
PRELIMINARY REPORT

ON AN

INVESTIGATION OF THE FISHES AND FISHERIES

OF THE

HAWAIIAN ISLANDS.

BY

DAVID STARR JORDAN AND BARTON WARREN EVERMANN.

NOTE.—This paper was first printed as House of Representatives Document No. 249, Fifty-seventh Congress, first session.

LETTER OF TRANSMITTAL.

To the Senate and House of Representatives:

I transmit herewith, for the information of the Congress, a communication from the Commissioner of Fish and Fisheries forwarding a preliminary report on an investigation of the fisheries and fishing laws of Hawaii, made in accordance with the provisions of the act of Congress approved April 30, 1900.

Your attention is called to the request of the Commissioner that the sum of \$10,000 be appropriated for the immediate use of the Commission in carrying out the wishes of Congress.

THEODORE ROOSEVELT.

WHITE HOUSE, *January 13, 1902.*

UNITED STATES COMMISSION OF FISH AND FISHERIES,
Washington, D. C., January 7, 1902.

The PRESIDENT:

The act of Congress approved April 30, 1900, providing a government for the Territory of Hawaii, contained the following section:

SEC. 94. That the Commissioner of Fish and Fisheries of the United States is empowered and required to examine into the entire subject of fisheries and the laws relating to the fishing rights in the Territory of Hawaii, and report to the President touching the same, and to recommend such changes in said laws as he shall see fit.

In accordance therewith, I caused to be made during the past summer an investigation of the fishes, fisheries, fishery laws, etc., of the Territory. The investigation was placed under the direction of Dr. David S. Jordan, president of Leland Stanford Junior University, and Dr. Barton W. Evermann, ichthyologist of the U. S. Commission of Fish and Fisheries, whose report I have the honor to submit herewith.

This report deals especially with the question of fishery legislation, and contains a number of recommendations, to which I have given my approval, for the improvement and preservation of the local fisheries.

The report is to be regarded as preliminary. The large size of the Territory and the great extent of the available fishing-grounds make desirable further investigation of the fishery resources, particularly those of the comparatively deep waters about the islands. This investigation will be conducted during the current calendar year under the general direction of Dr. Jordan, and the Commission has already obtained your approval of the plan to assign the steamer *Albatross* to this work.

In providing for the examination of the fisheries of Hawaii, Congress made no appropriation to meet the necessary expenses. It is therefore requested that the sum of \$10,000 be appropriated for the immediate use of the Commission in carrying out the wishes of Congress.

Very respectfully,

GEORGE M. BOWERS,
Commissioner.

PRELIMINARY REPORT ON AN INVESTIGATION OF THE FISHES AND FISHERIES OF THE HAWAIIAN ISLANDS.

By DAVID STARR JORDAN and BARTON WARREN EVERMANN.

We have the honor to present a preliminary report on the fish and fisheries of the Hawaiian Islands, based on investigations placed under our charge by the United States Commissioner of Fish and Fisheries. The investigations began in June, 1901, and were continued for about three months, during which time all the islands were visited. As assistants we had the services of the following: Mr. John N. Cobb, statistician, and Mr. E. L. Goldsborough, clerk and general assistant, detailed from the Fish Commission; Mr. C. B. Hudson and Mr. A. H. Baldwin, employed as artists; Mr. M. Sindo, of Stanford University, employed as preparator; and Dr. O. P. Jenkins, of Stanford University, the chief authority on the fishes of Hawaii, who accompanied the expedition as a volunteer assistant.

During the progress of these investigations many courtesies were shown us by the various Territorial officials and others, among whom we should mention specially Governor Dole and Acting Governor H. E. Cooper; Prof. W. D. Alexander, of the coast survey; Dr. J. B. Pratt, of the board of health; Mr. E. R. Stackable, collector of customs at Honolulu; Miss M. A. Burbank, librarian of the public library 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; Prof. W. T. Brigham and Mr. A. Seale, of the Bishop Museum; Mr. S. M. Damon and Mr. Jos. S. Emerson, of Honolulu; Mr. W. S. Wise, Mr. J. M. Hering, and Mr. Carl S. Smith, of Hilo; Mr. J. Storan Moloney, Mr. E. H. Bailey, and Mr. William T. Robinson, of Maui, and Hon. F. W. Beckley, of Molokai. To all of these we wish to acknowledge our obligations and express our thanks. We are also under especial indebtedness to Mr. E. L. Berndt, inspector of the market at Honolulu.

SCOPE OF THE INVESTIGATIONS.

So little being definitely known regarding the fishes and other aquatic resources of the Hawaiian Islands, it was manifestly desirable to go into the whole question of the fisheries of those islands, and to make the investigations sufficiently comprehensive and exhaustive to enable the Commission to publish, in time, a full and reliable report upon the aquatic resources of the entire group.

This would, in the first place, necessitate much work by shore parties, who would make inquiries along the following lines:

1. A qualitative and quantitative study of the commercial and shore fishes, mollusks, crustaceans, and other aquatic animals and plants. Attention would be given to the actual and relative food values and the commercial importance of the different species; the important facts in their life histories, such as their migrations, spawning time and place, food, feeding habits, enemies, and maximum and average size.

2. The methods, extent, and history of the fisheries would have to receive careful attention. The kinds of apparatus used, the manner, time, and place of using each, the species taken in each, and the manner of caring for and disposing of the catch; the statistics of the fisheries, value of each kind of apparatus, as boats, nets, traps, etc.; nature and value of shore property; nationality and number of people engaged in the fisheries; business relations and contracts between fishermen and those by whom employed; quantity and value of each species caught; prices paid the fishermen, also those received wholesale and retail; changes in methods, extent, and character of the fisheries in historic times as shown by records and traditions, particularly since the coming of Europeans and Asiatics.

3. The fishery laws would need special consideration, including an account of fishery regulations and legislation from the old system of tabu to the present time.

The possibility of improvement in the methods of taking fish and the methods of handling and marketing them should receive careful consideration, and the necessity for and possibility of fish-cultural operations with reference to species that may be in danger of extinction or serious diminution, and the introduction of species not native to the islands, are questions requiring careful investigation.

The expedition sailed from San Francisco for Honolulu May 29, and the summer and early fall were devoted to work along these lines.

Preliminary to a proper understanding of the economic phases of the fisheries, it is of course necessary that we know just what species of fishes and other aquatic animals inhabit or frequent Hawaiian waters. A large part of the time of the present expedition was therefore devoted to making collections of the species brought to the market by the fishermen and such as could be obtained by the use of seines and other means in shallow water along and near the shore. Mr. Cobb devoted his entire time to the methods and statistics of the fisheries.

About 350 species of fishes were obtained, about 70 of them being new to science, in addition to about 100 obtained by Dr. Jenkins in his expedition of 1889 and only lately described by him. A detailed account of the fishes of the islands will be published later, illustrated by colored plates taken from fresh and often from living specimens by Messrs. Hudson and Baldwin.

The fishes of Hawaii are remarkable for their brilliancy of color, a trait which they share with fishes of other volcanic and coral islands of the Tropics. Of the many species which come into the markets nearly all are good food-fishes. A very few (mostly puffers—*Tetraodontidæ*) are poisonous—or at least noxious—and a few species living in the crevices of the reefs are too small to be sought for food purposes.

As the natives mostly eat some fishes raw, certain species not of especial excellence when cooked are very highly valued by them. This is especially true of the parrot-fishes (*Scarus*), which sell in the market at prices which seem extraordinarily high.

FOOD-FISHES.

The following is a list of the principal fishes of the Hawaiian Islands, the majority of which are used as food, arranged according to the alphabetical order of the native names, together with the identifications, so far as they have been determined:

Common name.	Scientific name.
Aalaihi	<i>Thalassoma duperreyi</i> .
Aawa	<i>Lepidoplois bilunulatus</i> .
Aha	<i>Athlennes</i> (new species).
Ahi	<i>Germo sibi</i> .
Aholehole	<i>Kuhlia malo</i> .
Akilolo	<i>Gomphosus</i> and <i>Thalassoma</i> , species.
Aku	<i>Gymnosarda pelamis</i> .
Akule	<i>Trachurops crumenophthalmus</i> .
Aleihi	<i>Holocentrus diadema</i> , etc.
Aloiloi	
Amaama	<i>Mugil dobula</i> .
Anae	<i>Mugil dobula</i> (adult).
Api	<i>Zebrasoma guttatum</i> .
A'ua'a	<i>Chaenomugil</i> (new species).
Awa	<i>Chanos chanos</i> .
Awa kalamoho	<i>Chanos chanos</i> .
Awaawa	<i>Elops machnata</i> .
Awela	<i>Thalassoma purpuraceum</i> .
Aweoweo	<i>Priacanthus cruentatus</i> .
Ea	<i>Lepidoplois modestus</i> .
Hapuupuu	<i>Epinephelus</i> (new species).
Hauliuli	<i>Lemnisoma thyrsoitoides</i> .
Hihimanu	<i>Aetobatus narinari</i> .
Hilu	<i>Anampses cuvieri</i> .
Hilulauli	<i>Coris lepomis</i> .
Hinalea	<i>Coris</i> , <i>Novaculichthys</i> , etc.
Hinalea lolo	<i>Coris gaimardi</i> .
Humuhumu meeme	<i>Hemiramphus depauperatus</i> .
Humuhumu	<i>Melichthys bispinosus</i> , etc.
Iheihe	<i>Euleptorhamphus longirostris</i> .
Ii	
Iiao	
Iono	<i>Remora remora</i> .
Kahala	<i>Seriola</i> , species.
Kaku	<i>Sphyræna snodgrassi</i> .
Kala	<i>Monoceros unicornis</i> .
Kawakawa	<i>Gymnosarda alleterata</i> .
Kalekale	
Kawalea	
Kikakapu	<i>Chaetodon ornatissimus</i> .
Koae	
Koi	<i>Etelis carbunculus</i>
Kole	

358 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Common name.	Scientific name.
Kuapaa	
Kumu	Upeneus porphyreus.
Kupipi	
Kupoupou	Cheilio inermis.
Laenihi	Iniiustus, Henipteronotus, etc.
Lai	Scomberoides toto.
Laipala	Zebrasoma flavescens.
Lao	Halichæres lao.
Lauhau	Chaetodon quadrimaculatus.
Lauia	Scarus jordani, etc.
Lauwiliwili	Forcipiger longirostris.
Lolohau	Cephalacanthus orientalis
Loueu	Zanclus canescens.
Laukipala	Lampris luna.
Mahihi	Coryphæna hippurus.
Mahimahi	Coryphæna hippurus.
Maiii	Teuthis nigroris.
Maikoiko	Teuthis lineolatus.
Makaa	Malacanthus brevirostris.
Malamalama	
Malolo	Cypsilurus simus.
Mamama	Abudedefduf abdominalis.
Mamamo	Kyphosus fuscus.
Mamamu	Sphærodon grandoculis.
Maneoneo	Zebrasoma hypselopterus.
Manini	Teuthis sandwichensis.
Mano	Shark.
Mano kihikihi	Sphyrna zygena.
Maumau	
Mikiawa	
Moa	Ostracion camurum.
Moano	Upeneus velifer.
Moi	Polydactylus sexfilis.
Moi-ii	
Mu	Sphærodon grandoculis.
Munu	Upeneus trifasciatus.
Nainai	Teuthis olivaceus.
Nanihu	
Nehu	{Anchovia purpurea. {Atherina (new species).
Nenue	Kyphosus fuscus.
Nihipali	
Nohu	Scorpenopsis cacopsis.
Nohupinao	
Nunu	Aulostomus chinensis.
Oau	
Oili	Monocanthus spilosomus.
Oiilepa	Alutera scripta.
Oio	Albula vulpes.
Okuhekuhe	
Olale	Thalassoma purpureum.
Omakaha	Perkinsia (new species).
Omilu	Carangus melampygus and C. bajad.
Ono	
Oopu	Eleotris fusca and gobies of all species.
Oopuhue	Tetrodon hispidus (reputed very poisonous).
Oopukai	
Opakapaka	Apsilus kelloggi.
Opelu	Decapterus pinnulatus.
Opule	Anampses evermanni, etc.
Paapaa	Cirrhites marmoratus.
Paka	
Pakaikawale	
Pakalakala	
Pakii	Platophrys pantherinus.
Pakiki	
Pakole	Teuthis olivaceus.
Pakuikui	Teuthis achilles.

Common name.	Scientific name.
Pala .....	.....
Palani	<i>Teuthis matoides</i> .
Palukaluka	<i>Scarus palua</i> .
Paoo	} <i>Salarias</i> , species.
Paookauiia	
Paopao .....	.....
Panuhunuhu	<i>Scarus gilberti</i> .
Papiopio	<i>Carangus</i> (species with yellow fins).
Panu	<i>Myripristis</i> (new species).
Piha .....	.....
Pilikoa	<i>Paracirrhites forsteri</i> , etc.
Poopaa	<i>Paracirrhites cinctus</i> .
Poou	<i>Cheilinus hexagonatus</i> .
Poupou .....	.....
Puaa humuhumu	<i>Balistes rectangulus</i> .
Pua-ii .....	.....
Pua kahala	<i>Seriola purpurascens</i> .
Pualu	<i>Teuthis dussumieri</i> .
Puhei	<i>Echidna zebra</i> .
Puhi	<i>Gymnothorax</i> (new species.)
Puhikii	<i>Parexocœtus mesogaster</i> .
Puhilaumilo	<i>Gymnothorax undulatus</i> .
Puhiuha	<i>Leptocephalus marginatus</i> .
Puhi wela	<i>Gymnothorax pectus</i> .
Puwalu .....	.....
Puuili .....	.....
Uhu	<i>Calatomus sandwichensis</i> , etc.
Uhuula	<i>Scarus ahula</i> .
Uiui	<i>Platophrys pantherinus</i> .
Ukikiki	<i>Aprion microdon</i> .
Uku	<i>Aprion virescens</i> .
Ulae	<i>Synodus varius</i> .
Ulaula	<i>Etelis marshi</i> .
Ulaula	<i>Apsilus kelloggi</i> .
Ulua	<i>Carangus sausun</i> and other large species of <i>Carangus</i> .
Ulua kihi	<i>Alectis ciliaris</i> .
Umaumalei .....	.....
Uouoa .....	.....
Upapalu	<i>Apogon menesemus</i> .
Uu	<i>Myripristis murdgan</i> .
Uwau .....	.....
Uwiwi	<i>Monacanthus spilosomus</i> .
Walu .....	.....
Weke	<i>Upeneus</i> (all species with yellow stripe on side).
Weke puso	<i>Upenoides vittatus</i> .
Weke ula	<i>Mulloides pfugeri</i> .
Wekepahulu	<i>Upenoides vittatus</i> .
Wela .....	.....
Wolu .....	.....

LAWS RELATING TO THE FISHERIES.

Previous to about 1830 a state of affairs very much resembling the feudal system of Europe during the middle ages existed on the islands. The King and chiefs owned all the lands, while the common people were mere tenants at will, whose duty it was to support their feudal lord and his numerous retinue in peace by the sweat of their brows, and in war defend him with their lives.

A unique feature of this system was that not only were the lands owned by the chiefs but the exclusive right to fish in the waters of

the ocean adjacent to the estates was in most instances considered a part of the estates themselves, and as a result of this condition of affairs the common people were prevented from gathering from the sea, without vexatious restrictions and greivous exactions, that very necessary part of their food supply which they so much loved and which the sea could furnish in such abundance. The only redeeming feature in this was that if his landlord became too exacting the tenant could move on to the land of some more lenient taskmaster. As the importance of the chief was determined largely by the number of tenants he had on his lands, this proved at times a check on the rapaciousness of some of the chiefs.

In order to continue this condition of affairs more securely in their own hands the ruling classes had recourse to the system of tabu (a corruption of the Hawaiian word "kapu"). To tabu was to command to do or not to do, and the meaning of it was "obey or die." The tabu was a prerogative adhering exclusively to political and ecclesiastical rank, and was common to the Polynesian tribes, having been adopted and enforced by the priesthood and nobility as a protection to their lives, property, and dignity. In nearly every instance the penalty for breaking a tabu was death. Tabus were of two kinds, perpetual and temporary.

The perpetual tabus were universal and were well known to the people. It was perpetual tabu, except to the higher nobility, to cross the shadow of the king, to stand in his presence without permission, or to approach him except upon the knees. Everything pertaining to the priesthood and temples was under perpetual tabu. Squid, turtle, and two or three species of birds could be eaten only by the priests and tabu nobility, while women were tabued from eating plantains, bananas, coconuts, the flesh of swine and certain fish, among them the kumu, moano, ulua, honu, ea, hahalua, and naia. Men and women were allowed under no circumstances to partake of food together. This last tabu applied to everybody in the kingdom—king, nobles, and common people—and was one of the most oppressive of the religious tabus, as it necessitated having separate eating-houses for the women and men, thus putting everybody to considerable unnecessary expense and trouble.

The incidental and temporary tabus were the most oppressive and dangerous to the common people, as they were liable to be thoughtlessly violated. The king and tabu nobility would tabu favorite paths, springs, streams, and bathing-places, etc., as the whim seized them.

The general tabus declared by the king were proclaimed by herald, while the temporary tabus were notified to the people by a staff, surmounted by a crown of white or black kapa, stuck in the ground close to the object declared sacred.

The priesthood received its death blow in 1819, when Liholiho, the king, destroyed the idols and broke the worst of the religious tabus by eating openly with his queen. The common people, and, strange

to relate, the priests themselves, followed his example, and in a few weeks the country was without any religion at all.

In the fisheries the king usually had certain fishes tabued, while the chiefs or landlords (called "konohikis") had the same privilege with one species in the sea fisheries belonging to their respective estates. This tabu did not prevent the fishermen from catching the species so set apart, but they were compelled to hand over to the king or chiefs all or a portion of the catch of these species.

The advent of the American missionaries in 1820, coming as it did immediately after the destruction of the native religion by Liholiho, was most fortunate, the people being ripe for a change, and they gladly embraced the Christian religion after a short period of hesitation. The missionaries reduced the native language, which had been oral previously, to writing, and under their direction the people made probably the most remarkable advances in civilization and education ever witnessed among a heathen race. Stimulated by this great advance in intelligence and learning, the king, Kamehameha III, in conjunction with the chiefs and nobles, in 1839, gave the people a written constitution and code of laws. The following are the provisions in this document which relate to the fisheries:

CHAPTER III.—8. *Of free and prohibited fishing grounds.*

1. *Of free fishing grounds.*—His Majesty the King hereby takes the fishing grounds from those who now possess them from Hawaii to Kauai, and gives one portion of them to the common people, another portion to the landlords, and a portion he reserves to himself.

These are the fishing grounds which His Majesty the King takes and gives to the people: The fishing grounds without the coral reef, viz, the Kilohee grounds, the Luhee ground, the Malolo ground, together with the ocean beyond.

But the fishing grounds from the coral reef to the sea beach are for the landlords and for the tenants of their several lands, but not for others. But if that species of fish which the landlord selects as his own personal portion should go on to the grounds which are given to the common people, then that species of fish, and that only, is tabooed; if the squid, then the squid only; or if some other species of fish, that only and not the squid. And thus it shall be in all places all over the islands; if the squid, that only; and if in some other place it be another fish, then that only and not the squid.

If any of the people take the fish which the landlord taboos for himself, this is the penalty: For two years he shall not fish at all on any fishing ground. And the several landlords shall give immediate notice respecting said fisherman that the landlords may protect their fishing grounds, lest he go and take fish on other grounds.

If there be a variety of fish on the ground where the landlord taboos his particular fish, then the tenants of his own land may take them, but not the tenants of other lands, lest they take also the fish tabooed by the landlord. The people shall give to the landlord one-third of the fish thus taken. Furthermore, there shall no duty whatever be laid on the fish taken by the people on grounds given to them, nor shall any canoe be taxed or tabooed.

If a landlord having fishing grounds lay any duty on the fish taken by the people on their own fishing grounds, the penalty shall be as follows: For one full year his own fish shall be tabooed for the tenants of his own particular land, and notice shall be given of the same, so that the landlord who lays a duty on the fish of the people may be known.

If any of the landlords lay a protective taboo on their fish, when the proper fishing season arrives all the people may take fish, and when the fish are collected they shall be divided, one-third to the fishermen and two-thirds to the landlord. If the landlord seize all the fish and leave none for the fishermen, the punishment is the same as that of the landlords who lay a duty on the fish of the people.

If, however, there is any plantation having fishing grounds belonging to it, but no reef, the sea being deep, it shall still be proper for the landlord to lay a taboo on one species of fish for himself, but one species only. If the parrot-fish, then the parrot-fish only; but if some other fish, then that only and not the parrot-fish. These are the enactments respecting the free fishing grounds, and respecting the taking of fish.

2. *Respecting the tabooed fishing grounds.*—Those fishing grounds which are known by the people to have shoals of fish remaining upon them shall, at the proper season for fishing, be placed under the protective taboo of the tax officers for the King. The fishing grounds on Oahu thus protected are: 1, Kalia; 2, Keeli; 3, Kapapa; 4, Malaeakuli; 5, Pahihī. On Molokai as follows: 1, Punalau; 2, Ooia; 3, Kawai; 4, Koholanui; 5, Kaonini; 6, Aikoolua; 7, Waiokama; 8, Heleiki. On Lanai, the bonito and the parrot-fish. On Maui, the kuleku of Honuaula and other places. On Hawaii, the albicore.

On Kauai, the mullet of Huleia, Anehola, Kahili, and Hanalei, and the squid and fresh-water fish of Mana, the permanent shoal fish of Niihau, and all the transient shoal fish from Hawaii to Niihau, if in sufficient quantity to fill two or more canoes, but not so small a quantity as to fill one canoe only. But if the fishermen go and borrow a large canoe, that all the fish may be put into one, then there shall be a duty upon them.

On the above conditions there shall be a government duty on all the transient shoal fish of the islands. The tax officer shall lay a protective taboo on those fish for his Majesty the King, and when the proper time for taking the fish arrives, then the fish shall be divided in the same manner as those which are under the protective taboo of the landlords.

If the tax officer seize all the fish of the fisherman, and leave none for those who take them, then he shall pay a fine of ten dollars, and shall have nothing more to say respecting the royal takes. But if the order for seizing all the fish of the fishermen was from the governor, then he shall no longer be governor, though he may hold his own lands, and the tax officer shall not be turned out of office. At the proper time the tax officer may lay a protective taboo on all the King's fish and the landlords all around the island. But it is not proper that the officer should lay the taboo for a long time. The best course is for the officer to give previous notice to the fishermen, and then the common people and the landlords, to fish on the same day. Thus the rights of all will be protected.

But no restrictions whatever shall by any means be laid on the sea without the reef, even to the deepest ocean, though those particular fish which the general tax officer prohibits, and those of the landlords which swim into those seas, are taboo. The fine of those who take prohibited fish is specified above.

KAMEHAMEHA.
KEKAULUOHI.

Enacted June 7, 1839.

On April 1, 1841, the nobles met at Luaehu, in Lahaina, and made the following changes in the above laws:

5. *Of shoal fish.*—From the eighth section of the third chapter of this law, which is found on thirty-eighth page, certain words shall be erased, as follows: "If in sufficient quantities to fill two or more canoes, but not so small a quantity as to fill one canoe only."

The transient shoal fish spoken of in this law are: (1) The Akule, (2) the Anaeholo, (3) the Alalauwa, (4) the Uhukai, (5) the Kawolea, (6) the Kawakawa, (7) the

Kalaku. These kinds of fish shall be divided equally whenever they arrive at these islands, or whenever they drift along.

6. *Of duties laid by land agents on the fish of the people.*—On the twenty-seventh page, chapter 3, section 8, read thus: “The people of other lands shall give to the landlord one-third of the fish thus taken on said land.”

9. *Of the punishment of fishermen.*—In the third chapter, eighth section, page 37, the following words are erased: “For two years he shall not fish at all on any fishing ground.” The following words shall also be inserted in their place: “If he take one fish criminally, he shall pay five, and always at that rate. And if a canoe full be taken five canoes full shall be paid, according to the amount taken, even to the furthest extent.”

11. *Of the tax for the year 1841.*—5. Where none of these kinds of property can be obtained, and fish are abundant, then the tax shall be laid in fish, and shall be in proportion to what the tax of the land would be in money. If the land would be taxed a fathom swine, then there shall be an amount of fish equal in value to ten dollars.

21. *Of the protection of the fisheries.*—The following words are to be inserted in the eighth section of the third chapter, on the thirty-eighth page: “The general tax officer may lay a protective taboo on the King’s fish, and also on those of the land agents, but the land agents and the King also may eat of their own fish tabooed by themselves, even before the taboo of the tax officer is repealed.”

In 1845 it was found necessary to define more clearly the rights of the respective parties, and the following was adopted in connection with other legislation:

CHAPTER VI.—ARTICLE V.—*Of the public and private rights of piscary.*

SECTION I. The entire marine space without and seaward of the reefs upon the coasts of the several islands comprising the several fishing grounds commonly known as the Kilohee grounds, Luhee grounds, the Malolo grounds, and the fishery of the ocean from said reefs to the limit of the marine jurisdiction in the first article of this chapter defined shall be free to the people of these islands. The people shall not be molested in the enjoyment thereof except as hereinafter provided.

SEC. II. The fishing grounds from the reefs, and where there happen to be no reefs from the distance of one geographical mile seaward to the beach at low-water mark, shall in like manner be considered private property of the landlords whose lands by ancient regulation belong to the same; in the possession of which private fisheries the said landlords shall not be molested except to the extent of the reservations and prohibitions hereinafter set forth.

SEC. III. The landlords shall be considered in like manner to hold said private fisheries for the equal use of themselves and of the tenants on their respective lands; and the tenants shall be at liberty to use the fisheries of their landlords, subject to the restrictions in this article imposed.

SEC. IV. The landlords shall have power each year to set apart for themselves one given species or variety of fish natural to their respective fisheries, and give public notice by viva voce proclamation to their tenants and others residing on their lands, and signifying to the minister of the interior, in writing, through his agents in their districts, the kind and description of fish which they have chosen to set apart for themselves. The landlords shall respectively pay for such notification the fees prescribed by the third part of this act; and it shall be the duty of the minister of the interior yearly to furnish the director of the government press with the list of said landlords, the districts and islands of their residence, and the kind of fish specially set apart by each, in the form of catalogue, which catalogue the said director shall cause to be once inserted, in Hawaiian and English languages, in the Polynesian

newspaper, for public information, at the expense of said minister, to be included by him according to a fixed rate in the fees to be received at his department from the respective landlords.

SEC. V. The specific fish so set apart shall be exclusively for the use of the landlord if caught within the bounds of his fishery, and neither his tenants nor others shall be at liberty to appropriate such reserved fish to their private use; but when caught such reserved fish shall be the property of the landlord, for which he shall be at liberty to use and recover the value from any fisherman appropriating the same; and, moreover, if he take one fish criminally he shall pay five, and in that proportion shall pay the full amount of what he may have taken wrongfully. Whoever may have taken fish in violation of this law, without paying as above, shall be fined fifty dollars for each offense.

SEC. VI. The landlords shall not have power to lay any taxes or to impose any other restrictions upon their tenants regarding the private fisheries than is in the preceding section prescribed, neither shall such further restrictions be valid.

SEC. VII. It shall be competent to the landlords, on consultation with the tenants of their lands, in lieu of setting apart some peculiar fish to their exclusive use as hereinbefore allowed, to prohibit during certain indicated months of the year all fishing of every description upon their fisheries; and during the fishing season to exact of each fisherman among their tenants one-third part of all the fish taken upon their private fishing grounds. In every such case it shall be incumbent on the landlords to comply in like manner with the requirements of the fourth section of this article.

SEC. VIII. The royal fish shall appertain to the Hawaiian Government and shall be the following,* viz:

First. The bonito when off any part of the coast of Lanai.

Second. The albacore of Hawaii.

Third. The mullet of Huleia, Anehola, and Hanalei; the squid and freshwater fish of Kauai.

Fourth. The shoal fish taken at the following places noted for the abundance of fish frequenting them: Off Oahu: 1, Kalia; 2, Keehi; 3, Kapapa; 4, Malaekuli, and 5, Pahihī.

Fifth. Off Molokai: 1, Punalau; 2, Ooia; 3, Kawai; 4, Koholanui; 5, Kaonini; 6, Aikoolua; 7, Waiokama, and 8, Heleiki.

Sixth. And off Maui; the kuleku of Honuaula; and the same whenever found off said island.

Seventh. All the following transient fish, viz: 1, the kule; 2, the anaeholo; 3, the alalauwa; 4, the uhukai; 5, the kawelea; 6, the kawakawa; 7, the kalaku.

These shall be divided equally between the King and fishermen. But on all the prohibited fishing grounds the landlords shall be entitled to one species of fish and those who have walled fish ponds shall be allowed to scoop up small fish to replenish their ponds. If the prohibited fish of the landlord be mingled with the royal fish, then the landlord shall be entitled to one-third of the whole of the fish taken, though this applies only to Molokai, Oahu, and the reefs of Kauai.

All which shall be yearly protected by the king's taboo, to be imposed by the minister of the interior by means of circular from his department, as prescribed in the act to organize the executive ministry; and during the specified season of taboo they shall not be subject to be taken by the people.

SEC. IX. At the expiration of the taboo seasons all persons inhabiting these islands shall be at liberty to take the protected fish, accounting to the fishery agents of the

* A number of the common names in use at that time have since been changed so that at present it is a difficult matter to determine the scientific names of the species mentioned in the law. The following are some which have been determined: The bonito, *Gymnosarda pelamis*; the albacore, *Germonis*; the mullet, *Mugil dobula*; kule, *Trachurops crumenophthalmus*; the anaeholo, a young mullet; the alalauwa, *Priacanthus*; the kawakawa, *Gymnosarda alleterata*.

respective districts off which the same shall have been caught for the half or portion so taken; and the minister of the interior shall make known through his agents by viva voce proclamation the respective months or seasons of the year during which the said royal fisheries may be used and the said protected fish taken.

SEC. X. The minister of the interior shall appoint suitable and proper fishing agents in the several coast districts of the respective islands to superintend the fisheries aforesaid, to whom he shall from time to time give directions through the respective governors in regard to the sale or other disposition of the share of fish accruing to the government.

SEC. XI. It shall be the duty of the agents appointed to exact and receive of all fishermen for the use of the royal exchequer during the legalized fishing seasons the one-half part or portion of all protected fish taken without the reefs, whether at the respective places in the eighth section of this article indicated, or in the channels and inclosed seas dividing these islands, or upon the high seas within the marine jurisdiction of this country. And if any officer or agent of this government shall exact more fish of the people than is in and by this section expressly allowed he shall on conviction forfeit his office and be liable to pecuniary fine, in the discretion of the court before which he shall have been convicted.

SEC. XII. It shall be competent for His Majesty by an order in council from time to time to set apart any given portion or any definite kind of the said protected fish, or any proportional part of the avails therefrom arising for the use of the royal palace, to be delivered or paid over to the chamberlain of his household created by the third part of this act.

SEC. XIII. It shall be incumbent on the minister of the interior to provide, by instructions to the respective governors, for the sale and disposal of all fish received by the said fishing agents, and to pay the avails thereof to the minister of finance.

SEC. XIV. If any person shall, in violation of this article, take out of season the fish protected by the king's taboo, or if any person shall, within the free fishing seasons, take any of the protected fish without delivering to the agent appointed for that purpose the proportion accruing to the royal exchequer, he shall, on conviction, forfeit all fish found in his possession, and shall, in addition, pay fivefold for all fish thus taken, or he may be put in confinement, at the discretion of the court condemning him.

In 1850, under the heading of "Malicious injuries and mischiefs," the "destroying, cutting, injuring or impairing the usefulness or value of any fish net," etc., and the "putting of auhuhu or other substance deleterious to fish into any lake, pond, stream, or reservoir for the purpose of destroying the fish," were made misdemeanors.

As it was found to be a difficult matter to collect the government's share, and the fishing agents were oppressing the people, it was decided in the following act to give to the people the free use of the government fisheries.

AN ACT granting to the people the rights of piscary now belonging to the government.

Whereas the fish belonging to the government are productive of little revenue; and whereas the piscary rights of the government as managed by the fishing agents are a source of trouble and oppression to the people: Therefore,

Be it enacted by the house of nobles and representatives of the Hawaiian Islands in legislative council assembled: SECTION 1. That thirty days from and after the publication of this act in the Elele and Polynesian newspapers all fish belonging to or especially set apart for the government shall belong to and be the common property of all the people equally; excepting that the two-thirds mentioned in section 8, number 7, article 5, chapter 6, part 1, of the "Act to organize the executive departments," shall

not be exacted of the konohiki; and in all cases where the konohiki shall set apart one kind of fish only, as per section 4 of said law, such fish shall belong to the konohiki exclusively and without deviation or molestation.

SEC. 2. All fishing grounds pertaining to any government land, or otherwise belonging to the government, excepting only ponds, shall be, and are hereby, forever granted to the people for the free and equal use of all persons: *Provided, however,* That for the protection of such fishing grounds the minister of the interior may taboo the taking of fish thereon at certain seasons of the year.

SEC. 3. The minister of the interior shall give public notice in the Elele and Polynesian newspapers of any such taboo imposed by him, together with the name of such fish, and no such taboo shall be in force until due notice has been given. Any person who shall be found guilty of violating such taboo, upon complaint before any district justice, shall be punished by a fine not exceeding fifteen dollars in the discretion of the court, and restore all fishes taken, or the value thereof.

SEC. 4. No person living without the Kingdom shall take any fish within the harbors, streams, reefs, or other waters of the same for the purpose of carrying them for sale or otherwise to any place without the Kingdom.

SEC. 5. Every person violating the provisions of the preceding section may be punished, upon complaint made to any district justice, by a fine not exceeding two hundred dollars in the discretion of the court.

SEC. 6. All acts or parts of acts, resolves or parts of resolves, contrary to the provisions of this act shall be, and the same are hereby, repealed.

SEC. 7. The minister of the interior is hereby charged with the execution of this act.

Approved by the King July 11, 1851.

Although the government had given the people free access to the fisheries attached to its lands, many persons who had purchased or leased land from the government after this had been done attempted to assert exclusive rights to the fisheries adjacent to the lands, and refused the fishermen the rights they had previously enjoyed. In order to redress this grievance the following law was enacted in 1851:

AN ACT to protect the people in certain fishing grounds.

Whereas certain persons to whom government lands have been sold have assumed exclusive rights of fishing in the sea adjacent to said land, without the justification of law; and whereas the people in numerous instances have been unjustly deprived of their rights to the fish on the grounds long since made free to them by law, namely, on the fishing grounds commonly known as the Kilohee grounds, the Luhee grounds, the Malolo grounds, and the fishing of the ocean from the reefs seaward; and whereas the present law affords no sufficient protection to the people in those rights: Therefore,

Be it enacted by the nobles and representatives of the Hawaiian Islands in Legislative Council assembled:

SECTION 1. That no person who has bought or who may hereafter buy any government land, or obtain land by lease or other title from any party, has or shall have any greater right than any other person resident in this Kingdom over any fishing ground not included in his title, although adjacent to said land. The fish in said fishing ground shall belong to all persons alike, and may be taken at any time, subject only to the taboos of the minister of the interior.

SEC. 2. If that species of fish which has been tabooed by any konohiki shall go onto the grounds which have been or may be given to the people, such fish shall not be tabooed them. It shall only be tabooed when caught within the bounds of the

konohiki's private fishery. Nor shall it be lawful for a konohiki to taboo more than one kind of fish upon any fishing grounds which lie adjacent to each other.

SEC. 3. Every konohiki or other person who shall wilfully deprive another of his legal rights to fish on any fishing ground which now is or may become free to the use of the people, or who shall wilfully exact from another any portion of the fish caught on any public fishing ground, or who shall wilfully exact of another for the use of any private fishery a greater amount of fish than by law he is entitled to receive as his share, and any tenant or other person who shall wilfully deprive any konohiki of his fishing rights by appropriating to himself the tabooed fish of said konohiki, or otherwise, shall be punished by a fine not exceeding one hundred dollars for every such offense, in the discretion of the court, and in default of the payment of said fine be imprisoned at hard labor until the same is paid.

SEC. 4. The several district justices of the Kingdom shall have power to try and punish all offenders against the provisions of the preceding section committed in their respective districts.

SEC. 5. This act shall take effect ten days from and after the publication of the same in the Elele and Polynesian newspapers.

In 1859 a civil code, embracing all the laws then in force, was prepared for and passed by the legislature. The sections relating to the fisheries were as follows:

CHAPTER VII.—ARTICLE V.—*Of the fisheries.*

SEC. 384. All fishing grounds appertaining to any government land, or otherwise belonging to the government, excepting only ponds, shall be, and are hereby, forever granted to the people, for the free and equal use of all persons: *Provided, however,* That for the protection of such fishing grounds the minister of the interior may taboo the taking of fish thereon at certain seasons of the year.

SEC. 385. The minister of the interior shall give public notice of any such taboo imposed by him, and no such taboo shall be in force until such notice has been given. Every person who shall violate such taboo shall be punished by a fine not exceeding fifteen dollars and the value of the fish taken.

SEC. 386. No person residing without the kingdom shall take any fish within the harbors, streams, reefs, or other waters of the same for the purpose of carrying them for sale, or otherwise, to any place without the kingdom, under penalty of a fine not exceeding two hundred dollars, in the discretion of the court.

SEC. 387. The fishing grounds from the reefs, and where there happen to be no reefs, from the distance of one geographical mile seaward to the beach at low-water mark, shall, in law, be considered the private property of the konohikis, whose lands, by ancient regulation, belong to the same; in the possession of which private fisheries the said konohikis shall not be molested, except to the extent of the reservations and prohibitions hereinafter set forth.

SEC. 388. The konohikis shall be considered in law to hold said private fisheries for the equal use of themselves and the tenants on their respective lands, and the tenants shall be at liberty to use the fisheries of their konohikis, subject to the restrictions imposed by law.

SEC. 389. The konohikis shall have power each year to set apart for themselves one given species or variety of fish natural to their respective fisheries, giving public notice by viva voce proclamation, and by at least three written or printed notices posted in conspicuous places on the land, to their tenants and others residing on their lands, signifying the kind and description of fish which they have chosen to be set apart for themselves.

SEC. 390. The specific fish so set apart shall be exclusively for the use of the konohiki if caught within the bounds of his fishery, and neither his tenants nor others shall

be at liberty to appropriate such reserved fish to their private use; but when caught such reserved fish shall be the property of the konohiki, for which he shall be at liberty to sue and recover the value from any person appropriating the same.

SEC. 391. The konohikis shall not have power to lay any tax or to impose any other restriction upon their tenants, regarding the private fisheries, than is hereinbefore prescribed, nor shall any such further restriction be valid.

SEC. 392. It shall be competent to the konohikis, on consultation with the tenants of their lands, in lieu of setting apart some particular fish to their exclusive use, as hereinbefore allowed, to prohibit during certain months in the year all fishing upon their fisheries, and during the fishing season to exact of each fisherman among the tenants one-third part of all the fish taken upon their private fishing grounds. In every such case it shall be incumbent on the konohikis to give the notice prescribed in section 389.

SEC. 393. No person who has bought, or who may hereafter buy, any government land, or obtain lease or other title from any party, has or shall have any greater right than any other person resident in this kingdom over any fishing ground not included in his title, although adjacent to said land.

SEC. 394. If that species of fish which has been aboood by any konohiki shall go on to the grounds which have been or may be given to the people, such fish shall not be tabooed thereon. It shall be tabooed only when caught within the bounds of the konohiki's private fishery. Nor shall it be lawful for a konohiki to taboo more than one kind of fish upon any fishing grounds which lie adjacent to each other.

SEC. 395. Every konohiki or other person who shall willfully deprive another of any of his legal rights to fish on any fishing ground which now is, or may become, free to the use of the people, or who shall willfully exact from another any portion of the fish caught on any public fishing ground, or who shall wilfully exact of another, for the use of any private fishery, a greater amount of fish than by law he is entitled to receive as his share, and any tenant or other person who shall willfully deprive any konohiki of his fishing rights, by appropriating to himself the tabooed fish of said konohiki, or otherwise, shall be punished by a fine not exceeding one hundred dollars for every such offense, in the discretion of the court, and in default of the payment of such fine be imprisoned at hard labor not exceeding three months.

SEC. 396. The several district justices shall have power to try and punish all offenses against the provisions of the last preceding section committed in their respective districts.

For some years the use of giant powder or dynamite in the fisheries was permitted. Owing to ignorance or carelessness in handling this dangerous explosive such a large number of persons had lost their lives or been maimed that in 1872 the following law forbidding its use was passed:

AN ACT to prevent the use of explosive substances in taking Fish.

Be it enacted by the King and the legislative assembly of the Hawaiian Islands in the legislature of the Kingdom assembled: SECTION 1. No person shall use giant powder or any other explosive substance in taking fish within or upon any harbors, streams, reefs, or waters within the jurisdiction of this Kingdom.

SEC. 2. Whoever violates the provisions of the preceding section shall be punished by a fine not exceeding five hundred dollars and not less than twenty-five dollars, or by imprisonment at hard labor not exceeding five years and not less than three months, or both at the discretion of the court.

SEC. 3. The several district justices and police courts shall have concurrent jurisdiction in all cases under this act.

In 1888 this law was amended as follows:

SECTION 1. That section 1 of an act entitled "An act to prevent the use of explosive substances in taking fish," approved June 3, A. D. 1872, be, and the same is hereby, amended by adding to said section the following words:

"The possession by fishermen, fish venders, or persons in the habit of fishing, of fish killed by giant powder or other explosive substance shall be prima facie evidence that the person in whose possession such fish were found used giant powder or some other explosive substance in taking such fish, contrary to the provisions of this act."

SEC. 2. That section 2 of said act be, and the same is hereby, amended so as to read as follows:

"Whoever violates the provisions of this act shall be punished by a fine not exceeding two hundred dollars and not less than fifty dollars, or by imprisonment at hard labor not exceeding one year, or both, in the discretion of the court."

The general act was again amended in 1892, so as to make the penalty a fine not exceeding \$100 nor less than \$25, or by imprisonment at hard labor not exceeding six months, or both, in the discretion of the court. Unfortunately this law is not very closely enforced, and as a result great destruction is still being wrought to the fisheries by the use of this explosive, especially in the more inaccessible portions of the islands.

For many years it had been a common practice for the fishermen to catch young fish, particularly the mullet and awa, and sell them. This had proved such a heavy drain upon the supply of these species that in 1888 the following law was adopted:

AN ACT to provide for the protection of certain fish within the bays, harbors, waters, or streams of the Hawaiian Islands.

Be it enacted by the King and the Legislature of the Hawaiian Kingdom:

SECTION 1. It shall not be lawful for any person to take, catch, or destroy the young of the fish known as the mullet and the awa under 4 inches in length in any of the bays, harbors, waters, or streams of this Kingdom: *Provided, however,* That nothing in this act shall prevent the taking of the fish herein above prohibited for the purpose of stocking ponds.

SEC. 2. It shall not be lawful for any person to sell or offer for sale, or have in his possession, except alive, any of the young fish mentioned in section 1 of this act.

SEC. 3. Any person violating the provisions of this act shall, upon conviction before any police or district magistrate, be punished by a fine of not less than twenty dollars nor more than two hundred dollars, or by imprisonment at hard labor for not less than ten nor more than ninety days, or by both such fine and imprisonment, in the discretion of the court: *Provided, nevertheless,* That no such fine shall be imposed upon any person who, fishing for other fish, accidentally takes or catches no more than forty of the young fish mentioned in section 1 of this act.

SEC. 4. This act shall take effect from and after the date of its approval.

Approved this sixth day of September, A. D. 1888.

In 1892 the following amendment to a previous law, designed to clear up disputed points which had arisen, was passed:

Be it enacted by the Queen and Legislature of the Hawaiian Kingdom:

SECTION 1. Section 388 of the civil code shall be, and the same is hereby, amended to read as follows:

"SEC. 388. The konohikis shall be considered in law to hold said private fisheries for the equal use of themselves and of the tenants on their respective lands; and the

tenants shall be at liberty to take from such fisheries, either for their own use or for sale or exportation, but subject to the restrictions imposed by law, all fish, seaweed, shellfish, and other edible products of said fisheries.”

SEC. 2. This act shall take effect and become a law from the date of its approval.

Approved this 4th day of August, A. D. 1892.

The various changes and modifications made in the fishery laws from time to time have been in the direction of their simplification and explanation, that the rights of fishermen and the konohiki might be more clearly defined. It also appears that the rights and privileges of the common people were extended from time to time. Since annexation the only legislation pertaining to the fisheries of the islands by the Congress of the United States is in three sections of the enabling act, section 94, providing for the investigations upon which this paper is based, and already quoted, and sections 95 and 96, as follows:

REPEAL OF LAWS CONFERRING EXCLUSIVE FISHING RIGHTS.

SEC. 95. That all laws of the Republic of Hawaii which confer exclusive fishing rights upon any person or persons are hereby repealed, and all fisheries in the sea waters of the Territory of Hawaii not included in any fish pond or artificial inclosure shall be free to all citizens of the United States, subject, however, to vested rights; but no such vested right shall be valid after three years from the taking effect of this act unless established as hereinafter provided.

PROCEEDINGS FOR OPENING FISHERIES TO CITIZENS.

SEC. 96. That any person who claims a private right to any such fishery shall, within two years after the taking effect of this act, file his petition in a circuit court of the Territory of Hawaii, setting forth his claim to such fishing right, service of which petition shall be made upon the attorney-general, who shall conduct the case for the Territory, and such case shall be conducted as an ordinary action at law.

That if such fishing right be established, the attorney-general of the Territory of Hawaii may proceed, in such manner as may be provided by law for the condemnation of property for public use, to condemn such private right of fishing to the use of the citizens of the United States upon making just compensation, which compensation, when lawfully ascertained, shall be paid out of any money in the treasury of the Territory of Hawaii not otherwise appropriated.

Except in a few isolated instances these exclusive fishery rights are of not much importance on any of the islands except Oahu. On this island, especially in the vicinity of Honolulu, they are of considerable value, owing to the easily accessible market afforded by the city. On the other islands the population is too scattered to make the fisheries valuable. The owners of fishery rights usually lease them to Japanese, Chinese, and Hawaiians.

The abolishment of these fishery rights will, in some instances, work very serious damage to the commercial fisheries if proper laws are not provided to take the place of the old restrictions. Under the laws governing these fisheries at present, the owner can, and in some places does, protect certain species, particularly the mullet, during the spawning season by placing a tabu on them, and as everybody had to account to him when fishing he could easily prevent the use of destructive forms of apparatus or overfishing.

The fisheries of Honolulu are rapidly falling off in amount, with a corresponding rise in the prices for fish, which are now perhaps higher than in any other seaport town in the world. One cause of the falling off is to be found in overfishing within a limited area. The markets of Honolulu are supplied by resident fishermen, by fishermen along the line of the Oahu Railway at Waialua and Waianae, and by fishermen on the north side of the Pali, about the village of Heeia. None of these fishermen goes into deep water, or to any great distance from Honolulu. Their equipment is on a relatively small scale, and thus far larger equipments have not been found profitable. The high price of labor, its relative untrustworthy character, and the ease of overstocking the market have brought attempts at fishing on a large scale to a comparative failure. Native fishermen work when they feel like it. Chinese fishermen are afraid of new situations and beset by superstitious fears. Japanese fishermen enter into combinations with their competing fellows, thus defeating the purpose of large fishing plants to control the markets themselves.

The most valuable element in the Hawaiian fisheries is the anaama or mullet (*Mugil dobula*). The system of fencing off arms of the sea for the formation of mullet ponds is practically, in American territory, confined to Hawaii. The recognition of private ownership in such ponds is contrary to American precedents. If it be found impracticable to recognize such private ownership, these ponds may be condemned by the United States Government and again leased to private persons. The best interests of the fisheries will be served by leaving their present owners in undisturbed possession. The matter should, however, receive careful consideration, as the action of Congress will constitute a permanent precedent. Under Hawaiian law the sea between the land and the barrier reef is also held as personal property. The act establishing the Territory of Hawaii wisely provided for the extinction of such titles.

After the fishery rights are abolished in 1903 there will be almost no restrictions on the general fisheries. At the present time very fine-meshed seines are used, especially around Honolulu (Oahu) and Hilo (Hawaii), and immense numbers of very small young fish, such as the mullet (*Mugil dobula*), ulua (*Caranx* sp.), and akule (*Trachurops crumenophthalmus*), from 2 inches in length up, are caught and sold, although it is against the law to sell young mullet under 4 inches in length. Unless this great drain on the young is stopped the fisheries are bound to suffer severely.

The use of fine-meshed nets and the sale of small fish should be absolutely prohibited.

The same remark applies to the various species of *Mullida*, known as weke, moano, munu, kumu, umu, etc. Two of these species, the munu (*Upeneus trifasciatus*) and the umu (*Upeneus porphyreus*),

stand among the very first in quality of Hawaiian food-fishes, ranking with the famed red sur-mullet (*Mullus barbatus*) of Europe.

The large shore fishes known as ulua are worthy of similar protection. Hundreds of young too small to be of any food value are taken every day in the seines in Pearl Harbor and in the Bay of Hilo.

For the adequate protection of the fishes of the Hawaiian Islands the following regulations are suggested.

1. The size of the meshes of seines should be limited. No seine with a mesh less than 3 inches in extension should be used. An exception may be made which will allow the use of seines not exceeding 30 feet in length and with mesh not under three-eighths of an inch in extension for the purpose of taking bait.

2. The capture or taking in any manner whatsoever or the selling, offering for sale, or having in possession any amaama, weke, moano, kumu, or nunu, or other fish of the family *Mullidae* of less than 8 inches in length should be prohibited.

3. The minimum size limit for the ulua and related species of the family *Carangidae* should be 12 inches.

4. The minimum size limit for all species other than those specifically mentioned above should be 5 inches.

5. The amaama, or mullet, is of great importance on the islands of Oahu and Molokai, and in order to properly conserve the supply the catching of them during their spawning season should be prohibited. Their principal spawning season is from the latter part of October to the early part of February.

6. The selling of female ula (locally known as lobster) when carrying eggs should be strictly prohibited. While there is no present sign of a decrease in the supply of this crustacean, it is better to start now than when it is too late.

7. As the waters of Pearl Harbor (Oahu) seem to be favorably adapted to the raising of oysters it would be well if this industry could be established and fostered by the passage of a law permitting the leasing of small plots of land under water, adjacent to the shores, for the purpose of planting and raising oysters. There are at present a few beds of small native oysters scattered through Pearl Harbor, but very little dependence can be placed upon these to supply the demand. Several efforts have been made to introduce oysters from the eastern portion of the United States and from California, and the results were sufficient to show that with proper care and encouragement, such as recommended above, a profitable industry could be built up.

8. An efficient force of fish wardens should also be provided for in order to see that the laws are properly enforced. Each warden could have a certain district, in which he would reside, and he would thus be enabled to keep a close supervision over the fishermen.

9. It is also recommended that the native birds of the islands should be protected and that a clause to that effect be made a part of any legislation that may be had.

That legislation equivalent to the above recommendations is demanded by the interests of Hawaii admits of no question. It, however, raises the more important question: Should such a statute be passed by Congress and enforced by the Federal judges, marshals, and other officials; or should it be left to the action of the Territorial

legislature? The present commission desires to express no opinion on this large question of national policy. It is proper, however, to state this fact: With the present Territorial legislature it is apparently wholly impossible to pass any kind of statute for the protection of the fisheries. With the present laws governing suffrage there is no prospect of any change in this regard.

The chief argument used against protective laws is the desire of the Hawaiian people to eat little fishes raw. Of these little fishes thus eaten, one or two, called "nehu," never grow large. On the other hand, it may be urged that the nehu is an important food of larger fishes; that the market value of all which are taken is insignificant, and that the young of the mullet and other fishes of real value are taken and eaten with the nehu.

INTRODUCTION OF ADDITIONAL SPECIES OF FISHES, ETC.

The fresh waters of the Hawaiian Islands are too limited in importance to justify experiments in acclimatization. The chief streams are on the island of Kauai. The only native fishes in any of the streams are different species of gobies, known collectively as "oopu." These have some value as food, but are not highly esteemed.

Although the waters 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:

From China and Japan.—Gold-fish (*Carassius auratus*), china-fish (*Ophiocephalus*), a species of cat-fish (*Macropternotus naquv*), and one or more species of frogs.

From the United States.—Brook trout (*Salvelinus fontinalis*), black bass (probably *Micropterus salmoides*), cat-fish (*Ameiurus nebulosus*), carp (*Cyprinus carpio*), the bullfrog (*Rana catesbiana*), and terrapin. In 1876 some salmon and trout eggs were sent to parties in Honolulu in exchange for 100 awa; there is no record of what became of these eggs.

The gold-fish and frogs have thrived very well and are now to be found on most of the islands. At Hilo the frogs are so abundant that they have become an article of sale. On the island of Kauai they have been found especially useful in destroying the fluke, *Fasciola hepatica*, which works considerable damage to the cattle. They have also assisted very materially in thinning out some of the noxious insects which have been introduced.

The china-fish is to be found in numbers in the vicinity of Honolulu alone, and is raised in the irrigation ditches and fresh-water ponds. The china-fish and gold-fish are generally sold alive to the Chinese.

The rivers of the islands are, in nearly every instance, small mountain streams, which become torrents in the wet season and a series of pools, connected by slender rivulets, during the dry season. Trout do not thrive under such conditions, and it is a waste of time to attempt

to acclimatize them. Only one plant (on Kauai in 1894) has so far been made, and nothing has been seen or heard of them since.

The small-mouthed black bass, however, would probably thrive under such conditions. One plant of black bass has been made (at Hilo), and though they were never seen again this was probably due to their poor physical condition when planted. Owing to the absence of the consignee when they arrived, they were allowed to remain in the cans for some time before being planted, and as a freshet occurred the next day it is probable they were all carried out to sea. As the rivers are filled with fresh-water shrimp, the bass would have an abundant food supply.

The cat-fish (American and Chinese) are found in considerable numbers on Oahu, in the vicinity of Honolulu. Carp are found on the islands of Maui and Kauai, but are not yet common.

A more valuable fish than the black bass is probably available for these islands. It is the Japanese dwarf salmon or ayu, *Plecoglossus altivelis*. It is one of the most delicate of fishes, breeds freely, and lives in every clear stream of Japan from Hokkaido to Formosa, being thus well adapted to the climate of Hawaii. Perhaps more than any other foreign fish whatever it merits introduction into the waters of the United States, especially into those of California.

Several lots of oysters from the eastern part of the United States and from California have been brought to the islands at different times since 1893 and planted in Pearl Harbor. While the results achieved were not very satisfactory from a financial standpoint, still they were sufficient to show that the business might be put upon a remunerative basis if it were given the time and attention necessary. The eastern oyster was found to breed to a limited extent.

Clams could be planted in Pearl Harbor and in other favorable localities, and would probably thrive well.

The abalone, which is very highly prized by the Chinese, might be introduced on the rocky reefs and sea walls.

The depletion of the fisheries of these islands can be best prevented by proper protective legislation such as we have suggested. Fish-cultural methods have not yet been developed with regard to any of the fishes native to or suitable for these islands. The establishment of a fish-cultural station there is at present wholly impracticable and unnecessary. The establishment, however, of a biological station similar to that at Woods Hole or that at Beaufort, N. C., for the study of the many important problems connected with tropical insular aquatic life is of the highest importance and is earnestly recommended.

FISH PONDS.

The most interesting of the fishery resources of the islands are the fish ponds. Many of these were built so long ago that even tradition

does not approximate the date. As they were originally owned by the kings and chiefs, it is very probable that they were built by the forced labor of the common people. They are found principally in the bays indenting the shores of the islands, the common method of construction being 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 that case being run out from two points on the shore some distance apart in the shape of a half circle. A few were built 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. In the sea ponds the walls are built somewhat loosely, which permits the water to percolate freely. The ponds are arranged with narrow entrances, protected by sluice gates, which can be opened or closed at will. These are frequently left open when the tide is running in, which allows the amaama, or mullet, and the awa to enter freely. When the tide turns the gates are closed, making prisoners those which have entered. The salt-water ponds usually contain only the amaama and awa.

In the fresh and brackish water ponds gold-fish, china-fish, oopu, opai, carp, aholehole, and okuhekuhe are kept. No attempt at fish-culture is made with these ponds, the young fish being captured in the open in the case of most of the species enumerated and placed in the ponds until they attain a marketable size. Large quantities of amaama and awa are handled in these ponds annually, especially on the island of Oahu. Dip nets, seines, gill nets, and scoop nets are used in taking the fish from the ponds; and as they are quite shallow, this is done very easily. The ponds are operated almost exclusively by Chinese.

A number of the ponds have been allowed to fall into decay, particularly on Molokai and Hawaii, while on Oahu others have been filled up to meet the growing demand for rice land and for other purposes. The maintenance of these ponds should be encouraged as much as possible, as they are of great assistance in maintaining a regular supply of fish at all seasons of the year.

The irrigation ditches used in watering the numerous rice fields are also employed incidentally in raising a few of the species enumerated above.

FISH MARKETS AND METHODS OF HANDLING FISHERY PRODUCTS.

There are 7 fish-market houses, 1 each at Honolulu (Oahu), Hilo (Hawaii), and Wailuku (Maui), and 4 at Lahaina (Maui). Peddlers with small carts also 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 ever have an opportunity from one year's end to another to purchase fish.

At Honolulu the market house, with land, is valued at \$155,000. It is owned by the Territorial government, and is one of the best appointed fish markets in the United States. A fish inspector, with one assistant, is in charge of the market, and all fish must be inspected by him before they go upon the stalls. In this manner complete control over the fish sold in the city is obtained, as no peddling through the streets is permitted.

There are 20 stalls for the sale of fresh fishery products, the rents of which vary from \$15 to \$30 per month, according to 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 being Chinese 40, Japanese 6, and natives 2. In addition to these, 6 tables were occupied by 6 native women on Saturday for the sale of limu (algæ), while 3 tables were devoted to the sale of dried fish during most of the week, and were run by 3 native women. On a few days in the week, when fresh fish are scarce, certain of the dealers also sell pickled California salmon. 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 previous to noon must be sold before the market closes the same day, but if brought in after noon it can, if not sold before night, be kept in a cold-storage house close by, and placed on the stalls again the next morning, but in that event it 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 become tainted in that climate. No ice is used around the market house. 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 are sold dead. This market is exceedingly well managed, and there appears but little, if any, chance for improvement.

The market house at Hilo, which is owned by private parties, was built at an expense of \$10,000, including the value of the land, and 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 was 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 Ohaa, 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 carts. The principal selling time at the market is in the afternoon, after the dealers have returned from Waiakea.

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.

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 are 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 sorely 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.

COMMERCIAL FISHERIES.

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 business, but of late years the Japanese have engaged 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.

A great variety of apparatus is in use in the fisheries, the principal forms being gill nets, seines, bag nets, cast nets, dip nets, lines, baskets, and spears. No effort is made to work the deep-sea fisheries except with hook and line, the greater part of the fishing being done on the reefs or close inshore. It is probable that the beam trawl could be used to advantage in the deeper waters. 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 try.

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.

The high prices prevailing for many species forms a very noticeable feature of the industry. In the Honolulu market 25 cents per pound is not an uncommon price for some, while on certain of the other islands even higher prices are realized. Judging solely by this feature, many persons jump to the conclusion that fish are becoming scarce, but this apparently is not borne out by a close investigation of the industry

as a whole. It is but rarely that there is a scarcity of fish in the markets, the principal complaint in this regard coming from those places which are rather inaccessible and where the fishermen are few in number, such as on Kauai. The most plausible reason for the high prices is that fishery products have gone up in correspondence with the other necessities of life, which are unusually high as compared with the rest of the country. The great development of the sugar industry in the last fifteen years, and the profitable prices realized for the product, have caused a great boom in everything, particularly in the wages paid to labor, and the cost of the necessities of life has been raised to correspond. It is very probable that as things settle down to a more normal condition the cost of fishery products will be lowered to more nearly their proper level. The Chinese and Japanese have organized companies at several places to monopolize the business, and these have also been important factors in causing the high prices.

The methods of transportation between points on the same island are rather crude in many instances, while in others the cost of transportation is practically prohibitive so far as fishery products are concerned, as a result of which the supply of each place must be drawn largely from its own immediate neighborhood, especially as ice is so expensive that it can not be used to preserve shipments for any length of time. The building of railroads on Oahu and Hawaii has aided very materially in the matter of the transportation of fishery products at reasonable rates. The steamer rates between the various islands of the group are prohibitive at present, and as the distances are too far for small boats there is no opportunity for the fishermen on one island who have an excess to ship to another island where there is a temporary scarcity. These problems will all work themselves out as the means of transportation increase.

Immense quantities of canned, salted, smoked, and dried fishery products, such as salmon, cod, skipjack, mackerel, herring, sardines, shrimps, lobsters, oysters, clams, mullet, etc., are imported and consumed by the people, particularly on the sugar plantations. As these are in many instances located in rather inaccessible regions where fresh fishery products can not be obtained at any price, they are perforce compelled to depend on the prepared goods for their supply.

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, as it was thought by many persons that the disease might be transmitted in this way.

The three tables following show in condensed form, by islands, the persons employed, the boats, apparatus, fish ponds, shore and accessory property, and cash capital 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 shoresmen shown were employed principally in the fish markets. The total number of persons employed was 2,492. This does not include those engaged in carrying on the wholesale fish trade of Honolulu and Hilo.

The total investment in the industry, including the wholesale trade, was \$739,741. The shore and accessory property and cash capital employed in the wholesale trade of Honolulu and Hilo are included in this table.

So far as quantity is concerned, the catch of akule was the most important, but malolo leads in the value of catch. Other leading species were amaama, ulua, aku, oio, awa, moano, kawakawa, opelu, opihi, and ula. The total catch amounted to 6,222,455 pounds, valued at \$1,083,646.

[The tables on which the preceding remarks are based formed part of the original Congressional document, but as they necessarily occur in Mr. Cobb's statistical report (see pp. 383-499) they are omitted here to avoid repetition.]