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SOME PROCESSING AND TECHNOLOGICAL METHODS IN THE JAPANESE FISHERIES

D. T. Miyachi*

PREFACE

In the autumn of 1948 the Pacific Oceanic Fishery Investigations, U. S. Fish and Wildlife Service, initiated a project to have a team of fishery scientists make a reconnaissance of the Japanese pelagic tropical and subtropical fisheries. The team, composed of two fishery biologists and a technologist, was integrated into the Fisheries Division of the Natural Resources Section of SCAP and operated under Mr. William C. Herrington, the chief of the Fisheries Division. The primary objective of this reconnaissance was to gather information on all phases of the Japanese tuna fisheries which would (1) enable the Pacific Oceanic Fishery Investigations to more effectively plan the exploratory and investigational operation of the high seas fisheries of the Territories and island possessions of the United States in the tropical and subtropical Pacific Ocean, and (2) be useful in the administration by SCAP of the Japanese fisheries.

The primary concern of the fisheries technologist during the Japanese Reconnaissance was to gather information on the Japanese method of preserving and handling the tuna, fish-processing techniques, the various types of byproducts, and their fisheries technological research work. Tuna canneries were visited in Yokosuka, Kurihama, Yaizu, and Shimizu, but unfortunately most of the canneries were not in operation when they were visited during the months of December and January. Fish-liver oil plants in the vicinity of Tokyo were visited, and meetings were held with research workers at the fisheries experimental stations, private companies, and the universities.

Interviews with Japanese scientists did not prove too fruitful, mainly due to the language barrier. When interpreters were provided, they were satisfactory for the common, everyday type of conversation; but since they did not have a technical background, they were unable to interpret the more detailed and technical conversation. The Japanese scientists would describe their work briefly, and further questioning would not reveal the more specific description of their methods of research and results.

A great many of the research workers are engaged in limited and detailed studies that are of little significance in solving some of the problems confronting the Japanese fishing industry. There is a great deal of duplication of research work among the various institutions and individuals, and a great many of them are not familiar with the works of others or with the literature in their own field. The research program has been also somewhat limited because it has not been possible to replace some of the laboratory equipment destroyed during World War II.

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Written reports and articles on fishery technology published in the various journals were secured whenever possible in order to supplement the information obtained by interviews. Since these reports are written in Japanese, they must be translated into English before they can be studied and evaluated. There was no outstanding piece of research work among the limited number of publications, which included an English abstract.

Data on the Japanese fishing industry given in this report were obtained from as many independent sources as possible and were also checked for reliability, whenever possible, with information already on file with the Fisheries Division of the Natural Resources Section. It was not possible, however, for the Fisheries Division to make a check on all of the data included here.

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JAPANESE TUNA INDUSTRY

INTRODUCTION: The writer's observation of the Japanese methods of handling and processing tuna was limited due to the short stay in Japan and to the fact that only a few of the canneries were in operation at the time the visits were made. Only the landing and handling of fish caught in the winter tuna fishery were observed, and thus it is not possible to give an accurate description of the year-round operation. It was quite evident, however, that handling methods and processing techniques used by the American tuna industry are far more advanced than those in Japan. In his report entitled, "Survey of Processing Methods and Inspection Standards of Fisheries Products in Japan" for the Fisheries Division, Natural Resources Section, General Headquarters, SCAP, J. C. Lightburn states: "Observations disclosed that the processing techniques and handling methods in the Japanese fishing industry are outmoded. It is very apparent that no technological improvement of consequence has been made in the Japanese fishing industry for years. The only justification that appears possible for the use of the present methods is that they have been handed down from generation to generation." One of the contributing factors in this outmoded condition is that the Japanese use hand labor in many of the operations because labor is plentiful, whereas the American industry has mechanized the production lines and is constantly seeking ways to increase the operating efficiency and thus cut the cost of production.

HANDLING AND PRESERVATION OF FISH ABOARD THE TUNA VESSELS: The Japanese use ice to preserve the fish aboard the tuna vessels. Some of the larger tuna vessels have mechanical refrigeration with coils extending around the holds for the purpose of preserving the ice until needed, but none of the vessels has the necessary equipment for freezing the fish.^{1/} At one time the Japanese experimented with freezing tuna by holding the fish in eutectic brine (around -6° F.), but they did not adopt this method commercially because of salt penetration of the flesh. The freezing of

^{1/} THE BANSHU MARU, A REFRIGERATED MOTHERSHIP, WAS USED WITH A FLEET OF THREE TUNA CATCHER BOATS FOR ONE MONTH DURING THE SUMMER OF 1948 AS AN EXPERIMENT TO DETERMINE THE PRACTICABILITY OF USING A MOTHERSHIP IN THE TUNA FISHERY.

fish also has been avoided partly because the Japanese consumers prefer eating raw "fresh" tuna and because the skipjack is used mainly for manufacturing katsuobushi (dried skipjack sticks).

In the summer fisheries, when the trips are less than twenty days in duration, the tuna and skipjack are usually chilled and preserved in a mixture of sea water and ice. When this method is used, 30-pound blocks of ice are loaded into the holds of the vessels. As the fishing operation begins, an empty hold is partially filled with sea water and large chunks of ice; and the sea water is cooled to approximately 32° F. Much more ice is added to the well at intervals during the process of lowering the body temperature of the fish from about 65° F. to approximately 32° F. In most cases the fish are held in the chilled sea water for the duration of the trip; but in other instances, especially with the yellowfin tuna, the cooled fish are transferred to another hold and packed in crushed ice.

When a mixture of sea water and ice is used to hold the fish, some salt penetration of the flesh may occur, but the fish can be cooled more rapidly and evenly as a result of better heat transfer than if only crushed ice were used. The appearance of the fish remains good because the fish is kept relatively free of slime and is less apt to be crushed by the weight of other fish.

Crushed ice is used primarily to chill and to preserve the tuna in the winter fisheries when the trips take more than 20 days. The holds can be partitioned with shelves three to five in number, with each shelf carrying two layers of fish surrounded with crushed ice. At the present time many of the boats do not use the partitions, but use the entire hold as a single unit. Generally speaking, in the pre-war days the fish were handled with greater care. Some of the boats used 5 percent by weight of salt with the crushed ice, while a few boats iced the fish individually in wooden boxes, which were packed in tiers in the holds.

Tuna, other than albacore, which weigh over 30 pounds are eviscerated aboard the fishing vessels; the albacore tuna are usually left in the round. When the long-line method of fishing is used, the large fish are eviscerated as soon as they are hauled aboard the vessel; but when the pole and line method is used, the big fish are selected for evisceration after the fishing operation has slowed down or stopped.

In the several fish unloading operations observed at the dock, four or five of the fish were tied together by the tails, hoisted out of the hold with a winch, dumped onto the deck, and tossed down a wooden ramp to the dock where they were sorted according to species, weighed, and graded.

A relatively small percentage of the iced tuna landed is in sufficiently good condition for either freezing or canning for export to the United States. Approximately 10 to 20 percent of the albacore tuna observed at the fish docks during November and December were of good quality; the remainder of the fish were in fair to very poor condition. Statistics for the 1948 albacore tuna season showed that only about 35 percent of the total catch was suitable for freezing purposes. The following are some of the factors which contributed to the spoilage of fish:

1. Fishermen remain on the fishing grounds longer than they should because fuel oil is allotted to them on the basis of the amount of fish landed. Quality of the fish is not taken into consideration in making

2/ IT HAS BEEN POINTED OUT BY CLAUDE M. ADAMS, CHIEF OF THE PRODUCTION AND PROCESSING BRANCH FISHERIES DIVISION, NRS, SCAP, THAT ONLY THE LARGE FISH INTENDED FOR DOMESTIC CONSUMPTION ARE EVISCERATED AND THAT NO EVISCERATED FISH ARE ACCEPTED FOR FREEZING OR CANNING FOR EXPORT.

the fuel oil allotment; however, efforts are now being made to establish a system to distribute fuel oil on a basis of the amount of fish landed in edible condition. Most of the fish considered not to be of proper quality for export purposes is used for domestic consumption.

2. There is no incentive for delivery of high-quality fish since there is no differential in price between fish of excellent quality and those in fair or poor condition. Fishermen are paid the ceiling price for all fish in edible condition and about half the ceiling price for fish fit only for use as fertilizer.
3. Fish destined for domestic consumption are handled roughly and crudely. They are hooked indiscriminately and, too often, dragged over rough floors, and tossed onto vehicles or conveyors. Fish intended for export, however, are handled with great care.
4. Because available equipment and materials are scarce and inferior, there has been a shortage of proper refrigeration and ice-making facilities. For example, ammonia leaks are frequently noted and attributed to the substitution of ordinary pipes for the scarce seamless pipes when repairs on the existing refrigeration installations were necessary. Continual overloading of the system and improper maintenance were evident from the thick layers of frost on the refrigeration pipes and around the door sills at many of the cold-storage plants visited. In prewar days, the ice supply was more plentiful and the boats were able to take on additional ice at the Bonin Islands and at Formosa. Even then, the majority of the fish were only in fair condition in comparison with the present high United States standards.

PREPARATION AND PROCESSING OF TUNA AT THE CANNERY: There is no regular inspection of tuna at the cannery after they have been purchased and designated for



FIGURE 1 - WASHING ALBACORE TUNA BEFORE PROCESSING FOR CANNING.

canning purposes. The highest-quality fish are frozen either for export to the United States or for canning during the off-season. All these fish are frozen in the round. When the frozen fish are to be canned, they are thawed in large wooden tanks with running fresh water.

Butchering: Tuna to be canned are eviscerated and heads cut off. The heads are removed in order to decrease the size of the fish and to increase the capacity of the equipment for pre-cooking the edible portion. The Japanese claim that the appearance of the cooked meat is improved by cooking without the heads because of better drainage of the blood. The raw heads are used for bait or are cooked later with the entrails for fertilizer.

The fish are washed with fresh water and are ready for the pre-cook. The Japanese say that it is desirable to do the washing with salt water, and at one cannery the fish are actually held for 20 minutes in a 3-percent brine solution prior to the pre-cook.

Pre-cook Procedure Used: Pre-cook conditions as described by the company of officials differed from cannery to cannery, but they fall into one of the several groups for which descriptive data are given here.

1. Pre-cook conditions were unchanged for each of the several species of tuna processed, but they did differ in certain respects based on weight of the fish as shown in the following tabulation:

| Weight of Fish | Pressure | Temperature | Time of Cook |
|----------------|---------------|-------------|--------------|
| Pounds | Lbs./Sq. Inch | ° F. | Hours |
| 8-25 | 0 | 210.0 | 3 |
| 25-37 | 2 | 218.5 | 3½ |
| 37-50 | 3 | 221.5 | 4 |
| Over 50 | 3 | 221.5 | 4½ |

A groove is cut along the middle of each side of those fish which are above 25 pounds in weight. Very large fish are also cut down the back to the backbone before the pre-cook.

2. The conditions for the pre-cook were adjusted for the species of tuna and for the size of fish within each species to be processed.

Albacore Tuna

| Weight of Fish | Pressure | Temperature | Time of Cook |
|----------------|---------------|-------------|--------------|
| Pounds | Lbs./Sq. Inch | ° F. | Hours |
| Up to 25 | 2 | 218.5 | 3 |
| 25-33 | 3 | 221.5 | 3½-4 |
| 33-42 | 3 | 221.5 | 4-5 |

Katsuo (Skipjack)

| Weight of Fish | Pressure | Temperature | Time of Cook |
|----------------|---------------|-------------|--------------|
| Pounds | Lbs./Sq. Inch | ° F. | Hours |
| Under 8.3 | 2 | 218.5 | 2 |

Yellowfin tuna are cut longitudinally into four strips and are pre-cooked as in the case of the katsuo (skipjack) mentioned above.

3. All fish are pre-cooked for $3\frac{1}{2}$ hours at 4-pounds pressure. Larger fish have grooves cut down the back and along the sides so that they may be cooked the same length of time as the smaller fish.

During the tour of the tuna canneries the author did not have the opportunity of observing the pre-cook operations. It has been pointed out by Claude Adams,



FIGURE 2 - JAPANESE LABORER LOADING ALBACORE TUNA INTO A PRE-COOK RETORT.

however, that the Japanese canners do not place proper emphasis on this important step in the process; and while the tables given on the previous page show the proper pre-cook time and temperature and pressure to be used, generally these conditions are not followed closely by most canners. Also, the bring-up time is insufficient to allow the fish to heat up to the normal pre-cook temperature of the retort.

Tuna-Cleaning Procedure: The special cleaning knife used to trim the tuna loins has no handle and is merely a metal blade about eight inches long and half-an-inch wide. The cutting portion of the knife is about three inches long and is on the edge of the blade which angles off and meets the opposite edge at a point. The tip of the cutting end of the blade is curved to one side.

After allowing the cooked fish to cool overnight, the skin is scraped away, the body is split longitudinally into two halves, the exposed back-bone and rib bones are removed, and each half is split longitudinally again into two halves. The dark meat and any blood spots are carefully removed from the loins with the cleaning knife. The bones and skins are used for fertilizer, the dark meat and trimmings are packed in jars for the domestic market, and the top quality light meat is canned for export purposes.



FIGURE 3 - THE DARK MEAT AND BLOOD SPOTS ARE REMOVED FROM THE ALBACORE TUNA LOINS.

TUNA-CANNING PROCEDURE: Hand Packing: The trimmed loins are cut with a knife by hand in a wooden cutting block. The crumbling of the meat during the cutting process is kept at a minimum by this method. A minimum of 165 grams of meat is weighed out in a small pan, and these pans are passed along to the packers. Cotton-

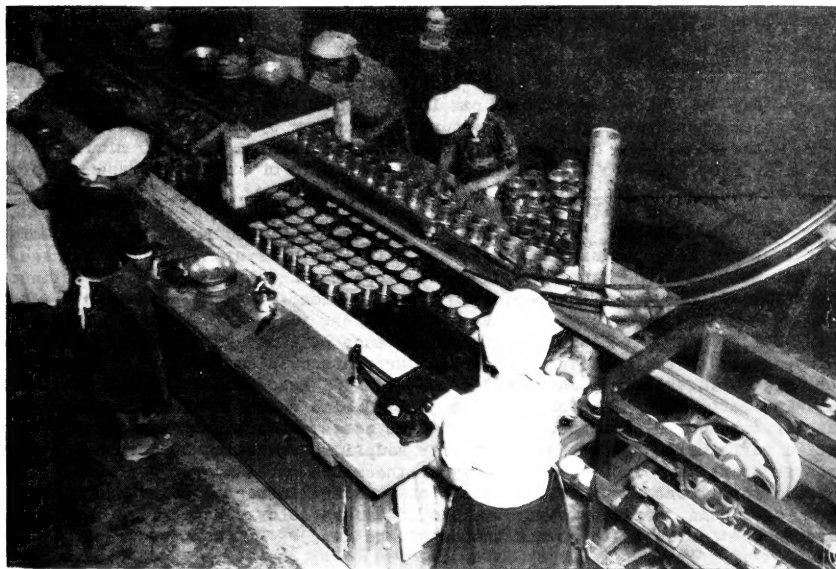


FIGURE 4 - PACKING CANS WITH ALBACORE TUNA AND CHECKING THE WEIGHT BEFORE SEALING.

seed oil imported from the United States is added to the empty cans, the amount of oil added varying from a small quantity to about 16 grams. Specifications require that the acid value of the cottonseed oil be less than 1.0; the oil being used now has an acid value of around 0.1. Next, the meat is packed into the cans very carefully by hand. One momme (3.75 grams) of salt is added with a standard spoon. The can is placed on a hand scale, and the remainder of the cottonseed oil is added with a dipper to bring the net weight of the contents to 200 grams. The cans are closed in vacuum-closing machines, which operate at capacities averaging between 50 to 60 cans per minute. One company passed the cans for five minutes through an exhaust box 60 feet long and then through the vacuum-closing machine. This company believes that the use of both the exhaust box and the vacuum-closing machine helps to remove any undesirable odors from the canned fish; however, the vacuum of the closing machine must be carefully regulated in order to prevent the loss of the cottonseed oil as the cans pass through the closing machine.



FIGURE 5 - PACKING DISCARDED SCRAPS OF ALBACORE WITH SOYA SAUCE IN TALL CANS FOR CONSUMPTION IN JAPAN.

Can-Cleaning Procedure: Formerly the cans went from the vacuum-closing machine through a mechanical can washer, which consisted of two large brushes rotating in a solution of steam-heated water and a special soap. These can washers are not being used at the present time due to the shortage of soap and to the lack of brushes. The cans are now cleaned by hand, utilizing pieces of cloth or sawdust and gasoline or other solvents.

Retorting: The canned tuna are retorted for 80 minutes at pressures ranging from 8 to 10 pounds per square inch. The "bring up" time varies from 10 to 20 minutes, and the "blow down" time from 10 to 25 minutes. The retorts are equipped with a steam pressure gauge and a mercury thermometer by which the retort operator controls the cook. The hot cans are cooled initially from 15 to 30 minutes with cold water from sprayers attached to the inside walls of the retort and are placed in the warehouse for the final cooling.

Generally speaking, the canneries have poorly equipped retorts. Many of the retorts do not have condensate traps, adequate cooling system, proper drainage outlet, nor more than one vent; they are not properly installed to insure continuous flow of steam throughout the period of sterilization.

INSPECTION OF THE CANNED TUNA: Sample cans of tuna are opened for examination by inspectors of the Food Trading Public Corporation, a semi-governmental organization, and by laboratory technicians of the Canning Association (Kan Binzume Kyokai Bu). The latter organization inspects 5 to 10 cans selected at random for each 100 cases of tuna or 20 cans for each lot of 500 cases examined. If one of the cans inspected falls below the standard, another sampling consisting of 20 cans per 100 cases is opened and inspected. If any of these are substandard, the whole lot is rejected for export purposes. The cans of tuna are inspected for vacuum, headspace, volume of liquid, drained weight of meat, odor and color of the juice, and the appearance of the tin plate on the inside of the can.

Examination of several cans of tuna showed the product to be of very good quality. The meat showed good color, normal flavor and odor; a sufficient amount of salt and good quality cottonseed oil were added; the cans registered from 2 to 14 inches of vacuum. It was noted, however, that the cans had no code marks on the lids by which such information as the date of pack could be determined.

TUNA-PROCESSING YIELD DATA: Data on the utilization of raw albacore tuna at one of the canneries during 1948 as submitted by the Japanese are as follows:

| Item | Summer Pack | Winter Pack |
|----------------------------------|-------------|-------------|
| | Percent | Percent |
| Fancy pack | 26.0 | 31.6 |
| Domestic-consumption pack | 27.0 | 21.5 |
| Heads (for fertilizer) | 13.0 | 10.0 |
| Viscera | 4.7 | 2.3 |
| Waste (bones, skins, etc.) | 11.3 | 1/ |

1/No data available.

The pre-cook shrinkage loss is not listed and probably accounts for that percentage of the whole which is lacking.

A more detailed report on the utilization of the albacore tuna was obtained from another company which began packing tuna in July 1948. The fancy and flake packs are put in half-pound cans, and the trimmings canned for domestic consumption are packed in one-pound cans. Processing yield data for one day per month is included in the tabulation on the following page:

| Date | Aug. 5, 1948 | | Sept. 6, 1948 | | Oct. 5, 1948 | | Nov. 6, 1948 | |
|-----------------------------------|--------------|------|---------------|------|--------------|------|--------------|------|
| Number of fish | 45 (frozen) | | 35 (frozen) | | 65 (iced) | | 48 (iced) | |
| Weight of fish | 2,170 lbs. | | 1,849 lbs. | | 3,753 lbs. | | 1,992 lbs. | |
| | Wt. | | Wt. | | Wt. | | Wt. | |
| | (lbs.) | % | (lbs.) | % | (lbs.) | % | (lbs.) | % |
| Waste (viscera, head, etc.) | 491 | 22.6 | 374 | 20.2 | 668 | 17.8 | 316 | 15.8 |
| Dressed fish | 1,679 | 77.4 | 1,475 | 79.8 | 3,085 | 82.2 | 1,676 | 84.2 |
| Shrinkage during pre-cook | 432 | 19.9 | 369 | 19.9 | 513 | 13.7 | 267 | 13.4 |
| Fish after pre-cook | 1,247 | 57.5 | 1,106 | 59.9 | 2,572 | 68.5 | 1,409 | 70.8 |
| Fancy-pack meat | 1/ | 1/ | 479 | 25.9 | 1,128 | 30.1 | 541 | 27.2 |
| Flakes | 1/ | 1/ | 20 | 1.1 | 422 | 11.2 | 306 | 15.4 |
| Domestic consumption | 924 | 42.6 | 579 | 31.4 | 881 | 23.5 | 442 | 22.2 |
| Waste (bone, skin, etc.) | 2/ | 2/ | 28 | 1.5 | 141 | 3.7 | 120 | 6.0 |

1/323 pounds or 14.9 percent were used for the fancy and flake packs.

2/It is noted that no allowance is made for waste.

"GREEN" TUNA PROBLEM: The companies canning albacore landed during the winter months are confronted with the problem of "green" tuna. The so-called "green" tuna are winter albacore, the white meat of which darkens during the pre-cooking period. The "green" tuna differ from the normal albacore in that they are thinner; have smaller livers and lower oil content; and have body juice with a higher pH. It is estimated that approximately 30 to 40 percent of the albacore tuna landed during the winter months are "green" tuna. The "green" tuna are landed in the greatest number during the periods of October to December and March through April; a smaller number of "green" tuna are landed during January and February.

Although the Japanese made limited studies on this problem before World War II, no concrete evidence on the causes of "green" tuna seems to have been uncovered. However, several reasons have been suggested. The poor quality of the meat is associated with low-oil content, and low-oil content during the winter is said to be related to the spawning time. Summer albacore tuna is caught with pole and line and is landed aboard the vessel immediately after being hooked. The winter albacore tuna, on the other hand, is caught by the long-line method, and some people believe that a chemical change, which is responsible for the discoloration and poor flavor of the cooked meat, takes place in the fish as it struggles to free itself from the hook. It has also been noted that the discoloration is not always evenly distributed throughout the fish, but is more prevalent near the tail portion. Some people believe that these poor qualities occur only in fish in the process of decomposition, while others believe it has no relationship with the degree of freshness of the fish. Until a scientific investigation is made, the true conditions which are responsible for the "green" tuna cannot be determined.

CHEMICAL AND ORGANOLEPTIC TESTS ON ALBACORE TUNA: The Japanese have made chemical analysis of the winter albacore tuna and some of their results are given in tables 1-6. It should be noted that all of the tables are as submitted by the Japanese; no attempt has been made to check for any discrepancies.

The data in table 1 indicate that fish of low-oil content having body juice of a high pH are not desirable for canning because the cooked meat has an off-flavor, rancid odor, and a bluish color.

Glass-like crystals of magnesium ammonium phosphate are found in some cans of winter albacore tuna processed from fish caught offshore by the long-line method; no crystals have been found in tuna canned from the inshore catch. It should be noted that the crystal formation is related to high pH of the body juice and to low-oil content (table 2).

| Caught by Pole and Line ^{1/} | pH of Body Juice | Percentage of | | | Quality of Meat ^{2/} |
|---------------------------------------|------------------|---------------|-------|------|-------------------------------|
| | | Protein | Fat | Ash | |
| 1 | 6.100 | 90.91 | 6.03 | 3.55 | Good |
| 2 | 6.052 | 92.00 | 7.55 | 3.14 | " |
| 3 | 5.965 | 85.18 | 12.52 | 2.67 | " |
| Caught by Long Line | | | | | |
| 4 | 6.755 | 96.40 | 1.03 | 3.54 | Poor |
| 5 | 6.520 | 96.31 | 1.58 | 3.06 | " |
| 6 | 6.285 | 96.08 | 1.51 | 2.81 | - |
| 7 | 6.240 | 94.53 | 2.98 | 3.20 | - |
| 8 | 6.195 | 89.34 | 8.31 | 2.85 | Good |
| 9 | 6.150 | 88.23 | 11.03 | 3.20 | " |
| 10 | 6.130 | 84.12 | 12.98 | 3.29 | " |
| 11 | 6.100 | 84.50 | 11.78 | 2.95 | " |
| 12 | 6.083 | 78.66 | 21.07 | 2.83 | " |
| 13 | 5.980 | 77.43 | 20.60 | 2.67 | " |

1/Numbers in this column identify samples consisting of one fish each.
2/Quality is based on appearance, odor, and flavor of the canned meat.

A comparison of the quality of albacore tuna canned aboard a vessel with that canned in a shore cannery shows no significant difference (table 3).

| Caught by Pole and Line ^{1/} | pH of Body Juice | Percentage of Fat | Crystal Formation |
|---------------------------------------|------------------|-------------------|-------------------|
| 1 | 6.100 | 6.03 | No |
| 2 | 6.052 | 7.55 | " |
| 3 | 5.965 | 12.52 | " |
| 4 | 5.875 | 23.55 | " |
| Caught by Long Line | | | |
| 5 | 6.755 | 1.03 | Yes |
| 6 | 6.520 | 1.58 | " |
| 7 | 6.415 | 4.29 | " |
| 8 | 6.330 | 7.64 | " |
| 9 | 6.295 | 7.62 | " |
| 10 | 6.100 | 11.78 | No |
| 11 | 6.000 | 24.27 | " |
| 12 | 5.980 | 20.60 | " |

1/Numbers in this column identify samples consisting of one fish each.

Comparison of canned albacore tuna caught by the long-line method and by the pole-and-line method shows no distinct difference in the color of the meat; however, a distinct difference in flavor can be noted. Also, the canned meat of the inshore tuna is of good quality even if the oil content is low, although it is slightly bluish in color.

PRESERVATION OF BAIT FISH: Anchovies and sardines are used as bait for skip-jack fishing; sardines, flying fish, sauries, anchovies, cuttlefish and small

machereel are used for tuna fishing. Whenever possible live fish is used for bait. These fish are also preserved by freezing or by salting and are used to supplement

| Table 3 - Comparison of Albacore Tuna Canned Aboard Ship and in Shore Cannery | | | | |
|---|------------------|-------------------|--------------------------------------|----------------|
| Sample Number ^{1/} | pH of Body Juice | Percentage of Fat | Quality of Canned Meat ^{2/} | Fishing Method |
| <u>Canned Aboard Ship</u> | | | | |
| 1 | 6.370 | 3.67 | Poor | Long line |
| 2 | 6.360 | 7.32 | " | " " |
| 3 | 6.310 | 12.86 | " | " " |
| 4 | 6.170 | 1.67 | " | " " |
| 5 | 6.160 | 1.33 | " | Pole and line |
| 6 | 6.055 | 14.85 | " | " " " |
| 7 | 6.030 | 5.97 | Good | Long line |
| 8 | 5.921 | 7.29 | " | " " |
| 9 | 5.915 | 4.28 | " | Pole and line |
| 10 | 5.910 | 2.23 | " | Long line |
| 11 | 5.890 | 13.25 | " | " " |
| 12 | 5.880 | 6.14 | " | " " |
| <u>Canned in Shore Cannery</u> | | | | |
| 1 | 6.785 | 0.91 | Poor | Long line |
| 2 | 6.475 | 1.12 | " | " " |
| 3 | 6.420 | 0.92 | " | " " |
| 4 | 6.155 | 1.50 | " | " " |
| 5 | 6.145 | 11.77 | Good | " " |
| 6 | 6.080 | 3.57 | " | " " |
| 7 | 5.925 | 8.54 | " | " " |
| 1/Numbers in this column identify samples consisting of one fish each. | | | | |
| 2/Quality is based on appearance, odor, and flavor of the canned meat. | | | | |

the live bait or at times when live bait is not available. The best quality fish are selected and are placed belly up in a pan for freezing. They are frozen in blocks of about 30 pounds in weight and are kept in cold storage until needed. Prior to the beginning of the fishing operation, the block of frozen bait fish is thawed by immersion in water or by exposure to the air. In pole-and-line fishing, the fish are used directly after thawing; but in long-line fishing, it is necessary to salt the thawed fish in order that disintegration will not be too rapid after the hooks have been baited and placed in the sea. The fresh bait fish may also be dry-salted directly; the salted fish are then kept in cold storage until needed.

| Table 4 - Summary of Observations Based on Studies of Winter Albacore Tuna | | |
|--|------------------------------------|--------------------------------|
| Physico-Chemical Observations | Fish Taken Mainly By Pole and Line | Fish Taken Mainly By Long Line |
| pH of body juice | Less than 6.0 | Greater than 6.3 |
| Color of cooked meat | Pink | Bluish |
| Flavor | Good | Off |
| Odor | Normal | Off |
| Fat content | High | Low |
| NH ₃ content | Small | Appreciable |
| Crystal formation | A little | Appreciable |
| Discoloration of can | Slight | Appreciable |

Table 5 - Chemical Analysis of Raw and Pre-cooked Albacore Tuna

| Item | Fresh | Fresh Fish, | Pre-cooked | Pre-cooked | Spilled |
|---------------------|------------|--------------|------------|--------------|--------------------------|
| | Whole Fish | Back Portion | Whole Fish | Back Portion | Whole Fish ^{1/} |
| | % | % | % | % | % |
| Water content | 66.47 | 71.21 | 56.5 | 65.1 | - |
| Solids | 35.53 | 28.76 | 43.5 | 34.9 | - |
| Total nitrogen | 4.422 | 4.610 | 4.459 | 4.432 | 4.503 |
| Hot water soluble N | 1.527 | 1.475 | 0.7899 | 0.9512 | 1.106 |
| Amino nitrogen | - | 0.0576 | 0.0818 | 0.108 | 0.1791 |
| Ammonia N | 0.0219 | 0.0165 | 0.0207 | 0.019 | 0.0898 |
| Lactic acid | 0.215 | 0.3517 | 0.1758 | 0.2315 | 0.5442 |

^{1/}Albacore tuna was landed at Ishinomaki on July 11 and stored for three days at 28° C.; the spoiled fish had a putrid odor.

Table 6 - Chemical Analysis of Different Portions of Pre-cooked Albacore Tuna

| Item | Light | Dark | Back | Belly-Flap |
|----------------------------|--------|--------|---------|------------|
| | Meat | Meat | Portion | Portion |
| | % | % | % | % |
| Water | 65.33 | 62.96 | 66.94 | 63.72 |
| Total nitrogen | 5.076 | 4.731 | 4.761 | 5.390 |
| Pure protein | 3.838 | 4.060 | 3.822 | 3.854 |
| Cold water soluble N | 0.739 | 0.798 | 0.668 | 0.811 |
| Amino nitrogen | 0.0415 | 0.0358 | 0.0281 | 0.0549 |
| Ammonia N | 0.0302 | 0.0550 | 0.0336 | 0.0267 |
| Ash | 2.005 | 2.355 | 1.760 | 2.250 |
| Fat | 4.102 | 3.402 | 3.320 | 4.884 |

SOME JAPANESE SPECIALTY FISH PRODUCTS



FIGURE 6 - PLACING A BASKET OF SKIPJACK FILLETS INTO A COOKING VAT FOR STEAMING. "THESE ARE THEN SMOKED AND DRIED FOR MAKING 'KATSUOBUSHI.'"

KATSUOBUSHI: The most valuable product from the skipjack is the "katsuobushi," or dried skipjack sticks. The method of processing the skipjack sticks is about the same as the one described by Shapiro.^{3/} The procedure is as follows:

Skipjack which weigh over one kan (8.267 pounds) are usually filleted into four pieces and are called "hombushi." The smaller fish are filleted into two pieces and are called "kamebushi." The fillets are placed in a cooking basket about two feet in diameter and are steamed for one hour. The cooked fillets are smoked with hardwood smoke and dried each day for a period of about three weeks. This reduces the weight of the fillets by 20 to 30 percent. The smoked fillets are scraped to remove the blackened surface and dried in the sun for one day. The removal of fat and the dehydration of the fish are ac-

^{3/}THE JAPANESE TUNA FISHERIES, REPORT NO. 104, NATURAL RESOURCES SECTION, GHQ, SCAP. U. S. FISH AND WILDLIFE SERVICE FISHERY LEAFLET 297, P. 18, APRIL 1948.

complished by placing the fillets in a barrel where normal growth of Asperigillus form on the surface, scraping off the mold, and drying in the sun. This is repeated until the skipjack sticks are completely dehydrated, at which time growth of the mold ceases. The dried skipjack sticks can be kept rather indefinitely at room temperature without spoiling. The sticks are shaved, and the shavings are used to make soup stocks and to flavor other dishes.



FIGURE 7 - SMOKING BOILED SKIPJACK FILLETS. FILLETS ARE PLACED IN WIRE-BOTTOMED WOODEN RACKS AND STACKED FOR SMOKING ON TOP OF BRICK FIRE-BOX.

SHIOKARA: Skipjack viscera are used to make "shio kara," a Japanese food product. The viscera are washed, cut into small pieces, and placed with some acetic acid and salt in wooden vats. The mixture is allowed to stand until fermentation has begun. The product is then ready for sale.

JAPANESE BYPRODUCTS

SQUALANE ($C_{30}H_{62}$): Squalane is a special lubricating oil produced by the hydrogenation of an unsaturated hydrocarbon, squalene ($C_{30}H_{50}$), which is extracted from the livers of shark living in the deep seas. The manufacturer claims the following properties for squalane:

- a. Colorless, odorless, neutral reaction.
- b. Pour point $-61^{\circ}C.$; solidifying point below $-65^{\circ}C.$
- c. Viscosity (Centi-stokes) at

| | |
|----------------|-------|
| $0^{\circ}C.$ | 131.0 |
| $30^{\circ}C.$ | 26.9 |
| $50^{\circ}C.$ | 12.9 |
- d. Viscosity index 224 (Viscosity pole-height 1.6)
- e. Viscosity ratio in Indiana Oxidation Test 1.08
- f. Flash point (Pensky-Maltens) $190^{\circ}C.$
- g. Boiling point

| | |
|-----------------|----------|
| $248^{\circ}C.$ | (5 mm.) |
| $262^{\circ}C.$ | (10 mm.) |
| $272^{\circ}C.$ | (15 mm.) |
- h. Specific gravity d_{4}^{15} 0.8115
- i. Evaporation loss at $110^{\circ}C.$, 6 hours 0.39 percent
- j. Refractive index n_{d}^{20} 1.4530

The hydrogenation of squalene takes place over a 4-hour period at a temperature between $198^{\circ}C.$ and $200^{\circ}C.$ and at a pressure of between 5 to 10 atmospheres; nickel precipitated on silica sand is used as the catalyst. Approximately 300 liters of hydrogen are used per kilogram of liver oil. The hydrogenated oil is treated by vacuum distillation, and the distillate boiling between $240^{\circ}C.$ and $260^{\circ}C.$ is taken as

the desired fraction of the product. This oil fraction is treated with aqueous caustic soda to neutralize the fatty acids after which it is cooled to -10° C., filtered, and washed with ethyl alcohol. Finally the purified material is redistilled under a vacuum of 5 mm. of mercury, and the distillate boiling at 248° C. constitutes the finished product.

"Squalube B" is manufactured through a special treatment of squalane by which the viscosity is increased. "Squalube B" has the following properties:

| | | |
|------------------------------|------------------|-------|
| a. Neutral reaction | | |
| b. Viscosity (Centi-strokes) | -20° C. | 1460 |
| | 0° C. | 259.1 |
| | 50° C. | 24.4 |
| | 100° C. | 6.7 |
| c. Viscosity index | | 147 |
| d. Pour point | -55° C. | |

The principal uses for squalane and "squalube B" are:

1. Lubricant for aeronautical instruments, meters and observation instruments for high altitude meteorology, medical implements, watches, and other general precision machinery.
2. Standard viscosity oils.
3. Base oil for anti-freezing grease.
4. Preparation of "squalin," which is squalane activated biochemically and which is used as a medicine for tuberculosis.

INSULIN: One company has been producing insulin as a byproduct for about ten years, and at the present time it produces about 60 to 70 percent of the total Japanese production. This insulin is extracted from the islands of Langerhans of skipjack, salmon, cod, and tuna. An islet weighs about 0.03 grams, and about one international unit of insulin can be obtained from each fish. After the islands of Langerhans are picked out from the internal organs of the fish, they are preserved in a saturated solution of picric acid until the time of processing for the insulin. The method for processing insulin is as follows:

Add silica sand and a small quantity of acetone to the islands of Langerhans; then grind the mixture thoroughly and filter. Repeat this step using successive small volumes of fresh acetone until an amount equivalent to about eight times that of the weight of the solids has been used. The combined acetone extract is held at room temperature for two to three hours and then centrifuged at 3,000 r.p.m. for 15 minutes. The liquid layer is separated from the precipitate, which is discarded.

Next, the acetone is removed from the liquid layer under vacuum at 40° C. to 42° C. As the acetone is being removed, picric acetate and fat separates from the residual solution. This mixture is centrifuged, the liquid layer is discarded, and the remaining precipitate of picric acetate and fat is dissolved in a solution composed of 25 parts of N HCl and 75 parts of ethyl alcohol. This alcohol-acid solution is centrifuged.

The clear solution from the centrifuge operation is poured slowly, with stirring, into pure acetone, and hydrochloric acetate of insulin is precipitated. This

precipitate is filtered, washed first with acetone, then with ethyl ether, and dried in a vacuum desiccator. The washing with acetone and ether and the drying steps are repeated. The hydrochloric acetate of insulin is dissolved in distilled water, the pH is adjusted to 5.0 with hydrochloric acid, and the final product is put into ampules.

VITAMIN A OILS FROM FISH LIVERS: Sources: Vitamin A oils are extracted from the livers of many different species of fish. In table 7 are listed the chief sources of vitamin A oils. The minimum and maximum vitamin A potencies were obtained from the analysis of a limited number of livers in the laboratory. The vitamin A potencies listed under the heading "average" are the values obtained by averaging the data from the analysis of the vitamin oils submitted for export and local sale and do not represent the average value of the livers analyzed in the laboratory.

Table 7 - Oil and Vitamins A and D Content of Fish Livers

| Item | Percent of Round Weight | Oil Content | Vitamin A Content in I.U. Per Gram of Oil | | | Vitamin D Content I.U. Per Gram of Oil |
|-----------------------------|-------------------------|-------------|---|-----------|-------------------------|--|
| | | | Minimum | Maximum | "Average" ^{1/} | |
| | | | | | | |
| Albacore | .2 | 5 | 26,900 | 44,900 | 34,000 | - |
| Bluefin | - | 13 | 32,900 | 429,900 | 100,000 | - |
| Bonito | 1.0 | 5 | 9,900 | 68,100 | 12,000 | 30,000 |
| Bream | 0.8 | 20 | - | - | 100,000 | - |
| Cod | 4.0 | 35-55 | 800 | 2,400 | 1,600 | 150 |
| Fin whale | - | 5 | - | - | 55,000 | - |
| Flounder | 1.9 | 20 | 3,900 | 42,900 | 22,000 | - |
| Halibut | - | 9 | - | - | 30,000 | - |
| Hammerhead shark | - | 25-35 | 2,700 | 44,100 | 22,000 | - |
| Hiragashira (shark) | - | 35 | - | - | 12,000 | - |
| Horse mackerel and hokke .. | 0.9 | 3 | - | - | 50,000 | 5,000 |
| Jewfish | - | 10 | 319,000 | 1,393,300 | 588,000 | - |
| Mackerel | 1.2 | 4-5 | 5,200 | 67,000 | 25,000 | 500 |
| Mebachi (big-eyed tuna) .. | - | 8 | 59,200 | 88,300 | 44,000 | - |
| Meji (small tuna) | - | 5-8 | 33,900 | 51,400 | 33,000 | - |
| Menuki | - | 10 | 39,000 | 440,000 | 88,000 | - |
| Spearfish | - | 8 | - | - | 50,000 | - |
| Sperm whale | - | 8 | 40,000 | 100,000 | 70,580 | - |
| Swordfish | - | 8 | 52,000 | 178,000 | 88,000 | - |
| Yellowfin tuna | - | 8 | 30,600 | 84,900 | 44,000 | - |
| Yellowtail | 0.9 | 7-15 | 6,600 | 14,000 | 10,000 | 10,000 |

^{1/}Minimum and maximum potencies were obtained from laboratory analysis of livers. Average potency was obtained from analysis of vitamin oils prepared for export and local sale.

Purchasing Procedure for Fish Livers: The liver-oil producers purchase the fish livers on a speculative basis. Livers are separated according to species and are placed in 5-gallon cans. Buyers from the processing plants examine the livers, guess at their value, and make a bid. The purchased cans of livers are usually frozen at the receiving stations or at the company's cold-storage plant.

Processing Procedure: At the liver-oil plant, the frozen livers are thawed, put through a meat chopper, and then a disintegrator. The ground liver material is diluted with one-half to one part by volume of water. The companies visited add enough sodium hydroxide so that the pH of the mixture is between 9.0 and 11.0. The mixture is heated with steam up to the digestion temperature, which varied from 40° C. to 90° C. depending upon the kind of liver and upon the ideas of the company doing the processing. The digesting material is stirred with the aid of paddles, which rotate at speeds varying from 30 to 40 r.p.m., for a period of 30 to 60 minutes.

Cod, shark, and pollock liver oils are used as pick-up or "wash" oil for livers of low-oil content to assure maximum yield of vitamin A from the raw material. These oils have a vitamin A potency of about 1,000 to 10,000 units per gram of oil. Usually 10 percent by weight of pick-up oil is used for each "wash," but up to 20 percent has

been added on occasions. The "wash" oil is usually added to the mixture to pick up the vitamin A after the digestion, but one company added the oil before the digestion.

The oil and aqueous liver material are allowed to separate by gravity; then the oil is siphoned off. Some of the companies repeat the "washing" step with new pick-up oil. Finally, the aqueous liver material is further diluted with hot water and sent through centrifuges to recover the vitamin-containing oil.

Each batch of oil is tested for free fatty acid content, and if necessary there is a treatment with a 15 percent solution of caustic soda to neutralize any excess free fatty acid. This mixture is centrifuged to separate the aqueous soap solution from the refined oil which is stored in large drums or tanks until sold.

Vitamin-A Tablet Manufacture: Several of the companies producing vitamin oils from fish livers also manufacture vitamin-A tablets. The livers are ground and dehydrated in an oven under a vacuum of 600 mm. of mercury for three hours at a temperature between 70° C. to 80° C.; two rotating rods mix and break up the liver material during this dehydrating process. Next, sugar, milk, starch, stearic acid, water, and spices are mixed with the liver powder for thirty minutes. This mixture is dried in a vacuum oven for approximately two hours, and stamped into tablets which are then covered with a sugar coating. Part of the vitamin A in the raw material is destroyed before the product is finished due to the processing conditions.

Report of Vitamin-A Research Projects: Research work on vitamin A has been carried out at the fisheries experimental stations and at the universities. Experiments are being carried out in the following projects:

1. Vitamin A content of the different portions of the fish is being determined for the various species of fish. It is reported that the oil from the intestines has a disagreeable taste. The vitamin-A content of the pyloric caeca is generally high.
2. Work is being carried out on vitamin A concentration by the molecular distillation method. The Japanese are using Hickman's apparatus and are now advanced to the pilot-plant stage.
3. Studies are being made on the destruction of vitamin A during the processing and refining stages of current manufacturing procedures.
4. Studies are being made to correlate vitamin-A deficiency with diseases. There is a high rate of incidence of vitamin-A deficiency among the tuberculosis patients.
5. Research on synthetic vitamin A and on antioxidants is being carried out, but no details on the work are available for this report.

FISH MEAL: Since the writer did not visit the fish meal plants in northern Japan, the following is abstracted from a report on the processing methods for fish meal in Japan by the Fisheries Division, Natural Resources Section, SCAP.

The fish reduction industry in Japan, in many instances, is very primitive and is wasteful of both meal and oil. There are 5,809 fish reduction plants in Japan with an average annual capacity of 4.6 tons of oil and 100 tons of meal per plant. Only 202 of the plants can produce more than 4.4 tons per 10-hour day. The processing of fish into meal and oil products is useful when gluts of (normal) distribution channels

occur. Regardless of the quality of the meal and oil, this end use is considerably better than using the fish for fertilizer in a raw state. When fish are buried in the ground as fertilizer, the oils present in the fish make proteins less available and retard the disintegration of the fish flesh. Generally five tons of fish are required to produce one ton of fish meal. Oil is obtained only in proportion to the amount of oil present in the body of the fish. This varies greatly according to the species.

One of the most prevalent methods of manufacture of fish meal in use in Japan is that of the small family-type of processing plant. These consist, in their simplest form, of a cast iron pot about 3 feet to 4 feet in diameter and 3 feet deep bedded in the sand at the edge of the beach, with a fire hole dug below the pot. A wooden press is required, as well as a few rice straw mats and buckets. The fish are placed in the pot, water is added and the whole cooked, allowed to cool, and the oil skimmed off. The solids are pressed in the wooden press, which is merely a flat base with a rectangular frame rising from it. A large screw with a flat base of the same shape of the rectangular frame is suspended from the top. The screw is turned by a wooden lever and presses the fish. This is very similar to hand-operated grape presses for extracting juice for the manufacture of wine. The stickwater and oil extracted from the fish settles in a pan under the press, and the oil is skimmed off. The oil is collected in buckets, and the meal spread on the rice straw mats on the beach to dry. The meal is used as fertilizer, but as all of the oil has not been extracted, it is of poor quality. In some areas, where large fish catches occur, this type of plant may be found located within 100 yards of another plant.

The larger factories vary considerably in type and efficiency, but all are relatively crude in design and poor in performance by comparison with reduction plants of other countries. Description of some of the larger plants are as follows:

1. A three-stage cooker complete with screw conveyor and continuous screw press. This plant should be able to produce meal with 5 to 6 percent oil. Actual tests show the meal contains 13 to 18 percent oil. This plant has three rotary driers 36 feet long and 6 feet in diameter. These are direct-heat driers, the heat being derived from a coke furnace. The meal is passed through two of the driers before it is ready for grinding. Fuel consumption of this plant is one ton of coke per ton of meal. The capacity of the factory is 37 tons of herring or 55 tons of sardines or mackerel per day. The yield of meal is 18 percent of the raw fish weight.
2. An intermediate type plant is one in which the fish is boiled with steam in open vats, pressed in hand-operated worm screw presses and dried on trays with wire bottoms of graded wire mesh. Flues run beneath the floor. In one plant the sides of the drying shed were open, resulting in a considerable loss of heat. The oil is recovered in settling pans.
3. A plant which produces fish meal and oil as byproducts to a patented process for production of imitation soybean sauce. The fish are boiled with water in steam heated vats with mechanical agitation to give a thick grey slurry. Boiling is at 90° C. for 30 to 60 minutes. The solids are removed in basket centrifuges and dried in rotary driers heated by coke flues. Some burning of the meal occurs at times in this type plant. Some soot particles may contaminate the meal. The oil is recovered by Sharples-type centrifuges; the heavy stickwater is treated with 2 percent hydrochloric acid, pressed in hydraulic presses and allowed to settle for 2 to 3 days. From this mixture the imitation soy sauce is made.

POISONOUS FISH OF THE SOUTH SEAS

Dr. Yoshio Hiyama, professor at Tokyo University, participated in the study of poisonous fish in the Marianas and Marshalls area during the period from July to December 1941. The following information was obtained from interviews with Dr. Hiyama and from a translation by W. G. Van Campen^{4/} of Hiyama's book, Report of an Investigation of Poisonous Fishes of the South Seas.

Since it was impossible to test all of the numerous species of fish found in the Marianas and Marshalls areas, tests were made only on those which had been reported poisonous, on those which closely resembled the reportedly poisonous species, and on all species which appeared promising as food fish because of their abundance and large size. The parts of the fish used in the animal-feeding tests were cooked in a covered alumite cooker with an equal quantity of water. Mice, cats, and some puppies were used as the experimental animals.

In view of the high temperatures prevailing and the lack of sufficient refrigeration facilities in the South Seas, a study was made of the relationship between putrefaction of the fish and toxicity. Muscle tissues varying in condition from fresh to putrid from six species of fish generally considered mildly toxic were fed to animals. Although some ill effects on the animals were observed, none of the animals died in any case. A study of the case histories of fish poisoning in humans showed that some incidences of poisoning occurred even when the fish were eaten soon after they had been caught. Dr. Hiyama concluded that the poison is not produced by the decomposition of the fish.

The organs which could be segregated and the various sections of the muscle tissues from the fish being studied were fed to the animals. No definite results were obtained which would limit the location of the poison in the fish. It was also found that the poison is easily extracted from the muscle tissues with water or alcohol and that the strength of the poison in most cases was not affected by heating at 100° C. for 20 minutes.

Dr. Hiyama stated that a popular belief--that some species of fish which are edible in Japan are poisonous in the South Seas--has a very wide circulation. However, he found species of fish in the South Seas which closely resemble those found near Japan, and only by careful comparing of specimens was he able to distinguish the difference between them. In most cases, the fish which closely resembled each other were of the same genus but of entirely distinct species.

Another theory attributes the poison to the food that the fish eat. Since many of the poisonous fish are found around the coral reefs, some people believe that fish which feed on coral or eat coral animals are poisonous. Of the 45 reportedly-toxic species studied by Dr. Hiyama, some fed on coral, some on small fish, others on large fish, and still others on shellfish. No definite connection could be found between the feeding habits of any poisonous fish and its toxicity.

Other workers have reported that in a number of species the toxicity of the poison varied with the age of the fish and with the locality where they were caught. The toxicity of some fish is reported to vary with the season, and it is attributed to some physiological causes related to spawning. Dr. Hiyama was unable to gather information to either prove or disprove these reports during the short period of time of his investigation.

^{4/} TRANSLATOR, PACIFIC OCEANIC FISHERY INVESTIGATIONS, FISH AND WILDLIFE SERVICE.

Chemical studies have been made of the poisonous fish caught in the vicinity of Japan, and the reports were written in Japanese. A few of the articles were translated into English and a digest of the articles are given here.

1. A report by Takahashi and Inoko.

The poison found in the ovary of the globefish, S. vermicularis is easily dissolved in water and slightly soluble in dilute alcohol. It is not soluble in the following: absolute alcohol, ether, chloroform, petroleum ether, and amyl alcohol. The poisonous substance is not precipitated by lead acetate nor by several kinds of alkaline reagents; it passes through animal membrane easily. The poison is destroyed when heated for a long time in either an alkaline or acid solution. The poison is not like an enzyme, toxalbumin, nor other organic bases. The procedure for the extraction of the poisonous substance is:

Wash fresh ovaries of globefish several times with ether and absolute alcohol. Grind the ovaries and mix with distilled water at room temperature. Add some lead acetate; filter and discard the precipitate. Remove the excess lead acetate in the filtrate by passing hydrogen sulphide gas through it and filtering off the precipitate. To remove choline, add phosphotungstic acid and mercuric chloride; filter and discard the precipitate. Evaporate the filtrate to dryness under vacuum. Wash the dried residue several times with absolute alcohol to remove impurities. The product is a yellowish non-crystal substance, insoluble in absolute alcohol, very poisonous, and contains a little inorganic matter. The substance has not yet been identified.

2. Work done by Professor Tawara, Kyushu University.

The poison tetrodonin is found in the ovaries of S. chrysops, S. rubripes, and S. lacepede. Tetrodonin is a colorless, neutral, needle-shaped crystal.

Tetrodoron acid is a white, resin-like substance, which is easily melted. It is soluble in dilute alcohol; slightly soluble in absolute alcohol; and insoluble in ether, chloroform, and carbon disulfide.

The procedure for extraction of tetrodotoxin from ovaries of S. porphyreus Sieb and S. vermicularis Sieb is:

Grind the ovaries of the fish and mix with hot water. Add acetic acid to precipitate the protein, and filter. Concentrate the filtrate, and filter. Add lead acetate and dilute ammonium hydroxide; the poison is precipitated as a lead compound. Wash the precipitate with ammonia solution. Remove the excess lead with hydrogen sulfide. Concentrate the solution at a temperature below 60° C. Add absolute alcohol to precipitate the poisonous substance again; dry under vacuum. The residue is a brown resin-like substance. Dissolve this residue in water and remove the water-insoluble substances and decolorize the solution with activated carbon. Treat with the alcohol and ether. The residue is a yellow resin-like substance.

Tetrodotoxin is similar to tetrodoron acid, except that the former is about twice as poisonous as the latter. In order to be fatal, 4 mg.

of tetrodotoxin is required per each kilogram of body weight of the rabbit; 7 mg. of tetrodoron acid is required.

When tetrodotoxin is dissolved in a small quantity of water and allowed to stand, neutral crystals which have a slightly sweet taste are precipitated out. This substance has been identified as $C_6H_{10}O_5$ and is named tetrodopentose; it is quite similar to inosit $C_6H_{12}O_5$ reported by Scheer and Gallois. After removing the tetrodopentose, add AgCl to remove tetronin $C_{11}H_{11}N_2O_2$. Tetradonin and tetrodopentose are not poisonous so that removal of these two leaves a purer and stronger poison--tetrodotoxin.

Another method of extraction:

Chop the ovaries of globe-fish and soak in a 3 percent formalin solution. Heat to $80^{\circ}C$. to coagulate the protein and filter. Lead acetate and dilute ammonium hydroxide are added to the filtrate in order to precipitate the poison as a lead compound. Filter and wash. Remove the excess lead with hydrogen sulfide. Concentrate the filtrate using vacuum. Add about three times as much methyl alcohol and filter. To the filtrate add a solution of saturated lead acetate and methyl alcohol and keep the solution neutral by adding ammonium hydroxide. Filter the precipitate. To the filtrate add a little ammonium hydroxide and an excess of methyl alcohol saturated with lead acetate to precipitate the poison. Dry the precipitate at a temperature under $60^{\circ}C$. Dissolve the precipitate in water and filter to remove the water-insoluble impurities. Remove the excess lead with hydrogen sulfide. Decolorize the solution with activated carbon. Evaporate the solution until syrupy. Add alcohol and ether, and tetrodotoxin is precipitated as a white, pure substance.

3. An article by Y. Suyehiro.

All types of animals were injected with tetrodotoxin. The globe-fish were not affected by the injections, but poisonous spiders were killed. When a solution of tetrodotoxin was poured on the shell of a hermit crab, it left its shell. The octopuses are killed by the injection but other mollusca are not; neither are the animals of a lower order than the mollusca. Snails are put into a coma but are not killed even if the amount injected is large.

The tetrodotoxin is carried by the blood stream after it is injected into an organism. The author tied the leg of a frog so that the blood circulation was stopped. The frog was injected with tetrodotoxin but it did not die. When the string was cut and the blood allowed to circulate, the frog died.





September 1950

PRESERVATION: Samples of preserved salmon eggs have been assayed at weekly intervals to determine the effect of the preservative on the riboflavin, niacin, biotin, and vitamin B₁₂ content. No significant changes have as yet occurred.

* * *

FRESH FISH: Three additional species of Pacific rockfish were tested for palatability. These were S. saxicolus, S. paucispinis, and S. ruberimus. The first of these appears to have palatability comparable to the S. alutus. The last two are of somewhat inferior palatability and apparently are in the same category as S. diploproa.

* * *

ANALYTICAL METHODS: The presence of hydrochloric acid, acetic acid, and formic acid in acetone used to extract oil from fish meal by refluxing was compared. Use of formic acid gave the most complete extraction of ether soluble material by this method.

* * *

REFRIGERATION: Organoleptic tests were carried out on several of the Pacific rockfish species which had been in cold storage for one month. No adverse changes had occurred in any of the species after this short storage period.

* * *

Pink salmon fillets were prepared for further freezing and storage studies.

* * *

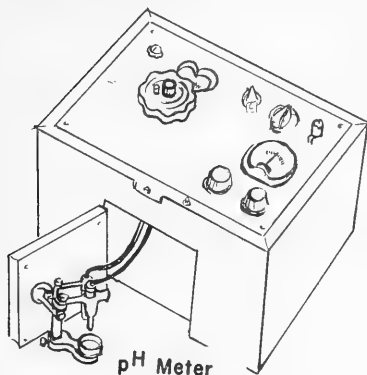
A series of red salmon (O. nerka) samples were frozen for further study of the effect of freezing and storage on the quality of the canned product. Two additional variables are being studied:

- (1) A comparison is being made of the effect of storing the glazed salmon in the round at -20° F. with that of salmon stored at 0° F. during a period of 24 weeks.
- (2) A comparison is being made of the effect of quick and slow freezing on the quality of the final canned product.

* * *

Acceptable palatability scores are still being obtained for all lots of frozen oysters treated in various ways with ascorbic acid and glazes. The oysters have now been in 0° F. storage for five months. Though the scores are showing some variation between lots, as well as having varied from month to month during this period of storage, no particular trend has as yet become evident. Slight darkening of the oysters has occurred, but the color is no worse than that found in fresh oysters from certain areas.

* * *



As an approach to the problem on studies of the toughening of blue crab meat, it was decided to investigate the effect of freezing on the pH and respiration of the meat. Samples of frozen blue crab meat were prepared by approximating as closely as possible the process used by certain commercial crab-meat packers. After one month of storage, there was no detectable change in the taste, color, odor, or tenderness of the frozen crab-meat samples, nor were there any significant changes in pH or respiration.

* * *

Additional funds have been made available for carrying out research on freezing North Atlantic fish species at sea (freezing-fish-at-sea project). More detailed and comprehensive studies are to be initiated on the methods of freezing and storing whole fish at sea, and the effect on the fillets cut from these fish and refrozen (frozen whole fish will be defrosted ashore, filleted, and the fillets refrozen). Pilot-plant and commercial-scale operations are planned as soon as personnel are recruited and equipment is made available.

* * *

SANITATION AND BACTERIOLOGY: Additional funds have been made available to the Atlantic States Marine Fisheries Commission for continued operation of the project to study the extent and effect of pollution on the marine fisheries of the Atlantic Coast. These studies are being carried out under the supervision of the Chief of the Service's Boston Fishery Technological Laboratory. The work for this fiscal year will consist of the completion of the exploratory studies in the Atlantic Coast States and the submission of the reports to health and fisheries authorities.

* * *

LABORATORY NOTES: The construction of the second floor of the Ketchikan (Alaska) Fishery Products Laboratory has been completed. The additional facilities include a modern test kitchen, laboratories, photographic dark room and offices. An "open house" was held at the laboratory on September 21 to give the general public an opportunity to inspect the new facilities and to become better acquainted with the work of the laboratory. Operated jointly by the Fish and

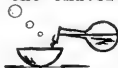
Wildlife Service and the Fisheries Experimental Commission of Alaska, the basic aims of the laboratory are:

1. Improvement of existing fishery products and processes.
2. Development of new fishery products from existing fisheries.
3. Development of new and especially off-season fisheries.

* * *

MAYAGUEZ FISHERY LABORATORY TRANSFERRED TO UNIVERSITY OF PUERTO RICO: The Service's Fishery Research Laboratory and facilities at Mayaguez, Puerto Rico, has been transferred for an indefinite period (on a loan basis) to the University of Puerto Rico in the same city. The University will use the laboratory for marine research in connection with University programs.

The funds of the Service's Branch of Commercial Fisheries have not been sufficient to make it possible to operate the laboratory on other than a very skeleton basis for some time. It is felt that the most benefit can be derived by loaning the laboratory and facilities to the University.



CANNED CRAB INDUSTRY OF JAPAN

Crab canning in Japan dates from 1880, when a sample of canned crab meat, produced in the Fisheries Laboratory at Nemuro, Hokkaido, was exhibited at the Second Industrial Exposition in Tokyo. The first crab cannery was established in 1884 in Fukui Prefecture. This event was followed by the opening of several other canneries in the immediate area, and the industry flourished briefly. However, the crab canned there, the zuwai-gani (Chionectes opilio), was of poor quality and was far inferior for canning to the taraba-gani (Paralithodes camtschatica) of the northern regions. With the establishment of canning factories in Hokkaido, Karafuto, and Kamchatka after the Russo-Japanese War, canning activities in the Fukui district ceased.

The Hokkaido industry was centered near the city of Otaru until 1891, but with the increasing demand for the superior taraba crab, canneries spread rapidly northward along the coast. Canned crab was exported to the United States for the first time in 1906. The annual pack in this area increased from 37,437 cases in 1916 to 172,885 cases in 1934. As early as 1922, fear of overproduction and evidence of depletion of the supply caused the Government to take restrictive measures which resulted in the amalgamation of all canneries under one controlling organization. The control of the industry changed hands several times until 1941, when the Government ordered all land-based crab and salmon canneries in the northern Pacific area placed under control of the Nichiro Fishing Company.



TRENDS AND DEVELOPMENTS

Additions to the Fleet of U. S. Fishing Vessels

First documents as fishing craft were received by 87 vessels of 5 net tons and over during July 1950--40 less than in July 1949, the Treasury Department's Bureau of the Customs reports. California led with 26 vessels, followed by Washington with 12, and Texas, Florida, and Alaska with 8 vessels each.

A total of 529 vessels were documented, during the first seven months of 1950 compared with 622 during the same period in 1949.

| Vessels Obtaining Their First Documents as Fishing Craft, July 1950 | | | | | |
|---|--------|--------|-----------------------------|--------|--------|
| Section | July | | Seven mos. ending with July | | Total |
| | 1950 | 1949 | 1950 | 1949 | 1949 |
| | Number | Number | Number | Number | Number |
| New England | 2 | 6 | 20 | 20 | 35 |
| Middle Atlantic | 3 | 4 | 30 | 34 | 44 |
| Chesapeake Bay | 9 | 9 | 50 | 44 | 87 |
| South Atlantic and Gulf . | 25 | 31 | 183 | 205 | 369 |
| Pacific Coast | 38 | 70 | 170 | 216 | 327 |
| Great Lakes | - | 2 | 6 | 29 | 38 |
| Alaska | 8 | 5 | 68 | 71 | 96 |
| Hawaii | 2 | - | 2 | 3 | 5 |
| Unknown | - | - | - | - | 1 |
| Total | 87 | 127 | 529 | 622 | 1,002 |

Note: Vessels have been assigned to the various sections on the basis of their home port.



Atlantic Coast Marine Fisheries Pollution Study ✓

The Atlantic States Marine Fisheries Commission is conducting a study and investigation on the extent and effect of pollution on the marine fisheries of its member States. Specifically, the program has for its objective an over-all study of the problem and determination of the extent and effect of pollution, of industrial and domestic origin, upon the economy of the fishing industry of the Atlantic Coast States.

Under provisions of Public Law 845 (Eighty-First Congress, First Session), the Commission received a grant-in-aid from the U. S. Public Health Service making it 1/THIS IS AN ABSTRACT OF A REPORT ("REPORT ON PROGRESS OF THE POLLUTION STUDY PROJECT") PRESENTED BY THE SANITATION COMMITTEE OF THE ATLANTIC STATES MARINE FISHERIES COMMISSION AT THE MEETING OF THE COMMISSION HELD JUNE 8, 1950, AT OLD POINT COMFORT, VA.

possible to carry out this work and the program was started in December of last year.

Administrative operations connected with this study are conducted by the Commission, while technical direction of the survey is under the supervision of the U. S. Fish and Wildlife Service, acting in its official capacity as the primary research agency for the Commission.

For practical purposes, the study was arbitrarily divided into two closely related phases, with the third and final phase presenting the over-all findings compiled from information gathered during the preliminary surveys. A brief description of these steps is as follows:-

1. RECORD OF PREVIOUS POLLUTION ACTIVITIES AND CURRENT STATUS OF PROBLEM: A review in each state of all previous activities relating to pollution and the fisheries, including a report containing presentation of the facts evolving from the study. This will reveal what remedies have been proposed to abate or prevent pollution, to what extent they have been adopted, and the resulting effect upon the fisheries. In short, an inventory and analysis of the current pollution situation relative to marine fisheries.

2. ECONOMIC STUDY OF THE FACTORS INVOLVED: Field surveys will be made to determine the extent of the fisheries involved, and to obtain realistic estimates on the annual monetary loss directly attributable to pollution. Fishermen, fish processors, state and municipal officials will be interviewed to obtain pertinent data relative to the problem. The anticipated results accruing from this part of the study would bring to the attention of the proper officials the value of the fisheries affected and assure proper recognition of the industry in the event of subsequent formulation of pollution-abatement programs.

3. ASSEMBLY OF FINDINGS: The objective will be to assemble all findings resulting from work undertaken in the first two phases of the study. This will include a historical summary and report on the current status of all fisheries pollution activities; evaluation of the efficacy and urgency of current sectional programs with recommendations and suggestions to the proper authorities that action be taken for corrective measures, where such are indicated to be necessary.

SUMMARY OF ACTIVITIES: Work during the first five months this year has been directed towards completion of the initial study phase, covering the collection of pertinent material from federal, state, and interstate agencies and summarization of these data into reports on individual states. Starting in Massachusetts in January, field work has been conducted in twelve of the member states, with Pennsylvania, New York, and New Jersey still to be covered.

Preliminary reports have been compiled for Maine, New Hampshire, Massachusetts, Rhode Island and North Carolina, while data from Virginia, Florida, and Maryland is available for completion of subsequent reports.

California Canning Industry Requested Not To Use Subtilin in Food Preservation

The California canning industry has been requested by that State's Bureau of Food and Drug Inspections, Department of Public Health, not to use subtilin for preserving low acid food products until more information has been developed on this method.

The Bureau of Agricultural and Industrial Chemistry, United States Department of Agriculture, has done considerable work on subtilin at its Western Regional Research Laboratory in Albany, California, and on December 29, 1949, released a report suggesting the use of subtilin supplemented by mild heat for preserving foods. Since this release, their work has been given wide publicity and a number of food processors have expressed great interest in the subtilin-mild heat method for preserving food.

Following the December 29th release, the National Cannery Association laboratories undertook a study of the effect of subtilin supplemented by mild heat on food spoilage organisms--including Cl. botulinum. Test packs of a variety of vegetable products to which subtilin had been added in the amounts used in the tests at the Western Regional Laboratories were inoculated with suitable spoilage organisms, and heated for the recommended time. The results showed marked variations in the initial sensitivity of different spoilage organisms to varying concentrations of subtilin, but after incubation the majority of the organisms had grown and spoiled the food.

At the Cannery Board meeting on June 21, 1950, Dr. K. R. Meyer called attention to the serious health hazard involved in the use of this method for the preservation of low acid foods. The Board directed the Department to advise California canners that, based upon the experimental findings to date, no early application of this method of preservation could be expected--particularly for products packed under California State Cannery Inspection.

The investigations are being continued to determine under what conditions, if any, subtilin might be made destructive against food spoilage organisms, including Cl. botulinum.



Federal Aid Branch to Handle Fishery and Wildlife Restoration Programs

Administration of the Dingell-Johnson program, which provides Federal aid for State sport fisheries beginning July 1, 1951, will be handled by the Branch of Federal Aid of the Fish and Wildlife Service, according to an announcement made on September 12 by the Secretary of the Interior.

The new work will be merged with the administrative activities now performed by the Service under the Pittman-Robertson Federal aid to wildlife program which has been in operation since 1938.

"By placing the responsibility of handling both these cooperative programs in a single Federal Aid organization, augmented by fishery specialists qualified

to appraise the various projects submitted by the States, we believe that the two lines of endeavor can be administered with the greatest economy and efficiency," Albert M. Day, Service director, said.

Plans are being worked out for a series of meetings between Service officials and groups of officials responsible for fishery work in the States for the purpose of discussing the new law and the types of activities which will be approvable under the language of the law. This same procedure was followed prior to inauguration of work under the Pittman-Robertson Act.

Growing out of these discussions, rules and regulations required by the law for adoption by the Secretary of the Interior will be drafted and a fishery policy manual prepared for issuance to the cooperating States. The Service expects to have all of this accomplished by early next spring.

The Dingell-Johnson Federal Aid to Fisheries Act (Public Law 681, 81st Congress) was approved by the President on August 9, 1950. Funds to carry out the purposes of the act, however, will not be available until an appropriation is made by the Congress for the fiscal year beginning July 1, 1951.^{1/}
1/SEE COMMERCIAL FISHERIES REVIEW, SEPTEMBER 1950, P. 26.



Federal Purchases of Fishery Products

DEPARTMENT OF THE ARMY, JULY 1950: A total of 1,326,003 pounds (valued at \$527,611) of fresh and frozen fishery products were purchased by the Army Quartermaster Corps during July this year for the U. S. Army, Navy, Marine Corps, and Air Force for military feeding (see Table). Purchases during July, as compared with the previous month, were down 13.5 percent in quantity and 16.1 percent in value; and compared with July 1949, this July's purchases were 9 percent lower in quantity, but 9 percent higher in value.

| Purchases of Fresh and Frozen Fishery Products by Department of the Army (July and the First Seven Months, 1949 and 1950) | | | | | | | |
|--|-----------|--------------|-----------|-----------|---------|--------------|-----------|
| Q U A N T I T Y | | | | V A L U E | | | |
| July | | January-July | | July | | January-July | |
| 1950 | 1949 | 1950 | 1949 | 1950 | 1949 | 1950 | 1949 |
| lbs. | lbs. | lbs. | lbs. | \$ | \$ | \$ | \$ |
| 1,326,003 | 1,457,729 | 7,692,427 | 9,338,053 | 527,611 | 485,767 | 3,219,055 | 3,130,441 |

Purchases for the first seven months this year were still below the corresponding period a year earlier--the quantity purchased was 17.6 percent lower, but the value was 2.8 percent higher.



Great Lakes Fishery Investigations

PROGRESS IN THE GREAT LAKES SEA LAMPREY INVESTIGATIONS AS OF JULY 1950: Field operations during the second quarter this year saw the end of this year's sea lamprey spawning runs in the Great Lakes streams and the removal of all but one of the weirs and traps operated within and without the first Experimental Control Zone, according to the Chief of the Service's Great Lakes Fishery Investigations. These devices took a total of 31,518 spawning-run sea lampreys in Michigan streams. Seven weirs and traps operated in Wisconsin, on a cooperative basis with the Wisconsin Conservation Department, captured 16,391 sea lampreys. One weir and trap operated during a portion of the season in Indiana took 896 sea lampreys.

Of 2,853 migrant sea lampreys tagged from a blockaded run in the Cheboygan River, 291 (10.2 percent) have been recovered to date at distances as great as 150 miles from the point of tagging. Data on weir operations and the tagging experiment are currently being tabulated and analyzed.

Field surveys to locate and catalog actual and potential sea lamprey spawning streams were conducted throughout the second quarter this year in the Lake Superior basin and will probably be continued until well into the fall. Reports from the survey parties and from other sources indicate that the lamprey is more firmly established in Lake Superior than heretofore suspected. Plans are progressing for installation of an electric fish screen and a checking weir and trap in the Chocoday River, a tributary of Lake Superior, near Marquette, Michigan, known to have a sizable spawning run.

Fishing operations were begun in July in the inshore waters of Lake Huron between Hammond Bay and Cheboygan, Michigan, for the purpose of obtaining from established sampling areas data on the abundance and degree of scarring of fish attacked by the sea lamprey. All lamprey-scarred fish taken are brought into the laboratory for studies, currently under way, on the feeding habits of the sea lamprey.

Reconstruction and improvement of control devices and installations have been carried on with the object of refining these structures for more efficient and economical operation.

Spot checks made of 19 south-shore tributaries of Lake Superior between Munising, Michigan, and Cornucopela, Wisconsin, revealed evidence of sea lamprey spawning in three of them (all between Munising and Marquette).



Gulf Exploratory Fishery Program

"OREGON" LOCATES GROOVED SHRIMP (Cruise No. 3): A series of shrimp-trawl drags were made by the Service's Gulf exploratory fishery vessel Oregon on its third cruise from July 5 to August 31.

The Oregon operated during this period in waters south of the Alabama-Mississippi coasts in depths from 10 to 232 fathoms. Most of this area lies east of the delta of the Mississippi.

Observations on Grooved Shrimp: Exploratory drags were made with 40-foot and 55-foot shrimp trawls. A single cable and a bridle were used with weighted trawl

doors. After locating shrimp, drags were made with a 100-foot shrimp trawl (12-foot trawl doors set with two cables were used). The style of rig used was similar to that employed extensively by larger shrimp boats in the northwest Gulf area.

Relatively higher concentrations of grooved shrimp were found at night with the 40-foot trawl between 10 and 20 fathoms and between 35 and 50 fathoms, and no grooved shrimp were taken in deeper water in this series of drags. The grooved shrimp taken in the 10- to 20-fathom range were mixed Peneus aztecus and Peneus duorarum, and the smaller ones were mostly P. aztecus. In the 35- to 50-fathom range, the grooved shrimp taken were all Peneus aztecus running from 7 to 14 count, heads on.

A series of five night drags in 36 to 45 fathoms with the 100-foot shrimp trawl produced shrimp at a rate of 128 pounds per hour. These drags were made at widely spaced intervals between longitude 88° W. and longitude 88° 50' W., and indicate that the shrimp in the area were widely scattered in these depths. In one drag, the weight of shrimp exceeded the weight of scrap, but a ratio of approximately one pound of shrimp to three pounds of scrap was usual in the 35- to 50-fathom depth range.

Of 52 drags made in this series, trawls were damaged six times and one trawl was lost. Rocks or coral were encountered in 48 fathoms.

Observations on other Shrimp: As expected the white shrimp were only taken in small quantity, since the shallower water drags were made at night. None were taken in more than 20 fathoms. Try-drag in 195 and 232 fathoms produced 8½ and 12 pounds of a bright red species of shrimp large enough to be of possible commercial interest.

Hurricanes in the Gulf of Mexico in August restricted the exploratory fishing operations of the vessel. Although the Oregon did not receive any damage from the storms, much time was lost in returning to port for hurricane preparations.

"OREGON" EXPLORES FOR SHRIMP IN DEEP WATER (Cruise No. 4): On this cruise the Oregon planned to work in waters from 25 to 200 fathoms off the Mississippi-Louisiana coasts between 88°30' W. longitude and 90°30' W. longitude in depths from 25 to 250 fathoms. The greater amount of time will be spent in fishing west of the Mississippi River.

The vessel left on September 11 and is expected to return to Pascagoula on October 2.

Investigations will be carried out on grooved shrimp in depths greater than 25 fathoms in order to determine whether the stocks of large grooved shrimp (Peneus aztecus), found in depths from 36 to 50 fathoms east of the Mississippi River, are also present west of the Mississippi and to determine the extent and concentration of such stocks. Work also will be continued on related problems concerning the fishing of grooved shrimp in deeper waters.

A preliminary report from the vessel indicated that during the early part of September hurricanes in the general area of operations caused interruptions to the fishing effort, but also resulted in interesting observations regarding the migration of shrimp under storm conditions. It was found that populations of large brown shrimp, Peneus aztecus, found in 38 to 50 fathoms south of the coast of Mississippi

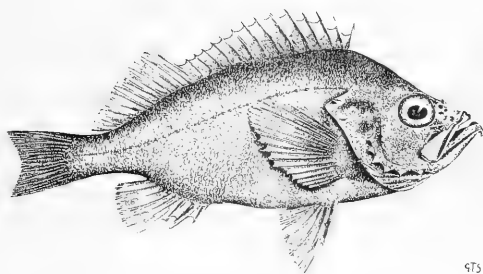
in late August, moved into water 7 to 10 fathoms shallower following the hurricane that approached that Coast on August 30.

In order to verify the indications previously obtained by exploratory drags that stocks of shrimp in deeper water may be large, the Oregon fished continuously one night in 32-34 fathoms in a position centered at 28°56.5' N. latitude, and 89°36.5' W. longitude. This fishing effort resulted in a catch of 2,700 pounds of 12- to 14-count heads-on shrimp.



Limit of Expansion for East Coast Rosefish Fishery Reached

Rosefish (Sebastes marinus), an East Coast spiny-rayed fish which is filleted and marketed as "ocean perch," now exceeds the once-dominant haddock in the amount landed. From a small beginning in the mid-30's, the catch has exceeded 327 million pounds for the past two years.



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ROSEFISH (SEBASTES MARINUS)

This species is one which is widely distributed over the northern Atlantic and is taken in large quantities by the European fishery as well as by our own, the Section of Marine Fisheries of the Service's Branch of Fishery Biology reports. The European fish average much larger in size than do those on the Atlantic Coast of America.

The catch has been maintained by expanding the fishing area for this species

from the original Gulf of Maine operation to include the more distant Nova Scotian grounds. As the reserve of older fish has been removed from the local grounds, the fleet has been forced farther afield until now the apparent limit of expansion has been reached.

Being a very slow-growing fish, the rosefish requires something like 10 years to attain sexual maturity. Because of this, the rate of replacement is slow, and sustained heavy catches, after the accumulated stock of older fish has been removed, seems unlikely. A decline in production of this valuable resource seems inevitable.



North Atlantic Fishery Investigations

"ALBATROSS III" COMPLETES FISH POPULATION CENSUS ON SOUTHERN NEW ENGLAND BANKS (Cruise No. 38): Completion of a census of fish populations on the southern New England banks was the purpose of Cruise No. 38 (August 21-30) of the Albatross III, research vessel of the Service's North Atlantic Fishery Investigations.

During this cruise, 79 half-hour tows were made at 58 stations from Cape Ann to Block Island. A concentration of large rosefish (redfish) was found 35 to 50 miles east of the Highlands. The catch of large and scrod haddock was very poor. Baby haddock (young-of-the-year) were taken in large numbers southeast of Nantucket Lightship in 60-75 fathoms, south of No Mans Land in 35 fathoms, and south of Block Island in 35-45 fathoms.

The taking of these small fish may indicate a good year class. In 1948, baby haddock were taken as far west as Ambrose Lightship and at the present time this 1948 year class is very abundant, e.g., the recent large landings of scrod at the Boston Fish Pier.

Data on the size, numbers, and weight of all species of fish, bottom temperatures, and bottom samples were also obtained at each station.

SCROD HADDOCK TAGGED BY THE "ALBATROSS III" (Cruise No. 39): Over 1,800 scrod haddock were tagged aboard the Albatross III on the Northern Edge and Southeast Part of Georges Bank during Cruise No. 39 (September 6-13). Exceptionally good



TAGGING HADDOCK ABOARD THE ALBATROSS III, RESEARCH VESSEL OF THE SERVICE'S NORTH ATLANTIC FISHERY INVESTIGATIONS.

fishing produced lively fish which made possible this record tagging operation. The biologists are confident that these fish have survived the tagging operations and will be recaptured in the future in large enough numbers to determine much about their migration routes.

Fishermen and fish handlers are urged to be on the lookout for these tagged haddock which bear red tags, 1/2 inch in diameter, on their left-hand gill covers. The Service will pay \$1.00 for the return of each tag and would appreciate information as to where and when each fish was caught.

One of the difficulties encountered in getting these haddock back to the bottom alive was numerous sharks that appeared after each tow and ate the tagged fish as they were released. Of three sharks taken on a hand line, one was found to have 40 scrod haddock in its stomach. Following this discovery, various methods were used to discourage the sharks, and in one 30-hour tagging period, 68 sharks were shot, of which 58 are believed to have been killed.

As usual en route to the haddock grounds, surface lines were trolled for pelagic fish and on this cruise a large concentration of bluefin tuna were encountered. About 58 fish were hooked while steaming along the Southwest Part of Georges and 25 that averaged approximately 11 pounds apiece were landed. This is the first record of concentrations of tuna in this area to the knowledge of the personnel of the vessel.

The Albatross III headed for port when hurricane warnings were received, but was able to get no closer than 60 miles off Race Point. The vessel successfully rode out the hurricane with gale and hurricane winds up to over 100 m.p.h. on September 11 and 12, and then continued on to Woods Hole.



North Pacific Exploratory Fishery Program

ALBACORE TUNA EXPLORATIONS CONTINUED DURING SEPTEMBER BY "JOHN N. COBB:" Albacore tuna explorations were continued during September by the John N. Cobb, one of the Service's exploratory fishing vessels. The vessel operated during the month from Cape St. Elias in the Gulf of Alaska to Cape Blanco in southern Oregon.

Only scattered tuna were caught in Alaskan waters. These were found 50 to 70 miles offshore in the Forester Island to Cape Bartolome area, and were taken in a surface-water temperature of 55° F. The amount of warm water in the Alaskan area was found to be very limited and decidedly affected by meteorological conditions. Following storms in the area of operations, surface temperatures were found to be several degrees lower.

During most of the month, albacore were still being taken, often in good quantities, by the trollers fishing off the Queen Charlotte Islands in northern British Columbia, but these fish did not penetrate in any quantity the barrier of colder water to the northward in the Alaskan area.

In working to the southward as far as Cape Blanco, favorable water temperatures as high as 62° F. were the rule, but latest reports stated that tuna seemed generally absent from the area. Indications of feed or birds were also extremely scarce. On the southward phase of the operations, the vessel did not find tuna in any quantity south of Cape St. James in the Queen Charlottes.

Several days were spent fishing long-line gear on the new seamount^{1/} located 280 miles west of Willapa Bay on the Washington Coast. The location of the seamount is 46°44' N. latitude, 130°47' W. longitude. Good catches of red rockfish (Sebastes ruberrimus) were again made at 70 fathoms. No concentration of halibut was found, although three good-sized prime halibut were taken. Gear set at 100-110 fathoms came up clear, indicating fairly good bottom. Possibilities for trawling the grounds remain very questionable.

^{1/}SEE COMMERCIAL FISHERIES REVIEW, AUGUST 1950, P. 18.



Pacific Oceanic Fishery Investigations

"HENRY O'MALLEY" SCOUTS FOR BAIT AND FISHES FOR TUNA (Cruise No. IV): The Henry O'Malley on its Cruise No. IV (July 1-August 30) scouted for bait in the waters of French Frigate Shoals and Midway Island; worked Canton Island lagoon for bait; made a preliminary bait reconnaissance at Hull Island; and conducted tuna fishing around Canton, Birnie, and Enderbury islands (in the Phoenix Group), and near Kingman Reef (Line Islands) on the return trip. Operational difficulties forced the Henry O'Malley, a research vessel of the Service's Pacific Oceanic Fishery Investigations, to Honolulu two weeks ahead of schedule.

The islands at French Frigate Shoals were scouted for bait on July 4 and 5 with no success. Large numbers of larval fish were seen which were identified as immature piha (round herring).

Baiting operations were conducted at Midway Island over a period of five days, approximately 422 buckets of bait fish were caught. They consisted of piha (Spratelloides delicatulus), iao (Pranesus insularum), aholehole (Kuhlia sandvichensis), weke or goatfish (Pseudopenus pleurostigma), and mullet (Mugil sp.). This bait was caught during the day with 40- and 80- fathom seines in both shallow and deep water.

All the piha died or were lost through the screens (some fish were very small) en route to Canton Island. Other species lived well in the bait tanks and suffered only a small mortality.

At Canton Island baiting activities were conducted in Canton lagoon for a period of one week, during which time a total of approximately 125 buckets of bait were caught in shallow water with a 40-fathom seine. This bait consisted of mullet, weke or goatfish (Mulloidichthys auriflamma), iao (Atherina ovalaua), and a snapper (Lutianus vaigiensis). Bait was rather scarce here, and the distance for transferring it to the vessel was from 1-2½ miles in a coral-studded lagoon. Baiting activities could be conducted with a force 4 easterly wind blowing but anything stronger than this curtailed all operations.

A preliminary bait reconnaissance was made of the lagoon at Hull Island. Only small scattered schools of mullet were observed.

Bait Fishing: In the Phoenix Islands, the weather was generally unfavorable for fishing activities, with usually an easterly wind of greater than Beaufort force 4 prevailing, and swells from 10-15 feet high outside the lee of the islands.

Near Canton Island, a total of 31 small, scattered, fast-moving schools of

skipjack and yellowfin, located by feeding birds, were approached and chummed, but only nine skipjack, of approximately 25 pounds each, were caught with pole and line in this area, due to the inability of drawing fish into racks by chumming. Five small schools of tuna were observed at Birnie Island and six small schools were seen at Enderbury Island. These were subsurface schools brought up by trolling jigs. During the one day at Birnie Island, approximately 2,100 pounds of two-pole yellowfin tuna were caught from one school, and on the following day at Enderbury Island, a catch was made of approximately 1,600 pounds of one-pole yellowfin tuna from one school. The weather during these two days of fishing was good. There were no indications of any large amount of tuna around any of these islands, and of the schools worked it was found difficult or impossible, in most cases, to chum the fish in close to the stern of the vessel. Also, large number of sharks in the area tended to disperse the schools when chummed.

The vessel left Canton Island for Honolulu via Palmyra and Kingman Reef on August 20, and only one morning was spent scouting for tuna at each place. Several small schools of both yellowfin and skipjack were observed around Kingman Reef, and one of these schools yielded approximately 260 pounds of one-pole yellowfin tuna and 350 pounds of rainbow runners, before all of the remaining bait was expended. Numerous sharks came close to the stern of the vessel causing the tuna to disperse and submerge.

Other Activities: Surface trolling was conducted during each day of travel from sunrise until sunset; fish were observed and caught mainly near the island areas, but some were seen up 400 miles offshore.

A good series of morphometric measurements of yellowfin tuna was collected in the Phoenix Group for comparison with other areas as part of the study of racial differentiation of this species. Stomach contents and ovaries of a considerable number were also preserved for use in food-habits and spawning studies.

Series of subsurface temperature observations were taken across the equatorial counter-equatorial current system both en route to and returning from the Phoenix Group. These will enable the oceanographers to determine the positions of the current boundaries at this season as part of the study of the variation of this major current system, and its relationship to productivity of the sea.

"HUGH M. SMITH" STUDIES ABUNDANCE OF TUNA SPAWN AND NEW DEVICE (Cruise No. VI): The primary mission of the early part of Cruise VI (August 18-September 5) of the Hugh M. Smith was to sample the waters in the vicinity of the Hawaiian Islands for tuna larvae and eggs in order to determine the areas and depths of greatest abundance of tuna spawn. The vessel, one of three research vessels operated by the Service's Pacific Oceanic Fishery Investigations, in addition took measurements of the forces and angles involved in towing a system of three plankton nets on a 1/4 inch cable to furnish data for computing levels at which the nets were fished.

The latter portion of the vessel's cruise was for the purpose of determining the operational characteristics of bronze high-speed depressors for use with subsurface collecting equipment, and testing their practicability for high-speed deep trolling for tuna. The device used is shaped to exert a downward pull when towed through the water, acting like a kite in reverse. Although it weighs only 30 pounds in air and less in water, it exerted a 400-pound downward pull at a speed of 8½ knots. The depressors proved stable and capable of being towed at depths up to 25 fathoms and at a speed of 8 to 9 knots. From September 1 to September 5 the vessel did some deep trolling with a single lure attached to a depressor at speeds of

between $5\frac{1}{2}$ and 7 knots and a depth of 100 feet in the vicinity of Waianae, Oahu, and Penguin Bank, Molokai. No fish were taken by this means.

A continuous watch was kept for schools and signs of tuna while running during the day. The greatest number of schools (skipjack) were seen in the waters lying to the north of the Island of Kauai. Night-light fishing with a 200-watt submarine incandescent light and dip nets was conducted when sea and other conditions permitted for the purpose of collecting juvenile tunas and tuna-food organisms.



Service to Make Massachusetts Seafoods Film

The colorful commercial fishery fleets of Massachusetts will figure in a new educational motion picture which the Fish and Wildlife Service is planning to produce next summer, according to an announcement made early in September.

The film, to be financed by the State of Massachusetts and the Massachusetts seafood industry, will be produced and distributed under the direction of the Service's Branch of Commercial Fisheries. It will deal with major phases of commercial fishing in Massachusetts. Tentatively titled "Seafoods from Massachusetts," the 16-mm. sound and color film is planned to run about 25 minutes.

The Gloucester fishing fleet landing ocean perch, the haddock and whiting operations of the trawler fleet from Boston Fish Pier, the scallop draggers of New Bedford, the Provincetown druggers, and the lobstermen and shellfish fishermen along the Massachusetts coast offer many opportunities of portraying the State's fisheries.

To plan the film's production, a motion picture advisory group, with members representing the fishing industry of New Bedford, Boston, and Gloucester, and the Service, has been established by the Massachusetts Fisheries Committee appointed by Governor Dever.

The Fish and Wildlife Service will supervise the filming of the picture, and distribute prints of the movie through its distribution centers and through private film libraries.



"Shipbuilders of Essex" Awarded First Prize at Venice Film Exhibition

Among the U. S. Government films awarded first prizes at the Eleventh International Exhibition of Cinematographic Art at Venice, Italy, August 8 to September 10, 1950, was Shipbuilders of Essex, in the technical films class (one of several classes), according to a State Department press release. This film shows skilled craftsmen of Essex, Massachusetts, constructing a wooden fishing trawler, and was produced for the Department of State's Information Service.

Among the 20 United States films selected for showing at this Exhibition was also the Fish and Wildlife Service film Food for Thought.



Social Security Act Amendments of 1950 Affect Fishing Industries

The "Social Security Act Amendments of 1950" (Public Law 734--81st Congress), approved by the President on August 28 this year, will affect the fishery industries. Some relatively minor administrative features are already operative, but most of the more important ones affecting the fishery industries will go into effect January 1, 1951.

The law brings self-employed persons in the fishery industries under the Federal Old-Age and Survivors Insurance System. A tax of $2\frac{1}{4}$ percent will be imposed on self-employment income for the first three years. Self-employment income is defined by the law as "net earnings from self-employment derived by an individual (other than a nonresident alien individual) during any taxable year beginning after December 31, 1950; except that such term shall not include:

"1. That part of the net earnings from self-employment which is in excess of:

- (A) \$3,600, minus
- (B) the amount of the wages paid to such individual during the taxable year; or

"2. The net earnings from self-employment, if such net earnings for the taxable year are less than \$400."

It is estimated by the Fish and Wildlife Service's Branch of Commercial Fisheries that about 36,000 self-employed fishermen will be covered by the law. These individuals will contribute to the Social Security System about \$2,000,000 during the first year.

In addition to self-employed fishermen, proprietors of fisheries processing, wholesaling, retailing, and allied businesses operated as individual concerns or partnerships will be subject to this tax.

According to information available at present, the collection of the social security tax on self-employment income will be administered and collected in conjunction with the Internal Revenue Bureau's income tax collection system.

The maximum amount of wages of employees on which the tax for Old-Age and Survivors Insurance is calculated is raised by this new law from \$3,000 to \$3,600 per annum. The effect of this will be to raise present contributions both by the employer and employee by 20 percent for all employees earning \$3,600 or more per year, but these increased contributions will provide a higher base on which annuity payments will be computed and paid when benefits become due.

Fishermen employed on vessels under 10 net tons (except vessels in the halibut or salmon fisheries) have been excluded from the Old-Age and Survivors Insurance System and the tax under the Social Security Act and continue to be so exempt under the new law. However, self-employed fishermen owning these vessels are now covered, and these individuals are required to pay the tax on self-employment income.



Wholesale and Retail Prices

WHOLESALE PRICES, AUGUST 1950: From July to August this year wholesale prices of nearly all fishery products increased substantially. The edible fish and shellfish (fresh, frozen, and canned) wholesale index for August was 105.6 percent of the 1947 average--8.3 percent higher than the previous month and 6.7 percent above August 1949 (see table 1), according to the Bureau of Labor Statistics of the Department of Labor. Sharp advances in all food prices, which started in July, continued during August, and edible fishery products followed the same trend.

| Table 1 - Wholesale Average Prices and Indexes of Fish and Shellfish, August 1950 with Comparative Data | | | | | | | | |
|---|------------------|-------|---------------------|-----------|-----------|----------------------|-----------|-----------|
| GROUP, SUBGROUP, AND ITEM SPECIFICATION | POINT OF PRICING | UNIT | AVERAGE PRICES (\$) | | | INDEXES (1947 = 100) | | |
| | | | Aug. 1950 | July 1950 | Aug. 1949 | Aug. 1950 | July 1950 | Aug. 1949 |
| ALL FISH AND SHELLFISH (Fresh, Frozen, and Canned) | | | | | | | | |
| Fresh and Frozen Fishery Products: | | | | | | | | |
| Drawn, Dressed, or Whole Finfish: | | | | | | | | |
| Haddock, large, offshore, drawn, fresh | Boston | lb. | .11 | .11 | .08 | 112.0 | 110.1 | 82.6 |
| Halibut, Western, 20/80 lbs., dressed, fresh or frozen | New York City | " | .38 | .37 | .32 | 110.0 | 107.6 | 94.5 |
| Salmon, king, leg. & med., dressed, fresh or frozen | " | " | .49 | .45 | .48 | 119.4 | 111.3 | 116.5 |
| Lake trout, domestic, mostly No. 1, drawn (dressed), fresh | Chicago | " | .47 | .45 | .50 | 103.5 | 98.4 | 109.8 |
| Whitefish, mostly Lake Superior, drawn (dressed), fresh | " | " | .39 | .33 | .43 | 112.0 | 95.4 | 125.4 |
| Whitefish, mostly Lake Erie pound size, round, fresh | New York City | " | .49 | .50 | .49 | 110.8 | 111.9 | 110.1 |
| Yellow pike, mostly Michigan (Lakes Michigan & Huron), round, fresh | " | " | .56 | .47 | .49 | 130.2 | 110.3 | 114.3 |
| Processed, Fresh (Fish and Shellfish): | | | | | | | | |
| Filets, haddock, small, skins on, 20-lb. tins | | | | | | | | |
| Boston | lb. | .25 | .27 | .25 | 90.9 | 97.6 | 88.9 | |
| Shrimp, leg. (26-30 count), headless, fresh or frozen | New York City | " | .64 | .62 | .58 | 92.9 | 89.2 | 82.9 |
| Oysters, shucked, standard | Norfolk area | gal. | 3.95 | 3.75 | 3.80 | 97.2 | 92.3 | 93.5 |
| Processed, Frozen (Fish and Shellfish): | | | | | | | | |
| Filets: Flounder (yellowtail), skinless, 10-lb. boxes | | | | | | | | |
| Boston | lb. | .35 | .34 | .30 | 111.4 | 109.7 | 96.8 | |
| Haddock, small, 10-lb. cello-pack | " | .25 | .25 | .20 | 115.7 | 113.3 | 90.0 | |
| Rosefish, 10-lb. cello-pack | Gloucester | " | .22 | .19 | .18 | 112.2 | 95.0 | 92.0 |
| Shrimp, leg. (26-30 count), 5- to 10-lb. boxes | Chicago | " | .64 | .67 | .66 | 92.0 | 97.2 | 95.5 |
| Canned Fishery Products: | | | | | | | | |
| Salmon, pink, No. 1 Tall (1 1/2 oz.), 48 cans per case | | | | | | | | |
| Seattle | case | 20.88 | 16.25 | 19.21 | 136.1 | 106.0 | 125.2 | |
| Tuna, light meat, solid pack, No. 2 (7 oz.), 48 cans per case | Los Angeles | " | 14.94 | 14.45 | 15.65 | 97.2 | 94.0 | 101.8 |
| Sardines (pilchards), California, tomato pack, No. 1 oval (1 1/2 oz.), 48 cans per case | " | " | 6.13 | 5.60 | 7.30 | 68.5 | 64.9 | 81.6 |
| Sardines, Maine, keyhole oil, No. 2 drawn (3 1/2 oz.), 100 cans per case | New York City | " | 6.13 | 6.00 | 7.85 | 60.1 | 58.8 | 77.0 |

1/Revised

Because of the Korean conflict and the resulting increased demand for canned fishery products, and the small salmon pack reported through the end of August this year, canned fish markets were even stronger during August than in July. The biggest increases during August occurred in the canned fishery products subgroup. The August index for canned fish was 106.3 percent of the 1947 average--16.0 percent higher than July, but 0.4 percent below August 1949. Prices for all canned fish in this subgroup rose, with canned pink salmon selling in August at prices that were 28.4 percent higher than in July and 8.7 percent higher than in August a year ago. In spite of the fact that the Maine sardine pack at the end of August was more than 50 percent higher than the previous year at the same time, wholesale prices of canned Maine sardines also showed an increase during August.

Prices of items under the drawn, dressed, or whole finfish subgroup continued to rise (August prices were 4.2 percent higher than for the previous month). Compared to the previous month, yellow pike prices at New York City during August were considerably higher, while prices of all other items in this subgroup increased moderately in most cases, except for whitefish prices at New York City which declined slightly. In August, prices for this subgroup were still 15.1 percent higher than in August 1949. The Canadian railroad strike in August curtailed the supply of fresh-water fish available in United States markets and no doubt accounted for the increased prices in almost all of the fresh-water items in this subgroup.

Fresh processed fish and shellfish prices were 3.5 percent higher during August as compared with July and 8.3 percent higher than in August 1949. Among the individual items in this subgroup, only haddock fillets sold at lower prices during August.

August prices for the items in the frozen processed fish and shellfish subgroup were 2.1 percent higher than in July and 9.6 percent higher than in August a year earlier. Except for shrimp, all of the products included in this subgroup wholesaled at higher prices during August. More liberal supplies of frozen shrimp resulted in a drop in the wholesale prices of 5.6 percent from July to August, and prices during August this year were 3.7 percent below the corresponding month the previous year.

RETAIL PRICES, AUGUST 1950: Retail food prices declined 0.5 percent on the average between July 15 and August 15, 1950--the first drop in the food index since February 1950. The retail food price index on August 15 was 209.0 percent of the 1935-39 average, 3.2 percent higher than a year earlier, and 2.2 percent above mid-June 1950 (table 2), just before the Korean conflict started.

Fish and shellfish retail prices, however, continued to increase, following the general trend established at wholesale for these commodities, but the increase in retail prices was not as great. For all fish and shellfish (fresh, frozen, and canned), the August 15 retail index was 302.5 percent of the 1935-39 average--2.0 percent higher than on July 15, but still 2.1 percent lower than on August 15, 1949.

Table 2 - Retail Price Indexes for Foods and Fishery Products,
August 15, 1950, with Comparative Data

| Item | Base | Indexes | | |
|--|---------------|---------------|---------------|---------------|
| | | Aug. 15, 1950 | July 15, 1950 | Aug. 15, 1949 |
| All foods | 1935-39 = 100 | 209.0 | 210.0 | 202.6 |
| All fish and shellfish (fresh, frozen, & canned) .. | do | 302.5 | 296.6 | 308.9 |
| Fresh and frozen fish | 1938-39 = 100 | 279.4 | 275.8 | 254.4 |
| Canned salmon: pink | do | 337.5 | 325.5 | 434.1 |

Prices of fresh and frozen fishery products at retail rose 1.3 percent from mid-July to mid-August this year, and on August 15 were 9.8 percent higher than on the same date a year earlier.

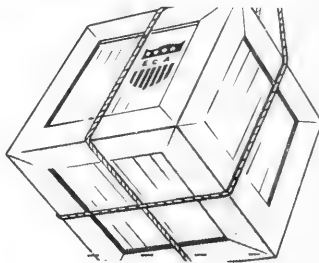
The biggest increase in retail prices of fishery products was for canned pink salmon. Retail prices for this item rose 3.7 percent from mid-July to mid-August this year, but on August 15 were still 22.3 percent below mid-August 1949. However, the small salmon pack this year (the smallest since 1921) will no doubt result in more substantial increases in the retail prices of all canned salmon. In fact, the increased demand for canned fishery products in general will probably result in price increases for almost all of these commodities.

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ECA Procurement Authorizations for Fishery Products

No procurement and reimbursement authorizations for fishery products (edible and inedible) were announced by the Economic Cooperation Administration during September 1950. In addition, no cancellations or decreases affecting previous authorizations for fishery products were reported.

Total ECA procurement authorizations for fishery products from April 1, 1948, through September 30, 1950, amounted to \$28,016,000 (\$16,267,000 for edible fishery products, \$10,209,000 for fish and whale oils, and \$1,540,000 for fish meal).



European Recovery Program Notes

AMERICAN RESEARCH AND TECHNOLOGY PLACED AT SERVICE OF WESTERN EUROPE: Establishment of an industrial "Mail Answer Service" to place American research and technology at the service of Western European manufacturers was announced by the Economic Cooperation Administration on September 30. The aim of the service is to answer technical problems—already solved by American industry—which are constantly arising to plague European plant managers and engineers. It is one part of an over-all program, the objective of which is to enable Western Europe to increase output at a lower unit cost, permitting lower prices, as well as equitable wages and profits.



The "Mail Answer Service" will be operated by the Office of Technical Services of the U. S. Department of Commerce, whose facilities will be opened to plant managers, union technicians, and others having production problems in the participating countries. Therefore, the Office of Technical Services will be able to give the same assistance to European industry that it has given, and is giving, American industry by supplying solutions to many of the problems which hinder production.

The new service will have some benefits for the U. S. businessmen too, according to the Director of ECA's Technical Assistance Division. Plans are now under way to make European production information available to American industry. The Organization for European Economic Cooperation, which requested approval of the service under ECA's technical assistance program, has recommended to the participating countries that they open an inter-European network of information centers which will provide services in Europe similar to those of the Office of Technical Services.

The Office of Technical Services is prepared to answer questions in 35 major categories of industry, including food preserving.

EUROPEAN PAYMENTS UNION IN OPERATION:^{1/} With the Paris signing of the agreement by the 18 Marshall Plan countries on September 19, the European Payments Union was placed in formal operation, according to the Economic Cooperation Administration.

Out of the \$500 million that Congress has appropriated to ECA for use in the form of transfers of funds to international institutions to promote transferability of European currencies and trade liberalization, ECA has made available \$350 million for the European Payments Union's operations.

According to the ECA Administrator, "the agreement, which is retroactive to last July, now brings the long-sought goal of currency convertibility and increased intra-European trade much nearer....By making the various European currencies in effect convertible among themselves, the Union will promote freer trade in Europe. In addition, the progressive removal of trade barriers, such as, quantitative restrictions on goods between countries in the Union, will increase the efficiency of manufacturing and trading and will benefit the consumer."

^{1/}SEE COMMERCIAL FISHERIES REVIEW, AUGUST 1950, P. 14.



THE EFFECT OF A SEAFOOD DIET ON THE RED CELL COUNT, HEMOGLOBIN VALUE, AND HEMATOCRIT OF HUMAN BLOOD

Seafood products are of major importance for their nutritional value. It is reasonable to suppose that marine animals living in a medium containing all the mineral elements needed by the human body would be a highly nutritious class of food. Since the minerals may be supplied to us in a usable form, by marine animals, we can get iron and copper to prevent nutritional anemia, iodine to prevent goiter, as well as phosphorus, copper and magnesium which are needed to regulate other body functions.

Oysters, shrimp, and crab meat, in addition to being rich sources of iron, copper and iodine contain one-half as much calcium, three times as much magnesium, and much more phosphorus than an equal quantity of milk. The oyster is comparable to liver and to milk, in its rich sources of nutrients. One pound of oysters provides about 12 percent of the energy needed by a man for one day; also, 50 percent of the protein, 26 percent of the calcium, 40 percent of the phosphorus, over 184 percent of the iron, and about 110 percent of the iodine, as well as vitamin A, thiamine, riboflavin and ascorbic acid.

Fish, as well as shellfish, are good sources of protein, phosphorus, iron, and iodine. The protein content of fish is comparable to beef and liver, and is higher than that of milk.

--Fishery Leaflet 334

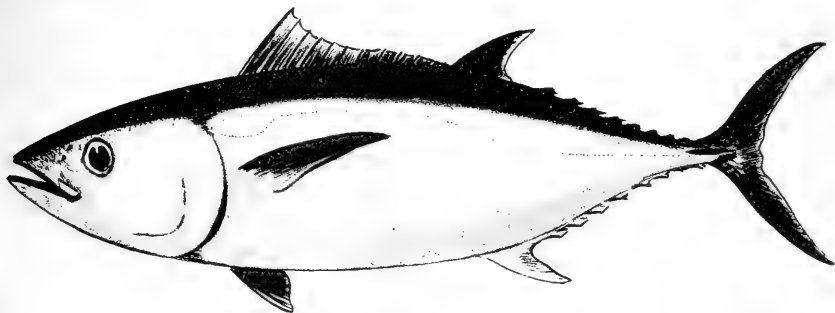


Australia

AMERICAN INTERESTS REQUEST PERMISSION TO FISH FOR TUNA IN AUSTRALIAN WATERS:

An opportunity has arisen to test pole fishing with live bait and purse seining for tuna in Australian waters, the July 1950 Fisheries Newsletter of the Australian Director of Fisheries reports. Negotiations are now taking place between American interests and the various Australian Departments concerned to facilitate the entry of the tuna vessels in that country's waters.

The offer to test live-bait pole fishing has been made by the general manager of the Fiji-Samoa tuna enterprises (see Commercial Fisheries Review, September 1950, p.52). These companies plan to bring a tuna clipper, live-bait boat, and a re-frigerated carrier, manned by experienced crews, to see if they can catch in Australian waters the tuna that they have failed to take in sufficient quantity in Fijian waters.



SOUTHERN BLUEFIN TUNA (THUNNUS MACCOYII) IS CAUGHT NEAR AUSTRALIA.

A somewhat similar offer has been made by one of California's largest tuna packers through a company in Sydney. This company plans to send a purse-seine skipper and vessel, and a skilled crew.

In addition to proving if tuna can be taken in Australian waters in commercial quantities by either or both of these two fishing methods, the exploratory fishing planned would provide a valuable opportunity for training Australian crews in both pole fishing and purse seining, provide employment for Australian fishermen, and greatly increase Australia's dollar-earning capacity.

It is pointed out that neither of the above methods is within the financial resources of the average Australian fisherman, but for him there will always remain trolling, which is capable of considerable expansion in New South Wales and can be introduced to other States.

SPINY LOBSTER AND TUNA EXPLORATIONS PLANNED: To investigate the prospects of finding new spiny lobster (crayfish) grounds in Western Australia, the Commonwealth Scientific and Industrial Research Organization has chartered the Villaret, a 139-metric-ton vessel. The vessel will operate in an area of 1,200 square miles which extends from North-West Cape to Onslow, and northwards to Barrow and Monte Bello Islands, the Western Australian Fisheries Department reports.

The vessel is being equipped with the latest quick-freezing and processing equipment and will be as modern and up-to-date as any on the Australian coast similarly engaged. In addition to the standard type of lobster pot, experiments will be made with a recently designed pot not previously used in Western Australia. Special lighted buoys for night hauling will be used.

Trolling for tuna and the operation of fish traps will also be undertaken with a view to gauging the commercial possibilities of these two methods of fishing.

Should the investigations prove favorable, it is believed that the spiny lobster fishing areas of Western Australia (already a valuable dollar-earning source) could be almost doubled, the July 1950 Australian Fisheries Newsletter states.

* * * * *

UNITED STATES LEADING IMPORTER OF AUSTRALIAN SPINY LOBSTER TAILS: Frozen spiny lobster tails are fast becoming one of Australia's most important items in



AUSTRALIAN FISHERMEN HAUL UP A LOBSTER POT INTO THEIR CUTTER. CATCHES ARE VARIABLE, DEPENDING ON THE CONDITIONS AT SEA. THEY'RE LIGHT WHEN A TURBULENT SEA KEEPS THE LOBSTERS IN THEIR CREVICES OR CLINGING TO THE ROCKY BED, AND GOOD WHEN THEY'RE CRAWLING ON THE SEA BED FORAGING FOR FOOD.

its postwar trade with the United States, according to a report from R. R. Ellen, Australian Government Trade Commissioner at New York City. A relatively small item in 1947, when less than 100,000 pounds were shipped from Australia to the United States, the spiny lobster industry has had a spectacular development over the last three years. In 1948, more than 500,000 pounds were sent to the United States; and in

the calendar year of 1949, exports tripled to the record figure of more than 1,500,000 pounds (valued at \$1,033,167). Since then, exports have been steadily climbing, with 2,609,996 pounds shipped to the United States from July 1949 to the end of June 1950.



A PACKER DISPLAYS TWO AUSTRALIAN SPINY LOBSTERS READY FOR PROCESSING.

gauged, and exporters have hopes of developing the trade to a point where this Australian food specialty will be selling in many retail stores.

The Australian spiny lobster (or marine crayfish), caught in the cool southern waters, is an entirely different species from the rock lobster caught in and around the Caribbean. It has a flesh color varying from white to pink and pale orange. For export to the United States, only the pure white is classified as "fancy grade." Processing of the spiny lobsters takes place within a few hours of catching, and every care is taken in their handling to avoid bruising and marking. As the habitat of the Australian spiny lobster is the dark cool waters of the sea floor, speed in transporting it to processing and freezing points is essential.

Specific Department of Commerce and Agriculture regulations determine the temperatures at which spiny lobster tails are frozen, stored, and shipped. The tails, which must be severed from the spiny lobsters while alive, are cleaned in clear water, wrapped in cellophane, and quick-frozen at -20° F. They are shipped to the United States in 20-pound packages.

Western Australia is by far the largest shipper of "tails" to the United States, but substantial quantities are also shipped from Tasmania and South Australia. The annual catch of spiny lobsters in Western Australia is more than 6,000,000 pounds, or almost one third of that State's total fish production. Most of these shellfish are

The United States is Australia's biggest spiny lobster customer, taking about 96 percent of the season's exports (valued at \$1,360,000). In the 1948-49 season, Great Britain, the British West Indies, India, and Singapore also took shipments. Early shipments of the tails were absorbed by the restaurant and hotel trades, but the capacity of the Australian fisheries has not been fully

taken in the Abrolhos Group--coral islands and reefs extending for about 50 miles and lying 40 miles off the coast near Geraldton. The other fishing areas in Western Australia are coastal waters west and north of Fremantle.

Lobster tails promise to be a valuable dollar earner for Australia.

* * * * *

FISH CANNERS URGE PROTECTION FROM IMPORTS: Commenting on the closing of three Australian fish canneries this year, the Secretary of the Fish Cannermen's Association of Australia said the Commonwealth Government would have to take urgent action to protect the industry or its future would be seriously prejudiced, reports the Australian Fisheries Newsletter in its July 1950 issue. Referring to the successful development of tuna canning in New South Wales last year, which marked the beginning of exploitation of Australia's tuna resources, he pointed out that this new development would be seriously retarded if the Government did not find some means of protecting the industry from imports.

The Fish Cannermen's Association, as a general measure of protection from imports, has asked the Government to fix maximum imports from easy-currency countries at 100 percent of their 1938-39 shipments, and from dollar countries at 50 percent.

Of the three canneries that ceased operations, two are now processing frozen fish, and the other was sold to a crayfish-processing company. Australia now has 15 canneries operating, at least to some extent.



Canada

FISHERIES DEPARTMENT ESTIMATES FOR 1950-51 EXPENDITURES: Main and supplementary estimates of expenditures by the Canadian Department of Fisheries for the fiscal year 1950-51 were approved by the House of Commons during its recent session and include activities in the fields of fish inspection, patrol and protection, fish-culture development, research, education, bait services, and international fisheries commissions, according to that Department's Trade News of July 1950. The Department's estimates provide for expenditures totaling C\$10,651,174, including C\$1,547,584 for supplementaries.

A joint federal-provincial working committee to unify government operations across Canada in fisheries protection, inspection, and development generally has been established.

The largest amount (C\$4,088,650, an increase of C\$864,250 over the previous fiscal year) of the 1950-51 funds will be spent for the maintenance of fisheries inspection, which includes salaries for fishery officers and guardians and the cost of fisheries patrol and protection services.

The East Coast administrative machinery has been revamped, and plans call for the reorientation of areas of administration, and in some cases, the reallocation of duties and the engagement of new staff.

In the inland areas, the Department's staff has been increased and services for whitefish inspection have been stepped up. The fisheries of the Northwest Territories, particularly those of Great Slave Lake, are expanding in economic impor-

tance and Federal officials feel keenly their responsibilities to encourage the utilization of, but at the same time the perpetuation of, the valuable fish stocks there. In Newfoundland, the Department has made a substantial increase in its inspection staff.

Similarly in fish-culture development, continued expansion of the work requires an appropriation of C\$779,045 for 1950-51, compared to C\$693,400 last year.

The main estimates also provide for an expenditure of C\$250,000 by the Department's Information and Educational Services. This provides for increased activities in technical education of fishermen.

The Fisheries Research Board of Canada was provided with an appropriation of C\$1,550,600 for operation and maintenance, an increase of C\$151,925 over last year's funds, and includes C\$103,000 for the acquisition of research equipment. For construction and improvements by the Board, the estimates provide an expenditure of C\$503,000. Expansion of both biological and technological services of the Board is provided for in these funds. At Halifax, N. S., provision is made for the extension of the work of the Atlantic Experimental Station, and new construction is being undertaken which, among other things, will provide space for pilot-plant experiments. At St. Andrews, N. B., similar building expansion is planned for the Atlantic Biological Station in order to enlarge their conservation and development studies activities. Both of these undertakings are the result of demands by the industry for increased fisheries research.

In British Columbia, the Department has substantially increased its biological and engineering activities.

The estimates contained C\$548,400 for the maintenance and extension of bait services. Three additional bait depots are provided for Newfoundland.

Other funds provided were C\$180,650 for Canada's share of the expenses of the International Pacific Salmon Fisheries Commission; C\$50,000 for Canada's share of expenses of the International Fisheries Commission for the regulation of the North Pacific halibut fisheries; and C\$500,000 for Canada's share of expenses of the Provisional Fur-Seal Agreement.

The Department again has been given special funds: C\$100,000 to be used to provide assistance in the construction of vessels of the dragger and long-line type; C\$100,000 to provide assistance in the construction of bait-freezing and storage facilities; and C\$80,000 to provide for the extension of educational work in cooperative producing and selling among fishermen.

NOTE: VALUES SHOWN ARE IN CANADIAN DOLLARS (C\$). VALUE OF 1 CANADIAN DOLLAR IS APPROXIMATELY 90 CENTS U.S.

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FISHERIES SUPPORT PROGRAM, FISCAL YEAR 1950: With the exception of the purchase of 4,476,802 pounds of Manitoba lakes frozen fish, valued at C\$281,740, no other species of fish were supported by the Canadian Government during the fiscal year ended March 31, 1950, according to the annual report of the Fisheries Prices Support Board.

During the previous fiscal year (1948-49), the Board supported the prices of East Coast fish by purchasing 151,026 cases of canned cod (and related species), herring, and mackerel. While arrangements had been made to dispose of the entire

purchase of canned fish before March 31, 1949, certain stocks still remained in warehouses at that date pending shipment. The loss incurred in the 1949-50 fiscal year in disposing of this balance amounted to C\$604,985. The loss incurred in the previous fiscal year was C\$538,988, bringing the total cost for this program up to C\$1,143,973, according to a July 10 American Embassy dispatch from Ottawa.

A limited program to assist Newfoundland fishermen (but not processors) by the purchase of 1949 carry-over stocks of salt cod was announced by the Minister of Fisheries in the House of Commons on June 28. The Fisheries Prices Support Board will undertake this buying at prices averaging two-thirds of the prices prevailing at the beginning of last year.

NOTE: VALUES SHOWN IN CANADIAN DOLLARS (C\$). THE CANADIAN DOLLAR AT THE OFFICIAL RATE IS WORTH \$0.9091 U. S.



Chile

DEVELOPMENT OF FISHERIES PLANNED: The Chilean Government has maintained its policy of fostering the fishing industry, according to an August 8 American Embassy dispatch from Santiago.

Chile's fisheries were surveyed during April and May by a representative of the Food and Agriculture Organization. The Corporacion de Fomento de la Produccion, on the basis of recommendations made in this survey, has announced a program which includes the building of fish processing plants; the development of a whaling industry, hydrogenation of fish oil, and ship construction; aid to fishery schools and organizations; improvement of marketing facilities; and preparation of a map of Chilean fisheries.



Costa Rica

GROUP OF DANISH FISHERMEN IN INVITED TO DEVELOP COSTA RICAN FISHERIES: The Government of Costa Rica invited a group of Danish fishermen to visit Costa Rica. This group is interested in transferring a fishing fleet and processing factories to Costa Rica in order to catch and preserve tuna and other fish, and to manufacture fish meal and oils, a September 11 American Embassy dispatch from San Jose reports. However, no definite plans have been formulated as yet.



TYPICAL COSTA RICAN SAILBOAT USED FOR HOOK AND LINE FISHING.

Ecuador

FISH MARKETING SITUATION:^{1/} Ecuadoran public markets in June 1950 had adequate supplies of fresh fish and shellfish. Most small fish weighing less than two pounds are sold by the piece without weighing. Since ice is used sparingly, most of the fish and shellfish are sold within 12 hours of being caught.

Most fishing is done with hook and line from canoes, or reed floats. The principal fishing ports in the Guayaquil area, other than the estuary and bay of Guayaquil, are Salinas, Libertad, and during the dry season from June to November, Ayangue and Entroda. At other seasons, roads to the latter are impassable.



SELLING LIVE CRABS OUTSIDE THE PUBLIC MARKET IN GUAYAQUIL, ECUADOR.

There is a tremendous fluctuation in prices for fish and shellfish in the markets, not only seasonally, but from day to day. This is due to the lack of refrigerated storage facilities so that all fish must be sold as soon as possible. Prices drop sharply when supplies are abundant and rise steeply on days of scarcity. The lack of processing plants, either canning or reduction, contributes to the general instability of prices.

Ecuador has been a net importer of processed fishery products, and seems likely to continue to be in spite of proven tuna resources in the Galapagos. There appears to be no likelihood of establishing any canning facilities during the remainder of 1950. No dried or salted fish was being imported during the first half of 1950, but adequate supplies

were being produced both in Ecuador proper, especially in the Galapagos Islands. Species commonly used are sharks, bonito, and albacore.

Although a fairly wide selection of fishery products was imported in the pre-war period, 1935-39, the actual quantities were relatively small and only sardines reached a respectable amount--varying between 750,000 pounds and 1,500,000 pounds annually. Imports from the United States averaged a little better than 880,000 pounds per year.

^{1/}THIS IS THE ELEVENTH REPORT IN A SERIES TO GIVE INFORMATION ON CURRENT AND POTENTIAL MARKETS FOR UNITED STATES FISHERY PRODUCTS IN SOUTH AMERICA. MILTON J. LINDNER AND ROBERT O. SMITH, UNITED STATES FISH AND WILDLIFE SERVICE REPRESENTATIVES, WERE IN SOUTH AMERICA IN JUNE INVESTIGATING MARKETS IN CONNECTION WITH A SURVEY SPONSORED COOPERATIVELY WITH THE U. S. DEPARTMENT OF AGRICULTURE'S OFFICE OF FOREIGN AGRICULTURAL RELATIONS. MORE DETAILED REPORTS WILL BE ISSUED AT A LATER DATE AS "FOREIGN MARKET CIRCULARS" AND WILL BE AVAILABLE FROM THE BRANCH OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. THE ANNOUNCEMENT OF THIS STUDY APPEARED IN COMMERCIAL FISHERIES REVIEW, JUNE 1950, P. 18, AND THE FIRST REPORT IN THIS SERIES ON THE ARGENTINE REPUBLIC ON PP. 33-4 OF THE SAME ISSUE; THE SECOND ON THE NETHERLANDS WEST INDIES APPEARED IN JULY 1950, PP. 46-7; AND OTHERS APPEARED IN THE AUGUST 1950 ISSUE AS FOLLOWS: THE THIRD ON URUGUAY, PP. 61-2; THE FOURTH ON PARAGUAY, PP. 52-3; THE FIFTH ON BRAZIL, P. 41; THE SIXTH ON BOLIVIA, PP. 39-40; THE SEVENTH ON SURINAM, PP. 57-8; THE EIGHTH ON VENEZUELA, PP. 62-3; THE NINTH ON CHILE, PP. 43-4; AND THE TENTH IN THE SEPTEMBER 1950 ISSUE, PP. 53-5.

Postwar import statistics are available only for 1946-47, and do not show the volume of present business. Considering the data at hand, it is evident that the demand for anchovies, smoked herring, shrimp, crabs, lobsters, and caviar is very light, and the total dollar value for each, except caviar, is less than \$1,000. Only two other categories, in addition to canned sardines, are represented in sufficient volume to warrant interest on the part of United States processors: miscellaneous salted and canned fish. The former, now supplied by Peru to the extent of over 148,000 pounds in 1947, is known to consist mostly of shark and bonito. Canned fish consists of such items as mackerel in various forms, fish roe, and other specialty products.

Data for 1946-47 show a rapid recovery in sardine imports, so that the 1947 figure of 767,000 pounds is approaching the 1935-39 average of about 1,162,000 pounds annually. However, the quantity from the United States has declined from 83 percent (5-year average 1935-39) to 61 percent (average 1946-47). The chief United States competitors have changed from Japan and Spain (prewar) to Canada, Venezuela, Peru, and Norway.

Ecuador's problem with respect to imports from the United States is the now familiar one of limited dollar exchange. With the possible exception of sardines, Ecuadoreans prefer to turn dollars into automotive products, machinery, tools, household equipment and supplies, and synthetic materials. The probability is remote that any unusual demand for fishery products will develop.

The Ecuadoran economy is based on agriculture and is dependent on imports for most types of manufactured goods. All imports into Ecuador are subject to exchange controls. Import permits must be obtained from the Central Bank, which is the only agency authorized to issue permits. When the import permit is issued, the dollars are granted.

There are three classes of commodities under the import permit system: List A is designated "essential," List B "useful," and List C "non-essential." An import permit for items listed under either A or B carries with it permission to buy the necessary dollars from the Central Bank at the rate of 13.50 sucres per U. S. dollar. Import permits for "C" items do not include authority to purchase dollars from the Central Bank. Such dollars must be purchased in the free market at rates which have fluctuated from 16.50 to 18.50 sucres to the U. S. dollar during the past 18 months. Fishery products are on List "C," except canned fish which is on List "B." Since List C items cannot be imported with Central Bank dollars, the full c.i.f. value of the shipment in dollars must be deposited with the Central Bank at the time the import permit is issued.

Ecuador extends 100 miles north and 400 miles south of the equator. The population was estimated in 1948 at 3,362,000. Of this number, from 250,000 to 300,000 live in and around the port of Guayaquil.



CUTTING AND SKINNING A SHARK AT A STALL IN THE GUAYAQUIL PUBLIC MARKET.

El Salvador

LEGISLATION PASSED TO ENCOURAGE FISHERIES ENTERPRISES: Legislation designed to encourage the development of commercial fishing and canning industries in El Salvador was passed by the Salvadoran Government, an August 17 American consular dispatch from San Salvador states. Reports indicate that fish are plentiful in Salvadoran coastal waters, but El Salvador has never had a commercial fishing enterprise or a canning industry.

The law (Decree Law No. 726, published in Diario Oficial of August 8, 1950) provides that during the period of 15 years following its publication, any fishing or canning industry established in El Salvador will have the benefit, during that period, of special concessions among which are: (1) tax free operations; (2) duty-free imports of all necessary equipment, machinery and supplies, including fuel oil; (3) the right to utilize fishing boats and equipment freely and without hampering restrictions in the bays, estuaries, rivers and at sea.

In order to qualify for the special benefits awarded, the law specifies that future canning or fishing industries comply with the following conditions: (1) be organized as a corporation under the laws of El Salvador; (2) at least 50 percent of the stock consist of Salvadoran capital, and no stock can be owned or acquired by foreign governments; (3) 80 percent of the employees must be Salvadoran citizens; (4) priority be given to the sale of the production in the domestic market; (5) sell the production to government, social benefit institutions at a discount of no less than 50 percent of the profit obtained from sale to private firms.

Article 6 of the Decree declares null and void a law passed in 1921 which gave an exclusive concession to a Salvadoran citizen for the establishment of a canning industry. No cannery was established in El Salvador by this citizen, despite the legislation which had enabled a virtual monopoly, and the fact that such a law remained on the books has militated against the establishment of a canning industry by other interested persons. The present law provides for free competition in both the fisheries and canning fields.

It is interesting to note that almost simultaneously with the publication of Decree No. 726 there arrived in El Salvador the first commercial fishing boat destined to fish exclusively in Salvadoran waters and sell its production in the local market under the terms of the new law. This boat, a 9-ton, Diesel-driven fishing craft, purchased in California, is to be operated by two American citizens who reportedly have the financial backing of a Salvadoran firm. Although this business is being started on a very small scale, it is important in that it is the first commercial fishing enterprise ever begun in this country, and should eventually make available fishery products at a cost low enough to bring them within the range of the low-income groups of El Salvador.



German Federal Republic

GOVERNMENT MEASURES AFFECTING THE FISHERIES: Equalization Fund: The amount paid from the Equalization Fund on unsalable and condemned fish was reduced from 6 to 5 pfennigs per $\frac{1}{2}$ kilo (from 1.3 to 1.1 cents per pound); the minimum price of fish sold for industrial uses was thereby lowered from 10 to 9 pfennigs (from 2.2 to 2 cents per pound), as the price of the fish to the processor remained at 4

pfennigs (1 cent per pound). The shipowners are said to object to the decrease, claiming that their break-even point is 15 pfennigs (3.2 cents per pound), reports an August 22 American consular dispatch from Bremerhaven.

The Equalization Fund is derived from a charge on each kilo of fish landed in Bremerhaven, Cuxhaven, Hamburg, and Kiel. Collections for the Fund, which ceased on April 1, 1950, following the expiration of the law under which they were made, were resumed on July 1, 1950, upon passage of a new law. It has been possible to continue payments during the interval between laws with the surplus which had been accumulated.

From this fund, DM2,000,000 was released (\$476,000) for credit to fish wholesalers, fish importers, and the industry. Of this amount, Dk730,000 (\$173,740) was for use in Bremerhaven, DM530,000 (\$126,140) in Hamburg, DM490,000 (\$116,620) in Cuxhaven, and DM250,000 (\$59,500) in Schleswig-Holstein.

Loans for the Fisheries: Land Bremen has offered a guarantee of DM2,000,000 (\$476,000) for short-term bank loans made through the Fischereihafen-Betriebsgesellschaft (the port administrative authority), Bremerhaven, on the current herring catch. The Fischereihafen-Betriebsgesellschaft has been authorized to apply for loans totaling DM5,800,000 (\$1,380,400) of which DM4,000,000 (\$952,000) is to be loaned on salted herring and DM1,800,000 (\$428,400) on marinated herring. Loans cannot exceed 60 percent of the processed value of the fish.

The press reports that Land Niedersachsen has also established a credit of DM2,000,000 (\$476,000) for the Cuxhaven herring industry.

A credit of DM3,100,000 (\$737,800) has been approved for the renovation of motors and equipment of the high sea and coastal fisheries of Schleswig-Holstein. Of this sum DM2,000,000 (\$476,000) will be advanced by the Federal Government from funds for use in areas of heavy unemployment, and DM1,100,000 (\$261,800) by the Land.

Subsidy for Coal Used By Fishing Vessels Extended: The law providing a subsidy of DM15,00 (\$3.57) per ton on coal used by the high sea fisheries has been extended through June 1951. The law was originally due to expire on June 30, 1950, but was prolonged because of the difficult financial position of the fisheries.



Iceland

HERRING PRICES RAISED: Prices of fresh herring for processing into oil and meal were fixed at 65 kronur per mal (approximately \$1.34 per hundredweight) by the Icelandic Minister of Fisheries on July 6, according to a July 6 American consular dispatch from Reykjavik. The price last year was 40 kronur per mal (83 cents per cwt.).

Two devaluations of the Icelandic krona were primarily responsible for the rise in the price of fresh herring in terms of Icelandic currency.

On July 7, the State Herring Board fixed the price of fresh herring for salting at 110 kronur (approximately \$6.75) per barrel (209 pounds) without heads (or \$3.23 per cwt.). Provided there will be ample fresh herring this summer, the Icelanders expect to salt approximately 200,000 barrels for export to countries with which Iceland has concluded Trade Agreements.

Japan

EXPORT OF SKILLED FISHERMEN TO INDIA: Three expert Japanese fishermen and an interpreter departed for Bombay, India, on August 14 to assist in the commercial development of fisheries in that area, according to the August 12 Weekly Summary of SCAP's Natural Resources Section. This is the first "export" of Japanese fishermen to overseas fisheries since the termination of hostilities.

Request for the fishermen was originated by commercial interests in Bombay with the approval of the Indian Government. The contract provides for the services of the skilled fishermen for a period of one year during which the Japanese technicians will supervise and participate in the exploration of the sea areas about Bombay. The Japanese fishermen will modify fishing boats and gear presently available at Bombay to meet fishing conditions which are peculiar to the Bombay area. The project provides for the Japanese to train Indian fishermen in the new type of operations.

JAPANESE GOVERNMENT



Mexico

EXPORT DUTIES ON SHRIMP: Owners and operators of freezing plants in the Mazatlan area (Sinaloa) on the west coast of Mexico are requesting the Government to put a duty of 3,000 pesos (about \$347) per metric tons on fresh shrimp, thus making it impossible to send fresh shrimp to the United States. However, the boat operators fear that a monopoly would result, a September 6 American consular dispatch from Mazatlan reports. The refrigerating plants are willing to pay an export duty of 650 pesos (about \$75) per ton on frozen shrimp. To date it is believed that export duties have not been definitely established by the Government.

SHRIMP WEIRS TO BE REMOVED: It is reported that some of the weirs placed in the estuaries or lagoons of southern Sinaloa, which prevent the shrimp from migrating to the open sea, will be removed this year and the balance will be eliminated gradually over a period of time. Those operating boats offshore oppose the use of weirs as they claim small shrimp cannot reach the ocean to mature to the size demanded by the export market. On the other hand, lagoon operators, which fish from small dugout canoes, favor the continued use of the weirs which protect their supply of small shrimp for the local market. Mexican fisheries authorities point out that the removal of the weirs must be gradual and with the cooperation of the canoe fishermen because the many lagoons would make it impossible to enforce any wide-scale removal order.

AMOUNT OF SHRIMP BEING FLOWN TO THE UNITED STATES INCREASING: A new 10-ton daily shrimp flight from Ciudad del Carmen (on the east coast of Mexico) to Brownsville, Texas, was announced during August. Fishing cooperatives in Carmen have contracted with an air line for 10-ton daily air shipments to Brownsville. This flight will bring to four the number of air carriers hauling shrimp from Carmen to Brownsville, according to a September 9 American consular report from Matamoros.

SHRIMP INDUSTRY EXPANDING: Fishermen at Ciudad del Carmen are reportedly getting very large catches. In addition, August reports indicate that schools of "giant" shrimp have recently appeared in large numbers off the coast of Campeche State, a September 7 American consular dispatch from Merida states. Facilities for processing and refrigerating shrimp are being increased at the city of Campeche in order to handle the contemplated increased production.

Norway

WEST COAST BOAT BUILDERS REPORT A SLUMP IN FISHING-VESSEL CONSTRUCTION: Norwegian west coast boat builders report that practically no fishing boats are being constructed at the present time, allegedly because of the difficulty fishermen have in raising the required capital. A fishing vessel 75 feet long costs approximately \$35,000. Loans up to three-fifths of the needed amount may be secured from the Government-operated Fiskeribanken; the remainder must be secured from private sources by prospective purchasers.

Another reason given for this slump is that war losses have been replaced and the effectiveness of the fishing fleet is reported to be double what it was before World War II, states an American Embassy dispatch from Oslo dated September 1.

It is also very difficult to secure the necessary crews to man the new vessels.

WHALING COMPANIES CHALLENGE RIGHT OF GOVERNMENT TO FIX PRICES FOR WHALE OIL: In a suit seeking the highest claims for damages ever presented to a Norwegian court, whaling companies have challenged the right of the Norwegian Price Directorate to levy an export tax and fix lower domestic market prices for whale oil than prevail in the world market. The damage claim is for 115 million kroner (\$16,100,000) covering losses allegedly sustained in the first three postwar years.

The Norwegian Export Council has called upon the Government to waive all export taxes.



Peru

REVIEW OF THE FISHERIES, 1949:1/ Fishing Seasons: Peruvian fishing operations are carried on throughout the year, according to an American consular report dated June 28. The most favorable periods for the catch of the important species are as follows: Bonito - October to March; Swordfish - August to March; Tuna - Sporadically throughout the year.

The other species of fresh fish consumed locally are caught throughout the year. However, the period of greatest abundance appears to be from September to March.

Number of Vessels: Official data on the number, size, and types of boats currently engaged in fishing are not available. However, an estimate, gathered from well-informed trade sources, reveals the following:

| Type | Length | Total Units |
|--------------------------------------|---------|-------------|
| | Feet | Number |
| Motorized Units: | | |
| "Boliche" type | 36 - 45 | 109 |
| "Boniteros" (covered launches) | 32 | 450 |
| Sailboats | 24 | 1,500 |
| Sea-going rowboats | - | 750 |

1/ALSO SEE COMMERCIAL FISHERIES REVIEW, SEPTEMBER 1950, PP. 53-5; APRIL 1950, P. 77.

Production by Species, 1949: Bonito and yellowfin tuna are the leading species of fish produced in Peru (see table). The catch of bonito has steadily increased from 32,463,614 pounds in 1946 to 59,940,760 pounds in 1949.

| Peruvian Fish Production by Leading Species, 1946-49 (Landed Weight) | | | | |
|--|-------------------------|------------|------------|------------|
| Species | 1949 | 1948 | 1947 | 1946 |
| | (in pounds) | | | |
| Atun (yellowfin tuna) | 7,072,285 | 1,303,975 | 1,873,377 | 3,012,909 |
| Barrilete (skipjack tuna) | 3,015,247 | 926,757 | 149,373 | 56,280 |
| Bonito (bonito) | 59,940,760 | 43,934,557 | 35,275,253 | 32,463,614 |
| Caballa (mackerel) | 4,031,515 | 1,792,017 | 5,506,547 | 6,217,312 |
| Cabrilla (sea bass) | 2,410,437 | 2,773,536 | 2,161,069 | 1,950,516 |
| Cojinoba (pompano) | 2,872,888 | 2,605,506 | 5,203,029 | 4,379,419 |
| Lorna (drum) | 3,555,152 | 4,806,886 | 2,380,763 | 1,502,875 |
| Machete (herring) | 3,332,481 | 1,957,657 | 923,985 | 634,962 |
| Pez espada (swordfish) | 825,075 | 5,810,823 | 2,349,070 | 1,196,606 |
| Other | 12,516,235 | 13,164,824 | 11,889,600 | 9,431,479 |
| Total | 99,572,075 | 79,076,538 | 67,712,066 | 60,845,972 |

* * * * *

EXPORT DUTIES: Export duties and charges are the most important source of revenue for the Peruvian Government, a September 1 report from the American Embassy at Lima states.

The basic export duty on fish of all kinds (Law No. 10545 of April 16, 1946) is 10 percent on the difference between the basic production costs at Peruvian port and the market price in the United States. For this purpose, basic production costs have been established as follows: salted fish, \$160 per short ton (907.184 kilograms, net weight); preserved fish, \$425 per short ton.

An additional export tax of 10 percent, payable on the market price exceeding by 25 percent the base price, is also levied.

The export duty on fish livers is \$10 per metric ton (net weight), but no additional export tax is collected on this item.



Republic of the Philippines

REVIEW OF THE FISHERIES, FISCAL YEAR 1949-50: Production: There was an estimated 22 percent increase in the Philippines' production of fishery products during

| Table 1 - Philippine Production of Fishery Products, Fiscal Year 1949-50 & 1948-49 ^{1/} | | |
|--|-------------------------|-------------|
| Item | 1949-50 | 1948-49 |
| | (in pounds) | |
| Production from: | | |
| Commercial licensed fishing vessels (of at least 3 metric tons) | 128,633,157 | 96,684,498 |
| Fish ponds | 53,917,116 | 52,292,328 |
| Municipal and sustenance fisheries | 365,100,547 | 297,953,654 |
| Total | 547,650,820 | 446,930,480 |

^{1/}Does not include gathered fishery products, such as shells, trepang, coral, etc.

the fiscal year ended June 30, 1950, when compared with production recorded for Fiscal 1949 (table 1). In view of the drastic import cuts¹ on fish products, the necessity for continued increases is apparent, states an August 31 dispatch from the United States Embassy in Manila.

Number of Vessels: In 1949-50 there were 825 commercial licensed vessels with a total gross tonnage of 20,245 metric tons engaged in the fisheries, compared with 706 vessels with a gross tonnage of 18,006 metric tons in 1948-49.

Fish Ponds: A total of 1,901 applications for fish-pond permits were filed during 1949-50, compared with 1,065 applications the previous fiscal year. In 1949-50, 302 permits were issued and 639 permits renewed, while the previous fiscal year only 194 permits were issued and 331 permits renewed.

There was also an increase in the acreage used for fish ponds from 171,156 acres in 1948-49 to 173,024 acres in 1949-50.

The productivity of fisheries has been seriously impaired over the past three years by the rampant use of dynamite and fish poison. Republic Act No. 428 passed during the last session of Congress declares illegal such practices and provides strict penalties. Although a downward trend has been noted in dynamite fishing, the virtual inability of the authorities to police the law will make the practice a problem for some years to come.

Table 2 - Philippine Production of Fishery Products (Including Gathered Products) Calendar Year 1948 and 1949

| Item | Calendar Year 1949 | | | Calendar Year 1948 | | |
|--------------------------------------|--------------------|----------------|-----------------|--------------------|----------------|-----------------|
| | Quantity lbs. | Value Pesos | Value U.S.\$ | Quantity lbs. | Value Pesos | Value U.S.\$ |
| Fish production | 523,606,871 | 296,865,658 | 148,432,829 | 429,172,663 | 163,456,630 | 81,788,315 |
| Shell production | 1,595,526 | 186,944 | 93,472 | 30,636,412 | 366,601 | 183,301 |
| Production of other fishery products | 54,019 | 35,218 | 17,609 | 446,291 | 65,956 | 32,978 |
| Total | 525,256,416 | 297,087,620 | 148,543,910 | 460,255,366 | 163,889,187 | 81,944,594 |

Development of Fisheries: In line with the nation-wide drive on food production, the amount of P100,000 (\$50,000) has been appropriated by special legislation for the promotion of the fisheries industry. Out of this amount, P75,000 (\$37,500) have been



allotted for the construction of three demonstration fish-farm projects and P25,000 (\$12,500) for the financing of a fisheries technological building to house a pilot canning plant and fish-preservation laboratory. The Philippine Bureau of Fisheries is actively engaged in expanding the fishing industry by lending technical guidance, providing stocks of fish for cultivation purposes, and by offering demonstration classes on prevention of waste by proper methods of preservation.

Imports: Imports of fishery products decreased from 79,565,299 pounds, valued at P28,284,656 (\$14,142,328) in 1948 to 66,287,489 pounds, valued at P32,588,985 (\$16,294,493) in 1949. More of a decrease can be anticipated during 1950 due to import cuts of from 60 to 80 percent based on average c.i.f. values of imports for the years 1946, 1947, and 1948.

Gathered Fishery Products: Unfinished shell production (table 2) and exports have shown a steady decline since 1948 due largely to increased competition from Australia

¹/ SEE COMMERCIAL FISHERIES REVIEW, AUGUST 1950, PP. 53-7.

and other sources and the lowered market value of commercial shell in New York. At the end of the fiscal year 1950, commercial shell exports, such as mother-of-pearl, trocha, snail and kapis, amounted to 656,066 pounds valued at P443,951 (\$221,971), compared with exports of 1,464,617 pounds valued at P976,180 (\$488,090) for Fiscal 1949. Exports of shell buttons, blanks and novelties increased during the same period from 47,399 pounds, valued at P368,912 (\$184,456) for Fiscal 1949 to 150,088 pounds, valued at P875,663 (\$437,832) for Fiscal 1950.



Portugal

FISHERIES REVIEW, 1949: Introduction: Portuguese fisheries production (according to official statistics) in 1949 was 203,243 metric tons (excluding whales), compared with 219,964 tons in 1948 (table 1), mid-year American consular dispatches from Lisbon report. During the years 1943-49, the annual average catch amounted to about 237,000 tons.

The main types of fisheries are:

1. Coastal fishery - concerned mainly with the production of sardines, but substantial quantities of anchovies, tuna, chinchards, and mackerel are also caught.
2. Otter-trawl fishery - conducted mainly on the high seas off the coast of West Africa in the vicinity of Cape Blanco. The chief varieties caught are whiting, pargo, sea bream, scabbard fish, dogfish, corvina, and some sole and turbot (flatfish).
3. Cod fishery - fishing on the Newfoundland Grand Banks and the west coast of Greenland. Conducted by a large fleet (mostly modern) of Portuguese schooners and trawlers.
4. Whale fishery - conducted on a small scale off the coast of Setubal and in the adjacent islands of the Azores.
5. Miscellaneous fisheries - small amounts of shellfish and fresh-water fish.

Coastal Fishery: The failure of sardines to appear off the Portuguese coast in sufficient quantities during the past two years has created economic distress in the sardine fishing industry. Before 1948, the annual sardine catch was around 100,000 tons. The catch for 1949 was only 55,842 tons, compared with 78,569 tons (table 1) for 1948. A scarcity of sardines has curtailed the fishery for the past several years. The sardine fishing season extends from May to December, but during the off-season, operations are conducted on a small scale.

The disposition of the total coastal fisheries production of 94,208 metric tons was as follows: sold in fresh-fish auction markets for public consumption, 69,709 tons; delivered to the fish canneries, 24,499 tons (consisting of 14,849 tons of sardines, 1,342 tons of chinchards, 2,077 tons of mackerel, 4,779 tons of anchovies, and 1,452 tons of tuna). About 85 percent of the fish sold to the canneries was canned in oil or sauce, and the remainder (mostly anchovies) processed in brine.

Table 1 - Landed Catch of Portuguese Fisheries by Type of Fishery and Leading Species, 1948-49
(Official Statistics)

| Type of Fishery and Species | 1 9 4 9 | | | 1 9 4 8 | | |
|---------------------------------|----------------|---------------------|-------------------|----------------|---------------------|-------------------|
| | Quantity | Value ^{1/} | | Quantity | Value ^{1/} | |
| | Metric Tons | Escudos | U.S.\$ | Metric Tons | Escudos | U.S.\$ |
| Coastal Fishery: | | | | | | |
| Sardines/..... | 55,842 | 192,202,000 | 7,457,438 | 78,569 | 254,665,000 | 10,237,533 |
| Chinchards | 26,655 | 70,750,000 | 2,745,100 | 32,375 | 75,932,000 | 3,092,666 |
| Anchovies | 4,564 | 10,173,000 | 394,712 | 3,392 | 15,191,000 | 610,878 |
| Mackerel | 4,524 | 12,507,000 | 485,272 | 1,592 | 6,700,000 | 269,340 |
| Tuna and similar species | 2,623 | 24,107,000 | 935,352 | 2,997 | 23,111,000 | 929,062 |
| Total^{2/} | 94,208 | 309,739,000 | 12,017,874 | 118,925 | 376,599,000 | 15,139,279 |
| Cod Fishery | 43,953 | 263,736,000 | 10,232,957 | 35,932 | 215,626,000 | 8,668,165 |
| Otter-Trawl Fishery: | | | | | | |
| Whiting | 13,035 | 108,553,000 | 4,211,856 | 12,245 | 104,151,000 | 4,186,870 |
| Other species | 41,510 | 183,822,000 | 7,132,294 | 41,082 | 175,127,000 | 7,040,105 |
| Total^{3/} | 54,545 | 292,375,000 | 11,344,150 | 53,327 | 279,278,000 | 11,226,975 |
| Miscellaneous Fisheries: | | | | | | |
| Shellfish | 9,939 | 11,204,000 | 434,715 | 11,157 | 15,680,000 | 630,336 |
| Fresh-water fish | 598 | 5,015,000 | 194,582 | 623 | 4,518,000 | 181,624 |
| Total | 10,537 | 16,219,000 | 629,297 | 11,780 | 20,198,000 | 811,960 |
| Grand Total | 203,243 | 882,069,000 | 34,224,278 | 219,964 | 891,701,000 | 35,846,379 |

^{1/}Based on wholesale auction sales.

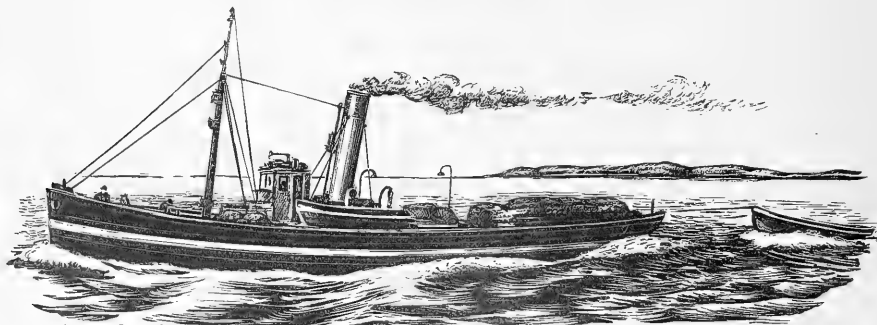
^{2/}According to statistics compiled by the fish-canning institute, the 1949 sardine catch was 34,796 tons, valued at US\$7,002,391 (47,683 tons, valued at US\$9,212,312, in 1948); and the total coastal fisheries catch was 79,879 tons, valued at US\$10,050,830 (84,861 tons, valued at US\$12,303,813, in 1948). These are the figures usually used by the trade.

^{3/}The gremio of owners of trawling vessels, a semi-official trade organization, reports the 1949 catch as 41,700 tons and the 1948 catch as 42,669 tons.

In addition to canned and brined products produced by the canneries, it is estimated by trade authorities that the scrap sold to factories yielded 700 tons of oil and 4,00 tons of fish meal.

Wholesale Prices: The rise in the wholesale price of sardines for cannelling and public consumption that took place during 1949 was attributable to the prevailing scarcity of fish (table 3).

Developments and Problems in the Sardine Fishery: The sardine fishing industry and the important canning industry, which depends on it, went through a disastrous year in 1949.



ANAL PORTUGUESE SARDINE MOTHERSHIP (GALEAO) USES LARGE SEINE NET WHICH OCCUPIES MOST OF THE DECK SPACE. VESSEL IS ABOUT 40 GROSS METRIC TONS AND 66 FEET IN LENGTH.

Because of the failure to organize a systematic, scientific study of the sardine fishery, very little is known concerning the causes of the sardine scarcity from which Portugal has suffered during the last two years. The only concrete development toward this end is an ECA technical assistance project recently approved under which Dr. Magalhaes

Ramalho, Director of the Marine Biology Station of Lisbon and Portugal's leading expert in the field of marine biology, planned to leave for the United States in July 1950 on a two-month study mission. Dr. Ramalho, accompanied by Dr. Jose Mouzinho de Figueiredo of the Fisheries Research Office, a body recently established by the fishing gremios, was to study scientific research projects carried out in the United States to determine the causes of the disappearance of sardines from the California coast, with a view to determining whether similar measures can be applied in Portugal. Whether the necessary funds will be forthcoming from the Government and other sources to mount a similar project in Portugal is problematical. The ECA technical assistance offered at least represents a hopeful beginning.

| Species | Quantity |
|----------------------------|--------------------------|
| | Std. Cases ^{1/} |
| Sardines | 726,870 |
| Anchovies | 231,500 |
| Mackerel | 79,508 |
| Tuna and similar species . | 69,023 |
| Chinchards | 54,182 |
| Other species | 20,355 |
| Total | 1,181,438 |

^{1/}A wooden case holding 100 $\frac{1}{4}$ -club cans (30 mm. size), each can containing 4 $\frac{1}{2}$ oz. Gross weight of case is approximately 51 pounds, while the contents of the case (excluding the weight of the wooden case) is about 42 pounds.

| Species | U.S. cents per lb. | | Escudos per kilo | |
|---|--------------------|------|------------------|------|
| | 1949 | 1948 | 1949 | 1948 |
| Fresh sardines for: | | | | |
| Canning | 10.4 | 9.9 | 5.90 | 5.40 |
| Brine | 4.1 | 4.8 | 2.31 | 2.61 |
| Local consumption | 8.2 | 7.6 | 4.66 | 4.16 |
| General use | 9.1 | 8.8 | 5.18 | 4.80 |
| All other species | 3.1 | 3.8 | 1.74 | 2.07 |
| Total average for coastal fishery catch | 5.7 | 6.6 | 3.24 | 3.61 |

Meanwhile, the economic crisis in the sardine ports, brought about by reduced sardine catches and the operation of the canneries at a small fraction of capacity, has resulted in the widespread unemployment of large numbers of packing-house workers and fishermen.

The ills from which the sardine fishing and packing industries are suffering are much more basic than the temporary misfortune of the sardine shortage. The sardine fishing fleet was considerably expanded during the war, and in 1949 it consisted of 385 vessels, as compared to about 250 in 1939. The result has been an intensified and uneconomic competition among the proprietors with each boat producing a smaller yield than formerly, since the total catch did not increase between 1939 and 1946 and since the latter year it has declined drastically. The yield of sardines per boat has dropped from about 350 metric tons before the war to only 90 tons in 1949 as the result of the greatly reduced catch and the increase in the fleet.

The Gremio estimates that an economic loss of about one million dollars has been suffered because of the excessive investment of capital in the sardine fleet. It also attributes the sardine scarcity to excessive fishing by the increased fleet and points out that even if the fish were abundant and the yield per boat returned to the 1939 level of 350 tons, the 385 boats now fishing would catch 135,000 tons. The canning industry might handle a maximum of 60,000 tons, but according to the Gremio the balance of 75,000 tons would be excessive for purposes of public consumption and the price would fall to ruinous levels.

In the face of the industry's difficult situation, the chief actions by the Government have been the imposition of a ban on further construction of sardine boats, small loans to proprietors to tide them over the crisis, reductions in the price of coal and liquid fuels supplied to the sardine fishing fleet, and the consideration of certain measures of tax relief. The Gremio has also extended financial assistance to its members to enable them to equip their boats for the 1950 season.

In addition to the measures cited, the Government restricted sardine fishing operations for the first time in 1949 by issuing regulations requiring the mandatory suspension of fishing activities for minimum periods of 15 days each. The time of such suspensions of activity are freely chosen by the proprietors and the periods may be continuous or alternating on condition that the annual total of suspension is 60 days for boats up to 39 feet in length and 90 days for boats of a length greater than 39 feet. These new regulations became effective on January 1, 1949.

At the insistence of the various fishing organizations, the Government has called a conference in June for the purpose of making an over-all study of the industry and of submitting recommendations for relief. The Ministries of Marine, Economy, and Colonies were to participate in this conference.

In the meantime, efforts have been made to alleviate the hardships being experienced in the sardine fishery by investigating the possibility of fishing sardines off the coast of Morocco. As a result of this investigation, the Government is led to believe that there is an abundance of sardines and that the volume is steady. A number of vessels have already explored the possibilities and have returned with satisfactory catches; however, due to the long haul, the fish have all been marketed for direct local consumption. It will be difficult to gauge accurately the results of fishing off Morocco until the end of 1950 because the boats were not permitted to fish during April and May due to a Moroccan regulation which forbids fishing in these two months.

Problems of the Fish Canning Industry: The situation of the canning industry is even more serious than that of the coastal fishing industry because of the larger capital investment involved in plants and equipment. The most serious problem is reported to be the ruinous competition among the various producers which during the past season drove export prices down to unremunerative levels. The hopes that were placed last year on the British collective contract for one million cases of sardines were unfulfilled (as was the contract). It was anticipated that this contract would constitute a guarantee of continuity for the operation of the industry and also have a stabilizing effect on prices, since it fixed the price for 50 percent of the production which was mandatorily set aside to fulfill the contract. However, these hopes were not realized and most producers

vied with each other to sell their production at whatever price it would bring. A slight ray of hope that the canning industry might establish a more cooperative relationship with the fishing proprietors in the sale of the catch was provided by an agreement made at the important fishing center of Matosinhos last year to fix prices and the percentage of sardines to be delivered to the canneries. This agreement is said to have worked out well and to have shown possibility of an effective accord between the two industries for the mutual defense of their interests.

Aside from internecine conflict over prices, the canning industry's chief current problem is the lack of export markets. Portugal's traditional customers for canned fish have made imports more difficult by increasing their restrictions, reducing quantities authorized in commercial accords, and in some cases prohibiting imports entirely. The network of bilateral trade agreements established by Portugal with other European countries since the war has proved unsatisfactory to the industry because in the majority of cases actual exports of canned fish have not approached the contingents set in the respective agreements. The industry has been extremely critical of the measures taken to protect its interests in the negotiation of trade accords and has insisted that such accords must carry some guarantee of compliance on the part of the countries concerned. The development of canning industries in other countries and the consequent movement to discourage or prohibit imports of canned fish has also had its repercussions on the Portuguese industry. This factor has been responsible for the loss of Portuguese markets in Central and South America.

Also, there is the severe competition represented by the Moroccan industry which disposes of a plentiful supply of fish and cheap labor. The Moroccan production represents a serious threat to the Portuguese industry since, because of the local shortage of fish, it has tended to displace Portuguese products in their



UNLOADING SARDINES FROM THE HOLD OF A PORTUGUESE SARDINE AUXILIARY CRAFT. SINCE THERE IS INSUFFICIENT SPACE IN THE MOTHERSHIP TO HOLD THE FISH, THE MOTHERSHIP IS ACCOMPANIED BY 3 OR 4 SMALL AUXILIARY CRAFT TO TRANSPORT THE SARDINES.

traditional markets of Western Europe. Exports of Moroccan canned fish in 1949 were twice those of Portugal and are increasing rapidly. The United Kingdom has this year signed a collective contract with Moroccan producers for the purchase of one million cases of sardines and is offering Portugal a similar contract for only half that amount. Finally, the devaluation of the escudo in September 1949, while it benefited Portuguese exports to the United States, it also prejudiced them to all other countries, especially

to the sterling area which has practically ceased purchases.

Perhaps the basic need is a radical reorganization of the entire canning industry in the country with a view to reducing the present excessive number of factories. Such a reorganization was advocated in an article in the January 1950 issue of Conservas de Peixe by Engineer Henrique Perreira. He points out that in 1947 there were 247 canning factories in continental Portugal employing 20,424 workers of both sexes. These factories produced in that year approximately 1,900,000 cases of canned fish, whereas their theoretical capacity, as fixed by the Canned Fish Institute, was more than three times that quantity, or about six million cases. The writer makes out a convincing case that the industry is over-equipped and that the economic return on the capital invested in it cannot be remunerative under present conditions. The solution he advances is a program of expropriating the smallest and most antiquated plants and centralizing the production in the largest and most modern establishments. Wherever possible, he proposes that surplus plant and equipment be transferred to Angola for use in the fish canning industry there which the Government is now seeking to expand.

Early in 1950 the Portuguese Canned Fish Institute presented an exposition to the Government on the crisis of the industry in which it advocated the immediate adoption of certain measures.

In response to the requests made in the Institute's exposition, the Government abolished the taxes on olive oil and peanut oil used by the industry. It also abolished the export tax on canned fish which amounted to approximately four-tenths of a cent a pound. The abolition of these two taxes will result in a saving to the producers and exporters of about 42 cents per case. Finally, it exempted factory owners during 1950 from the obligatory payment of three days' wages per week to workers as called for in the collective labor contract.

Cod Fishery: Participating in the 1949 cod-fishing campaign on the Grand Banks off Newfoundland and Greenland were 17 trawlers and 47 schooners. The trawlers made two trips between late February and November, while the schooners made one trip extending from April to November. The landed catch of the combined fleet amounted to 43,953 tons of salted green cod, compared with a catch of 35,932 tons for 1948 (table 1). When dried, the 1949 salted green cod production will yield about 30,750 tons of dried cod. In addition, the cod-fishing campaign also yielded some 600 tons of medicinal oil and 120 tons of industrial oil, according to trade estimates.

The retail price of dried cod is controlled by regulation. The present average (1950) is approximately 14 escudos per kilogram (about 22 cents per pound).

The cod-fishing fleet is still in the process of expansion. Four new trawlers entered this fishery early in 1950. With the hope of gaining an advantage by fishing close off the shores of Newfoundland, where in recent seasons there has been a greater abundance of large cod, the schooner fleet in 1950 proceeded from Portugal about a month earlier than usual.

The expanded and modernized cod fishing fleet has made notable progress in recent years in supplying an ever greater proportion of the Portuguese consumption of dried cod, which is currently estimated at 60,000 tons annually. In 1949, the national catch resulted in the production of approximately 50 percent of the domestic requirement. By comparison, in 1936, only about 8,500 tons of dried cod were produced from the national catch, which covered only around 15 percent of the country's consumption.

Otter-Trawl Fishery: The Portuguese otter-trawl industry (which does not include the cod-fishing boats) during 1949 operated 98 trawlers in the eastern Atlantic mainly off the coast of West Africa in the vicinity of Cape Blanco. These trawlers landed 54,545 tons of fish in 1949, compared with 53,327 tons in 1948 (table 1).

With the exception of Cape Blanco, all of the official fishing grounds for this fleet were visited less in 1949. The preference for the Cape Blanco fishing grounds is considered healthy since the ships fishing there have greater capacity and their catches represent a greater return for the effort and capital involved.

The fishing policy of the Gremio is founded on two basic principles:

1. The need of increasing the production.
2. The protection of the fisheries resources of the Portuguese coast

To achieve these ends, the Gremio has been promoting an increase in its high-seas trawling fleet, and in collaboration with the Government, attempting to prevent overfishing off the Portuguese coast. Thus, the policy is one of promoting high production in fishing grounds off Portugal and defending the coastal fisheries from too intense an exploitation.

There are no byproducts derived from the otter-trawl fishery. The whole fish is sold at auction; occasionally, the head, tail, and other parts are retailed separately for consumption by low-income groups.

According to trade sources, the average wholesale price for the entire trawl catch (not including the cod fishery) in each of the years 1945 through 1949 was as follows (in escudos per kilo with the approximate U. S. value in cents per pound in parenthesis): 1949--5.30 escudos per kilo (9.3 cents per pound); 1948--5.13 (9.3); 1947--4.77 (8.7); 1946--4.75 (8.7); and 1945--4.57 (8.4). These are only average prices--there is a considerable range between the highest and the lowest price.

The retail mark-up for the species of fish caught by the trawl fishery is anywhere from 30 to 60 percent. The retail prices of the more desirable varieties, such as sole and whiting, are currently (1950) between 18 and 30 escudos per kilo (28 to 47 cents per pound). The official ceiling prices for fresh fish, which had been imposed during the war were removed in 1948.

At the close of 1949, the trawler fleet consisted of 100 vessels divided as follows:

| | | |
|-----|---|--|
| 45 | - | high-seas trawlers |
| 44 | - | coastal trawlers |
| 11 | - | restricted coastal trawlers |
| 100 | - | with a gross tonnage of 18,741 metric tons |

The greatest part of the trawler fleet is antiquated, but more than one-third of the vessels being under ten years of age. In 1949, 4 new units were added with a total of 713 gross tons. Five high-seas trawlers are now under construction in Portuguese shipyards, and it is anticipated that by the close of 1950 these five and possibly a sixth will be in operations. The Gremio is seeking to have the proprietors fit these ships with the latest equipment, such as, metal holds, refriger-

ator facilities, etc. It is anticipated that the regular replacement of obsolete units, with emphasis on high-seas trawlers as opposed to coastal vessels, will bring about in a few years a general renovation of the fleet, which thus will not only be expanded but modernized.

According to the Gremio, the number of men in the crews of the trawlers operating out of Lisbon is approximately 1,500. An additional 500 constitute the crews of trawlers based on Figueira da Foz and Oporto. In addition, the Gremio employs about 1,000 men on shore in connection with the operation of its fish auction markets.

The Gremio maintains fish auction markets (lotas) at all the ports named above with the Santos market at Lisbon being by far the largest and receiving approximately 85 percent of the total trawler catch. Upon discharge of the catch, the fish are sorted out by species and weighed in boxes of 132 pounds each. The auction method is to begin with a fixed price and to gradually reduce the quotation until sales are made. About half the wholesale sales are made to the fish women (varinas), who sell the fish at retail in baskets throughout the city of Lisbon. Most of the remainder goes into the public markets for sale. There are no price ceilings (tabelas) on fish and the prices are fixed by supply and demand. Certain discounts, however, are made for fish sold to public hospitals and military units and for fish distributed to interior points in the country. Some 20 percent of the fish sold at Santos is distributed outside the Lisbon area.

Together with its efforts to maintain an increased production, the Gremio has sought to increase its sales services and distribution of fish in the country. To this end in 1949, the regulations of the different auction markets were revised to permit a speeding up of the operations of loading and selling the fish and a better control of services and statistics. The results of these efforts are shown by the fact that in the Santos auction market, average daily sales are now between 140 and 160 metric tons, whereas until recently only 80 or 90 tons were handled in the same length of time. During the entire year of 1949, the average quantity of fish offered each day for sale was 115 tons.

Whale Fishery: The Azores and Madeira islands' catch normally consists of sperm whales only, while the Portuguese continental catch ordinarily is made up of about two-thirds finback whales and one-third sperm whales (table 4). Fishing operations from the continent in 1949 resulted in a very poor catch of only 37 whales, of which the more valuable finbacks constituted but a third. According to trade reports, the finback whales avoided Portuguese waters last year, however, they are this year reported to have returned in large numbers and a better than average catch is expected in 1950.

| Year | Species of whale | Continent | Azores | Madeira | Total |
|------|------------------|-----------|--------|---------|-------|
| 1949 | Sperm | 50 | 565 | 109 | 724 |
| | Finback | 111 | - | - | 111 |
| | Total | 161 | 565 | 109 | 835 |
| 1948 | Sperm | 47 | 698 | 162 | 907 |
| | Finback | 94 | - | - | 94 |
| | Total | 141 | 698 | 162 | 1,001 |
| 1947 | Sperm | 23 | 1/575 | 1/ | 598 |
| | Finback | 14 | - | - | 14 |
| | Total | 37 | 575 | - | 612 |

1/Azores and Madeira combined.

According to official statistics, the 1949 production of sperm oil in the Azores and Madeira was valued at 18,758,000 escudos (\$727,810), while in 1948 the total pro-

duction of whale oil in the islands and the continent was valued at 20,109,000 escudos (\$808,382). The whale products other than oil are of relatively small value—in 1948, they were worth 1,380,000 escudos (\$55,476).

The Portuguese production of sperm whale oil represents slightly less than one-tenth of the world's total production (table 5).

Table 5 - Portuguese Production of Whale Products, 1947-49

| Type of Product | 1949 | 1948 | 1947 |
|---|------------------|-----------|-----------|
| | (in metric tons) | | |
| Azores and Madeira Islands: | | | |
| Sperm oil | 2,037 | 3,249 | 2,658 |
| Ambergris | <u>1/</u> | <u>2/</u> | <u>2/</u> |
| Continent: | | | |
| Sperm and finback oil | 676 | 598 | 149 |
| Meat for human consumption | 485 | 134 | 33 |
| Preserved meat | 137 | 63 | - |
| Meat meal | 268 | 281 | 154 |
| Bone meal | 146 | 162 | 57 |
| Residues for fertilizer | 787 | 902 | 141 |
| Total for Continent | 5,221 | 5,530 | 2,571 |
| <u>1/</u> Data not available. <u>2/</u> 310 pounds. <u>3/</u> 141 pounds. | | | |

Portugal is an exporting country with respect to whale oil and byproducts.

The current (1950) wholesale price f.o.b. Portuguese ports for sperm whale oil is approximately 53 cents per gallon.

Continental fishing began in 1944 in response to the war-time demand for edible finback whale oil and

other byproducts. Only one firm is engaged in the business with head offices at Setubal and a branch office in Lisbon. This firm has 3 vessels all equipped with modern whale hunting devices, including cannon for the shooting of harpoons. One of these vessels is a motor-driven ketch purchased in Norway and the other two are converted sardine boats known locally as "traineiras." In addition to this small fleet and fishing gear, the firm has a factory at the mouth of the Sado River near Setubal for the processing of the whales caught and also a small installation at Sacavem near Lisbon for the treatment of edible finback whale oil. It employs 40 men on its vessels and about 200 men at the two factories. Total investment is calculated at approximately 10,500,000 escudos (\$363,300).

Fishing operations are carried out from March to November but, in conformity with the International Whaling Agreement to which Portugal is a party, they do not extend over more than six months during the year on a daily basis. Fishing is carried out on the continental shelf south of Setubal as far down as Cape St. Vincent but does not extend more than 10-15 miles offshore. Once the whales are harpooned and killed they are towed into Setubal for processing. The whaling grounds are regularly traversed by whales swimming north along the Portuguese coast and they are normally present in fairly abundant numbers.

According to the official statistics, 597 men were engaged in whaling in the Azores and Madeira islands in 1947, operating 26 whale-hunting units, consisting of 121 boats with a total tonnage of 471 metric tons. At present, there are about 33 units (armacoes) operating, consisting of approximately 150 small boats manned by 800 men. Whale fishing is carried on from all the islands of the Azores but centers on the islands of Pico and Faial where about 70 whaling boats have their home ports. At present there are four factories for the processing of the catch with the islands of Flores, Pico, Faial, and Sao Miguel each possessing one. Two more are under construction, one in Pico and one in Madeira. Total capital invested in the industry in the Azores and Madeira is estimated at 20,000,000 (\$692,000). Fishing is carried on in the old-time manner of harpooning the whales from small boats and no modern equipment or cannons are utilized.

Besides the extraction of oil, the whale industry also produces whale meat for human consumption, either fresh, in brine, or canned. Fresh whale meat is consumed entirely in the Azores, and in the Setubal-Lisbon area as far as the continental area is concerned. The small amount of canned whale meat produced is exported principally to France. Whale meat meal and whale bone meal is used for cattle feed and most of the local production is exported, principally to Germany and Belgium. Residues remaining from the treatment of the whales are used in Portugal for fertilizer.

A Government delegate to the corporative fishing organization addressed the National Assembly at the end of 1949 on the economic crisis of the whale fishing industry, brought about by the decline in foreign demand for sperm whale oil. After describing the difficult situation of the industry and the danger that the capital invested in it might be lost if present conditions continue, he called for the Government to step in and extend financial assistance and relief both to the operators and the fishermen.

At the present time Portugal has a stock of about 4,000 tons of sperm whale oil for which no foreign markets can be found. To provide an outlet for some of this surplus, the Government has recently approved the mixing of 1,000 tons of it with gas oil sold for fuel on the continent. The Government is paying the owners of the oil for the difference in price for the thousand tons thus utilized. Because of the large surplus of sperm oil existing and the limited amount which can be absorbed by such expedients, it is anticipated that fishing for sperm whales will be greatly reduced in 1950 if it is not stopped altogether.

A decree published in the Diario Do Governo of September 11 exempts whale and sperm oil from export duty, as a means of relieving the crisis in the industry. World markets for whale oil are reported, however, to have improved recently to such an extent that the need for the relief is less urgent than it was a few months ago, a September 15 American Embassy dispatch from Lisbon reports. The exemption is also intended to facilitate shipment of whale oil to foreign countries for hydrogenation, there being no hydrogenating equipment in Portugal; a separate clause provides for a reduction of 50 percent from the minimum duty on hydrogenated oil re-imported by the leading manufacturer of margarine and vegetable lard, if made from raw oil exported by that company.

EXPERIMENTAL USE OF HELICOPTER FOR WHALE FISHING: Early in April 1950 experiments in whale hunting were carried out off the Portuguese coast with a helicopter. The British helicopter, which carries three persons, has facilities for the launching of harpoons from the air and is expected to be extremely effective in locating and killing whales at sea. Its maximum speed is 100 miles an hour. If the experiments come up to anticipations, the Portuguese whaling firm on the Continent is expected to purchase one of these helicopters for its own use.

Exports: Italy, the United Kingdom, the United States, Belgium-Luxembourg, and France (in that order) were the principal importers of Portuguese canned fish. Belgium was the principal purchaser of sardines, followed closely by the United Kingdom, and substantial quantities were imported by Italy and France, with the United States in fifth place. The United Kingdom was the principal purchaser of chinchards; Belgium of mackerel; Italy of tuna; and the United States of anchovies.

The possibility of expanding exports of sardines to the United States is conditioned by other factors than the exchange rate. Most important is the American tariff

Table 6 - Portuguese Exports of Canned Fish in Oil (Trade Statistics), 1949

| Species | Total Exports | | | | Exports to the United States |
|---------------------------|---------------|------------|-------------|------------|------------------------------|
| | Quantity | | Value | | |
| | Std. Cases | Pounds | Escudos | U.S.\$ | Pounds |
| Sardines | 897,810 | 37,007,788 | 295,302,000 | 11,457,718 | 3,026,439 |
| Chinchards | 53,471 | 2,271,247 | 14,195,000 | 550,766 | - |
| Mackerel | 25,243 | 1,191,304 | 11,332,000 | 439,682 | 3,804 |
| Tuna and similar species | 68,963 | 4,358,512 | 53,573,000 | 2,078,632 | 189,556 |
| Anchovies | 298,007 | 6,066,210 | 78,880,000 | 3,060,544 | 5,017,965 |
| Cuttlefish and squid | 11,129 | 381,280 | 4,184,000 | 162,339 | 61,651 |
| Other species | 3,188 | 145,777 | 1,193,000 | 46,288 | 24,567 |
| Total | 1,357,811 | 51,422,118 | 458,659,000 | 17,795,969 | 8,323,982 |

1/100 $\frac{1}{4}$ -club cans (30 mm. size), each can containing $4\frac{1}{2}$ oz.

on sardines. About 95 percent of Portugal's exports of sardines to the United States consist of the boneless and boneless-skinless types which are packed chiefly as a specialty for the American market. These enter the United States at an ad-valorem duty of 30 percent. Norwegian canned brislings, on the other hand, pay 15 percent ad-valorem duty as the result of a reduction in the applicable rate under the GATT program. The competitive disadvantage at which the Portuguese products has been placed in the United States is of serious concern to local exporters.

The Canned Fish Institute, as a result of a visit of one of its directors to the United States in 1948 to study the market for sardines, has drawn up a plan promoting American sales and has collected approximately \$100,000 from its members for this purpose. However, nothing has yet been done to implement this scheme pending a decision by the Government as to what form Portugal's projected over-all dollar export promotion program should take.

Exports of anchovies in 1949 reached one of the highest levels in recent years and might have done much to compensate for the deficit in sardines if the competition among Portuguese exporters had not depressed prices to unremunerative levels. Thus, the price of \$11.00 per case for fillets of anchovies, prevailing in April of 1949, was forced down to as low as \$7.00 per case at the close of the year. The same situation occurred with respect to the export price of canned mackerel.

Exports of canned tuna fell 28 percent in volume and 19,500,000 escudos (U.S.\$756,600) in value in relation to 1948, due to a marked decline in exports to the United States and Italy which were not compensated by increased purchases by the United Kingdom. Italian purchases declined because of the difficulty in obtaining exchange, large offerings of Spanish tuna in that market, and competition from a new source—refrigerated tuna imported from Norway and Denmark. In the United States, the importation of Japanese tuna practically eliminated the possibility of effective competition as far as the Portuguese product was concerned.

Exports of fish in brine in 1949 (output of the coastal fisheries) totaled 466 metric tons—411 tons of sardines and 55 tons of other species. Greece was the principal market for sardines in brine, taking 273 tons. The value of exports of fish in brine, 3,559,000 escudos (\$138,089), was far below the value for the 1948 exports, which were valued at 27,500,000 escudos (\$1,105,500).

Frozen fish exports in 1949 amounted to 259 tons, valued at 4,144,000 escudos (\$160,787). These consisted mainly of octopus (120 tons) and sardines (93 tons). The United States was the principal market, taking 161 tons of the total. However,

the recently established frozen fish industry suffered a marked reduction in its exports in 1949, chiefly because Argentina, hitherto the principal market, has prohibited the entry of the Portuguese frozen fish.

Fresh fish exports were negligible in 1949--72 tons, valued at 606,000 escudos (U.S.\$23,513), were supplied to foreign ships in Portuguese ports.

In addition, Portugal exported the following fishery byproducts during 1949 (according to official statistics): 2,752 tons of fish meal to the United States; 1,489 tons of sardine oil (1,327 tons to Germany, 139 tons to Norway, and 27 tons to Czechoslovakia); 1,031 tons of sperm whale oil (695 tons to France, 205 tons to Holland, 105 tons to Denmark, and 26 tons to other countries); 156 tons of finback whale oil to Germany; and 58 tons of cod-liver oil to the United States. (Also trade sources report that the exports of cod-liver oil probably totaled 500 tons).

Imports: Portugal imported 27,609 metric tons of fresh and dried cod during 1949, valued at 257,172,000 escudos (U.S.\$9,978,274). Imports by country of origin in metric tons were as follows: Norway 9,785; Newfoundland 5,497; Denmark 5,124; Iceland 3,252; France 3,222; Greenland 549; England 180. Imports from Norway, Newfoundland, and the United Kingdom were fresh cod (preserved with salt or ice).

Imports of fish of the same varieties caught in the domestic sardine fishery during 1949 amounted to 390 tons, valued at 2,619,000 escudos (U.S.\$101,617) and consisted mainly of tuna in brine from the Portuguese African colonies, Spain, and French Morocco.

Fresh fish imports in 1949 amounted to 1,606 tons, valued at 10,246,000 escudos (U.S.\$397,545). The bulk (1,138 tons) was imported from Spain and the balance from French Morocco and Tangier.

Consumption: In one form or another, fish is a very basic element in the Portuguese diet. Dried cod is by far the most important staple of the diet. Annual consumption of dried cod amounts to around 60,000 tons. In recent years, there has been an increasing use of salted fish (salted sardines and chinchards). The amount of canned fish consumed in Portugal is small because fish packers operate predominantly for export. The annual consumption of fish is reported to be about $2\frac{1}{2}$ times the combined consumption of beef, pork, sheep, goats, and poultry.

NOTE: VALUES IN U.S. DOLLARS SHOWN THROUGHOUT THIS ARTICLE ARE BASED ON THE FOLLOWING RATES OF EXCHANGE: 1950--1 PORTUGUESE ESCUDO EQUALS 3.46 U.S. CENTS; 1949--1 ESCUDO EQUALS 3.88 U.S. CENTS; 1948--1 ESCUDO EQUALS 4.02 U.S. CENTS.



Spain

FISHERY BYPRODUCTS INDUSTRY: Introduction: The fishing industry of Spain is not only one of the country's important economic resources, but one of the leading sources of its food supply. The Spanish fishing fleet is composed of some 37,500 units of many types (from row boats to steam-propelled vessels), with a gross tonnage of about 210,000 metric tons, a February 28 American consular dispatch from Vigo reports.

The annual catch of the fishing fleet is estimated at about 500,000 metric tons, of which about 25 percent is said to be processed in the 200 odd canning and pickling plants operating in Spain.

Importance of Fishery Byproducts: In spite of the abundance of raw material, the processing of fish waste was not attempted in Spain until about 1935 when the manufacture of fish meal from the residue of the canneries was undertaken by one of the largest local fish canners, one of whose members spent some time in the United States studying the industrial processing of fish byproducts. Until then, fish scrap and waste, after the fish oil had been extracted, was either dumped into the sea or sold as fertilizer. The peak of the fishing season coincides with the period during which fertilizer is in demand. Because of the scarcity and high cost of nitrogen fertilizers, the agricultural industry continues to be the fish meal industry's biggest competitor for fish residue.

The value of fish byproducts was soon realized and the processing thereof was steadily stepped up. However, the outbreak of the Spanish Civil War in July 1936 and the dislocation of normal sources of supply caused by the outbreak of World War II, which followed the end of the Civil War in 1939, prevented any further development. The plants that were established continue, therefore, to operate with the same machinery and equipment that was originally installed in 1935.

Raw Material Used in Fish Reduction Plants: Mostly fish scrap and waste are processed by reduction plants. While the following calculations on the quantities of fish scrap and waste that are available for processing may not be considered too reliable, they may be of some value in appraising the situation. Of the roughly 125,000 tons of fresh fish that are normally available to the canneries, and picklers and smokers annually, 60 percent are purchased by the former and 40 percent by the picklers and smokers.

Fish waste and scrap from picklers and smokers is disposed of as fertilizer, after the fish oil has been extracted. Therefore, the amount of material that would normally be available for processing in fish-meal plants should average 22,500 tons, since fish residue represents, roughly, 30 percent of the weight of the fish purchased by the canneries. The greater part of this amount, however, is at present sold as fertilizer.

The bulk of the fish scrap and waste processed in fish meal plants comes from sardines (pilchard) and jurel (Trachurus trachurus), and to a lesser extent from bonito (albacore)--the principal varieties used by the canneries.

The scarcity of these varieties during the past two or three years also greatly reduced the possibility of any expansion of the fish-meal processing industry due to its complete dependence on the canneries.

Because fish meal must reach the market at prices within the limited purchasing power of the farmers, fish-meal processors have found the processing of even the cheapest fish specimens uneconomical. Only on the very rare occasions when the price of jurel has fallen below pesetas 0.40 per kilo (about \$1.66 per cwt.) at first sale, have fish meal processors purchased substantial quantities of this variety for processing.

Fish Reduction Season: Spanish fish meal plants are prepared to work all year round. The busiest months of the year, however, are from the latter part of August to the end of the year, which are the months of the heaviest catches of sardines and jurel.

Fish Meal Production: According to the largest fish-meal processing company in Spain, from 16 to 18 tons of fish meal are obtained from 100 metric tons of fish

scrap and waste. However, due to the competition of the farmers for fish scrap and waste for fertilizing purposes, it is estimated that the output of the fish-meal plants during 1949 was not more than 650 or 700 tons. The demand for fish meal is estimated at about 2,000 tons.

Fish Reduction Process: The first step in the processing of the fish scrap and waste is the extraction by a pressure process of all liquid elements which are deposited in large tanks. The residue is then dried by means of hot-air conveyors before it is passed on to the grinding mill. The second and only other step is the extraction of the oils and greases from the liquid elements deposited in the tanks, which is accomplished by a centrifugal process. The waste, or stickwater, that remains is estimated to amount to 400 tons to each 500 tons of liquid.

Stickwater: In spite of the fact that the Lassen system for the processing of waste stickwater created an interest among the fish-meal processors, no one has, until recently, given the matter any thought.

The possibility of processing fish stickwater, in accordance with Lassen's system, is now being studied by the Spanish processors, but the opinion is expressed that it would not pay to install the necessary equipment at this time due to the limited volume of material available from the fish canneries.



Sweden

ECONOMIC CONTROL OF FISHERIES EXTENDED: The Swedish Riksdag decided to extend the system of price and market regulation (including fishery products) until July 1951 and took certain steps to centralize the exports of fishery products.

Exports of fishery products have met with increasing difficulties this year due to the bilateral trade agreements, and licensing and centralization of imports in certain foreign countries. Stocks of fish were high during the first four months this year and surpluses were used for the production of fish meal, an August 15 American Embassy dispatch from Stockholm reports.

GOVERNMENT PROPOSES EXTENSION OF "GENERAL WATERS FOR FISHING:" A bill proposing, among other things, a certain extension of "general waters" in which anybody should have the right to fish, has been submitted by the Government.

* * * * *

SWEDISH-NORWEGIAN DISPUTE OVER FISHING RIGHTS IN THE SKAGERAK: A complaint that Norwegian patrol boats on repeated occasions had intercepted Swedish shrimp trawlers in international waters south of Farder (Norway) in the Skagerak and ordered them not to operate within eight nautical miles of the Norwegian coast was made by the Central Organization of the Swedish West Coast Fishermen in a letter to the Swedish Government published on August 15.

The most recent incidents of this nature were said to have occurred on July 25, when 20 Swedish trawlers were intercepted while fishing in what they regarded as their old fishing grounds in the waters between four and eight nautical miles south of Farder; and on July 27, when ten trawlers were similarly chased away from a point

$5\frac{1}{2}$ miles south of Farder. One of the Swedish fishing vessels was reported to have been threatened with gunfire by a Norwegian patrol boat, reports an August 18 American Embassy dispatch from Stockholm. Fishing, therefore, had to be abandoned and the trawlers returned to their home ports. They reported that a large number of Norwegian shrimp trawlers had been fishing in the same waters at the time and that even a Danish trawler had been allowed to remain although fishing much closer to the Norwegian shore.

The Swedish fishermen protested against what they considered discriminatory treatment in their "lawful pursuits" and requested that the Swedish Government approach the Norwegian Government in an effort to rectify the situation.

The matter is now being considered both by the Swedish Ministry of Agriculture, to which the Fishery Administration is subordinated, and by the Foreign Office.

With regard to the most recent incidents reported, the Foreign Minister was quoted by the press as saying:

"Swedish fishermen must naturally for the time being respect the Norwegian regulations pending a settlement of the dispute by agreement between the two Governments. It should be recalled in this connection that a dispute regarding the same question of principle concerning territorial waters in Norwegian fjords is under consideration by the Hague Court as a case between the United Kingdom and Norway."



U.S.S.R.

REAFFIRMS CLAIM TO TWELVE-MILE LIMIT IN BALTIC: The Soviet Government, replying to Swedish-Danish notes of July 24 regarding territorial waters in the Baltic, has reaffirmed its claim to the twelve-mile limit, according to Stockholm press reports quoted by a September 7 American Embassy dispatch from that city.

The Soviet reply, as summarized by the Swedish Foreign Office, asserts that no general rules of international law exist regarding extent of territorial waters and that determination thereof falls within "exclusive competence" of each respective state. Reply also states that the extent of Russian territorial waters was established under decree of 1927, regarding Soviet frontiers, and that no extension has been made of Russian territorial waters.



Venezuela

FISH CANNERS ASSOCIATION URGES BAN ON CANNED FISH IMPORTS:^{1/} The problem confronting the Venezuelan fish canners has two solutions for immediate application: stop importations and establish rules and regulations for fish, according to an article which appeared in El Nacional of August 27 and which quoted the President of the Association of Fish Canners. He believes that unless measures are promptly taken to solve the problem definitively, the situation of the local fish canners will reach alarming proportions, a September 1 American consular dispatch from Caracas states.

^{1/} SEE COMMERCIAL FISHERIES REVIEW, AUGUST 1950, PP. 63-4.

In addition, the President of the Association announced that four of the principal fish canners have stopped canning, and that of the three now in operation, two will have to close shortly.

All the Venezuelan canners through their association are advertising the following wholesale prices:

| Type of Product | Cans Per Case | Weight Per Can | Price Per Case | |
|----------------------------|---------------|-----------------|----------------|------------------------------------|
| | No. | Ounces | In bolivars | U.S. ² / ₁₀₀ |
| Sardines: | | | | |
| In peanut oil | 100 | 4 $\frac{1}{2}$ | 45 | 13.43 |
| In hot peppers | 100 | 4 $\frac{1}{2}$ | 42 | 12.54 |
| In tomatoes | 100 | 4 $\frac{1}{2}$ | 40 | 11.94 |
| Pickled | 100 | 4 $\frac{1}{2}$ | 36 | 10.75 |
| Pickled | 100 | 5.3 | 36 | 10.75 |
| Natural, in peanut oil ... | 100 | 5.3 | 27 | 8.06 |

²/₁₀₀ Converted on the basis of 1 Venezuelan bolivar equals 29.8507 U. S. cents.



EGYPTIAN FISHERIES

Manufacturing operations in the Egyptian fishing industry are limited to the canning of sardines at the Suez landing point and in a small factory at Aboukir near Alexandria during the short sardine season lasting for about four months.


The Aboukir factory was established in 1941 with a paid-up capital of 50,000 Egyptian pounds. With some 100 workers, it has an annual output of 200 metric tons. Small takings of sardines during the current season have restricted operations this year.

The only other operation is the salting of mullet and sardines in a very primitive way, using barrels and empty gasoline cans.

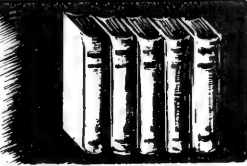
There appears to be a need of canning factories during the sardine season. Egyptian waters are also rich in mollusks and crustaceans which might be preserved. An effort has been made to can shrimp but results so far have not been satisfactory.

Other secondary industries are the manufacture of fish oils, fish meal and fertilizers. All of these are projects which should receive the attention of local authorities as well as the National Government for the expansion of Egyptian canning, smoking, salting and preserving industries would absorb thousands of workers and reduce unemployment.

--Fishery Leaflet 363



FEDERAL ACTIONS



Department of the Interior

FISH AND WILDLIFE SERVICE

FISHERIES TRAINING PROGRAM OF FILIPINOS TERMINATED: The program of providing practical training for Filipinos in fisheries under the Philippine Rehabilitation Act of 1946 was terminated on September 23. On this date, the last group of 23 trainees departed from San Francisco to the Philippines after being presented with certificates of merit awarded by the Director of the U. S. Fish and Wildlife Service.



PRESENTATION OF CERTIFICATES OF MERIT TO FILIPINO FISHERY TRAINEES, SAN FRANCISCO, CALIF., DECEMBER 2, 1948. LEFT TO RIGHT: TRAINEE SUSANO V. CAMILOTES; ENSIGN WILLIS UNCAPHER, U. S. MARITIME SERVICE; DR. STILLMAN WRIGHT, U. S. FISH AND WILDLIFE SERVICE; CAPTAIN M. E. CROSSMAN, U. S. MARITIME SERVICE; TRAINEE VICENTE B. ALCERA. THE LAST AWARD OF CERTIFICATES WAS MADE TO TRAINEES AT SAN FRANCISCO ON SEPTEMBER 23 THIS YEAR.

The Service is informed that opportunities for employment in the fisheries exist for these men upon their return to the Philippines. Of the 102 other Filipino trainees who have completed their training previously, all but a very few are now employed in the fisheries or fishery administration, thus utilizing their training to good advantage.

This training program would not have been successful without the widespread and generous cooperation of the commercial fishing industry and other interested organizations throughout the United States.



Food and Drug Administration

"PACIFIC PERCH" NOT APPROPRIATE FOR ROCKFISH ("SEBASTODES ALUTUS") FILLETS: Earlier this year, some Columbia River processors of rockfish fillets asked the Food and Drug Administration its opinion with reference to the use of "Pacific Perch" as a market name for fillets of the Pacific rockfish Sebastes alutus. On August 23, the Food and Drug Administration replied that the name "Pacific Perch" was not appropriate for the species in question. The full text of the reply by P. B. Dunbar, Commissioner of Food and Drugs follows:

"We have given very careful consideration to the petitions you have submitted on behalf of members of the West Coast fisheries industry in support of a proposal to market fillets of the species of Pacific rockfish, Sebastes alutus, as 'Pacific Perch.'

"After a review of the available facts, it is our opinion that the name 'Pacific Perch' is not appropriate as applied to fillets of Sebastes alutus and that the product so labeled would be in violation of the Food, Drug, and Cosmetic Act.

"The industry petition stresses the similarity of Sebastes alutus to Sebastes marinus, commonly marketed as 'Ocean Perch,' in support of the proposal of the name 'Pacific Perch' for the former species. While the two species do resemble one another, they are, in fact, distinct species and the Act as interpreted by the courts does not confer upon us authority to sanction the use of the same or essentially the same name for articles of food of different identities.

"The situation which resulted in the industry proposal arises, we understand, from the fact that this fish species has not previously been marketed commercially and, therefore, has no established common or usual name. In seeking to establish a common or usual name for a new product it is, of course, a basic principle that an erroneous or misleading designation should not be used. The name 'Perch' as applied to Sebastes alutus is erroneous since the fish is not one of the perches. In occasional instances, misnomers have become established as common or usual names for fishes on the basis of general acceptance and long usage where the names do not conflict with those of other established species. Such instances are rare and the necessary conditions do not exist in the case before us.

"We regret that we cannot make a favorable response to your petition."

Department of State

U. S. REPRESENTATIVES TO FAO HERRING MEETINGS^{1/}NAMED: The United States Government will be represented at two meetings being convened by the Food and Agriculture Organization (FAO) at Bergen, Norway, a September 15 State Department release announced. Harold E. Crowther, Chief, Technological Section, Fish and Wildlife Service, Department of the Interior, has been designated as delegate, and Herbert C. Davis, President, Terminal Island Sea Foods Ltd., Terminal Island, California, as adviser.

The first meeting, the FAO Meeting on Herring Technology, will begin on September 24 and will be concerned with technological problems related to the processing, marketing, and distribution of herring. Participants will present papers summarizing the latest research and technical developments related to herring.

The FAO Meeting of Fisheries Technologists will be convened on September 30, immediately following the Meeting on Herring Technology. The purpose of the second meeting is to consider the desirability of arranging for continued cooperation among fisheries technologists on a regional basis.

^{1/}SEE COMMERCIAL FISHERIES REVIEW, SEPTEMBER 1950, P. 58

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U. S. DELEGATION DESIGNATED FOR FORTHCOMING TARIFF NEGOTIATIONS^{1/}: Including the United States, 39 countries are expected to participate in the forthcoming tariff negotiations under the General Agreement on Tariffs and Trade scheduled at Torquay, England, beginning September 28. The United States has announced its intention of negotiating with 24 of those 39 countries, a September 21 Department of State release announced.

The members of the United States Delegation have been designated from the Departments of State, Commerce, Agriculture, Treasury, Labor, Interior,^{2/} Defense, and the Tariff Commission and Economic Cooperation Administration.

With a view to becoming contracting parties to the General Agreement, 7 countries are expected to participate in the negotiations. These are Austria, the Federal Republic of Germany, Guatemala, Korea, Peru, the Republic of the Philippines, and Turkey.

The existing contracting parties will negotiate among themselves for new and broader trade-barrier concessions in addition to those granted at Geneva in 1947. The "new" countries will negotiate among themselves and with the existing contracting parties. Each country will negotiate with those others with which its trade provides a basis for mutually advantageous concessions.

The United States has announced its intention of negotiating with the following 24 countries: Australia, Austria, Belgium, Brazil, Canada, Cuba, Denmark, the Dominican Republic, France, the Federal Republic of Germany, Guatemala, India, Indonesia, Italy, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Peru, Sweden, Turkey, the Union of South Africa, and the United Kingdom.

In preparation for the forthcoming negotiations, the Inter-Departmental Trade-Agreements Organization of the United States Government has made an item-by-item study of the products on which the United States may either request or offer concessions during the negotiations. In accordance with Executive Order No. 10082, the Tariff Commission has provided, with regard to each import item on which a

^{1/}SEE COMMERCIAL FISHERIES REVIEW, SEPTEMBER 1950, PP. 62-4; JUNE 1950, PP. 68-9; APRIL 1950, PP. 83-6.

^{2/}AMENDMENT OF EXECUTIVE ORDER NO. 10082 OF OCTOBER 5, 1949 (ISSUED BY THE WHITE HOUSE ON OCTOBER 12, 1950) PROVIDES FOR THE REPRESENTATION OF THE DEPARTMENT OF THE INTERIOR ON THE INTERDEPARTMENTAL COMMITTEE ON TRADE AGREEMENTS AND THE COMMITTEE FOR RECIPROcity INFORMATION.

United States concession may be considered, a study of production, consumption, trade, competitive factors, and probable effects of a concession. The Department of Commerce has made a similar study for each export item on which the United States may request a concession from a foreign country.

It is on the basis of the studies of the various Government agencies participating in the trade-agreements program, and of the views and information developed at the public hearings, that the Interdepartmental Committee on Trade Agreements makes its recommendations to the President with regard to concessions which are to be sought or offered during the negotiations. What concessions are actually obtained or granted depends, of course, on the success of the negotiations.

At the conclusion of the country-with-country negotiations at Torquay all the schedules of concessions will be examined by all the participating countries and, if they are approved, will be integrated into the General Agreement. All concessions granted by each country will be applicable to the products of all the other contracting parties and will not be limited merely to the country with which they were initially negotiated.

* * * * *

TERMINATION OF TRADE AGREEMENT WITH MEXICO TO BECOME EFFECTIVE: The President, on September 6, 1950, signed a proclamation giving effect to the termination as of December 31, 1950, of the trade agreement between the United States and Mexico concluded in 1942, states a September 8 news release from the Department of State. The termination was jointly agreed to by the two governments through an exchange of notes on June 23, 1950.^{1/}

For some articles on which the general United States tariff rates will be increased as a result of the termination, the proclamation specifies the increased preferential rates applicable to products of Cuba to which preferential tariff treatment applies.

^{1/}SEE COMMERCIAL FISHERIES REVIEW, JULY 1950, PP. 58-9.

* * * * *

SOME IMPORT DUTIES ON FISH WILL INCREASE WITH CHINESE WITHDRAWAL FROM GATT: The United States proposes to terminate certain tariff concessions granted in the General Agreement on Tariffs and Trade (GATT), and initially negotiated with China at Geneva in 1947, according to a Department of State press release dated September 13. This action will be taken as a result of China's withdrawal from the General Agreement, effective May 6, 1950.

Among other products, fishery products will be affected as shown on the next page (column 1 lists duties under the Agreement and column 2 lists the pre-agreement duties).

A presidential proclamation will be required to give effect to these new rates, which will enter into force as provided in the proclamation, but not less than 30 days after the date of the proclamation.

The list issued does not include all concessions originally negotiated with China. Concessions not included in this list will not be terminated at the present time. Such concessions apply to certain items (canned oysters is the only fishery product included) in which contracting parties to the General Agreement,

House:

H. R. 9681 - same as S. 4167; to the Committee on Interstate and Foreign Commerce.

H. R. 9724 (Flood) - A bill to create a Susquehanna Watershed Commission, and for other purposes; to the Committee on Public Works. (Includes those portions of the watershed of the Susquehanna and its tributaries in Pennsylvania, New York, and Maryland.)

The following was introduced prior to September 1, 1950, and was not previously reported in this section:

H. J. Res. 437 (Latham) - Joint resolution establishing a Federal Motor Vehicle Commission for the purpose of making uniform laws pertaining to operation, ownership, and control of motor vehicles; to the Committee on Interstate and Foreign Commerce. March 13, 1950.

SIGNED BY THE PRESIDENT:

P. L. 751 (H. R. 9134) - An Act to amend title 46 (Section 4311) of U. S. Code relative to foreign fishing vessels in U. S. waters. Signed September 2, 1950.

P. L. 759 (H. R. 7786) - An Act making appropriations for the support of the Government for the fiscal year ending June 30, 1951, and for other purposes. Signed September 6, 1950. (Included are the appropriations for the Fish and Wildlife Service.)

P. L. 764 (S. 2633) - An Act to give effect to the Convention for the Establishment of an International Commission for the Scientific Investigation of Tuna, signed at Mexico City, January 25, 1949, by the United States of America and the United Mexican States, and the Convention for the Establishment of an Inter-American Tropical Tuna Commission, signed at Washington, May 31, 1949, by the United States of America and the Republic of Costa Rica, and for other purposes. Signed September 7, 1950.

P. L. 774 (H. R. 9176) - An Act to establish a system of priorities and allocations for materials and facilities, authorize the requisitioning thereof, provide financial assistance for expansion of productive capacity and supply, provide for price and wage stabilization, provide for the settlement of labor disputes, strengthen controls over credit, and by these measures facilitate the production of goods and services necessary for the national security, and for other purposes. Signed September 8, 1950. (Contains seven titles: Title I - Priorities and allocations; Title II - Authority to requisitioning; Title III - Expansion of productive capacity and supply; Title IV - Price and wage stabilization; Title V - Settlement of labor disputes; Title VI - Control of consumer and real estate credit; Title VII - General provisions.)

P. L. 776 (S. 868) - An Act to provide for the

dissemination of technological, scientific, and engineering information to American business and industry, and for other purposes. Signed September 9, 1950. (The purpose of this Act is to make the results of technological research and development more readily available to industry and business, and to the general public, by clarifying and defining the functions and responsibilities of the Department of Commerce as a central clearinghouse for technical information which is useful to American industry and business.)

CONGRESSIONAL REPORTS:

Copies of the reports listed available only from the committee submitting the report.

Senate Committee on Foreign Relations

Report No. 2450 (August 28, 1950), 16 p., printed, to accompany H. J. Res. 334, to amend certain laws providing for membership and participation of the United States to five international organizations of which the United States is a member. This resolution reported favorably with one amendment and passage was recommended by the Committee. (The organizations included in this resolution are the American International Institute for the Protection of Childhood, Food and Agriculture Organization, South Pacific Commission, World Health Organization, and International Labor Organization. In its conclusion, the Committee stated that the United States is making an effort to reduce its share of expenses in most international organizations. The Committee believes that this resolution will give the Department of State the necessary latitude to meet our responsibilities to the international organizations covered by this resolution.)

House Committee of Conference

House Report No. 3042 (Conference Report) (August 31, 1950), 40 p., printed, to accompany H. R. 9176, to establish a system of priorities and allocations for materials and facilities, authorize the requisitioning thereof, provide financial assistance for expansion of productive capacity and supply, strengthen controls over credit, regulate speculation on commodity exchanges, and by these measures facilitate the production of goods and services necessary for the national security, and for other purposes. The Committee recommended that the House recede from its disagreement to the amendment of the Senate to the text of the bill and agree to the same with an amendment. (This bill to be cited as the "Defense Production Act of 1950," with the following five titles: Title I - Priorities and allocations; Title II - Authority to requisitioning; Title III - Expansion of productive capacity and supply; Title IV - Price and wage stabilization; Title V - Settlement of labor disputes; Title VI - Control of consumer and real estate credit; and Title VII - General provisions. The full text of the bill as submitted by the Committee is given in this report, as well as a statement of the managers on the part of the House.)

House Committee on Merchant Marine and Fisheries

Report No. 3052 (September 11, 1950), 3 p., printed, to accompany S. 3123, to amend Section 5 of the Act of February 26, 1944, entitled "An Act to give effect to the Provisional Fur Seal Agreement of 1942 between the United States of America and Canada; to protect the fur seals of the Pribilof Islands; and for other purposes." Committee reported bill favorably without amendment and recommended passage. (Adds to the

present law the following: "and the proceeds of such sales and of the sales of other products of the wildlife resources of the Pribilof Islands shall be deposited into the Treasury. There is hereby authorized to be appropriated annually an amount, not exceeding the total proceeds of such sales covered into the Treasury during the preceding fiscal year, for the purposes of this Act and for the development of the fur seal and other wildlife resources of the Pribilof Islands and the proper utilization of their products.")



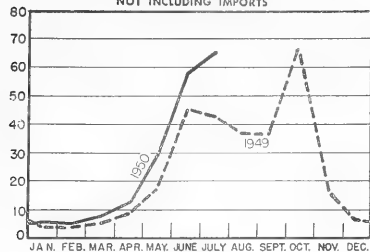
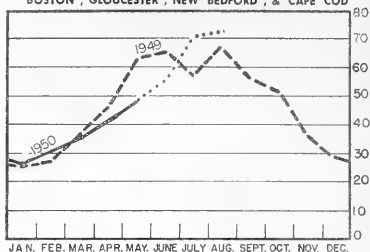
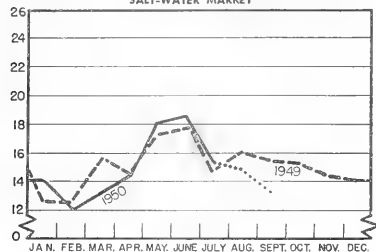
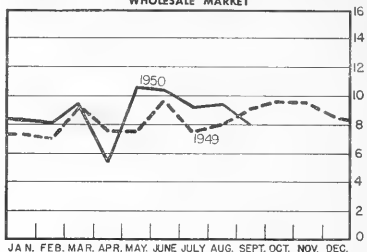
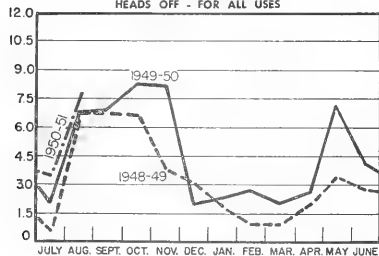
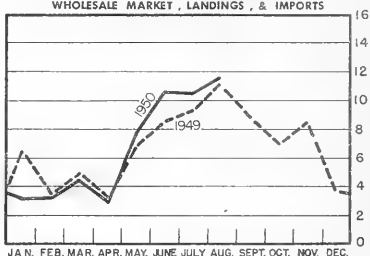
STATE OF WASHINGTON COMMERCIAL FISHERIES--ECONOMIC VALUE OF
PRODUCTION AND CAPITAL INVESTMENT, 1949^{1/}

| | |
|--|----------------------|
| 1. Wholesale value of fishery products and byproducts, including canned, smoked, kippered, mild-cured, and frozen fish; vitamin oils and fish meal. (Includes \$30,941,256 paid to fishermen for their catch.) | \$102,353,140 |
| 2. Value of fishing vessels, tenders, scows, and other floating equipment | 63,638,924 |
| 3. Value of fishing gear | 11,932,699 |
| 4. Amount invested in plants and stationary equipment, including freezers, smokehouses, machinery, docks, and offices | 25,092,928 |
| 5. Operating expenses and salaries (does not include amount paid to fishermen for fish). | 34,899,794 |
| 6. Amount spent annually for provisions, clothing, paint, oil, gasoline, Diesel fuel, electronic gear, replacement of engines, and other mechanical gear (operating expenses and salaries of supply houses not known or included). | 16,982,436 |
| 7. Amount invested in boat yards, building and overhauling almost entirely vessels engaged in commercial fishing (operating expenses and salaries of building yards not known or included). | 41,458,281 |
| 8. Capitalizing and financing at 4 percent | 11,854,328 |
| <u>Total</u> | <u>\$308,212,530</u> |

^{1/}ESTIMATED. DOES NOT INCLUDE THE EVALUATION OF RECREATIONAL OR SPORT FISHING.
NOTE: ISSUED BY THE DEPARTMENT OF FISHERIES, STATE OF WASHINGTON, AND BASED ON A SURVEY CONDUCTED BY THAT AGENCY.

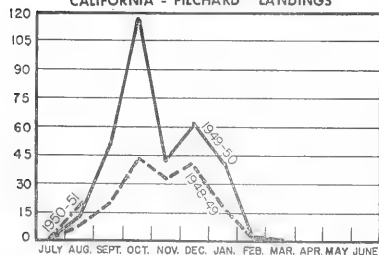
LANDINGS AND RECEIPTS

In Millions of Pounds

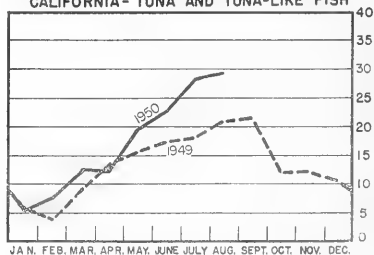
MAINE - LANDINGS
NOT INCLUDING IMPORTSMASSACHUSETTS - LANDINGS
BOSTON, GLOUCESTER, NEW BEDFORD, & CAPE CODNEW YORK CITY - RECEIPTS OF FRESH & FROZEN FISH
SALT-WATER MARKETCHICAGO - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKETGULF - SHRIMP LANDINGS
HEADS OFF - FOR ALL USESSEATTLE - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKET, LANDINGS, & IMPORTS

CALIFORNIA - PILCHARD LANDINGS

In Thousands of Tons



CALIFORNIA - TUNA AND TUNA-LIKE FISH

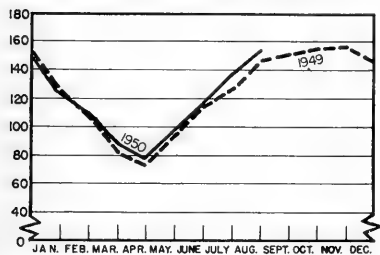


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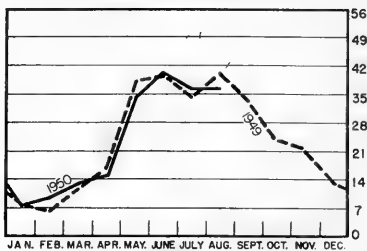
COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

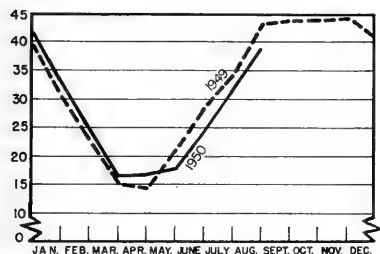
U.S. & ALASKA - HOLDINGS OF FROZEN FISH



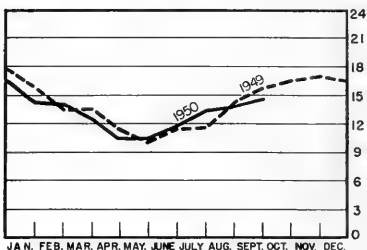
U.S. & ALASKA - FREEZINGS



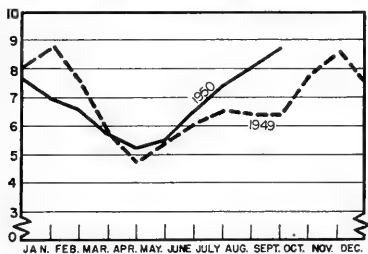
NEW ENGLAND - HOLDINGS OF FROZEN FISH



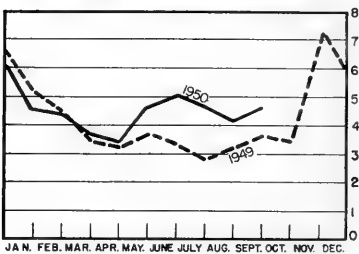
NEW YORK CITY - HOLDINGS OF FROZEN FISH



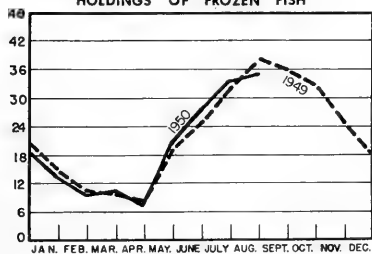
CHICAGO - HOLDINGS OF FROZEN FISH



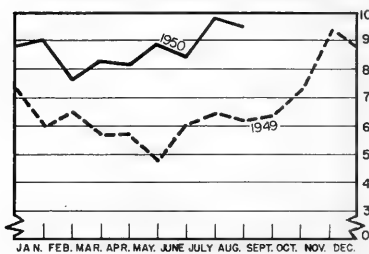
GULF - HOLDINGS OF FROZEN FISH



WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH

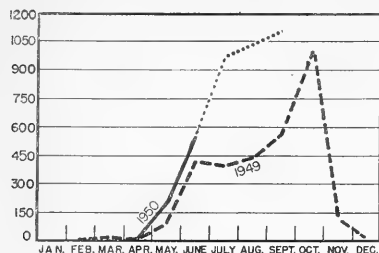
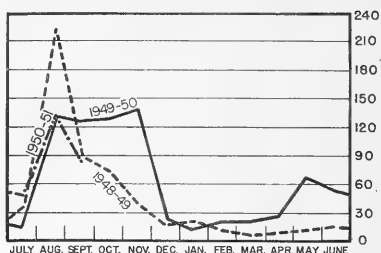
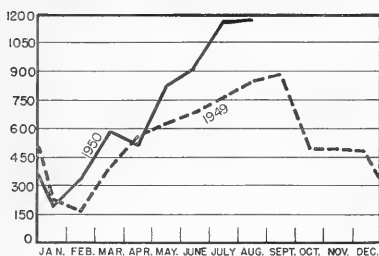
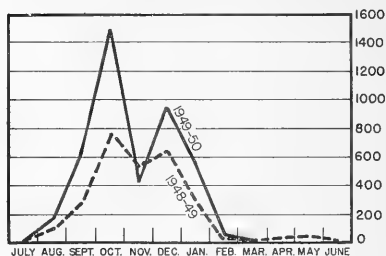
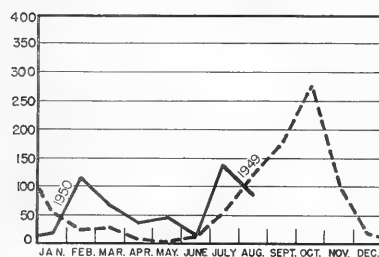
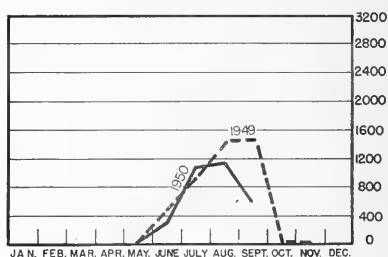
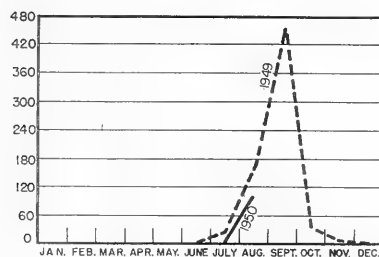


CALIFORNIA - HOLDINGS OF FROZEN FISH



CANNED FISHERY PRODUCTS

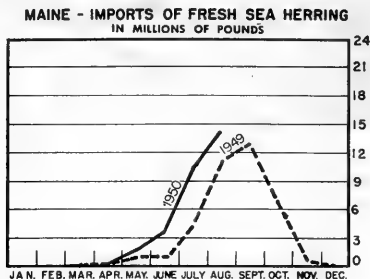
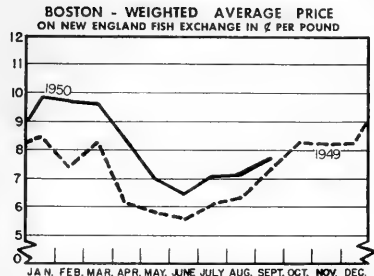
In Thousands of Standard Cases
MAINE - SARDINES, ESTIMATED PACK

**UNITED STATES - SHRIMP****CALIFORNIA - TUNA AND TUNA-LIKE FISH****CALIFORNIA - PILCHARDS****CALIFORNIA - MACKEREL****ALASKA - SALMON****WASHINGTON - PUGET SOUND SALMON****STANDARD CASES**

| Variety | No. Cans | Can Designation | Net. Wgt. |
|-----------|----------|-----------------|-----------|
| SARDINES | 100 | 1/4 drawn | 3 1/4 oz. |
| SHRIMP | 48 | — | 5 oz. |
| TUNA | 48 | No. 1/2 tuna | 7 oz. |
| PILCHARDS | 48 | No. 1 oval | 15 oz. |
| MACKEREL | 48 | No. 300 | 15 oz. |
| SALMON | 48 | 1-pound tall | 16 oz. |

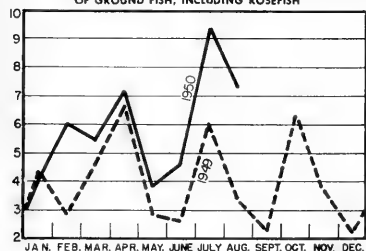
.....ESTIMATED

PRICES, IMPORTS and BY-PRODUCTS

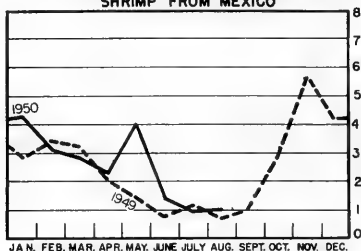


U.S. - IMPORTS OF FRESH & FROZEN FILLETS OF GROUND FISH, INCLUDING ROSEFISH

In Millions of Pounds

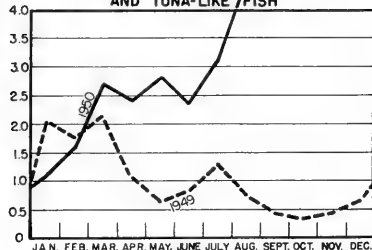


U.S. - IMPORTS OF FRESH AND FROZEN SHRIMP FROM MEXICO

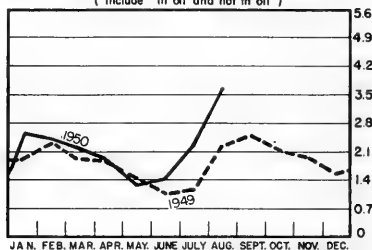


U.S. - IMPORTS OF CANNED TUNA AND TUNA-LIKE FISH

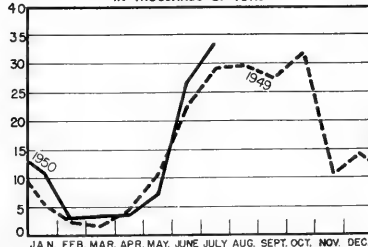
In Millions of Pounds



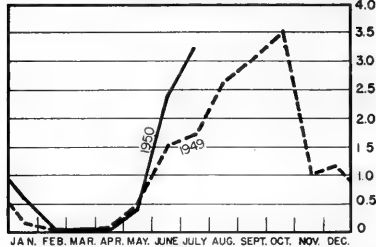
U.S. - IMPORTS OF CANNED SARINES (Include in oil and not in oil)



U.S. & ALASKA - PRODUCTION OF FISH MEAL IN THOUSANDS OF TONS



U.S. & ALASKA - PRODUCTION OF FISH OIL IN MILLIONS OF GALLONS





Recent publications of interest to the commercial fishing industry are listed below.

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
 SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
 SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

| Number | Title |
|---------|---|
| CFS-568 | - Fish Meal and Oil, July 1950, 4 p. |
| CFS-570 | - Massachusetts Landings, April 1950, 14 p. |
| CFS-573 | - Texas Landings, August 1950, 4 p. |
| CFS-574 | - Maine Landings, July 1950, 4 p. |

| Number | Title |
|------------------|--|
| SL-111 (Revised) | - Firms Canning Clam Products, 1949, 2 p. |
| Sep. 258 | - Salmon Cannery Trimmings -- Part I - Relative Amounts of Separated Parts. |

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE AGENCIES ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE AGENCIES OR PUBLISHERS MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

Advance Report on the Fisheries of British Columbia, 1948, 12-1029, 13 p. (mostly statistical tables), processed, 25 cents. Fisheries Section, Industry and Merchandising Division, Dominion Bureau of Statistics, Ottawa, Canada, 1950. Reports on the fisheries of British Columbia for the year 1948. Included are data on the quantity and value of fish landed and marketed, and capital equipment and employees in the fisheries.

Advance Report on the Fisheries of New Brunswick, 1948, 12-1032, 12 p. (mostly statistical tables), processed, 25 cents. Fisheries Section, Industry and Merchandising Division, Dominion Bureau of Statistics, Ottawa, Canada, 1950. Reports on the sea and inland fisheries of New Brunswick for the year 1948. Included are data on the quantity and value of fish landed and marketed, and capital equipment and employees in the fisheries.

Advance Report on the Fisheries of Ontario, the Prairie Provinces and the Northwest Territories, 1948, 12-102X, 16 p. (mostly statistical tables), processed, 25 cents. Fisheries Section, Industry and Merchandising

Division, Dominion Bureau of Statistics, Ottawa, Canada, 1950. Reports on the fisheries of Ontario, the Prairie Provinces, and the Northwest Territories of Canada for the year 1948. Included are data on the quantity and value of fish landed and marketed, and capital equipment and employees in the fisheries.

The American Ephemeris and Nautical Almanac (For the Year 1951), 620 p., with tables, printed, \$3.25. The Nautical Almanac Office, United States Observatory under the authority of the Secretary of the Navy, Washington, D. C., 1949. (Available only by purchase from the Superintendent of Documents, Washington 25, D. C.) This book is similar in all respects to the one for 1950, with a few minor exceptions. It provides the navigator with a compact publication containing all of the ephemeris (astronomical) material essential to the solution of problems of navigational position.

Average Lunar Month Catch by California Sardine Fishermen 1932-33 through 1948-49, by Frances N. Clark and Anita E. Daugherty, Fish Bulletin No. 76, 28 p.,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE,
BUT USUALLY MAY BE OBTAINED FROM THE AGENCIES ISSUING THEM.

illus., printed. Bureau of Marine Fisheries, Division of Fish and Game, San Francisco, Calif., 1950. This report covers the results of a study using boat catches as in two former investigations for the seasons of 1932-33 through 1941-42, and extending the calculations through 1948-49. The fisherman's success has been measured both in tons per lunar month and in number of fish per month. For all of California, according to this report, the average lunar month catch in tons increased from 1932-33 to 1934-35, decreased to 1937-38, increased somewhat until 1942-43, and then began a slight decline which accelerated after 1944-45 and continued through 1947-48. A slight upward trend occurred in 1948-49. This general trend was also evident in the average monthly catch in number of fish but the increase from 1937-38 to 1941-42 was greater. Based on numbers of fish caught, the highest peak in total catch occurred in 1941-42 when there was a scarcity of older sardines on the fishing grounds and the fishery depended on the very abundant 1939 year class. This lack of fish with no new abundant year classes entering the fishery is offered as the explanation of the serious decline in the sardine fishery after 1944-45.

"Biological and Economic Notes on the Sharks of the Gulf of Mexico, With Especial Reference to Those of Texas, and With a Key for their Identification," by J. L. Baughman and Stewart Springer, article, reprinted from The American Midland Naturalist, July 1950, vol. 44, no. 1, pp. 96-152, illus., printed. University of Notre Dame, Notre Dame, Ind., \$6.00 per year. As no comprehensive work has hitherto been attempted on the sharks of the Gulf of Mexico, the authors present in this article all available data on these fish. Wherever possible a photograph or line drawing of the species has been used. In addition, a key has been prepared to aid the student in identifying the various species, and all available information on range, food, breeding habits, embryology, and economic uses has been incorporated, in order to present as complete a picture of each species as possible. According to the authors, "the Texas sharks present an interesting commingling of Panamanian, West Indian, and South American forms."

"Development Plans for Haiti," article, Trade News, July 1950, vol. 3, no. 1, pp. 23-8, processed. Department of Fisheries, Ottawa, Canada. Discusses the importance of Haiti as a fisheries market; and deals with the need of fishery products in Haiti, the nature of the local fisheries industry, the expansion of production and marketing of fishery products, and the difficulties facing a fisheries development program.

Florida Seaweeds and Their Commercial Use, by Robert H. Williams, Educational Series No. 7, 19 p., illus., printed. State Board of Conservation, Tallahassee, Fla. Summarizes the existing information on useful seaweeds in Florida—kinds, distribution, and seasonal abundance. Uses, harvesting and processing methods, and what the State of Florida is doing for this potential industry are presented in this booklet.

"The Harvest from the Sea," article, Monthly Review, July 31, 1950, vol. XXV, no. 7, pp. 61-6, printed. Federal Reserve Bank of Atlanta, Atlanta, Ga. Discusses the fisheries of the Sixth Federal Reserve District (Florida, Georgia, Alabama, Mississippi, and Louisiana). The catch, processing and marketing, financing, problems of the industry, and progress at Pascagoula are some of the subjects covered in this article.

"La Pesca de Perlas en Venezuela," (Venezuelan Pearl Fishery), article, El Agricultor Venezolano, June 1950, vol. XV, no. 143, pp. 10-2, illus., in Spanish. Ministerio de Agricultura Y Cria, Caracas, Venezuela. Discusses the Venezuelan pearl fishery.

Oyster Culture in Japan, by A. R. Cahn, Report No. 134, 80 p., illus., processed. Natural Resources Section, Supreme Commander for the Allied Powers, Tokyo, September 1950. (Reports may be purchased in photostat or microfilm from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.) Because of the direct interest of the United States, Canada, and other nations in Japan's oyster production, this report discusses the Japanese oyster culture procedures in some detail. The Japanese have been exceedingly efficient in the culture of both edible and pearl oysters, and their methods are therefore of more than passing interest to the occidental world. Because the methods employed today are the result of many hundreds of years of culture, experience, and experiment, this report traces the history of oyster culture in Japan from its beginning to the present-day techniques. Among the subjects covered are species and distribution; biology; culture; utilization and byproducts; production and export; and enemies and damage.

Oysters in Texas, by J. L. Baughman and Byron B. Baker, Jr., Bulletin No. 29, Marine Laboratory Series No. 1, 37 p., illus., printed. The Texas Game, Fish and Oyster Commission, Austin, Texas, 1950. This booklet, the first of a series, gives what information is available on the oysters of Texas. It is the hope of the Commission that it will aid in the successful development of an oyster industry along the Texas coast. In addition to biological data on oysters, the various methods of planting and harvesting oysters are explained, and advice is given on how to obtain oyster bottom on which to grow oysters. What Texas is doing to encourage the oyster industry and a list of recommendations for changes in legislation and biological research also are given.

Report of the Council of FAO (Ninth Session 8-17 May 1950, Rome, Italy), 32 p., processed. Food and Agriculture Organization of the United Nations, Washington, D. C., May 1950. A report of the Ninth Session of the Council of FAO, May 8-17, 1950, in Rome. Among the activities covered and reported upon in this report are the following: world food and agriculture situation; commodity problems; technical assistance for economic development; improvements in the collection of economic and statistical information from Member Governments; and relations with international organizations. In addition, this report gives the discussions on the removal of FAO headquarters to Rome; financial situation of the Organization; revision of the constitution; and the next session of the Conference.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE,
BUT USUALLY MAY BE OBTAINED FROM THE AGENCIES ISSUING THEM.

Transactions of the American Fisheries Society, 1949
(Seventy-Ninth Annual Meeting, Winnipeg, Manitoba, September 14-16, 1949), vol. 79, 344 p., illus., printed, \$4.00. American Fisheries Society, St. Paul, Minnesota, 1950. (Order From William C. Beckman, Librarian, American Fisheries Society, Colorado Cooperative Fisheries Research Unit, Colorado A and M College, Fort Collins, Colo.) Part I gives the papers presented at the Seventy-Ninth Annual Meeting of the Society. The following are some of the papers presented: "A Consideration of the Hoover Report;" "The Lakes and Lake Fisheries of Manitoba;" "The Effect of Lamprey Attacks Upon Lake Trout in Seneca Lake, New York;" "Menhaden Utilization in Relation to the Conservation of Food and Game Fishes of the Texas Gulf Coast;" "Determination of Optimum Size of Mesh for Gill Nets in Lake Manitoba;" "Observations on Mortality Rates in Fished and Unfished Cisco Populations;" "The Philippine Institute of Fisheries Technology: Its Organization and Progress." Part II reports on the business sessions of the Society.

Trade Lists

The Commercial Intelligence Branch, Office of International Trade, U. S. Department of Commerce,

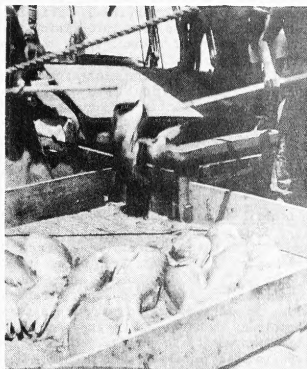
has published the following mimeographed trade lists, and copies of these trade lists may be obtained by firms in the United States from that office or from Department of Commerce field offices at \$1.00 per list.

- Crayfish Processors--Australia, 2 p. (July 1950)
- Frozen Foods Processors and Exporters--Mexico, 3 p. (July 1950)
- Frozen Foods Processors and Exporters--Australia, 6 p. (July 1950)
- Canneries--Mexico, 6 p. (July 1950)
- Canneries--Morocco, 26 p. (July 1950)
- Canneries--Norway, 15 p. (August 1950)
- Canneries--Spain, 30 p. (August 1950)
- Canneries--Venezuela, 2 p. (July 1950)

The above lists include processors and exporters of fishery products. The name, address, and products handled are given for each firm listed.



THE CUBAN FISHING INDUSTRY



In Cuba, fresh fillets are prepared by fish vendors only upon request. The fish is cleaned and the head and bones removed, all by hand. The limited demand for fillets is mostly of grouper, cod, red snapper, muttonfish and kingfish. Small quantities have been shipped sporadically to the United States, and then only when the local market was congested and prices were low. In the past, very small quantities of glazed fillets were also exported to the United States.

Frozen fillets are not prepared or sold in Cuba.

--Fishery Leaflet 308

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FOOD VALUE OF FISH AND SHELLFISH

DO YOU KNOW

That fat fish like salmon and mackerel are excellent sources of vitamins A and D, an average portion supplying 20 percent of the daily quota of vitamin A and all the vitamin D required. The natural oil in canned fish is also a valuable source of these vitamins.....

Illustrator-- Gustaf T. Sundstrom

Compositors-- Jean Zalevsky, Carolyn Wood, Betty Coakley

Photograph credits: Cover - Sidney Shapiro; pp. 4, 6, 7, 12, and 13 - U. S. Army Signal Corps; p. 31 - H. A. Schuck; p. 42 - Australian official photo, Cliff Bottomley; p. 43 - Australian official photo; p. 46 - Mogens Jul; pp. 47-8 - Robert O. Smith, Other photographs in this issue anonymous.

Interior--Duplicating Section, Washington, D. C.
JOB #83159



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THE CODFISH INDUSTRY IN NORTHERN PORTUGAL

The codfish industry in Northern Portugal is one of the most important industries in the country, representing a capital investment of about \$14,000,000.

Fishery Leaflet 367, The Codfish Industry in Northern Portugal, describes the Portuguese cod fishing industry, the curing industry, the distribution of fresh cod and byproducts, and Portugal's international trade in cod.



Seasons, equipment used, methods of fishing, port facilities, personnel employed, and the amount of control the Government has over the industry are all discussed in the section on the cod fishing industry to be found in this 23-page leaflet. The section dealing with the curing industry covers the equipment and the methods used, and the personnel employed. In the section on distribution, the system used in handling the cod and byproducts from the time it leaves the vessel until it reaches the retail stores is described. The discussion on international trade brings out the fact that Portugal is a major importer of cod and will remain so for some time to come. Included is a short history of the Portuguese cod fishing industry.

Because the Portuguese demand for cod remains considerably in excess of supply, the author of the leaflet points out, the Government controls the cod trade quantitatively to the wholesale level and sets the prices paid by the wholesalers, retailer, and consumers to assure a relatively equitable distribution.

Free copies of Fishery Leaflet 367 are available upon request from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

*New York
304 College Ave.
Sefkora*

~~128 D~~ ~~Chas. Chas. Rd.~~

~~114 N. Thompson St.~~

Robert H. Gibbs



PENALTY FOR PRIVATE USE TO AVOID PAYMENT OF POSTAGE, \$300

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILD LIFE SERVICE
WASHINGTON 25, D. C.
OFFICIAL BUSINESS
Permit No. 1015
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