pounds of amaama, valued at \$1,538, and 400 pounds of opai, worth \$200.

THE FISHERIES OF LANAI.

Schools of fishes congregate around the shores of this island, and it is a favorite fishing-ground for the fishermen from Lahaina and the eastern portion of Molokai. Only natives were engaged in the fisheries. Seines and lines were the only forms of apparatus in use, but a number of women and children engaged in fishing with their hands. The total investment in the fisheries of the island was \$3,478. The principal species taken in the fisheries were akule, aku, amaama, and ulua. The total catch amounted to 212,628 pounds, valued at \$29,853. The portion of the catch not consumed locally is usually carried to the markets at Lahaina, on Maui.

The products of the seine and line fisheries are almost the same, both in quantity and value. In the line fisheries the aku, ulua, kawakawa, and puhi were the leading species, while in the seine fisheries akule, amaama, kumu, and iheihe were most prominent.

Table showing, by apparatus and species, the yield of the fisheries of Lanai in 1900.

Apparatus and species.	Lbs.	Value.	Apparatus and species.	Lbs.	Value.
<b>Seines:</b>			<b>Lines—Continued.</b>		
Ahi.....	335	\$84	Haululu.....	3,800	\$760
Akule.....	33,000	3,300	Hihimanu.....	300	15
Amaama.....	12,000	4,800	Humuhumu.....	1,400	112
Iheihc.....	4,100	1,230	Ihelhc.....	1,200	360
Iiao.....	10,625	170	Kahala.....	5,300	824
Kala.....	1,300	52	Kaku.....	125	13
Kalekale.....	300	* 30	Kalekale.....	200	20
Kawelea.....	918	92	Kawakawa.....	12,000	1,200
Kole.....	1,600	400	Mahimahi.....	1,300	78
Kuapaa.....	1,219	122	Mano.....	961	80
Kumu.....	2,714	1,357	Moano.....	4,200	1,050
Laenihl.....	313	78	Olo.....	3,241	810
Maiih.....	460	92	Ono.....	300	90
Maumau.....	82	8	Pakiki.....	182	18
Moano.....	1,600	400	Pakih.....	845	127
Moi-ih.....	400	20	Palani.....	1,500	225
Mu.....	244	61	Poou.....	200	20
Nanihu.....	70	7	Puulu.....	1,000	250
Nehu.....	12,600	200	Puhi.....	5,200	1,300
Nenue.....	1,200	300	Uku.....	1,800	90
Opule.....	747	149	Uiai.....	216	43
Pakalakala.....	665	67	Ulaula.....	590	148
Piha.....	3,500	56	Ulua.....	12,100	3,025
Poupou.....	200	20	Upapalu.....	114	11
Pua-II.....	8,750	140	Uu.....	1,111	167
Puulu.....	1,132	236	Walu.....	700	70
Welca.....	336	94	Welca.....	1,700	170
Wuhec.....	200	20			
<b>Total.....</b>	<b>101,160</b>	<b>13,645</b>	<b>Total.....</b>	<b>101,398</b>	<b>13,690</b>
<b>Lines:</b>			<b>Hands:</b>		
Aawa.....	180	54	Hee.....	2,200	550
Aba.....	110	11	Ina.....	300	75
Ahi.....	400	150	Limu.....	720	180
Aku.....	38,000	2,111	Papai.....	150	38
Awa.....	345	35	Uia.....	6,100	1,525
Awaawa.....	365	182	Wana.....	600	150
Aweoweo.....	200	50			
Hapuupuu.....	213	21	<b>Total.....</b>	<b>10,070</b>	<b>2,518</b>

## THE FISHERIES OF MAUI.

Maui is divided into five districts—Hana, Honuaula, Kaupo, Lahaina, and Wailuku. Kahului, on Kahului Bay, on the north of the neck of land joining the two parts of the island, and Lahaina are shipping ports with fairly safe harbors. The principal port is Lahaina, which was formerly a place of much greater importance than at present, having been the favorite residence of the kings for many years. During the palmy days of the whale fishery Lahaina was a popular port of call for whalers who wanted supplies, as Maui was noted for its potatoes and wheat. At one time the Pacific coast, during the early gold discoveries, drew most of its food supplies of these products from this island. The whalers in time ceased to visit the islands, and as the mainland furnished its own food supplies after a few years, Maui rapidly decreased in wealth and population. Sugar is now the principal crop of the island. Lahaina and Wailuku are the only towns of any size on the island.

A railroad now extends from Wailuku to Kahului, Sprecklesville, and Keia, and this has aided somewhat in extending the opportunities for the marketing of the fishery products taken at the Kahului fishery.

The irrigation dams and ditches on Maui contain numbers of carp and gold-fish, but no commercial use is made of them as yet. The Japanese and Chinese take them in large numbers for home consumption.

The fresh-water streams contain gold-fish, oopu, uwau, and opai, but practically no commercial use is made of these, although large quantities are taken by the natives for home use.

Table showing, by nationality, the number of persons using each form of apparatus in the fisheries of Maui in 1900.

Nationality.	Haul seine.	Gill net.	Bag net.	Cast net.	Dip net.	Scoop net.	Basket.	Line.	Spear.	Hand.	Total exclu- sive of du- plication.
Americans.....	1										1
Chinese.....	3										3
Hawaiian men.....	49	12	110	3	25	6	8	84	9	8	151
Hawaiian women.....										80	80
Japanese.....				24				25			37
South Sea Islanders.....							25		20		25
Total.....	53	12	110	27	25	6	33	109	29	88	297

The table below shows by apparatus and species the yield of the fisheries.

The bag-net fisheries were first in importance, with 385,824 pounds, valued at \$68,308. Nenuue, oio, opelu, kole, moano, and ulua were the principal species taken.

The line catch was second in importance, with 334,387 pounds, valued at \$56,481. The leading species taken were oio, aku, puhi, ulua, and moano.

Table showing, by apparatus and species, the yield of the fisheries of Maui in 1900.

Apparatus and species.	Lbs.	Value.	Apparatus and species.	Lbs.	Value.
<b>Seines:</b>			<b>Seines—Continued.</b>		
Ahi.....	700	\$70	Opule.....	920	\$184
Akule.....	138,400	13,840	Pakalakala.....	542	54
Amaama.....	8,000	2,000	Palani.....	4,400	660
Awaawa.....	2,050	1,025	Paopao.....	950	95
Ihelhe.....	5,683	1,705	Piha.....	5,000	80
Iio.....	10,000	160	Poupou.....	260	26
Kahala.....	900	144	Pua-il.....	12,500	200
Kala.....	1,200	48	Pualu.....	800	200
Kalekale.....	900	90	Ulai.....	1,600	320
Kuwelea.....	600	60	Ulua.....	6,100	1,525
Kawakawa.....	10,000	1,000	Weke.....	1,100	165
Kole.....	1,800	360	Welea.....	3,900	390
Kuapaa.....	3,200	320	Muhce.....	500	50
Kumu.....	11,700	2,925			
Laenhi.....	300	75	Total.....	262,183	30,017
Lal.....	6,300	788			
Mali.....	500	100	<b>Gill nets:</b>		
Mano.....	800	67	Aholehole.....	800	240
Maumau.....	180	18	Amaama.....	16,000	5,000
Mikinwa.....	433	49	Awa.....	1,000	500
Moano.....	1,400	350	Awanawa.....	600	150
Mol-lil.....	380	19	Aweoweo.....	7,000	1,750
Mu.....	200	50	Kala.....	1,100	44
Nanihu.....	150	2	Lal.....	6,966	871
Nehu.....	15,000	270	Manini.....	720	180
Nenuue.....	1,700	425	Mol-lil.....	3,800	190
Nunu.....	1,075	108	Nenuue.....	1,800	450

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Table showing, by apparatus and species, the yield of the fisheries of Maui in 1900—Cont'd.

Apparatus and species.	Lbs.	Value.	Apparatus and species.	Lbs.	Value.
<b>Gill nets—Continued.</b>			<b>Lines—Continued.</b>		
Oio.....	500	\$125	Awaawa.....	200	850
Uluu.....	8,920	2,230	Aweoweo.....	5,190	1,858
Welea.....	6,504	650	Hapupuuu.....	2,623	263
Total.....	55,710	12,380	Haululu.....	6,100	420
<b>Bag nets:</b>			Hihimanu.....	513	27
Aalalhi.....	2,770	693	Hinalea.....	2,100	420
Aha.....	1,612	161	Humuhumu.....	6,200	496
Hiluu.....	3,196	384	Ihelhe.....	3,260	979
Hinalea.....	4,013	803	Kahala.....	8,786	1,215
Ihelhe.....	1,400	700	Kaku.....	150	19
Il.....	2,546	256	Kalekale.....	245	25
Iiao.....	700	12	Kawakawg.....	30,300	2,330
Kala.....	4,709	188	Kupoupou.....	1,080	432
Kole.....	46,500	9,300	Mahimahi.....	2,705	163
Kumu.....	2,700	1,350	Maou.....	1,400	117
Kupoupou.....	1,045	418	Moano.....	17,800	4,475
Laenihl.....	3,124	781	Nohu.....	603	125
Lalpala.....	3,415	854	Oio.....	76,700	19,175
Lauhau.....	1,208	242	Ono.....	260	6
Maiih.....	2,387	477	Oopukai.....	1,192	478
Mamamo.....	529	132	Paku.....	2,062	206
Manini.....	1,957	489	Pakih.....	1,000	150
Maumau.....	600	60	Pakiki.....	300	30
Moano.....	21,000	5,250	Palani.....	1,892	284
Mot-ih.....	1,897	84	Poou.....	444	111
Nehu.....	62,500	1,000	Pualu.....	1,265	316
Neaue.....	67,700	16,925	Puhi.....	19,319	6,059
Nunu.....	600	60	Uku.....	11,715	702
Oau.....	940	109	Ulae.....	415	83
Oio.....	41,177	10,294	Ulaula.....	800	200
Opelu.....	41,156	10,289	Uluu.....	28,800	5,850
Opule.....	3,675	461	Upapahu.....	200	20
Paha.....	685	8	Uu.....	776	116
Puwalu.....	4,700	470	Walu.....	1,200	300
Uhu.....	875	88	Welea.....	8,008	801
Uluu.....	40,905	4,728	Muhece.....	75	8
Umaumalei.....	1,100	110	Papai.....	1,600	375
Upapalu.....	1,343	134	Total.....	334,387	56,481
Uu.....	3,959	792	<b>Baskets:</b>		
Weke.....	1,300	195	Hiluu.....	4,100	492
Total.....	385,824	68,308	Himalea.....	6,320	1,320
<b>Cast nets:</b>			Kala.....	4,800	192
Aalalhi.....	3,500	875	Mamamo.....	1,600	400
Lauhau.....	800	160	Manini.....	2,800	700
Olale.....	1,960	294	Palani.....	2,200	330
Pakih.....	7,933	1,190	Puhi.....	14,000	3,500
Total.....	14,193	2,519	Total.....	36,100	6,934
<b>Scoop nets:</b>			<b>Spears:</b>		
Kaku.....	3,900	488	Mano.....	1,400	90
Pakaikuwale.....	1,800	180	Puhi.....	2,200	550
Pakih.....	2,700	405	Hee.....	1,398	350
Total.....	8,400	1,073	Honu.....	975	49
<b>Dip nets:</b>			Muhece.....	8,100	310
Aweoweo.....	400	100	Total.....	9,073	1,349
Maikoiko.....	4,900	490	<b>Hands:</b>		
Opal.....	2,500	625	Conchs.....	700	175
Ula.....	6,800	1,700	Hee.....	2,800	700
Total.....	14,600	2,915	Ina.....	2,870	718
<b>Lines:</b>			Leho.....	1,738	435
Aawa.....	1,516	439	Limu.....	2,680	268
Aha.....	85	9	Loli.....	1,158	116
Ahi.....	300	129	Mollusk.....	150	23
Aholehole.....	2,698	809	Ophi.....	1,327	289
Aku.....	82,400	7,009	Pupu.....	615	62
Awa.....	210	17	Ula.....	15,831	3,957
			Wana.....	8,380	2,220
			Total.....	38,647	8,953

THE FISHERIES OF NIIHAU.

This island is devoted almost exclusively to the raising of sheep, and fishing is carried on in a desultory fashion by the employees of the sheep ranch and their families. What they do not consume is carried across the strait to Waimea, on Kauai, and sold there. A small portion of the catch is also dried. Native men and women alone engage in the fisheries. The following table shows by apparatus the yield of the fisheries in 1900:

Species.	Lbs.	Value.
<b>Lines:</b>		
Aku.....	380	\$95
Awaawa, dried.....	3,100	465
Ea, dried.....	800	120
Olo.....	7,200	1,800
Ulaula.....	1,200	480
Uku.....	4,400	1,100
Ulua, fresh.....	4,900	490
Ulua, dried.....	5,100	510
Weke.....	600	120
Total.....	27,680	5,180
<b>Hands:</b>		
Limu.....	145	16
Ophi.....	250	65
Ula.....	1,200	300
Wana.....	250	63
Total.....	1,845	443

THE FISHERIES OF MOLOKAI.

Although one of the larger islands of the group, Molokai has but a very small part of the total population. It must have supported a considerable native population at one time, as there are a large number of fish ponds on the southern side of the island, many of which have been abandoned, as, owing to a lack of market consequent upon the rapid dying out of the native population, it did not pay to keep them up. The island at present is used mainly for grazing, as the lack of water makes it unsuitable for the growing of sugar cane. There are no harbors along the coast and no settlements of any size. Pukoo and Kaunakakai, the principal places, are very small villages.

About the center of the northern side of the island, on a point of land extending a considerable distance out into the ocean, are located the two leper settlements, which contain more than half of the total population of the island. Fishing is carried on at these settlements by the lepers—3 bag nets, valued at \$450; 10 cast nets, worth \$100, and \$18 worth of lines, being used. The board of health for the territory, which has charge of the settlements, purchases all the fish that are caught, provided the fishermen care to dispose of them, at a uniform price of 7 cents per pound, and distributes these in lieu of meat ration. Should the fishermen wish to sell personally to the people of the settlements they are permitted to do so. The fishermen are all lepers. This fishing has been included in the tables.



Near Kaunakakai large numbers of clams are found growing in the mud, but are not eaten because of a fine grit found in them.

During 1900 there were 20 Chinese (all in the fish-pond fisheries), 103 natives, and 5 Japanese engaged in the fisheries. The Chinese used gill nets exclusively, the Japanese cast nets, and the natives all forms of apparatus.

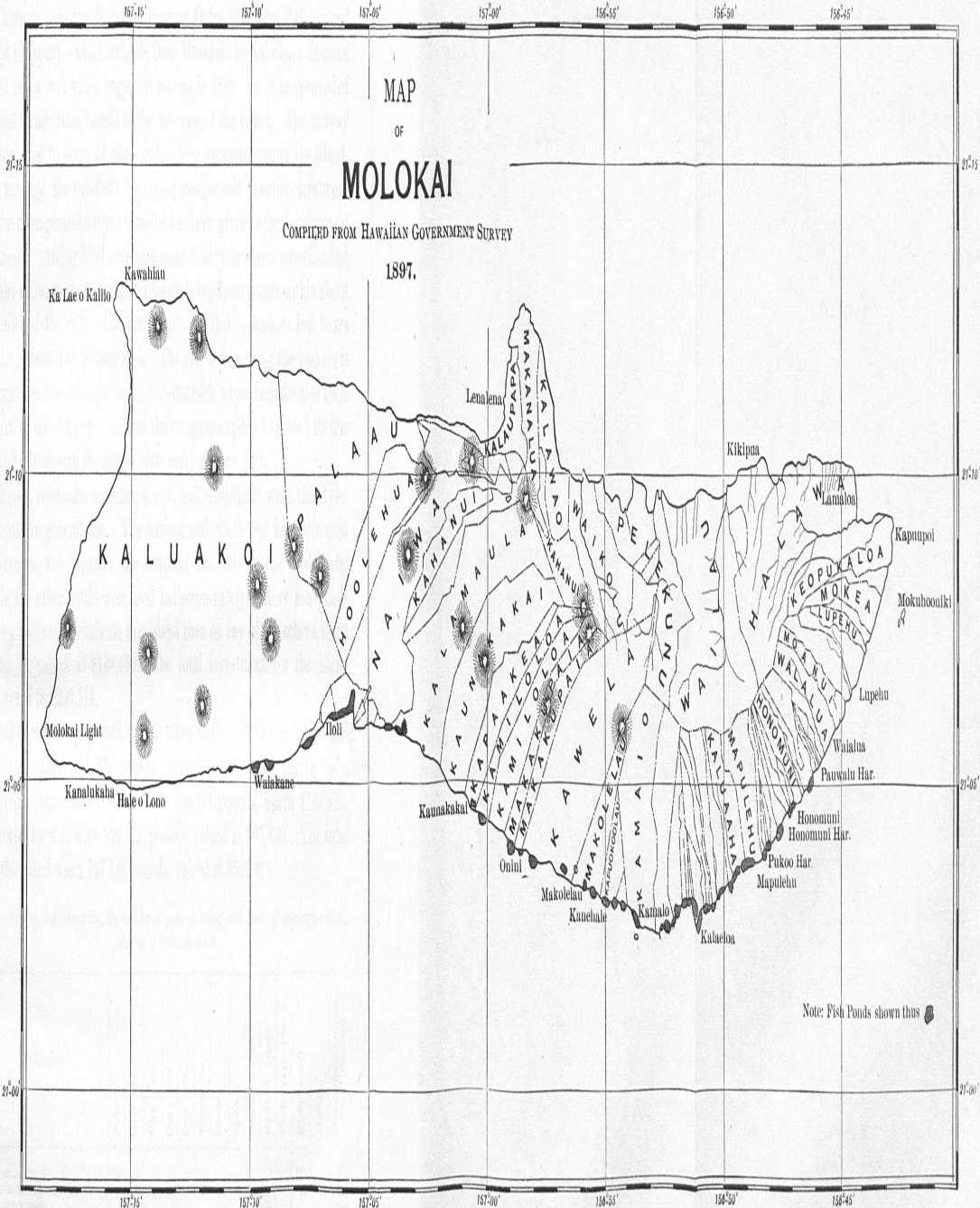
The canoe was almost exclusively used in the fisheries, 1 whaleboat alone having been employed. In numbers, the cast net leads all other forms of apparatus. The bag net is the most valuable. There were 15 fish ponds which were worked commercially in 1900, and these were valued at \$11,425. The total investment in the fisheries of the island amounted to \$17,140.

The amaama is the principal product of the fisheries, 112,514 pounds, valued at \$28,154, being taken. Oio is second, with 36,000 pounds, worth \$9,000. The total catch for the whole island amounted to 376,255 pounds, valued at \$67,599.

Table showing, by apparatus and species, the yield of the fisheries of Molokai in 1900.

Apparatus and species.	Lbs.	Value.	Apparatus and species.	Lbs.	Value.
<b>Seines:</b>			<b>Cast nets:</b>		
Akule .....	25,900	\$2,590	Aulahi .....	2,875	\$575
Amaama .....	12,200	3,050	Amaama .....	9,714	2,429
Iheihe .....	495	124	Lauhau .....	2,065	310
Kahala .....	428	43	Nehu .....	300	6
Kawakawa .....	3,431	343	Ohle .....	1,612	161
Kumu .....	4,282	642	Pakii .....	4,129	413
Lai .....	1,634	163			
Mano .....	695	30	<b>Total</b> .....	<b>20,695</b>	<b>3,894</b>
Miklawa .....	391	39			
Nunu .....	835	84	<b>Line fisheries:</b>		
Palani .....	2,640	381	Aawa .....	1,205	181
Pao-pao .....	745	75	Ahi .....	603	60
Ula .....	616	123	Aholehole .....	1,834	275
Ulua .....	6,117	1,223	Aku .....	33,300	3,996
Weke .....	1,316	158	Akule .....	412	41
Welea .....	1,272	127	Aloloi .....	923	65
<b>Total</b> .....	<b>62,798</b>	<b>9,195</b>	Awe-weo .....	1,275	446
			Hapuupu .....	502	50
<b>Bag nets:</b>			Hinalea .....	1,696	170
Akule .....	7,600	760	Humuhumu .....	7,191	575
Amaama .....	900	250	Iheihe .....	1,420	355
Iheihe .....	1,325	331	Kahala .....	1,720	172
Kala .....	7,421	594	Kawakawa .....	10,243	1,024
Kumu .....	7,349	1,102	Kone .....	643	96
Malolo .....	800	200	Kupoupou .....	851	213
Manini .....	3,600	720	Muhimahi .....	1,895	114
Nunu .....	1,216	122	Maikoiko .....	429	43
Oau .....	467	47	Moano .....	5,497	825
Opehu .....	13,842	2,708	Nohu .....	1,006	151
Opule .....	1,739	174	Oio .....	36,000	9,000
Uhu .....	5,674	567	Ono .....	1,171	176
Weke .....	1,562	187	Oopukai .....	694	139
<b>Total</b> .....	<b>53,495</b>	<b>7,822</b>	Paka .....	1,303	130
			Palani .....	9,700	1,455
<b>Spears:</b>			Puhi .....	6,864	824
Puhi .....	1,200	144	Uku .....	2,617	131
Hee .....	1,700	340	Ulaula .....	775	116
Honu .....	160	9	Ulua .....	10,675	2,115
<b>Total</b> .....	<b>3,050</b>	<b>493</b>	Upapalu .....	314	31
			Uu .....	1,090	131
			Welea .....	1,150	115
			<b>Total</b> .....	<b>144,298</b>	<b>23,215</b>

Amaama and awa were the only species taken in the fish ponds, by far the greater part being of the former. Gill nets took the principal portion, 83,919 pounds, valued at \$20,980. Seines were also used, their catch being 8,000 pounds of amaama, worth \$2,000.



MAP SHOWING LOCATION OF FISH PONDS ON MOLOKAI.

THE FISHERIES OF OAHU.

This island is divided into 6 districts—Kona (sometimes called Honolulu), Ewa, Waianae, Waialua, Koolauloa, and Koolaupoko.

There is only one line of railway on Oahu, the Oahu Railway and Land Company—which extends from Honolulu to Kahuku, a distance of 71 miles, and which began operations in 1889—but it has proved of almost incalculable benefit to the fisheries of the island. The railway passes close to some of the finest fishing-grounds around the island, and through the excellent business foresight and generous treatment of the management a great impetus has been given to the development of these. During 1900 over 61 tons of fishery products were handled by the railway, most of the shipments being from points within about 35 miles of the city. Fish are usually handled in baskets and boxes holding about 100 pounds each. The rate for carrying the baskets is 25 cents each and for the boxes 30 cents each, which includes also their return to the shipper. In time the company expects to extend its line completely around the island, thus making a belt line.

Canoes, rowboats, sampans, scows, and whaleboats were the styles of boats in general use. The natives and South Sea Islanders used the canoes, the Japanese the sampans, the Chinese the whaleboats, while the other forms were used indiscriminately. More fish ponds were used commercially on this island than on any of the others, there being 75, valued at \$149,050. The total investment for the island amounted to \$200,544.

Malolo was the principal species taken in the fisheries in both quantity and value, 571,002 pounds, valued at \$142,773, having been secured. Amaama was second with 503,794 pounds, worth \$125,920, followed by ulua with 324,272 pounds, valued at \$67,630. The total for the island was 2,737,198 pounds, valued at \$561,915.

Table showing, by nationality, the number of persons using each form of apparatus in the fisheries of Oahu in 1900.

Nationality.	Seine.	Gill net.	Bag net.	Cast net.	Dip net.	Scoop net.	Line.	Spear.	Basket, fish.	Basket, opai.	Fish trap or pen.	Fish pond.	Hand.	Total, exclusive of duplication.
Chinese.....	36	87	.....	.....	12	12	.....	.....	.....	.....	.....	113	.....	173
Hawaiian men.....	5	93	126	81	20	52	101	83	10	2	8	29	30	471
Hawaiian women.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35	.....	.....	.....	183
Japanese.....	24	183	4	12	5	8	159	.....	.....	.....	.....	.....	.....	259
Portuguese.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
South Sea Islanders.....	.....	.....	15	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	18
Total.....	66	263	145	93	37	72	262	83	28	37	8	142	178	1,106

In quantity and value of catch bag nets are first with 694,838 pounds, valued at \$163,103. Nearly all the malolo are taken in this form of apparatus. The other principal species were weke, akule, and amaama.

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Gill nets occupy second place with 619,912 pounds, valued at \$104,525. The principal species taken in this form of apparatus were ulua, akule, amaama, awa, and ula.

The catch by lines amounted to 487,954 pounds, which sold for \$95,157. Ulua, kawakawa, aku, and oio were the principal species taken in this fishery.

The following tables show, by apparatus and species, the catch by each form of apparatus:

Table showing, by apparatus and species, the yield of the fisheries of Oahu in 1900.

Apparatus and species.	Lbs.	Value.	Apparatus and species.	Lbs.	Value.
<b>Seines:</b>			<b>Gill nets—Continued.</b>		
Aalahi.....	1,145	\$286	Uku.....	15	\$2
Aawa.....	2,150	537	Ulae.....	6	1
Aholehole.....	4,888	1,222	Ulaula.....	4,096	1,024
Amaama.....	11,058	2,762	Ulua.....	113,080	20,191
Awa.....	7,274	1,819	Umaumalei.....	40	4
Kala.....	3,385	169	Uouoa.....	8	2
Kumu.....	2,322	580	Uu.....	19,629	4,907
Laenihl.....	1,066	266	Uwau.....	185	46
Malamalama.....	3	1	Weke.....	35,014	8,754
Mikiawa.....	280	70	Welea.....	316	64
Moano.....	4,555	1,139	Haukuke.....	50	13
Omakaha.....	8,342	835	Honu.....	120	16
Opelu.....	4,119	1,029	Muhee.....	24	4
Pakil.....	2,400	840	Opal.....	548	56
Pualu.....	200	65	Papal.....	744	186
<b>Total.....</b>	<b>48,247</b>	<b>11,620</b>	Ula.....	72,705	7,278
<b>Gill nets:</b>			<b>Total.....</b>	<b>619,912</b>	<b>104,525</b>
Aawa.....	3,771	944	<b>Bag nets:</b>		
Aha.....	180	30	Aalahi.....	1,239	810
Aholehole.....	5,423	1,357	Akule.....	54,249	4,266
Akule.....	145,068	10,109	Amaama.....	14,221	3,555
Amaama.....	105,957	26,464	Ihehe.....	1,175	235
A'ua'u.....	24	4	Kumu.....	6,163	1,511
Awa.....	39,760	9,860	Malolo.....	570,307	142,577
Awaawa.....	2,083	522	Manini.....	1,700	425
Awela.....	26	6	Mano.....	3,216	63
Aweoweo.....	1,375	590	Nunu.....	1,011	101
Ea.....	193	48	Oau.....	319	80
Hilu.....	995	124	Omakaha.....	265	66
Humuhumu.....	1,000	60	Opule.....	258	65
Ihehe.....	842	169	Uhu.....	6,400	1,280
Kaku.....	1,067	215	Upapalu.....	400	60
Kala.....	8,827	441	Weke.....	33,915	8,479
Kole.....	6	1	<b>Total.....</b>	<b>694,838</b>	<b>163,103</b>
Kumu.....	5,222	1,306	<b>Cast nets:</b>		
Kupipi.....	139	16	Aalahi.....	1,492	373
Laenihl.....	103	26	Ahi.....	15	2
Lai.....	156	16	Akule.....	66,900	5,410
Lauhau.....	12	1	Kumu.....	3,118	780
Maffi.....	131	20	Lauhau.....	98	10
Malkoiko.....	3	1	Olale.....	11	3
Malolo.....	695	196	Pakil.....	1,972	690
Mamamo.....	2	1	Upapalu.....	983	147
Manini.....	4,505	1,109	<b>Total.....</b>	<b>74,589</b>	<b>7,415</b>
Mano.....	1,844	80	<b>Scoop nets:</b>		
Mikiawa.....	562	141	Aha.....	2,364	253
Moano.....	109	27	Kumu.....	2,400	600
Moi-lili.....	12,642	1,265	Palani.....	387	54
Mu.....	32	9	Pualu.....	200	50
Nenne.....	2,260	339	Ula.....	2,200	230
Nihipali.....	42	11	<b>Total.....</b>	<b>7,551</b>	<b>1,191</b>
Nunu.....	10	1	<b>Dip nets:</b>		
Omakaha.....	19,294	4,823	Papal.....	6,426	1,606
Opakapaka.....	20	5	<b>Lines:</b>		
Opelu.....	2,000	200	Ahi.....	1,894	239
Pakalakala.....	2,512	628	Aholehole.....	2,301	576
Palani.....	10	1	Aku.....	66,589	6,277
Pilikoa.....	9	2			
Pootu.....	212	32			
Poupou.....	206	31			
Pualu.....	26	2			
Puhi.....	63	15			
Uhu.....	22	2			
	3,892	778			

Table showing, by apparatus and species, the yield of the fisheries of Oahu in 1900—Cont'd.

Apparatus and species.	Lbs.	Value.	Apparatus and species.	Lbs.	Value.
<b>Lines—Continued.</b>			<b>Spears or harpoons—Cont'd.</b>		
Hapuupuu .....	1,890	\$237	Mano .....	860	\$17
Hihimanu .....	1,094	109	Oopuhue .....	130	20
Hinalea .....	1,430	215	Palani .....	400	60
Humuhumu .....	13,876	833	Pualu .....	300	8
Kaho'ia .....	3,915	781	Puhi .....	2,290	229
Kawakawa .....	77,135	16,427	Hce .....	9,321	2,330
Kupoupou .....	219	55	Honu .....	2,625	341
Laenihl .....	511	129	Ula .....	400	40
Lai .....	212	21	<b>Total</b> .....	<b>18,122</b>	<b>3,365</b>
Mahimahi .....	3,344	502	<b>Hands:</b>		
Maikoiko .....	119	12	Hce .....	6,683	1,659
Mukaa .....	195	49	Limu .....	36,672	4,584
Mano .....	5,240	104	Olepa .....	827	49
Moano .....	13,378	3,344	Opai .....	844	86
Noano .....	195	47	Opihi .....	129,500	19,425
Nohu .....	21,028	5,257	Papal .....	1,500	376
Oio .....	12,276	1,841	Ula .....	10,029	1,003
Omilu .....	560	56	Wana .....	4,587	1,147
Opukai .....	1,948	486	<b>Total</b> .....	<b>189,592</b>	<b>28,329</b>
Opakapaka .....	4,056	406	<i>Irrigation ditches.</i>		
Opelu .....	2,730	683	<b>Hands:</b>		
Opule .....	511	128	China-fish .....	3,770	1,320
Palani .....	19	3	Gold-fish .....	4,000	500
Pualu .....	396	99	Oopu .....	325	49
Puhi .....	2,270	227	<b>Total</b> .....	<b>8,095</b>	<b>1,869</b>
Uku .....	14,590	1,457	<i>Fish ponds.</i>		
Ulae .....	91	9	<b>Gill nets:</b>		
Ulaula .....	7,140	1,785	Amaama .....	187,362	46,840
Uluu .....	211,192	47,439	Awa .....	102,192	26,547
Upapalu .....	600	90	Oopu .....	492	74
Uu .....	13,525	3,381	Oral .....	310	31
Weke .....	1,294	319	<b>Total</b> .....	<b>290,356</b>	<b>72,492</b>
Hce .....	10,131	2,632	<b>Seines:</b>		
Nala .....	60	2	Amaama .....	36,000	9,000
<b>Total</b> .....	<b>487,954</b>	<b>95,157</b>	Awa .....	13,511	3,128
<b>Baskets:</b>			<b>Total</b> .....	<b>49,511</b>	<b>12,128</b>
Hinalea .....	1,713	257	<b>Dip nets:</b>		
Kala .....	1,554	78	Amaama .....	140,428	35,107
Kumu .....	600	150	Awa .....	70,521	17,630
Mamamo .....	307	77	Gold-fish .....	80	10
Manini .....	3,800	950	<b>Total</b> .....	<b>211,029</b>	<b>52,747</b>
Opule .....	200	50	<b>Scoop nets:</b>		
Palani .....	1,789	428	Amaama .....	8,768	2,192
Pualu .....	657	165	Awa .....	619	155
Puhi .....	2,000	200	<b>Total</b> .....	<b>9,387</b>	<b>2,347</b>
Uhu .....	213	43	<b>Grand total of fish ponds</b>	<b>560,283</b>	<b>139,714</b>
Opal .....	310	78			
<b>Total</b> .....	<b>13,143</b>	<b>2,476</b>			
<b>Fish traps or pens:</b>					
Akule .....	426	43			
Kawakawa .....	1,000	200			
Mano .....	330	5			
Weke .....	490	123			
<b>Total</b> .....	<b>2,246</b>	<b>371</b>			
<b>Spears or harpoons:</b>					
Hihimanu .....	696	70			
Kunu .....	1,100	250			

Formerly there were quite extensive beds of native oysters in Pearl Harbor, but of late years little attention has been given to the gathering of these, and it is not known whether they are to be found in abundance now or not. The mounds of oyster and other shells found at various places around the harbor indicate that oysters were a favorite and common article of food many years ago. For a considerable period they were practically forgotten, until in 1871 Capt. E. Wood, of Honolulu, discovered some beds while surveying around the harbor;

since then natives have gathered them in limited quantities for sale at the Honolulu market. They are said to have a very good flavor.

The yield of the fish ponds was very important on this island owing to their number and size, as shown by the preceding table. The gill net was the most important form of apparatus employed, 290,356 pounds, valued at \$72,492, being secured. Dip nets were second, with 211,029 pounds, worth \$52,747. The other forms of apparatus took but a limited quantity. Amaama was the principal species secured. The other species were awa, oopu, opai, and gold-fish.

The numerous irrigation ditches for transporting water to the rice fields and taro patches were employed incidentally in raising china-fish, gold-fish, and oopu. The trenches between the rows of Chinese bananas were also used for the same purpose. But a small part of the fish taken in these ditches appears in the table given above, as most of it was consumed by the families of the fishermen or fisherwomen.

Fishing is carried on to a limited extent in nearly all of the fresh-water streams on the island. These streams are few in number, and during a considerable part of the year are almost dry, the rainy season being the only time when they are of any consequence. The only indigenous species in them are the oopu (gobies) and the opai (shrimp). China-fish and gold-fish have been introduced and are taken in limited quantities. A considerable proportion of the catch in these waters was by people living along their banks, and most of it was consumed by the people who caught it. The streams fished commercially were the Kaneohe, Nuuanu, Piinaio, and Waiawa. Scoop nets, dip nets, and baskets were the forms of apparatus in use. The baskets were employed exclusively for opai. Piinaio stream was the most important, followed by Nuuanu, Waiawa, and Kaneohe in the order named. The total catch was 6,200 pounds, valued at \$1,174.

*Table showing, by rivers and apparatus, the yield of the river fisheries of Oahu in 1900.*

Streams.	Apparatus.	Species.	Lbs.	Value.
Kaneohe.....	Scoop nets.....	China-fish.....	104	\$36
		Oopu.....	568	85
Nuuanu.....	Scoop nets.....	do.....	900	135
	Baskets.....	Opai.....	750	188
Piinaio.....	Scoop nets.....	China-fish.....	114	40
		Gold-fish.....	474	59
		Oopu.....	1,068	160
		Opai.....	1,050	263
Waiawa.....	Baskets.....	Opai.....	300	38
	Dip nets.....	Gold-fish.....	490	74
		Oopu.....	490	74
		Opai.....	382	96
<b>Total.....</b>			<b>6,200</b>	<b>1,174</b>

## NOTES OF FORMER FISHERIES OF IMPORTANCE.

At different periods during the past century the islanders have prosecuted certain fisheries with varying success. While some of these proved very successful and were carried on for many years, others soon ceased, owing to the destruction of the object sought, or for other reasons. Among these may be mentioned the whale, seal, otter, shark, pearl, and bêche-de-mer fisheries.

## THE HAWAIIAN WHALE FISHERY.

Owing to the immense importance of the foreign fleet, especially the American, which made its headquarters at the islands, the feeble struggles of the domestic fleet are frequently swallowed up and lost sight of in those of its giant competitors. While the files of early Honolulu newspapers contain much which refers to the foreign fleet, there appears but little, and that very fragmentary, on the home fleet. Every effort possible was made to fill in the numerous gaps, but this was found impossible in many instances, and the following can be considered merely as notes on the industry.

## VESSEL WHALING.

The first mention of a whaler being fitted out from the islands was in an early number of the *Polynesian*, of Honolulu, which stated that the first whaler fitted out was in 1832, in which H. A. Pierce, of Honolulu, was interested. Later and more thorough inquiries would seem to fix the period at 1834, when the brig *Waverly* was fitted out for whaling and searching among the islands to the westward for Captain Dowsett and others. While engaged in this search she herself was cut off and all her crew massacred at Strong's Island.

In the *Polynesian*, of Honolulu, under date of April 12, 1851, occurs the following:

We are happy to notice, in connection with the whaling business, that the ship *Chariot* has been purchased in this place by an enterprising company and will soon sail on a whaling voyage under the command of Captain Spencer. We wish them every success, and believe they will meet with it, as Capt. S. is well skilled in the business and has filled ships before. We know of no good reason why this lucrative branch of commerce can not be prosecuted from this port, with many advantages over all others, as we have frequently suggested in the *Polynesian*. It is certainly worthy of the experiment, and we are glad to see it undertaken.

During the fall season of 1852 only one Honolulu vessel was engaged in whaling, the brig *Juno*.

On January 8, 1855, as the ship *Heroine*, owned by R. Coady & Co., of Honolulu, was being towed out of the harbor preparatory to starting on a cruise, the hawser parted and she was wrecked on the reef at the entrance to the harbor.

In the *Friend*, of Honolulu, on March 3, 1858, occurs the following list of vessels owned in and fitted from Honolulu during the spring season of 1858, with the amount of capital invested in each.

*List of vessels owned in and fitted from Honolulu in the spring season of 1858.*

Flag.	Class and name.	Tons.	Cost, ready for sea.	Remarks.
American	Ship Black Warrior*	231	\$10,500	sperm whaling off coast of California.
Do.	Bark Harmony	316	22,000	In port; sails soon for Arctic Ocean.
Do.	Bark Italy*	298	19,000	In port; sails soon for Okhotsk.
Do.	Bark Vernon	306	23,000	Do.
Do.	Bark Metropolis	210	21,000	In port; sails about April 1.
Do.	Sch. E. L. Frost	141	13,000	Coast of California.
Hawaiian	Bark Faith	317	115,000	Jan. 23 sailed to cruise.
American	Bark Merrimac*	414		Feb. 8 sailed to cruise.
Do.	Bark Frances Palmer	303		On the California coast.
Do.	Ship Chas. Phelps	362	186	Feb. 15 sailed to cruise.
Do.	Brig Agate	186		Oct. 14 sailed for California coast.
Hawaiian	Brig Oahu	157	20,000	Dec. 16 sailed to cruise.
Do.	Brig Hawaii	230	20,000	Dec. 9 sailed to cruise.
Do.	Brig Antilla	220	27,500	In port; sails soon.
Oldenburg	Brig Kauai	220	21,000	Dec. 15 sailed to cruise.
Hawaiian	Brig Victoria	200	23,000	Nov. 30 sailed for California coast.
Do.	Brig Wailua	280	24,000	On passage from Bremen; due April 1.
Do.	Bark Cynthia	251	19,000	Feb. 13 sailed to cruise.
Do.	Bark Gambia	249	17,500	In port; sails soon.

\* Each of these vessels had a tender.

In the *Polynesian*, under date of November 20, 1858, occurs the following article:

*Hawaiian whalers in port November 19, 1858.*

Barks Vernon, Gambia, Silver Cloud, Robert Morrison, Harmony, Frau Henrietta. Brigs Antilla, Kauai, Hawaii, Wailua, Oahu, Agate. Herm. bg. Pfiel.

Ships Hudson, Adeline, Northern Light, Sharon, Brutus, Sheffield, Ben Morgan, Addison, Majestic.

In the spring fishing 17 left Honolulu for the northern grounds, of which 2 were simply tenders.

Thirteen have arrived, with 6,425 barrels of whale oil, 98,300 pounds bone, besides untold quantity of ivory and peltry obtained by trade. The other two vessels, yet out of port, have been reported with 1,050 barrels between them.

These vessels did not all fly the Hawaiian flag, some being merely owned by residents of the islands and flying the American and Bremen flags. Possibly several of them were really not whalers, but scalers.

At the annual meeting of the Royal Agricultural Society, in 1857, a resolution was passed to award "a silver cup to the master, silver medals to the officers, and bronze medals to the crew of the whaling vessel, fitted out from these islands, which shall bring in the largest cargo of oil next year in proportion to her size." Although their attention was called to this matter the latter part of 1858, the society failed to live up to its promise.

In 1859 the fleet was composed of the following vessels:

Rig.	Name.	Tons.	Rig.	Name.	Tons.
Schooner	Alice	106	Brig	Kohola	270
Brig	Aloha	294	Do.	Oahu	164
Do.	Antilla	239	Schooner	Pfiel	106
Bark	Cynthia	251	Brigantine	Victoria	200
Do.	Faith	317	Brig	Wailua	264
Do.	Harmony	316	Schooner	Caroline, tender to Faith	106
Brig	Hawaii	230			

The American bark *Florence*, 326 tons, and Oldenburg brig *Kauai*, 220 tons, were also owned and fitted out in Honolulu.



One of the new vessels to start in the business about 1860 was the schooner *Kalama*, of 85 tons. This vessel was built at Waterford, Conn., in 1846. She arrived at the islands in 1857 under the name *Queen of the West*, when "Capt. John Meek purchased her and named her after the dowager Queen Kalama, relict of Kamehameha III, and placed her in the coasting trade July 14, 1857, on the windward route. A short time afterwards J. I. Dowsett bought her and put her in the whaling service under command of L. Kelly. In the winter of 1861 she made a very successful season in company with the brig *Comet*, returning here April 11, 1862, reporting 1,200 barrels. She was then sold and subsequently used as coaster, royal yacht, guano searcher, sperm whaler, and again as coaster."\*

On April 1, 1865, the Hawaiian vessels *Pearl* and *Harvest* were lying at Ascension in company with a number of American whalers, when the Confederate steamer *Shenandoah* destroyed the whole fleet, the Hawaiian vessels being burned so that they could not warn other vessels. Their owners were reimbursed by the American Government from the money paid by Great Britain as a result of the Alabama Claims Commission award.

In 1867 the fleet comprised the following vessels: Schooner *Ifel*, brig *Kohola*, bark *Eagle*, bark *Oregon*, bark *Hae Hawaii*, brig *Comet*.

Three more were added to the fleet late in the year, the schooners *Wm. H. Allen* and *Emeline* and the bark *Julian*, but they did no whaling in 1867. Some of the Bremen whalers were also owned in Honolulu at this period.

In 1868 the schooner *Wm. H. Allen* sperm-whaled among the Bonin Islands and got 300 barrels of sperm oil. In 1870 she visited the coast of Peru, where she got 220 barrels of sperm oil. Sperm-whaling at this time was rather unusual among the whalers frequenting the islands, as most of them were engaged in right and humpback whaling in the North Pacific and the Arctic oceans. The *Wm. H. Allen* dropped out of the business in 1872.

In 1869 the fleet comprised the following vessels:

Rig.	Name.	Tons.
Brig .....	Kohola .....	270
Bark .....	Arctic .....	425
Bark .....	Lono .....	207
Bark .....	Eagle .....	382
Brigantine .....	Wm. H. Allen .....	157
Bark .....	Count Bismarck .....	453
Bark .....	Wilhelm I .....	463
Brig .....	Comet .....	255
Ship .....	Julian .....	362
Bark .....	Palca .....	386

In 1871 a terrible disaster happened to the whaling fleet in the Arctic Ocean by which 34 vessels were abandoned in the ice. Among these

\*Hawaiian Maritime History, Part II. Hawaiian Almanac and Annual for 1891, pp. 130, 131.

were the following Hawaiian vessels: Bark *Comet*, bark *Paira Kōhola*, bark *Victoria 2d*, ship *Julian*. Early in the year the *Eagle* and *Count Bismarck* had been withdrawn from the whaling fleet and thus escaped the fate of the others. This disaster almost wiped out the home fleet.

In 1876 the only Hawaiian vessels in the Arctic, the bark *Arctic*, valued at \$32,000, and the *Desmond*, valued at \$24,000, were abandoned in the ice. Eleven American vessels were abandoned at the same time.

After 1881, when there were 2 vessels in the business, there is practically no mention of Hawaiian whalers until 1894, when the last vessel, the steamer *Alexander*, 294 tons, gave up the business under the Hawaiian flag and is now in the San Francisco fleet.

After 1875 very few foreign whalers called at the islands, as it was found more profitable to refit and transship oil and bone from San Francisco, owing to the railroad connection with the Eastern seaboard, and as most of the Hawaiian whalers were owned by Americans they were transferred to San Francisco with the rest of the fleet or else withdrawn from the business.

The following table shows the Hawaiian fleet and the catch of same for certain years from 1839 to 1894, both inclusive:

Year.	Vessels.		Sperm oil.		Whale oil.		Whalebone.		Ivory.		Walrus teeth.		Fur skins.	Total value.
	No.	Tonnage.	Gals.	Val.	Gals.	Val.	Lbs.	Val.	Lbs.	Val.	Lbs.	Val.	Val.	
1839	1													
1840	1													
1842	2													
1851	1													
1862	1				1,440		400							\$547
1864	2													
1866														87,280
1857	4		6,297	\$6,297	148,671	\$59,468	64,915	\$16,229			22,863	\$2,286		84,280
1858	17													
1859	14	4,112												
1860	6	1,595												57,033
1861	4	880												65,360
1862	3	734												33,164
1863	2	622												25,771
1864	5	1,500												93,729
1865	5	1,356												78,830
1866	4	1,168												94,329
1867	6	1,636												59,922
1868	9	2,570												40,557
1869	10	3,360												175,873
1870	12													140,918
1871	7													12,240
1872	4													89,818
1873	5		1,600	1,520	34,541	12,018	17,787	13,161	4,262	\$903			90	
1874			7,304	6,941	50,968	17,413	21,492	16,564	11,569	3,015			790	44,663
1875			30	29	102,856	37,531	38,854	35,883	21,553	9,970			330	
1876							13,057	12,494	8,042	3,217				
1878	1	189												
1880	1	188												
1881	2	103												
1894	1	294												

NOTE.—The fact that nothing is noted for certain years does not necessarily indicate that there were no vessels during those years, but rather the lack of data.

The following table shows the exports from the islands of products taken by the Hawaiian whaling fleet from 1857 to 1880, both inclusive. A small proportion of the catch would be consumed locally and this, of course, does not appear in the table.

Table showing exports from the Hawaiian Islands of products taken by the Hawaiian whaling fleet from 1857 to 1880.

Year.	Sperm oil.	Whale oil.	Whale-bone.	Seal oil.	Ivory.	Walrus hides.
	Galls.	Galls.	Lbs.	Galls.	Lbs.	Pieces.
1857		53,332	21,997			
1858		96,959	39,300			
1859		219,187	60,480	7,254		
1861	6,794	188,548	27,003			
1862	9,988	11,392	2,716			
1863	3,036	137,855	37,872			
1864	8,360	123,023	45,402			
1865	2,280	111,421	37,716			
1866	44,968	46,318	56,840			
1867	58	70,646	48,444		1,702	
1868	15,007	41,685	11,960			
1869	8,971	159,735	89,842		1,116	
1870	3,654	134,167	101,101		12,718	162
1871	4,867	140,319	283		582	450
1872	98	23,083	29,336		3,804	
1873	3,795	42,806	17,561			
1874	621	48,605	16,174		10,979	
1875	597	81,375	41,955		20,814	
1876		33,518	23,965			
1877	805	186	11,507			
1878		7,254	14,865			
1879			816			
1880		14,632	10,977			

BAY WHALING.

In addition to the vessel fishery for whales a number of persons engaged at various times in what was called "bay whaling." The small humpback whales in the winter time would resort to the region between Lahaina and Kalepolepo Bay for breeding purposes. The sperm whales would also do the same to the leeward side and off the southern point of Hawaii, and also off the other islands at times. When a whale was sighted close to the shore parties would go out in small boats and attempt to capture it. If successful, the whale would be towed ashore, cut up, and the blubber tried out in rude try works.

The first mention in the local newspapers of this fishery was the following, from the *Polynesian*, of Honolulu, May 20, 1848:

Sperm whales are frequently seen near these islands, and several projects have been set on foot at different times to capture them. Mr. James Hough, of Lahaina, obtained a few months since a charter for the exclusive right of fishing for whales at Honouliuli, on the island of Maui, and at length succeeded in capturing a sperm whale. In consequence of the difficulty experienced in "cutting in" and getting the "blubber" on shore, only about 30 barrels of oil were secured. This at the current rates here is worth about \$800.

Maalaea Bay, on the north side of Maui, was frequently visited by sperm whales. According to several of the old inhabitants of Wailuku the natives used to kill whales in the bay quite often in the "forties."

Whales would sometimes get stranded upon the coast. In June, 1857, a young sperm whale, about 8 feet in length, was stranded on the beach at the mouth of the Waiole River, Hanalei Bay, Kauai. The natives secured him and floated him into the river, where he soon died, and his oil was then tried out.

In the *Pacific Commercial Advertiser*, of Honolulu, under date of March 11, 1858, appeared the following:

The season for humpback whales amongst these islands extends from January to April. The four or five whaling companies at or near Lahaina have not as yet succeeded in securing a whale, but a company of natives from Honolulu stationed at Lahaina killed a cow and a calf there on the 1st of March, while a boat from the *Sharon*, lying at anchor, captured the male which was in company. From Hilo our correspondent gives an account of the taking of a whale in that harbor by the boats of the *Dover*. A school of these whales were seen off the entrance of our harbor yesterday morning.

In 1859 three stations for bay whaling were opened in and around Kalepolepo Bay, on Maui. On April 8, 1862, Mr. O. J. Harris, of Lahaina, captured a large bowhead whale in this bay. When tried out it yielded about 50 barrels.

A small sloop, the *Laanui*, O. J. Harris, captain, was engaged in the business in 1863 and met with considerable success, while Mr. Pat Shaw, of Lahaina, with a crew from the same place, was very successful in bay whaling during the "sixties."

In 1870 the *Anne*, Captain Roys, of Honolulu, engaged in bay whaling at Kalepolepo Bay. Try works were erected at Oloalu, some 4 or 5 miles beyond Lahaina. Captain Roys used an explosive gun of his own design and met with considerable success.

In March, 1870, a whale was caught off Hilo, Hawaii, by a shore party from that place. They obtained 75 barrels of oil from it.

The vessel *Henrietta*, of Honolulu, engaged in the fishery in 1872 around Lahaina and was quite successful. She got one whale in Maa-laea Bay which tried out 50 barrels, worth about \$1,000. A shore party under O. J. Harris was also working in the same vicinity at that time and met with considerable success.

Whales are still seen quite frequently each year around the islands, but little attention is paid to them unless one should be stranded, when the natives gladly seize upon it.

#### THE FOREIGN WHALING FLEET AT THE ISLANDS.

One of the principal causes of the present material wealth of the islands was the rendezvousing of the Pacific whaling fleets from the United States and other countries at the various ports of the islands for many years, and the transshipment of oil and bone from these ports. An effort is made herewith to show the history and extent of this business so far as can be done from the data available.

The first whaler to enter the Pacific Ocean was the ship *Amelia*, Captain Shields, from London, in 1788. She was fitted out at vast expense by Mr. Enderby, a London merchant, and carried a crew of Nantucket, Mass., whalers. She sailed on September 1, 1788, and returned March 12, 1790, with a cargo of 139 tons of sperm oil. She received a bounty of 800 pounds from the Government. Most of the whaling was done off the coasts of Chile and Peru. Capt. Archetus

Hammond, of Nantucket, Mass., was first officer of the ship and struck the first sperm whale ever known to be taken in that ocean.

The success of the *Amelia* stimulated other nations, and the United States was among the first to fit out vessels for this fishery. In 1791 Nantucket people built and sent three new ships, with three old ones, into the Pacific Ocean, the first from the United States. These were very successful, each ship obtaining up to 1,500 barrels of oil, mostly sperm. The first of the ships to enter the Pacific was one of the new vessels, the *Beaver*, Paul Worth. She was also the first to return.

In 1802 whaling was prosecuted first off New Zealand, and in 1803 the whalers were in the China seas about the Molucca Islands.

The first American whalers to visit the Hawaiian Islands were the ships *Balæna* and *Equator*, of New Bedford. They arrived at Kealahou Bay, Hawaii, September 17, 1819, off which port they captured a large sperm whale which yielded 102 barrels. They sailed thence on October 1, for Lahaina to water, and touched off Oahu, to leave letters, October 10. At this time Honolulu is described as a scattered, irregular village of thatched huts, of 3,000 or 4,000 inhabitants. By 1820 the calls of whalers at Honolulu were quite frequent. In 1823 there were four American mercantile houses established there, two of Boston, one of New York, and one of Bristol, R. I. The Americans were quick to see the superiority of the islands for recruiting and refitting over other stations in the Pacific, and very soon all the American vessels in the Pacific, and quite a few from other countries, were touching at the islands regularly.

The discovery of the sperm whaling-ground off the Japan coast in 1819 by the *Syren*, Captain Coffin, where she had great success, drew large numbers of the new vessels, particularly American, to the new grounds, and these fixed their headquarters at the islands. Capt. Joseph Allen, of the ship *Maro*, of Nantucket, also discovered these grounds independently in 1820.

Stimulated by the demand on the products of the islands created by the great influx of foreign whalers, strenuous efforts were put forth to furnish the supplies desired. The island of Maui was noted for its potatoes and wheat, and most of the whalers called at Lahaina specially for supplies of these articles. In 1828 potatoes were rather scarce and sold in Honolulu for \$2 per barrel, but were cheaper at Lahaina.

According to the *Daily Advertiser* (Boston, Mass.), of December 24, 1874, the first whaling in the Ochotsk Sea was done by American whalers in 1834. The whales were reported by the master of the American schooner *Unity*, of 60 tons, which was bound to the port of Ochotsk, in Siberia, and thence to Kamchatka.

In August, 1820, Captain Meek, in the trading brig *Peddler*, of New York, visited the Arctic Ocean. He secured by trade some oil and bone from the natives. It was partly on his recommendation later that whaling was begun there.

Captain Roys, of the bark *Superior*, of Sag Harbor, N. Y., was the first to go into the Arctic for whales. In the Honolulu *Friend* he gave the following account of the opening up of this profitable region:

I entered the Arctic Ocean about the middle of July, and cruised from continent to continent, going as high as latitude 70, and saw whales wherever I went, cutting in my last whale on the 23d of August, and returning through Bering Strait on the 28th of the same month. On account of powerful currents, thick fogs, the near vicinity of land and ice, combined with the imperfection of charts and want of information respecting the region, I found it both difficult and dangerous to get oil, although there were plenty of whales. Hereafter, doubtless, many ships will go there, and I think there ought to be some provision made to save the lives of those who go there should they be cast away.

The discovery of this new ground was of inestimable value, as sperm whaling was rapidly dying out, owing to the scarcity of these animals and the new grounds were soon visited yearly by a large fleet of vessels, principally American. The whales secured in this region were of the bowhead or Greenland variety.

From the very beginning American whalers predominated at the Hawaiian Islands. In the "twenties," Great Britain was a somewhat serious competitor, but she was soon hopelessly distanced. The reasons for this are well set forth in the following quotation from one who was in a position to know, and who had no love for Americans:\*

The number of vessels fitted out from England for the whale fishery of the Pacific was, in 1820, 140, while at present there are not more than 70, the Americans having at least 400 vessels profitably employed in this trade. Say about 24,500 tons British shipping and 2,100 seamen; ditto 130,000 tons of American shipping and 12,000 seamen. This disproportion is but slightly altered by the vessels fitted out from British colonies.

The protection to British fishing vessels was, up to July, 1843, no less than £25 12s. per ton on all oils, and is now £15 15s. on spermaceti oil and £6 6s. on black oil. Yet there is a falling off in their number of one-half during the last twenty years, while the American vessels have increased in a greater ratio.

It would be easy to detail the causes of the greater success of the Americans in conducting this profitable trade; among the more prominent of which are, the greater sobriety of the officers and the superior character of the crews, both which—recommendations in any trade—are indispensable in the prosecution of this one.

He was anxious for Great Britain to seize the islands and make Honolulu a depot for the British whaling interests, and created a great deal of trouble for the native government before he was recalled.

The first French whaler to call at the islands was the *Nancy*, in 1837, but French vessels called quite frequently after this. The first Prussian and Danish whalers to visit the islands was in 1842.

The native government was quick to realize the benefits of this trade, and made every effort possible to attract the whalers to the islands. In 1844 the following regulations in regard to whalers were in force at the various ports of the islands:

*General regulations.*—Whalers were permitted to sell goods to the amount of \$200 each without paying any duty whatever. On all

\*The Sandwich Islands, etc. By Alexander Simpson, esq., late acting there as Her Majesty's consul. Pamphlet published in London, 1811.

above \$200 they paid an ad valorem duty of 3 per cent. Goods were allowed to be transshipped or reexported on payment of a duty.

*Honolulu.*—The harbor dues at this port were as follows: Six cents per ton on whale ships and merchant vessels entering for the purpose of obtaining refreshments only. For the use of the buoys, \$2. For certificate of clearance, \$1. Per foot pilotage for taking a vessel in or out, \$1.

*Lahaina.*—Regulations of port: Every captain requiring refreshments had to pay \$10 for the harbor dues, for which he was allowed 5 barrels of potatoes and the privilege of purchasing supplies for his ship. Every ship on arriving and making purchases had to pay \$1 for the support of two lights kept burning to mark the place where boats could land. The captain was compelled to secure a certificate showing that the port regulations had been complied with; charge for this, \$1.

*Hilo.*—Harbor dues for whalers: For anchorage, \$6; for pilotage, \$6.

*Kealakekua.*—Harbor dues for whalers: For anchorage, \$6; for pilotage, \$6.

In the general laws of 1846 no duty was charged on the transshipment of whale products at the ports of the islands.

In 1847 the following law to encourage the visits of whalers was passed by the Legislative Council of the islands:

SECTION I. *Be it resolved by the nobles and representatives of the Hawaiian Islands in Legislative Council assembled,* That in order to encourage the visits of whale ships of all nations to the ports of entry for such vessels now open by the existing laws, or hereafter to be declared open, they and each of them, on and after the proclamation hereof in the Polynesian newspaper, be exempted from all anchorage fees and tonnage dues imposed by the existing tariff upon vessels exclusively engaged in the whale fishery; in all cases so long as said vessels shall not exceed in their trade or barter in foreign goods the amount of \$200 ad valorem allowed by law to be landed from them free of duty, provided brandy, wine, or other liquors which have an intoxicating effect be entirely excluded from that trade or barter, any vessel trading or bartering in which shall wholly forfeit the advantage of this resolution.

SEC. II. *And be it further resolved,* That from and after the proclamation hereof as aforesaid, the harbor or roadstead of Kealakekua, on the island of Hawaii, shall be and is hereby created a port of entry and departure for whale ships in accordance with the existing laws applicable to such vessels at the other ports already opened to whale ships.

SEC. III. *And be it further resolved,* That the minister of finance be and he is hereby authorized to pay out of any moneys in the exchequer the drafts of the collector-general of customs in favor of any duly appointed pilot employed at the port of Honolulu the sum of \$25 for each whale ship which shall have been promptly and faithfully piloted by him in and out of the port of Honolulu in lieu of the \$1 per foot allowed by law to be charged for the pilotage of whale ships.

SEC. IV. *And be it further resolved,* That the minister of finance be and he is hereby authorized to pay to the pilots appointed for Lahaina, Hanalei, and Hilo out of any moneys in the exchequer such gross sums per annum as may be recommended by the board of finance in lieu of the charge which they are authorized to make for the pilotage of whale ships.

SEC. V. *And be it further resolved*, That the joint resolution of 3rd April, 1846, relative to brandies, wines, and other spirituous liquors shall be understood and is hereby interpreted to mean as follows: The permits to trade or barter, given to vessels engaged in the whale fishery, do not and shall not include the trade, sale, landing, or disposal of spirituous liquors, but all such traffic on the part of said vessels shall be and is hereby construed to constitute them merchantmen, and shall subject them, within the meaning of said joint resolution, to the payment of 20 cents per ton tonnage dues, as well at the anchorage of Lahaina and the roadstead of Honolulu as at anchor in the harbor of Honolulu, and to all other legal liabilities.

SEC. VI. Relates to fees for various kinds of general licenses.

SEC. VII. Relates to the breaking up of hulks.

SEC. VIII. *And be it further resolved*, That from and after the proclamation hereof as aforesaid no clearance shall be given by any collector of customs to any foreign vessels at any port in this Kingdom where there is or shall be a consul, vice-consul, or commercial agent, or vice commercial agent of the nation to which such vessel belongs until the master or commander of such vessel shall produce to said collector a certificate under the seal of his consul that all legal charges and demands in his office against said vessel have been paid and that he knows of no reason why said vessel should not immediately depart; and that in ports where no such consul, vice-consul, or commercial agent, or vice commercial agent may exist the local collector shall otherwise satisfy himself that all proper and legal charges have been paid before granting a clearance to any foreign vessel.

SEC. IX. *And be it further resolved by the authority aforesaid*, That from and after the proclamation hereof in manner aforesaid, all, each, and every, the provisions of the foregoing eight resolutions shall be considered, received, taken, and construed to be amendments to the existing laws of this Kingdom, and that they be substituted instead of any such laws at conflict therewith, which existing laws, so far as the same are found to be so at conflict, are and shall be hereby repealed.

The effect of this law was to make all the ports free ports.

Section 8 of the above act was repealed on May 26, 1853.

The following act regulating the duties on the products of the whale fishery was approved July 27, 1852:

SECTION 1. All oil, bone, and other products of the sea taken by an Hawaiian vessel may be imported into this Kingdom free of duty, but the same shall be entered and permitted at the custom-house in the same manner as goods liable to 5 per cent ad valorem duty.

SEC. 2. All oil, bone, and other products of the whale fishery imported into this Kingdom in any foreign vessel, or being the product of any foreign vessel and sold or landed, shall be considered to have been imported for consumption, and shall be liable to the duty of 5 per cent ad valorem and not entitled to any drawback for reexporting unless the same shall have been stored in the custom-house stores or under the direction of the collector of customs.

SEC. 3. This act shall take effect on the thirtieth day after its passage.

As the remitting of the pilot dues was quite a serious drain on the financial resources of the Government, they were reimposed in 1850. On August 16, 1854, however, all tonnage dues on whalers, foreign and domestic, were abolished.

The usual custom was for the whalers to make two cruises each year. The first, or spring season, was from January 1 to about June 14, the second, or fall season, beginning about July 27 and ending about October 10. The intervening time was employed in refitting for the



next season. During the spring season the vessels usually visited some of the southern grounds for sperm or right whales, or both, while during the fall season the North Pacific and Arctic grounds were visited.

American vessels, which hailed principally from New Bedford, New London, and Nantucket, engaging in the Pacific and Arctic fishery, usually left their home port in the fall of the year so as to make the passage of the Horn or Cape of Good Hope in the southern summer. These ships would arrive at the islands in March or April, in time to refit for the fall cruise. An American vessel whaling in the Arctic usually remained out three and one-half or more years, including the time spent in coming from and returning to her home port.

It was quite common for the whalers to come to the islands on the outbound passage with only enough men to work the vessel. They would then engage young natives, called "Kanakas," to fill out the crew, bringing them back to the islands before starting on the homeward journey. From January 1 to December 31, 1843, 44 of the natives were serving in whalers, and from January 1, 1844, to June 1, 1844, there were 70 so employed, all engaged at Honolulu. Probably as many more were engaged by vessels calling at the other ports of the islands. In 1865, 400 shipped on American whalers alone. In 1869, 488 Kanakas were employed on whalers, their lay for the season amounting to \$45,700, while 388 were shipped in 1871 from Honolulu on the spring and fall whalers, and 378 returned to port, 10 having died during the year. The Kanakas were very popular with the captains, as they made good seamen and whalers and were easily managed.

At first the Government took no particular interest in this part of the business, but in time the abuse of and cheating of the men by dishonest and brutal captains became so notorious that the Government was compelled to adopt regulations in regard to the matter. Under these the master of the vessel had to execute a bond that he would obey the laws, which were that he could not hire a Kanaka for more than two years, was to return him to the island at the expiration of his time, and was to pay him his proper lay of the products taken during the cruise.

From 1840 to 1860 were the palmy days of whaling in the North Pacific and Arctic. The number of vessels visiting Honolulu would be so great and the inner harbor so packed that it is said one could go all around the harbor by stepping from one vessel to another, while in the outer harbor would be almost as many more which had been unable to get in.

As the harbor at Lahaina is nothing but an open roadstead, protected from the prevailing winds by the high mountains of the island itself, there was more room. As many as 89 whalers were counted at anchor here at one time during the period above stated.

The ship-chandlery business for whalers virtually began at Honolulu in 1843. From this time on a number of firms made it their regular business. The following summary of an article appearing in the *Polynesian*, Honolulu, April 20, 1861, gives a very good idea of the extent to which Honolulu was benefited by the visit of whalers:

For the twelve years from 1849 to 1860, both inclusive, it is stated that 4,929 callings at ports on the islands were made by whalers. Domestic supplies to the extent of \$1,382,413 were furnished to them. It is estimated that these 4,929 ships, averaging 30 men each (147,870), expended \$30 each at the islands, which would amount to \$4,436,100. It is also estimated that the repairs to the fleet amounted to \$180,000.

The following table shows for certain years between 1846 and 1875, both inclusive, the value of supplies furnished to foreign whalers at Honolulu, together with the number of vessels so supplied for certain years:

Years.	Value of supplies.	Number of vessels supplied.	Years.	Value of supplies.	Number of vessels supplied.
1846.....	\$468,000		1863.....	\$13,200	44
1847.....	78,200	167	1864.....	65,000	93
1849*.....	27,000	108	1865.....	50,400	
1850*.....	26,500	106	1866.....	69,000	
1851.....	18,400	82	1867.....	72,100	
1852.....	49,720	226	1868.....	56,800	
1853.....	67,650	246	1869.....	46,200	
1854.....	51,975	189	1870.....	33,000	
1857.....	106,750	122	1872.....	10,500	
1858.....	109,850	169	1873.....	16,600	
1859.....	85,000	170	1874.....	12,500	
1861.....	38,500	77	1875 †.....	7,200	
1862.....	21,000	42			

\* Only shows value of supplies furnished to vessels in the inner harbor. There is no record of the supplies sold to vessels in the outer harbor.

† No separate record was kept by the custom-house after 1875.

The profits in this business were enormous for a time, and it has been well said that "Honolulu was built upon the whale business." No specific records were kept of these matters at Lahaina, but it is known that during 1849 the supplies furnished to whalers amounted to \$38,500, while in 1850 they amounted to \$24,640.

The first recorded transshipment of whaling products was in 1846, when some whalebone was so handled. The business practically began, however, in 1851, and was of immense benefit to Honolulu, as this harbor was the principal scene of operations. As wharves were practically nonexistent at this time, the hulks of old whalers and merchantmen were used as storage places for the oil and bone until vessels were ready to load for home ports. The whalers would usually store their catch here on their return from a cruise, then refit and start on another cruise. Regular clipper ships would call at the islands, bringing out supplies, and return with a cargo of bone and oil. On November 10, 1857, the clipper ship *John Land* sailed from Honolulu with a cargo of oil and bone for New Bedford valued at \$635,556.

The following table shows the transshipments of oil and bone from 1851 to 1875 (the business practically ceased in the latter year):

Years.	Sperm oil.	Whale oil.	Whale-bone.	Ivory.
	Gallons.	Gallons.	Lbs.	Lbs.
1851	104,362	909,379	901,604	
1852	173,490	1,182,738	3,159,951	
1853	175,396	3,787,348	2,020,264	
1854	146,484	1,665,921	1,508,443	
1855	109,308	1,436,810	872,954	
1856	121,291	1,641,579	1,074,942	
1857	175,306	2,018,027	1,295,525	
1858	222,464	2,551,382	1,614,710	
1859	156,560	1,668,175	1,147,120	
1860	47,859	782,086	571,968	
1861	20,435	795,988	527,910	
1862	12,522	460,407	193,920	
1863	56,687	675,344	337,043	
1864	38,860	608,502	339,331	
1865	42,841	578,593	337,394	
1866	118,961	1,250,965	536,043	
1867	103,215	821,029	405,140	
1868	108,778	774,313	506,013	
1869	157,030	1,698,189	627,770	
1870	105,234	1,443,809	632,905	
1871	63,310	283,055	29,362	
1872	50,887	32,074	81,998	
1873	56,687	573,697	122,654	25,108
1874	23,187	403,876	174,111	56,552
1875	37,812	312,305	104,715	14,909

NOTE.—Includes the shipments of the Hawaiian vessels.

The principal portion of the products were shipped to New Bedford either by clipper ships sailing around the Horn or to Panama by sailing vessel, thence by rail across the Isthmus to Colon, and from there by sailing vessel or steamer to Atlantic ports. A part also went to San Francisco and thence by rail to Eastern points after the Pacific Railroad was completed. A considerable portion went to Bremen, Germany, and for a few years some went to Havre, France. Great Britain and New South Wales also received a few shipments.

The following table shows for certain years between 1852 and 1875 the countries to which the transshipped products were sent:

Table showing the countries to which the transshipped foreign and domestic products of the whale fishery were shipped.

Years.*	United States.				Germany.		
	Sperm oil.	Whale oil.	Whale-bone.	Ivory.	Sperm oil.	Whale oil.	Whale-bone.
	Gallons.	Gallons.	Lbs.	Lbs.	Gallons.	Gallons.	Lbs.
1852	172,418	1,133,259	3,078,019		1,072	49,479	81,932
1853	174,920	3,750,310	1,956,405			284,667	110,499
1854	156,484	1,630,005	1,435,345			10,244	26,288
1855	120,894	1,606,193	1,058,959				
1858	208,076	2,217,616	1,428,760		488	123,648	79,950
1859	154,205	1,365,866	1,016,812		1,473	284,667	110,499
1860	47,859	713,323				69,773	33,742
1864	29,486	529,210	292,377		4,374	79,202	46,954
1865	42,841	529,449	290,656			49,144	46,788
1866	118,961	1,285,489	508,117			15,476	18,061
1867	101,344	786,947	350,361		1,871	34,982	54,769
1868	104,920	733,805	496,784			41,108	99,259
1869	154,569	1,578,814	627,578		3,121	119,375	100,192
1870	105,234	1,304,088	515,698			139,721	117,207
1871	60,112	142,736	29,079		3,198	140,319	283
1872	21,288	50,789	67,292		98	11,686	14,706
1873	56,687	573,131	122,551	25,108			566
1874	10,606	306,036	170,642	56,552			18,667
1875	34,380	268,789	67,047	9,828	607	27,136	†25,517

\* The records are missing for the years not given between 1852 and 1875.  
 † 7,118 pounds of Ivory were also exported to Germany.

Table showing the countries to which the transhipped foreign and domestic products of the whale fishery were shipped—Continued.

Years.	France.			Great Britain.		Australia (New South Wales).		
	Sperm oil.	Whale oil.	Whale-bone.	Whale oil.	Whale-bone.	Sperm oil.	Whale oil.	Whale-bone.
	Gallons.	Gallons.	Lbs.	Gallons.	Lbs.	Gallons.	Gallons.	Lbs.
1853 .....	476	37,038	28,200					
1854 .....		25,172	46,810					
1857 .....	600	35,400	16,000					
1858 .....				25,156				
1859 .....	682	17,642	19,809					
1874 .....						2,581	10,143	3,469
1875 .....						2,835	16,380	6,000

The year 1875 was practically the last one in which oil and bone were transhipped at the islands. For some years San Francisco had been endeavoring to persuade the whalers to make that port their refitting and transshipping point. During the gold excitement a few vessels did call there, but they were put to such great expense and delays by the desertions of their men that they ceased calling except when absolutely necessary. During the late "sixties," however, a few resumed their calls, and these kept on increasing until in 1875 nearly all of the American fleet called there. In 1871 the Pacific Railroad provided tank cars and agreed to transport the oil to New Bedford at the rate of 7 cents per gallon, and this had a great deal to do with drawing the whalers to San Francisco. At present San Francisco is the port of call for all of the Pacific and Arctic fleet.

After 1860 the fleet rapidly declined in numbers. During the civil war in the United States a number of them were withdrawn by their owners, owing to the fear of Confederate cruisers. In 1860, 293 calls were made at ports in the islands by Americans, while in 1862 there were only 57. After this they increased somewhat in number until in 1865 there were 162. In this year the Confederate steamer *Shenandoah* destroyed 34 ships and barks of the Arctic fleet.

In 1871, 30 out of 37 vessels of the American Arctic fleet were caught in the ice off Point Belcher and the crews were compelled to abandon them to their fate. The fleet had hardly begun to recover from this crushing blow when, in 1876, half of the fleet of 16 American vessels were caught in the ice and destroyed. As the fleet practically ceased to visit the islands regularly after 1875, its subsequent history does not come within the province of this paper.

Vessels called at the islands occasionally, however, even after 1875. According to Capt. D. Taylor, of Lahaina, the *Nimrod*, of New Bedford, was the last whaler to call at Lahaina. This was in March, 1886. The last visit of whalers at Honolulu was in 1896, when 2 American and 3 British vessels called.

The following table shows by nationality the visits of the foreign whalers at the islands each year from 1824 to 1896, both inclusive:

Year.	Belgium.	Chile.	Denmark.	France.	Germany.*	Great Britain.	Holland.	New Brunswick.	New South Wales.	Norway.	Russia.	Tahiti.	United States.	Nationality not given.	Total number of visits.†
1824						15							48		63
1825						17							38		55
1826						16							91		107
1827						18							64		82
1828						28							84		112
1829				2		26							83		111
1830						19							75		94
1831						21							60		81
1832						17							101		118
1833						18							89		107
1834						17							95		112
1835						10		1					62		73
1836						16		1					65		74
1837				1		24							104		129
1838				4		15							129		148
1839				2		8		1					108		114
1840				2		4							80		86
1841				2		8							123	7	140
1842			2	10	1	22		3					137	2	177
1843				2	5	4		3					232	84	281
1844				26	19	5		4	1				438		495
1845			2	30	9	11		3					479	6	542
1846				24	21	13	1						537		596
1847				22	22	3							359		406
1849				7	5	1							261		274
1850				14	10	2							211		237
1851	2			8	12	2							195		220
1852		2		20	12	1							482		518
1853				17	8								500		633
1854		2		22	2								490		628
1857				9	3								350		362
1858				15	3								488		511
1859				19	3								505		585
1860				4	5								293		810
1861				3	9								172		181
1862				5	3								57		65
1863					4								92		90
1864				4	3								112		121
1865				5	4								162		171
1866				1	3								220		226
1867				2	4							2	227		236
1868					2							2	143		147
1869													89		89
1870													101		101
1871						2							42		44
1872						3							42		45
1873						7							49		56
1874						4						1	81		86
1876						1							34		35
1876													37		37
1877						1							29		30
1878													26		26
1879													25		25
1880													16		15
1881													17		17
1882													32		32
1884													23		23
1885													26		26
1886													20		20
1887													22		23
1888													17		17
1889						1							18		19
1890													21		21
1891													17		17
1892													20		20
1893													17		17
1894						1							17		18
1895						4							6		10
1896						3							2		5

NOTE.—No statistics were available for 1848, 1855, 1856, and 1883.

\*Includes Bremen, Hamburg, Hanover, Oldenburg, and Prussia.

†As the same vessel sometimes visited two or three ports, and would be counted at each, this total necessarily does not represent the real number of vessels. It is estimated that a reduction of about one-third in the number would show the real total.

‡29 vessels were caught in the ice in the Arctic Ocean and abandoned.

From 1843 the North Pacific fishery was the most important, the Americans and Hawaiians practically monopolizing it. The following table shows the number of vessels (including only those which returned to the islands) engaged in this fishery, together with the oil and bone secured, from 1839 to 1869:

*Table showing the number of vessels in the North Pacific whale fishery, and the oil and bone taken by same, from 1839 to 1869, including only the vessels that have returned to the islands.*

Years.	No. of vessels.	Sperm oil.	Whale oil.	Total oil.	Whale-bone.
		Barrels.	Barrels.	Barrels.	Lbs.
1839*	2			2,800	
1840.	8			1,760	
1841.	20			28,200	
1842.	29			47,200	
1843.	108			146,800	
1844.	170			259,570	
1845.	263			250,600	
1846.	292			258,800	
1847.	177			187,443	
1848.	159			185,256	
1849.	155			206,860	
1850.	144			243,648	
1851†.	143			96,177	
1852.	275		337,124	337,124	5,357,737
1853.	252	(†)	280,360	280,360	3,448,300
1854.	245	4,276	191,843	196,119	2,698,180
1855.	250	6,242	225,626	231,868	2,413,250
1856.	177	3,337	135,708	139,045	1,524,650
1857.	166	3,079	124,460	127,539	1,591,643
1858.	218	1,555	129,240	130,795	1,667,700
1859.	197	2,350	102,980	105,330	1,312,700
1860.	132	2,099	63,965	66,064	838,500
1861.	68	2,013	50,575	52,588	659,000
1862.	34	1,685	28,315	30,000	387,000
1863.	43	288	36,120	36,408	503,000
1864.	55	390	29,425	29,815	428,300
1865.	67	1,080	45,000	46,080	671,100
1866.	76	2,643	49,056	51,699	828,500
1867.	75	1,940	52,050	53,990	773,500
1868.	57	2,693	38,765	41,458	539,700
1869.	46	2,500	42,114	44,614	596,700

\*The vessels and oil reported up to 1852 are exclusively American; since 1852 they include whalers of all nations that have recruited after the season at the Hawaiian Islands. The coast whaling of California of late years is not included.

† A hard season, owing to the heavy ice and terrific gales; seven vessels were lost.

‡ No report is obtainable for these years.

THE SEAL FISHERY.

The Hawaiians early took up the seal fishery. It is not known when the first voyage was made, but the following is an interesting summary of several made early in the last century:

March 2, 1824, by order of Kalaimoku, sanctioned by the King, he [William Sumner] was given charge of the brig *Aihoa* for a sealing voyage, returning in October with 5,845 fur skins, a quantity of elephant oil, and fish. On this and a similar voyage in the brig *Tamorolana* (Kamahalolanai) in 1826, in which he obtained 3,160 seal skins, he reported that much better success would have resulted had they been properly provisioned.\*

On September 14, 1838, the schooner *Flibberty Gibbet*, 25 tons, Rogers, commander, owned at Oahu, returned from a twenty-one days' cruise to the island of Ceres, with a cargo of sealskins.

There are occasional notices of sealers in the maritime notes of the newspapers of the islands after this date, as in 1859, when the bark *Gambia*, 249 tons, is reported as having been sealing. She left Hono-

\*Hawaiian Maritime History. Hawaiian Almanac and Annual for 1890, pp. 67, 68.

lulu on April 26, and cruised among the islands to the westward of this group, returning on August 7 with 240 barrels of seal oil, 1,500 skins, a quantity of sharks' fins and oil, etc.

Foreign sealers also touched at the islands occasionally, even as late as 1901, when a Russian and a Canadian vessel visited Waimea, on Kauai, to refit.

#### SEA-OTTER FISHERY.

Sea-otter skins were early traded in at Honolulu, as is shown by the following extract from the journal of one of her pioneer merchants:\*

1829, April 1.—\* \* \* Sold French a lot of sea otter skins belonging to Dana & Temple: Primes, at \$35; small, at \$12; reds, at \$5; tail pcs., \$1 each.

Many of the otter skins were obtained by merchant and whaling vessels in the course of trade. At times vessels would be fitted out especially for the fishery, as mentioned in the following quotation referring to the year 1835:

Upward of 20 sail, chiefly British and American whale ships, anchored in the port of Honoum [Honolulu] while we continued there. One of them was a fine brig, the property of an American merchant, resident at this island. She was engaged in the fur trade on the northwest coast of America, was commanded by Captain Bancroft, an Englishman, and carried as part of her crew 23 Northwest Indians, who had been engaged to shoot the sea otter. The latter people are found to be tractable when on distant seas, although prone to treachery when on their own coast. They were paid by the owner of the vessel the market price of each fur skin they obtained, or, more commonly, to the same amount in such European commodities as they required, namely, blankets, knives, tobacco, and spirits.†

In 1837 sea-otter skins to the value of \$29,000 were exported from the islands.

There is no further mention of the industry in any of the available records, and it is probable that it was given up at an early date, as the islands were too far from the hunting-grounds.

#### SHARK FISHERY.

During the latter half of the last century particularly, considerable shark fishing was done among the chain of islands to the westward of the main group, and these islands in time came to achieve an unenviable notoriety from the number of wrecks which occurred upon their shores. The first record we have of this fishery was in 1859 when the bark *Gambia* returned from a three and one-half months' cruise amongst these islands with, among other things, a quantity of sharks' fins and oil. In 1872 the *Henrietta* made a cruise among the islands for the same purpose. In 1886 the schooner *General Seigel*, while on a shark-fishing cruise, parted her cables and went ashore at Midway

\* Honolulu in Primitive Days. As seen by extracts from the journal of one of her pioneer merchants during the years 1826 to 1829. The Hawaiian Almanac and Annual for 1901.

† Narrative of a Whaling Voyage round the Globe, from the Year 1833 to 1836, etc. By Frederick Debell Bennett, vol. 1, p. 402. 2 vols., London, 1840.

Island, and the crew only reached safety in an open boat after great privations. Very little shark fishing has been done of late years owing to the lack of a profitable market for the products obtained.

Sharks' teeth were highly prized by the natives, while the oil extracted was valuable and of a good quality. After an export trade had been opened with other countries considerable quantities of sharks' fins were dried and shipped to China and San Francisco.

#### THE PEARL FISHERY.

During the early years of the last century pearl oysters were first discovered in the locality now bearing the name of Pearl Harbor, about 9 miles from Honolulu—a magnificent sheet of water, running about 10 miles back into the interior, and about 4 miles across in the widest part. It is divided into two parts by an island and a narrow strip of the mainland running down about the center of it. The beds were located at the head of the harbor. As the value of the discovery soon became manifest the King declared it a royal monopoly, and he employed divers to bring up the oysters, which were found in great plenty.

Speaking of the marine fauna, James Jackson Jarves, the historian of the islands, says:

Edible shell-fish are also abundant, of which the pearl oyster is very palatable. Pearls are common, but of no great size or beauty. They formerly constituted a profitable branch of trade and were monopolized by the king.\*

The shell, or mother-of-pearl, formed the more valuable part of the product and was usually shipped to China, where it found a ready sale, but the business was so vigorously prosecuted that before 1850 it had ceased to exist, owing to the exhaustion of the bed.

Pearls have been found on the Puna coast, on Hawaii, inclosed in a large mollusk, shaped like a pearl oyster, and called "pa" by the natives. The pearls are of but little value, owing to dark streaks in the center of them. The natives use the portion of the shell around the valve in making fishhooks, as this part has the rough outline of a hook already and is easily worked. This mollusk is quite rare now and is highly prized by the natives when found.

#### LOLI (BÊCHE-DE-MER) FISHERY.

This is an edible Holothurian much esteemed by the Chinese for its supposed medicinal qualities, and is prepared by them in the form of a soup. It is a gelatinous slug, found in the sea from low-water mark to a depth of several fathoms, and grows from 3 to 10 inches in length. When taken from the rocks, to which it is generally found adhering, it is cut open, the entrails removed, and the body is then dried in the sun. After being thus prepared it is of a dark or black color. Vari-

\* A history of the Hawaiian or Sandwich Islands, etc. By James Jackson Jarves. p. 13. Boston, 1843, 8vo.



ous species of these Holothurians are quite generally distributed in the Pacific Ocean, and the traffic in them was started among the South Sea Islands in the early years of last century, China and Manila being the principal markets. Up to 1861 no attempt was made to take up the industry on the islands. In that year Messrs. Utai & Ahee, a Chinese firm in Honolulu, advertised in the local papers that they would purchase cured *bêche-de-mer* from the natives if it could be found. This stimulated the natives and they soon found it in large numbers. Since then the custom-house reports show the following exports for certain years:

	Pounds.		Pounds.
1861.....	6,507	1864.....	7,135
1862.....	5,809	1867.....	4,958
1863.....	5,500	1876.....	1,125

As a commercial fishery the industry did not last very long for some reason or other. It is still quite abundant, however, especially around Oahu and Maui. The only island where any were sold in 1900 was Maui. It is frequently eaten by the natives, who half boil the large ones to make them soft, while the small ones are eaten fresh. The boiled ones are chopped up in slices and mixed with the meat of the wana (sea egg).