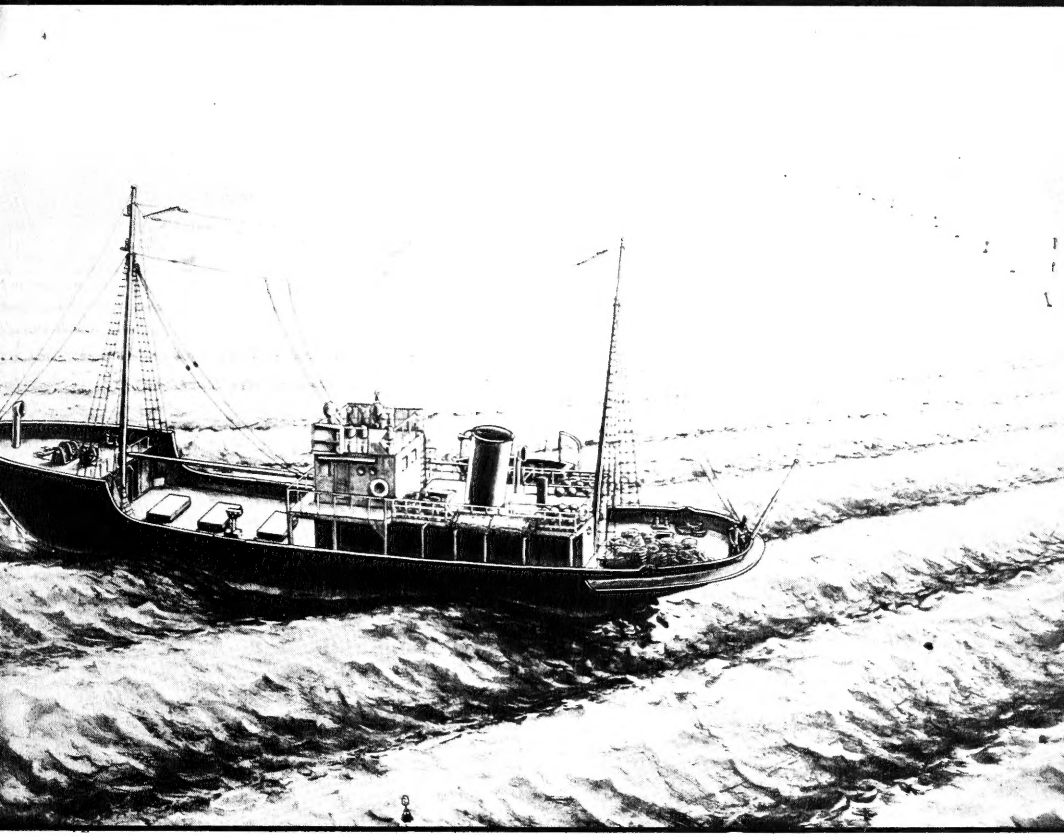
COMMERCIAL FISHERIES REVIEW



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COMMERCIAL FISHERIES REVIEW

A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES
PREPARED IN THE BRANCH OF COMMERCIAL FISHERIES

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COMMERCIAL FISHERIES REVIEW

April 1950 Washington 25, D.C. Vol.12, No.4

THE JAPANESE LONG-LINE FISHERY FOR TUNAS

By Sidney Shapiro*

ABSTRACT

Under normal conditions, the Japanese fishing industry has been able to produce the largest tuna catch made by any single nation--recording during the prewar years (1936-40) an annual catch in the neighborhood of 400 million pounds. Of this amount, about 65 percent (or 260 million pounds) was taken by the surface-fishing pole-and-line gear and 25 percent (or 100 million pounds) by the subsurface-fishing long-line gear. Other gear of minor importance, such as, the set net, drift net, circling net, and trolling jig, accounted for the remaining 10 percent of the catch.

The long-line gear is essentially a method by which hooks are lowered to fishing depths of about 100 to 350 feet below surface level. The Japanese have thus been able to obtain a part of their tuna catch at times and from places which could otherwise not be tapped by the surface-fishing methods widely in use in Japan and other nations throughout the world. Among the more important of the areas developed by the Japanese long-line fishermen are the winter albacore grounds located near Midway Island in the mid-Pacific, the tuna grounds of the Ryukyu Archipelago, and the yellowfin tuna grounds in the southwest Pacific Ocean.

Two main types of long-line gear, the construction and use of which are described in this report, have been developed by the Japanese--the albacore type for subsurface fishing at depths of about 100 to 200 feet, and the black-tuna type for deeper fishing at about 150 to 350 feet. The albacore-type gear generally catches albacore and big-eyed tuna, the black-tuna type takes black, big-eyed, and yellowfin tunas. Although each type of gear yields primarily an abundance of the species for which it has been designed, the catch composition is usually varied, and some marlins, swordfish, and sharks, as well as the various tunas, may be taken on an albacore or black tuna long line.

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NOTE: The data presented herewith have been obtained during an 18-month tour of duty with the Fisheries Division, Natural Resources Section, Supreme Commander for the Allied Powers (SCAP), Tokyo, Japan. Assistance in arranging field trips to observe the operation of the long-line gear and in supplying detailed information regarding its construction and use has been given by Mr. Shigene Takayama, Chief, Fishing Gear Section, Tokai Fisheries Experimental Station, Tokyo, Japan. Mr. Katsuyuki Kita, draftsman for Fisheries Division, Natural Resources Section, and Miss Alice Hunt, Pacific Oceanic Fishery Investigations, Fish and Wildlife Service, Honolulu, T. H., have prepared the illustrations. The paper was written while the author was assigned to the Pacific Oceanic Fishery Investigations of the U. S. Fish and Wildlife Service.

The Japanese experience in developing a long-line fishery has shown that a period of intensive exploration has been necessary to locate productive fishing grounds. Since it was difficult to detect the presence of the far-ranging tunas when they are swimming at subsurface levels in many parts of a vast ocean, commercial vessels were unwilling to invest the money and effort required for initial operations. Therefore, Japanese national and prefectural fisheries organizations sponsored the exploratory phase needed to develop a sizable offshore long-line fishery. Over a period of several decades, their exploratory vessels compiled and disseminated to the industry information on the location of productive grounds and the hydrographic conditions under which the best catches were likely to be made. Thus, data on the locality of best catch, when correlated with information on optimum water temperatures, configuration of ocean bottom, and type of ocean current, have been useful in indicating to commercial vessels the situations under which the long-line gear can be operated to maximum advantage.

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INTRODUCTION

Tuna fishing is carried on to some degree by almost every maritime country located in the tropical and temperate zones of the world. However, the resource has been exploited to support thriving fisheries only where a large consumer's market for tuna exists and where fishing effort is intensive and of a progressive nature. Of the many regions where tuna fishing is practiced, the most important are those located along the Pacific coast of North and South America and in the western Pacific. Production from these regions, largely by the United States and Japan, respectively, has accounted for the bulk of the world's tuna catch. Under normal conditions these countries have taken in excess of 90 percent of all tunas caught throughout the world during the last several decades.

A further comparison of production statistics shows that in the prewar years (1936-40) the Japanese recorded the largest annual catch of tuna and tuna-like fish[1/] obtained by any single nation. During this five-year period an annual average production of about 400 million pounds was attained by vessels operating from Japan Proper. Although the United States tuna fisheries have expanded to major proportions during the past several decades, they have still not reached the level of normal Japanese production. The peak catch for United States tuna vessels has been recorded in the latest production figures available--the 1949 catch being 332 million pounds, or about 80 percent of the normal prewar Japanese catch.

The American catch was obtained solely by surface-fishing tuna vessels. In a representative year, 1940, the pole-and-line live-bait fishing gear contributed approximately 70 percent to the total tuna catch, and purse seines about 25 percent. Trolling for albacore accounted largely for the remaining five percent.

The major part of the Japanese catch was also obtained through the use of the pole-and-line gear. On the basis of personal observation and analysis of Japanese statistical records, the pole-and-line catch is estimated to be about 65 percent of a normal year's total. The second most important Japanese tuna gear was the subsurface-fishing long line, and this caught approximately 25 percent (or 100 million pounds) of tunas. Other gear of minor importance, such as the set (or trap) net, the drift net, the circling net, and the trolling jig, accounted for the remaining 10 percent of the catch.

The expansion of the American tuna industry has come about primarily through an increase in the Pacific fishing fleet and the continued extension of the fishing grounds to greater distances from home ports, so that many of the major fishing areas are now located in such distant regions as the ocean waters adjacent to Central and South American countries. Progress in the development of the Japanese tuna industry has been due, in part, to these same factors--the building of a larger fleet and the intensification of fishing operations from home waters to more distant localities. However, the development of the Japanese tuna fisheries has also been furthered by the introduction of the long-line gear, and exploitation of subsurface waters has thus been possible. That subsurface fishing has contributed markedly to the Japanese catch has been noted above--approximately 100 million pounds of tunas being taken from ocean waters not reached by surface-fishing gear.

American expansion in the tuna industry is continuing. This is evident from the fact that, in their search for new fishing grounds, many of the larger fishing companies have under serious consideration the possibility of extending their operations westward into the mid-Pacific regions. Indications are that such operations may eventually materialize, but it is also possible that the American fisherman has neglected sources of supply closer to home--and those are the deeper ocean waters which cannot be fished by the pole-and-line or the purse-seine gear.

The use of the long-line gear for subsurface fishing also offers the American tuna fisherman an opportunity to continue peak operations throughout the year. Although the long-line gear has been operated by the Japanese at all seasons in a

1/ Tuna long-line boats operating in the offshore pelagic waters take, in addition to tunas, a large number of marlins, swordfish, and sailfish. The Japanese generally include these species in their tabulation of the tuna catch. During the 1936-40 period, a breakdown by species was attempted and statistical records show an average yearly marlin, swordfish, and sailfish catch of slightly over 16 million pounds. However, this recorded catch may be less than the actual, since a number of vessels probably continued to report these species as tunas.

number of areas, the most important catches have been made during the winter months in the central Pacific near Midway Island and in the Ryukyu area. American fishermen now carry on the bulk of their tuna operations during the spring, summer, and fall months, with a period of minor activity during the winter months, principally January and February. The use of the long-line gear may aid in locating and making available to the Americans such desirable species as the yellowfin tuna, the bluefin tuna, and the albacore at times of the year when they cannot be caught by surface-fishing methods. In this respect the waters located at a distance off the northwestern United States might yield a winter fishery for the albacore and the big-eyed tuna (a species presently not taken by American fishermen), as they have for the Japanese in the far and midwestern Pacific. Also, yellowfin tuna grounds, which can be fished by the long-line gear throughout the year, may materialize in the tropical eastern Pacific, as they have in the vicinity of the southwestern Pacific islands.

The purpose of this report is to present material that may assist American fishermen in the construction and operation of the long-line gear. This method has produced a large over-all catch in the western Pacific, but American tuna fishermen may not consider the unit-vessel catch obtained by the Japanese sufficiently large to warrant its adoption and continued use in the eastern Pacific. Japanese tuna vessels—both those that fish with the pole-and-line gear on the surface and with the long-line gear below ocean surface—would be considered inefficient by American standards. A 100-foot Japanese vessel, with a crew of 50 to 60 men for pole-and-line fishing or 20 to 30 men for long-line fishing, will catch an average of 40 to 50 metric tons of tuna on a voyage of four to six weeks. This low efficiency of operation is typical of many Japanese fisheries, for labor costs to their vessel owners are negligible by comparison with those in the American tuna industry. Should American tuna vessels show interest in adopting the long-line gear as a major tuna-fishing method, it may be necessary to modify its operation by increased mechanization, or by more efficient handling of the gear. Thus, smaller crews may be able to operate the gear with a correspondingly larger return for the unit of effort expended. The information regarding the Japanese long-line gear is, therefore, presented to American fishermen only as an initial step in guiding them towards the development of a subsurface fishery for tunas.

ORIGIN OF THE LONG-LINE GEAR

The early development of the Japanese long-line gear was associated with the black tuna (Figure 1) fishery. Bones unearthed from excavations of shell mounds in the northeastern Kanto and the mid-central Tohoku regions of Honshu, Japan, have been indentified as those of the black tuna,[2/] indicating that this species has been consumed by the people of Japan since ancient times. The flesh of this fish has always been prized by the Japanese, and is marketable in any quantity for use chiefly as "sashimi" (raw fish, sliced and eaten as an appetizer).

Prior to the advent of modern mechanized methods for commercial fishing operations, the bulk of the Japanese tuna catch was obtained from coastal waters primarily by pole and line, set (or trap) net, and drift net. The black tuna, a wide-ranging pelagic species that approaches close to the Japanese coast during its annual migration, was generally taken by huge set nets placed in shallow waters adjacent to the shore. This method of trap fishing was, and still is, used effectively to obtain the black tunas that migrate into waters less than 200 feet deep.

2/ The black tuna, Thunnus orientalis, is comparable to the American Pacific coast bluefin tuna, Thunnus thynnus, but adequate studies have not been made to determine the exact relationship of the two forms.

FIGURE 1 - BLACK TUNA (THUNNUS ORIENTALIS) LANDED AT JAPANESE FISHING PORT OF SHIOGAMA. WEIGHT ABOUT 500 POUNDS.

However, the species was also occasionally taken by hook-and-line fishermen operating boats where waters were deeper than 200 feet. Fishermen were thus aware of the possibility of expanding the black tuna fishery to deeper waters, but it was desirable that a more efficient gear be devised for obtaining large fish from levels below the surface of the water.

The long-line gear, as now used in the tuna industry, was initially constructed through the attempts of the fishermen to obtain black tunas from subsurface waters. One of the first available records of the application of a long-line gear to the capture of this species was by the fishermen of Mera, a small fishing village located at the entrance to Tokyo Bay. The original long line had been imported from Wakayama Prefecture some 250 years previously, and was used locally for diverse fishing operations; the type of operations are unknown. About 1890 the Mera fishermen adapted the gear for tuna long-line fishing with coastal sailing and hand-propelled skiffs. For a number of years the fishermen prospered and the local long-line fishery for the black tuna grew to sizable proportions. However, as the gear was operated most effectively during rough and stormy weather, many lives were lost and, after a decade or so, the fishery almost disappeared because of the fishermen's dislike for the hardships encountered while operating small motorless craft at a distance from shore.

With the introduction of engined vessels into the Japanese tuna fisheries in 1906, a major shift in the intensity of fishing operations resulted and the emphasis changed from coastal to offshore operations. The advent of motorized

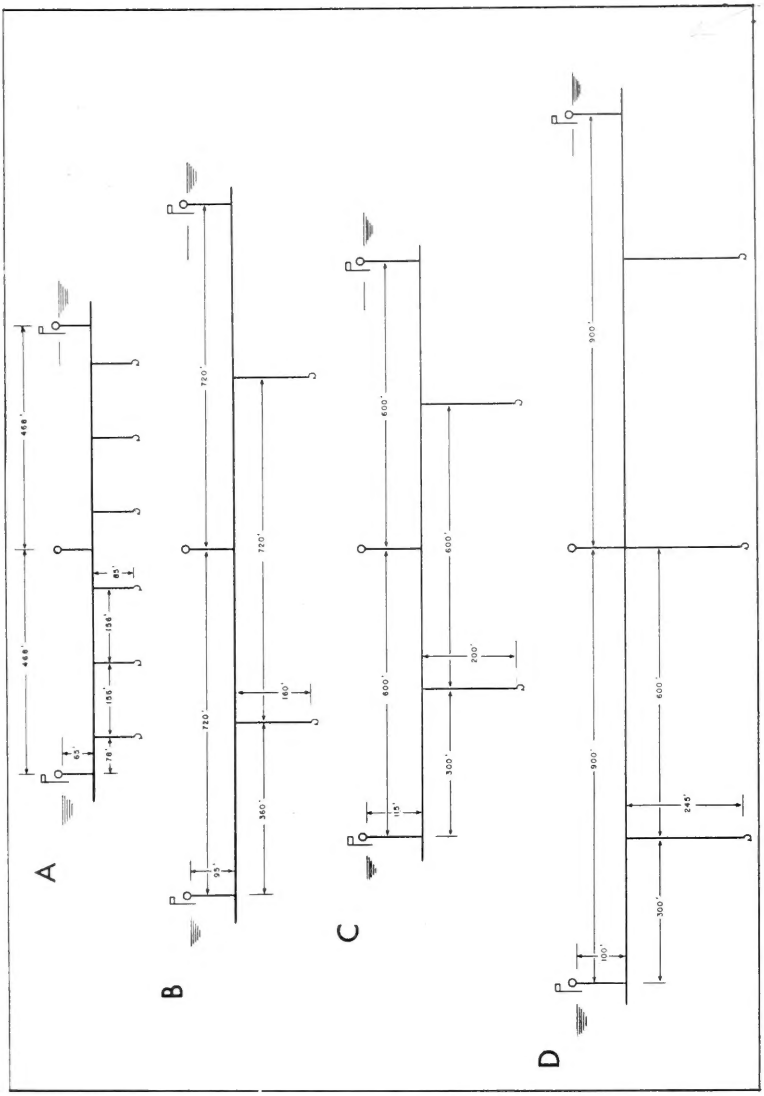

FIGURE 2 - TYPES OF ALBACORE LONG-LINE GEAR FOR SHALLOW SUBSURFACE FISHING. ALBACORE AND BIG-EYED TUNA ARE CAUGHT PRIMARILY WITH THESE GEAR. EACH BASKET (THE DISTANCE BETWEEN TWO FLAG BUOYS) MAY CONTAIN FROM 10 TO 30 BRANCH LINES. SINCE ALL BASKETS OF A LONG LINE ARE SIMILAR, ONLY A SINGLE BASKET OF EACH TYPE IS SHOWN.

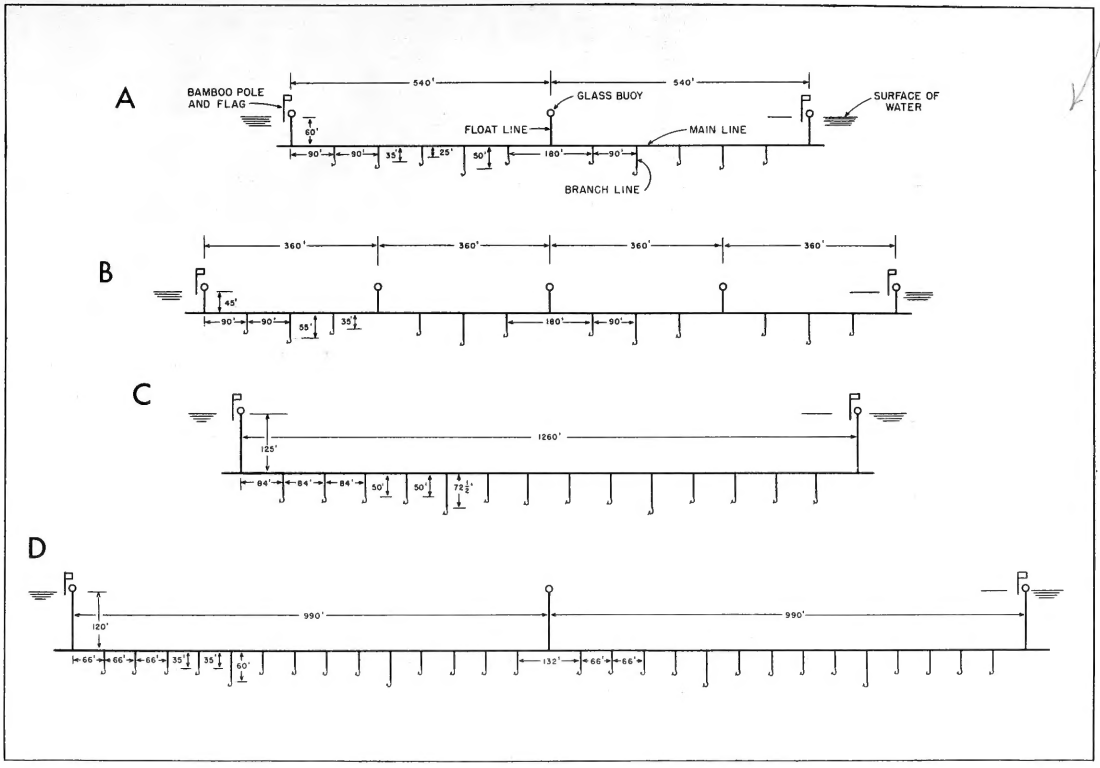

FIGURE 3 - TYPES OF BLACK TUNA LONG-LINE GEAR FOR DEEP SUBSURFACE FISHING. BLACK, YELLOWFIN, AND BIG-EYED TUNAS ARE TAKEN PRIMARILY WITH THESE GEAR. EACH BASKET (THE DISTANCE FROM ONE FLAG BUOY TO THE NEXT) MAY CONTAIN FROM TWO TO TEN BRANCH LINES. THE DEEPER THE GEAR IS DESIGNED TO FISH THE FEWER THE NUMBER OF BRANCH LINES USED. SINCE ALL BASKETS OF A LONG LINE ARE SIMILAR, ONLY A SINGLE BASKET OF EACH TYPE IS SHOWN.

vessels made it possible for larger boats to be constructed for offshore tuna fishing and thus the fisherman could be assured of greater safety. In these offshore operations the pole and line for skipjack surface fishing was at first used exclusively, but deep subsurface fishing with the long-line gear gradually reentered the tuna fisheries. In the course of time, the long-line gear assumed a position of importance since it proved to be more efficient and less costly than other forms of tuna gear, such as, the drift net. Moreover, through its operation the Japanese were able to fish with the long-line gear at times and in places where other fishing methods might not be practical. As vessels and engines improved, so did the long-line catch. Furthermore, the development of foreign export markets after 1929 acted as an additional incentive to produce larger quantities of higher-priced fish. Refinements of the long-line gear were also introduced to fish specifically during different seasons of the year and in different localities for such desirable species as the albacore and the yellowfin tuna.

TYPES OF LONG LINES

Most present-day Japanese long lines are of two general types: the albacore type (Figure 2, see p. 6), which has been developed only within the past several decades for shallow subsurface tuna fishing and the black-tuna type (Figure 3, see p. 7), which is patterned after the original long line used in the early days of deep subsurface tuna fishing.

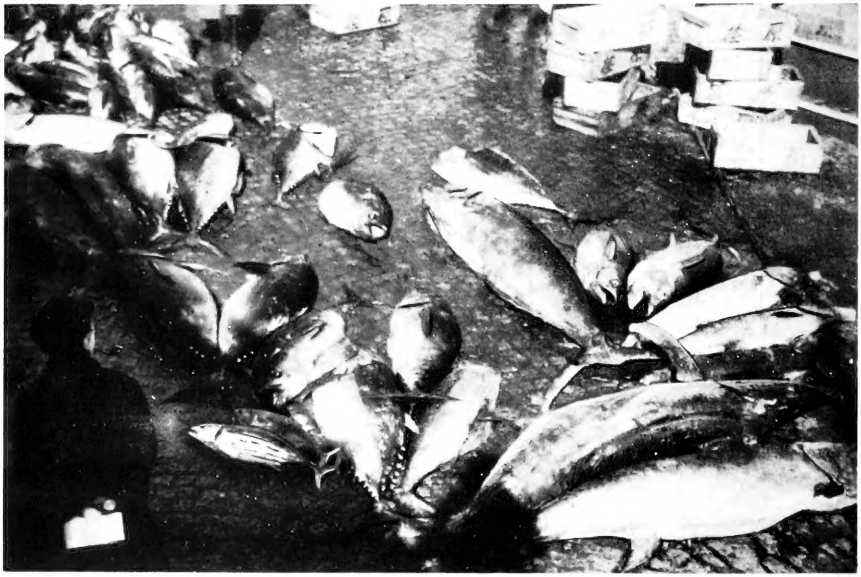

FIGURE 4 - LONG-LINE CATCH LANDED AT TOKYO FISH MARKET. BIG-EYED AND YELLOWFIN TUNAS, MARLINS, AND SWORDFISH PREDOMINATE IN THIS CATCH.

FIGURE 5 - MARLINS AND SHARKS FROM A LONG-LINE CATCH. TOKYO FISH MARKET.

Long lines, specifically designed for catching albacore (Thunnus germo), rapidly came into use when the large export market for canned and frozen white-meat tuna developed subsequent to 1929. Exploratory surveys indicated that albacore, generally, were found swimming closer to the surface than the black tuna and were more densely schooled. As a result, the long lines were constructed to fish at depths of about 100 to 200 feet, and the distance between branch lines was reduced to as little as 50 or 60 feet. Baskets of albacore-type gear were designed to contain from 10 to 30 branch (or hook) lines.

The black tuna long line is used to fish at comparatively deep levels, about 150 to 350 feet or more, and generally the branch lines are spaced at intervals of about 150 to as much as 600 feet. A basket of black tuna gear may contain from 2 to 10 branch lines; the deeper the gear is designed to fish, the fewer the number of branch lines used. In the initial stages of its use, black tunas taken in the deeper waters close to the Japanese coast composed the bulk of the catch but, as fishermen gradually extended their operations further offshore, other species of tunas, such as the yellowfin tuna (Neothunnus macropterus) and the big-eyed tuna (Parathunnus mebachi), were taken in large numbers.

Although each type of gear tends to catch primarily the species for which it has been designed, the catch composition during fishing operations is usually varied (Figures 4 and 5) and marlins (Makaira mitsukurii, M. mazara, and M. marlina), swordfish (Xiphias gladius), sailfish (Istiophorus orientalis), and sharks, as well as the various tunas, may be taken on an albacore or a black tuna long line. In some areas sharks may compose from 10 to 25 percent of the total long-line catch.

Long lines are sometimes designed to fish at both shallow and deeper levels. In recent years such construction has been favored by many fishermen, since the addition of several deeper-fishing branch lines to a shallow-type gear (Figure 2) permits the catching in certain areas of a wider variety of species.

BASIC FACTORS IN CONSTRUCTING A LONG LINE

The captain of a long-line vessel considers many factors in constructing the gear and determining the dimensions of the different parts. Among the most important of these are:

1. If the main line were placed on or near the surface of the ocean, passing vessels could cut or tangle it in their propellers. Moreover, wave action, if sufficiently severe, could snap this line. For these reasons the main line is suspended by float lines to a depth of at least 40 to 50 feet below surface level (Figures 2 and 3). Often, captains may design their gear with float lines up to 125 feet long--thus enabling them to use shorter branch lines. If the float line is longer, the branch lines can be made correspondingly shorter and more can be suspended from the main line (see page 16 and Figure 2--C and D).

2. The parts of the long-line gear should be arranged so that they may be set quickly while the vessel is running at a uniform speed. Although the long line is composed of numerous parts, all are put together in a manner so as to expedite the handling of the gear (Figures 6 and 7). Before a fishing voyage starts, float, main, and branch lines (including hooks) are tied together and arranged in a basket in proper sequence for setting out (Figure 8). When the long line is used during the actual fishing operation, only flag markers (bamboo poles) and buoys need be added and the hooks baited.

3. Many Japanese vessels, especially those that operate considerable distances from shore, handle large amounts of long line. These vessels may set as much as 50 miles of gear during a single operation. To haul this gear aboard, either by hand or by using a niggerhead, would be a wearisome task. Modern long-line vessels all carry a line hauler (Figure 9), the sheaves of which are coupled either to gears driven by an electric motor or to gears which operate from a shaft powered by the main-engine drive. In order to permit the ready passage over the sheaves of the knots which attach float and branch lines to the main line, the parts of the long line are tied together with knots that are not bulky (Figures 6 and 7). This is an additional convenience in permitting the main line to be hauled in without too much need for stopping the line hauler. A great deal of stopping and starting cuts down sharply on the amount of line that can be handled during a daily operation. Moreover, air compression for excessive starting and stopping of the main engine becomes a serious consideration for the engineer.

4. In the early days of exploratory and commercial long-line fishing operations, data were gathered which showed that the behavior of each tuna species in a particular area was distinctive and that the greatest commercial concentrations of each were found at almost specific depths. For example, the species composition of the long-line catch during the winter season in the waters east and southeast of Japan proper is

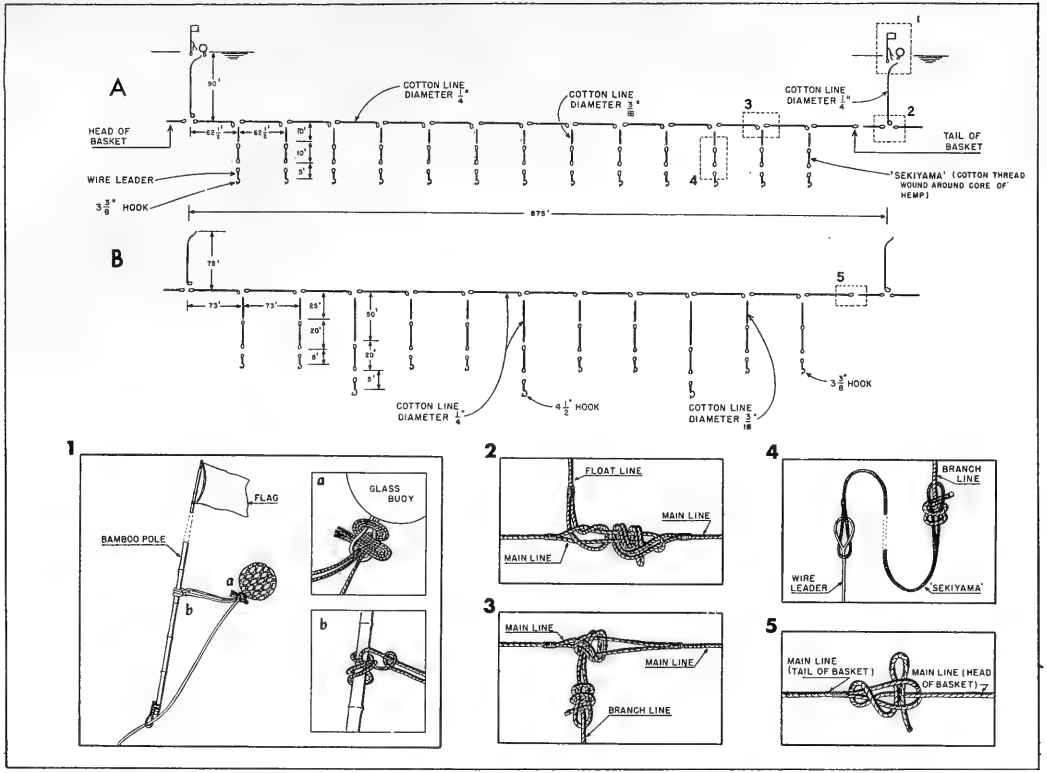

FIGURE 6 - DETAILED DESIGN OF TWO LONG LINES ILLUSTRATING ALBACORE-TYPE GEAR. GEAR A HAS 13 BRANCH LINES OF EQUAL LENGTH ON EACH BASKET OF MAIN LINE; GEAR B HAS 11 BRANCH LINES OF UNEQUAL LENGTH. THE INSETS SHOW THE MANNER IN WHICH THE PARTS OF THE LINE ARE TIED TOGETHER. THIS METHOD OF TYING IS THE MOST RECENT DEVELOPED BY THE JAPANESE FISHERMEN.

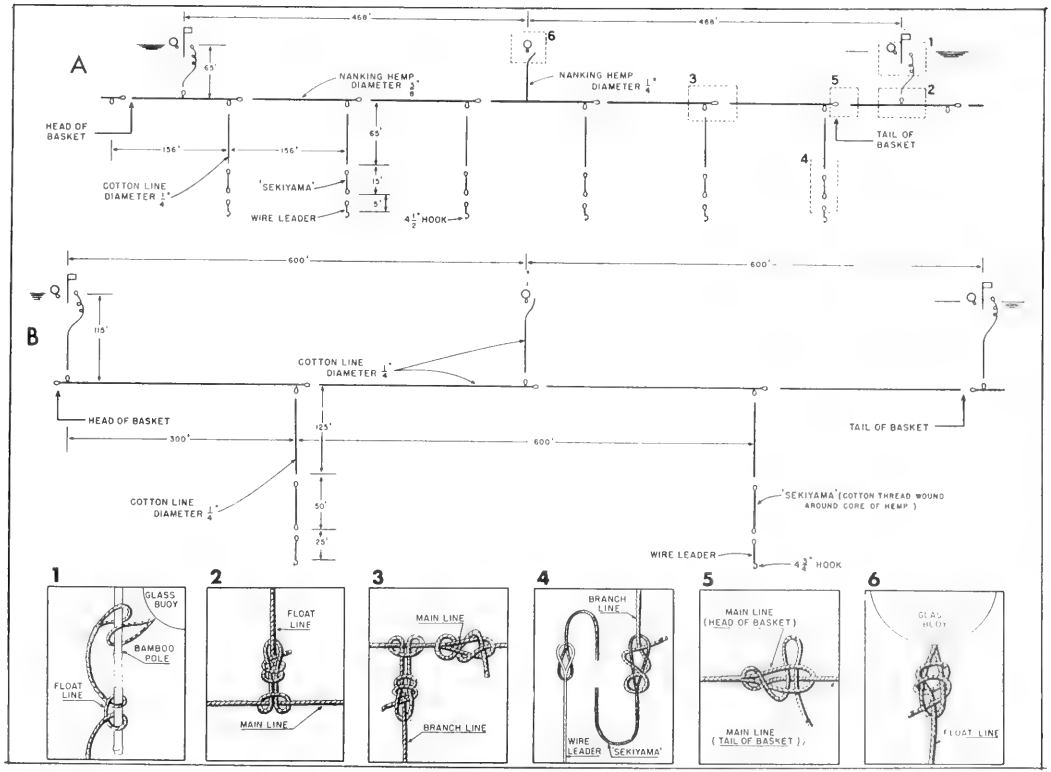

FIGURE 7 - DETAILED DESIGN OF TWO LONG LINES ILLUSTRATING BLACK TUNA-TYPE GEAR. GEAR A HAS SIX BRANCH LINES PER BASKET; GEAR B IS DESIGNED FOR DEEPER FISHING AND, ACCORDINGLY, HAS ONLY TWO BRANCH LINES. THE INSETS SHOW ANOTHER OF THE MANY METHODS OF TYING TOGETHER THE PARTS OF THE LONG LINE. THE METHOD ILLUSTRATED IS OLDER THAN THE ONE SHOWN IN FIGURE 6 AND IS AT PRESENT NOT AS WIDELY USED.

largely black, yellowfin, and big-eyed tunas taken from depths between 250 and 350 feet; whereas, during the winter season in the area nearby Midway Island, albacore and big-eyed tuna, in the proportion of two to one, have been taken in large numbers from depths of about 100 to 200 feet. Accordingly, the captain of a vessel designs his gear for the types of tunas he prefers to catch and the area in which he wishes to operate.

FIGURE 8 - BASKETS OF LONG-LINE GEAR READY TO BE STOWED ABOARD VESSEL. EACH BASKET CONTAINS FLOAT, MAIN, AND BRANCH LINES (INCLUDING HOOKS) ARRANGED IN PROPER SEQUENCE FOR RAPID HANDLING DURING THE SETTING-OUT OPERATION.

5. Recent developments in the long-line fishery have indicated that the same species of tuna inhabits different levels of water in different regions. For example, black tuna long-line fishing is carried on in two major areas off the Pacific coast of Japan--during the winter, in the warm Kyushu sea region and during the summer and fall, in the cold Hokkaido sea region. In the Kyushu area, the fish are quite deep; whereas, in the northern waters they approach closer to the surface. Fishermen often operate in both areas during their respective peak seasons, using the same gear but adjusting the level of the main line by shortening or lengthening the float line. Once constructed, the main and branch lines are used without changing their lengths.

6. The length of the float line plus the length of the branch line is only one of several factors determining the depth at which the hooks will fish. When the long-line gear is placed in water, the main line tends to sag where it is not supported by float lines. In a single basket, the number of float lines in relation to the length of the main line is thus an additional factor in determining the fishing depths of the various branch lines. Adding more float lines between the flag buoys will reduce the amount of sag. The captain can also control the fishing depths of the various hooks during a particular operation by either giving the main line more or less slack when it is set out (see page 20).

FIGURE 9 - LINE HAULER ON FORWARD WELL DECK OF LONG-LINE VESSEL. THE MAIN LINE PASSES OVER THE ROLLER WHICH IS SET ON THE DECK RAIL AND IS FED INTO THE HAULER SHOWN AT THE LEFT-OF THE PHOTOGRAPH.

PARTS OF A TYPICAL LONG LINE

BASKET: The long-line gear is essentially a method by which numerous hooks are lowered to depths at which it is desired to fish. A vessel of large size will generally set out many miles of line. In order to handle complex gear, which can easily tangle during any part of an operation, the main line is divided into baskets or sets (Figures 6 and 7). Each basket, from its head to the tail, is identical in construction; therefore, it will only be necessary to describe and illustrate the parts of a single basket.

MAIN LINE: The portion of the gear that is suspended horizontally below the surface of the water is known as the main line. To it are tied the lower ends of the float lines and the upper ends of the branch lines. The length of a single basket of main line varies with the preference of the individual fisherman and may be from 800 to 2,000 feet long.

The main line is prepared by first measuring out sections of cotton, hemp, or Manila line; the number of sections usually correspond to the number of hooks in a basket of gear (Figures 6 and 7). One length of line can be used for the entire main line of a basket, but the handling of such a length is more difficult than is the case where the main line is made up of sections. Then, should the main line kink or twist when being hauled in, the knot joining any two sections may be untied and the gear straightened out in order for it to come aboard prop-

erly. Moreover, as occasionally happens, the current will put too much slack in the main line, causing the branch lines to tangle about it. To prevent this, the slack can be reduced by removing from the water a number of sections of the main line without interrupting the fishing operation.

The material most often used for the main line is tightly-woven cotton line of medium to hard lay, with a diameter varying from 1/8 inch to 1/4 inch. The line of larger diameter is generally preferred by a long-line vessel, but some captains, fishing solely for albacore, may utilize the less expensive line of smaller diameter. In addition to cotton line, Nanking hemp (diameter 3/8 inch), Manila line (diameter 3/16 inch), or a mixture of cotton and Nanking hemp (diameter 1/4 inch) have been used for the main line by some Japanese long liners.

FLOAT LINE: The main line is suspended to its horizontal position by float lines, which are attached to floats or buoys. The length of the float line is similar for all baskets on the same gear but, as noted previously, different captains favor different lengths; these lengths may vary from 45 to 125 feet (Figures 2 and 3).

A float line, with a buoy at the top to keep the line suspended vertically and a bamboo flagpole to serve as a marker, is always put on the main line at the beginning or head of each basket. Other float lines may or may not be used to hold the main line of a basket in a horizontal position. This is entirely a matter of preference for the individual fisherman. Using more float lines per basket of gear reduces the sag in the central part of the main line. Thus, by either constructing gear with one or more float lines in the central part of the basket, or without any, it is possible to control to some extent the depth to which the hooks in the center will descend. Many fishermen prefer considerable sag, for the hooks will then fish at various depths.

The material used for the float line is often the same as that used for the main line. However, it is possible to utilize cotton, hemp, or Manila line of slightly smaller diameter than the main line. Old or slightly worn main line may sometimes be used as a float line.

FLAGPOLE: Bamboo poles with a small piece of colored cloth or a tuft of bamboo twigs on the upper tip are used, generally one to a basket, to serve as a marker in indicating the whereabouts of the long line in water. The float line and a buoy are attached to the flagpole in a manner so as to keep the pole upright during the fishing operation (Figures 6-A-1 and 7-A-1).

BUOYS: Three types of buoys are in use--glass, metal, or wood. Glass or metal buoys, with a diameter of 10 to 12 inches, are preferred because of their greater buoyancy and, since they do not become water-soaked, can be used over a long period of time. Floats of paulownia wood, having a diameter of about four inches and a length of three to four feet, are utilized by some vessels. Other vessels may use glass and wood buoys alternately--a glass buoy at the head of the float lines that are attached to the flagpoles, followed by a wood float tied to the float lines in the center of the baskets. A wood float has the advantage in that, if the line is tied to one end of the float, the float will serve as a signal to indicate that there is a fish on the section of the basket below it. The weight of the fish pulls on the float line causing the wood float to stand erect or wave about. This arrangement is especially desirable where the long-line gear should be patrolled at frequent intervals and the fish removed because of the presence of sharks or seals. On occasions when an extremely large

fish has taken the hook, its weight pulls the long line down and the buoy with it. In these instances failure to sight a buoy indicates a fish on the line and it is removed.

BRANCH LINES: The lines that do the actual fishing are suspended from the main line at pre-designated intervals. Branch lines are almost always made up in the following order (Figures 6-A-4 and 7-A-4): a length of line, either cotton, hemp, or Manila; a "sekiyama" (cotton wound around a core of ramie, wire, or Japanese hemp); a wire leader; and a tin-plated iron hook. The only exception to this arrangement is that the "sekiyama" and the wire leader are sometimes omitted in long lines designed specifically for albacore fishing. This is possible since the fish taken by such long lines are generally below 60 pounds in weight. The branch line is permitted to hang freely; no lead weight being used to hold it down.

Swivels are often placed at some point along the branch line to minimize twisting when a hooked fish is threshing about.

For the most efficient operation, and to prevent tangling of adjacent branch lines, the distance between two branch lines is greater than their individual lengths. Thus, the longer the branch lines, the further apart they are placed and the fewer the number suspended from the main line.

There is sound justification for the use of a "sekiyama" between the line and the wire leader. Ordinary line is apt to twist and kink when hanging free in the water, whereas the tightly-wound "sekiyama" is rigid and tends to hold the baited hook away from entanglement with the line above it.

For the upper section of the branch line many vessels prefer cotton line, which is of the same or slightly smaller diameter than that of the main line. Nanking hemp or Manila line is occasionally used by some captains. The core of the "sekiyama" is either 30-thread hemp or ramie, or 9-strand wire. Cotton line (usually 3-strand, 9-thread) is wound crosswise about the core. The wire core, although desirable for its strength, has the disadvantage of rusting. The wire leader used varies from 9 to 16 strands, and the tin-plated iron hook, which must be stout in order not to be broken at the shank or straightened out, measures (in its extended length) from $3\frac{1}{2}$ to $5\frac{1}{2}$ inches. It has been noted that some long lines are designed to fish at both shallow and deeper levels. If this is the case, the shorter branch lines are usually constructed with thinner line and wire and with smaller hooks (Figure 6B). There appears to be a correlation between the size of the fish and the depth of the water; the larger fish are taken from deeper levels and the branch lines are accordingly made stouter the deeper they are expected to fish.

TYPES OF LONG-LINE VESSELS

It is possible to operate a tuna long line from most any type of fishing vessel, and many craft designed for other operations will fish with the long line during months that would otherwise be inactive (Figure 10). However, the Japanese have settled on standard plans for constructing long-line vessels that will operate the long-line gear solely (see front-cover photo). The trend in recent years has been to build large vessels, since most of the major tuna operations are carried on at considerable distances from home ports.

Long-line vessels from the most widely used standard classes have the following dimensions:

Construction	Category: Gross Metric Tons*	Length	Breadth	Depth	Horsepower
		..... (Feet)			
Steel	195	110.1	21.7	10.7	400
	160	103.5	20.4	10.2	320
	135	97.9	19.7	9.7	250
Wooden	95	81.5	18.1	9.0	210

*The volume of the entire vessel divided by 100 cubic feet.

Vessels of 195 gross tons may operate as many as 200 baskets of gear during a single day's fishing. The smaller vessels handle a correspondingly smaller amount of gear; a 95-gross-ton long liner generally operates in the neighborhood of 100 baskets. The Japanese have recently constructed a few vessels of more than 200 gross metric tons, and these fish up to 300 baskets of gear.

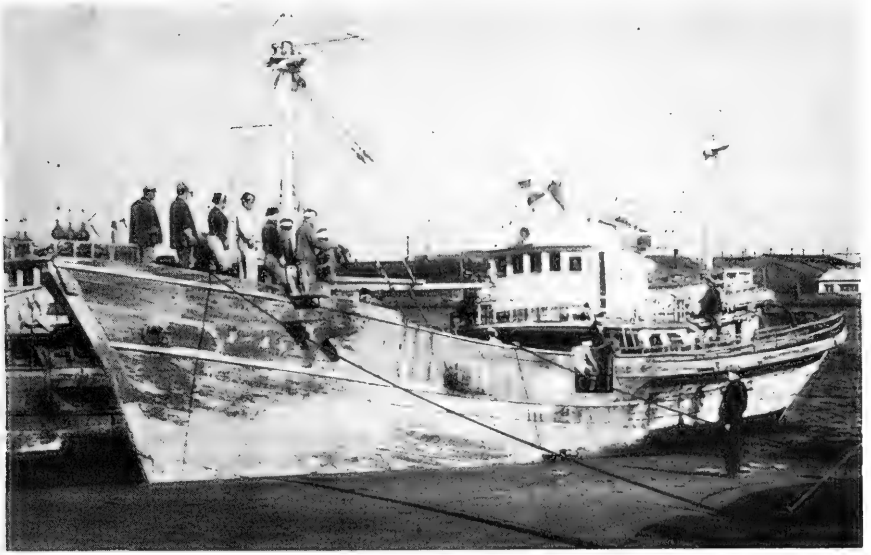

FIGURE 10 - COMBINATION POLE-AND-LINE SKIPJACK AND LONG-LINE TUNA VESSEL. WOODEN TYPE OF 95 GROSS METRIC TONS. DURING THE SPRING, SUMMER, AND FALL, THIS VESSEL FISHES FOR SKIPJACK WITH LIVE BAIT; DURING THE WINTER, FOR OTHER TUNAS WITH THE LONG-LINE GEAR.

For ease of operation in setting or taking up the gear, a long-line vessel is built with a moderately low fore and afterdeck. Since the long line is set out over the aft rail, the afterdeck has sufficient level space for handling the baskets of gear. On the modern-type vessels, hauling in is done by heading into the line so that it comes aboard over either the starboard or port side of the bow, and a low main foredeck facilitates pulling in the gear and removing the fish from the branch lines. A line hauler is placed on the main deck forward of the pilot house near the side over which the line is hauled. Hatches to the cargo hold are on the main deck close to the line hauler. The fish are pulled aboard through an opening in the main-deck rail and bulwark immediately aft of the roller, which is set on the main-deck rail and over which the main line passes into the line hauler. When not in use, buoys, flagpoles, and baskets of line are secured on top of the deckhouse.

BAIT FOR LONG-LINE FISHING

Obtaining adequate bait for long-line operations does not offer the serious difficulties often encountered in the live-bait skipjack fishery. Sardine, anchovy, mackerel, saury, flying fish, cuttlefish, or squid are among the more important of the baits used. Firm, fresh bait is preferred, since it will stay on the hook longest without tearing out. A round-bodied fish is said to be more desirable than a somewhat flattened form, for the latter tends to fall over on its side in the water and does not appear as lifelike as the rounded form. On long voyages, the bait is either frozen or salted. The hooks are generally baited by putting the barbed point through the eyes of the fish. Cuttlefish and squid are placed on the hook by putting the barbed point through the fleshy posterior region and then doubling this point back again through the flesh so that the bait will be fastened to the hook securely.

Long-line fishermen have occasionally used live mackerel as bait, and exceedingly fine catches have been made. The live fish is placed on a small hook, which is in turn attached by a short chain leader to the large hook on the branch line. Since Japanese long-line vessels are built without live-bait wells, it has been difficult for the fishermen to keep the mackerel alive on extended voyages, and the practice of using live bait for long lining has not been widely adopted. However, a live-bait fishery for the skipjack has been developed to a high degree of perfection, and it should be possible for tuna long-line vessels to be constructed for handling bait in a similar manner.

METHODS OF LOCATING LONG-LINE FISHING GROUNDS

The success of the Japanese long-line fishery has been based largely on the ability to locate fishing grounds that are capable of yielding abundant quantities of fish. A period of exploration to locate productive grounds has been necessary since it is impossible to detect by ordinary methods the presence of the far-ranging tunas when they are swimming at subsurface levels in many different parts of a vast ocean. As commercial interests were unwilling to invest the money and effort necessary to locate promising fishing grounds in distant waters, Japanese national and prefectural fisheries organizations sponsored the exploratory phase needed to develop a sizable offshore long-line fishery. Their exploratory vessels compiled and disseminated to the industry a huge amount of data on the catch obtained during their fishing voyages. Moreover, these catch records were correlated with various oceanographic factors, such as water temperature, current drift, and depth of the ocean bed. Commercial vessels were thus given not only the general location of new fishing grounds but also the hydrographic conditions under which the best catches were likely to be made.

A number of the major developments in the Japanese long-line fishery can be attributed directly to exploratory fishing operations by the national and prefectural vessels. The location and eventual exploitation of the albacore grounds nearby Midway Island were almost entirely due to their efforts, and a sizable winter fishery for producing the exportable white-meat tuna was established. In the South Seas, major long-line explorations were under way during the greater part of the 1930 decade, and major fishing grounds, principally for the yellowfin tuna, were located near the equatorial belt of the southwest Pacific. Closer-to-home smaller-scale explorations witnessed the development of the Ryukyu region as a long-line fishing area.

On the basis of their exploratory work, Japanese investigators claim that the tunas caught by the long-line gear are primarily on a feeding migration and it is best to set the gear across the path of movement of the fish or near an obstacle in their path. The migrating tunas tend to follow the course of a current, and the long line can be set where a strong current exists and the tunas are known to be plentiful. However, areas where the tunas are available are more easily located by looking for barriers to movement. Barriers to movement may be an island, a reef, a submerged bank, or a difference in water temperature between two water masses.

Where reefs, banks, islands, or submerged shelves act as barriers to movement and change the direction of current flow, they are often inhabited by a diverse and plentiful assemblage of reef and bottom fish. The voracious tunas, finding such fish an attraction, remain nearby or move alongside these barriers before continuing their migration in a new direction. The Ryukyu area can be cited as a region in which the most productive long-line grounds have been found to be those where the migratory tunas are hindered in their movements by shallow banks, islands, or reefs which change the course of the current. Other productive grounds in the Ryukyu area are located where the shallow waters surrounding the island groups drop off sharply to great ocean depths, as they do to the east and south of the archipelago, for the tunas apparently find excellent feeding alongside these shelves.

Where temperature barriers exist, water currents of different temperatures are present and the colder mass of water acts as a wall into which the warm-water tunas hesitate to enter. The zone of contact between two currents is often irregular and there is much mixing between the cold and warm waters. Places of mixture between currents are considered excellent feeding localities, for the colder waters have a greater abundance of food than do the warmer waters. The migratory tunas, searching for food, can take advantage of the fact that an abundance of pelagic crustaceans and other animals, which comprise a large share of their diet, are swept from the colder waters which they normally inhabit into the warmer waters at the zone of mixture between currents. As they are feeding at these temperature barriers, the tunas can be taken in numbers large enough to make commercial operations feasible.

A Japanese long-line vessel exploring a new region for tuna will set gear where it is able to find obstacles of the type mentioned above. The exploratory vessels look for localities:

1. Where the ocean bed drops off sharply to greater depths or where reefs or banks (either emergent or submerged) are present in an otherwise deep area. Hydrographic maps, which show the contours of the ocean bottom, are valuable aids in locating barriers of the submerged type. Echo sounders have recently come into wide use for exploring areas which are not well charted.

2. Where a strongly flowing current is present or where there are obstacles (reefs, islands, or banks) in the path of a current. In the tropics, the waters near coral banks are considered ideal places for exploratory fishing operations.

3. Where areas of convergence or divergence between two adjacent currents or masses of water are present. These are located by recording water temperatures at surface and below-surface levels.

All exploratory vessels, while moving about, have trolling lines out. The efficiency of catch with trolling jigs is low as compared to the long line. However, some investigators believe that when a few tunas are taken from near-surface levels, they signify the possibility of tunas at deeper levels. This has been found to be applicable along the coastal areas of Japan but does not hold true for the mid-Pacific albacore grounds and other off-shore areas.

After explorations have indicated an area to be suitable for further exploitation, Japanese commercial vessels, partly subsidized by government funds, continue the development of that area. Profitable trips to the newly-located fishing grounds eventually result in intensive exploitation by commercial vessels. The reports of exploratory vessels aid the commercial vessels in that, since the area has already been surveyed, the captain can proceed to the general locality which has been shown to be productive. There, the commercial fisherman follows much the same procedure used by an exploratory vessel, and determines the exact locality for setting out the line as follows:

1. From hydrographic charts, the fisherman can locate submerged banks or ocean bottom which fall away to great depths. The gear is then set out diagonally with the flow of the current (Figure 11) over or beside these barriers.

2. Fishermen often set long-line gear where a strong current is present, especially if an island or a reef is in the vicinity. Floating substances, such as logs and seaweed, serve to indicate the flow of the current. The gear is set out diagonally with the flow (Figure 11) and in a direction away from the island or reef, if any are nearby.

3. The line of contact between cold- and warm-water masses, if one is known to be present in the general vicinity, is located by recording surface-water temperatures. A sharp drop in temperature within a small area indicates a transition zone from warm to cold water, or vice versa, and the gear is set out along this line of contact (Figure 12).

OPERATION OF LONG-LINE GEAR

The long-line gear is almost always set out over deep water, where it would be impractical to anchor it. After remaining in the water for any length of time, the line will tend to adjust itself to current drift. Therefore, in setting out the gear some consideration must be given to the strength or direction of the current. Suppose an area is located that is thought suitable for a long-line operation and the current is flowing at a rapid pace. Theoretically, it would be most desirable to place the line across the current, but the force of the strong flow of water, if the flow is stronger at some points of the current, would put a bow in the line and possibly break it. Accordingly, the fishing vessel starts putting the line down from the strongest part of the current and works out diagonally (Figure 11) towards a weaker portion. Enough slack must be given the line to permit it to adjust to the different forces of the current and also allow the hooks to sink to their proper depth. Since the branch lines are not weighted, the hooks sink slowly, taking from one to one-and-a-half hours to reach their deepest fishing level. Not only does this slow settling permit the flagpoles and floats to adjust to current, but the baited hooks, as they descend, fish all levels of the water from the surface to the greatest depth for which the gear has been constructed. Slack is also necessary when a fish takes a hook; extra weight on a taut line may cause it to snap.

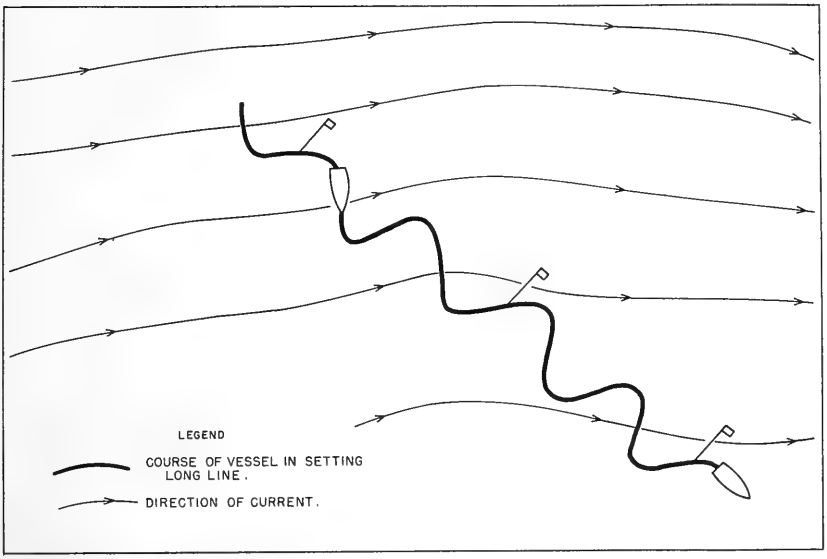

FIGURE 11 - COURSE OF VESSEL IN SETTING LONG LINE WHERE STRONG CURRENT EXISTS. THE LINE IS SET OUT DIAGONALLY TO THE FLOW OF THE CURRENT. CHANGING THE DIRECTION OF THE VESSEL ABOUT EVERY 200 YARDS PUTS SLACK INTO THE LINE AND PERMITS THE LINE TO ADJUST ITSELF TO WEAK-AND STRONG CURRENT DRIFTS. SLACK MAY ALSO BE OBTAINED BY RUNNING A DIRECT COURSE (ALSO DIAGONAL TO THE FLOW OF THE CURRENT), BUT THE SPEED IS REDUCED TO TWO-THIRDS THAT USED WHEN A ZIGZAG COURSE IS FOLLOWED.

Slack in setting the long line is obtained by either of the following methods:

1. The vessel follows a zigzag course and changes direction about every 200 yards (Figures 11 and 12). This is the most commonly used method. The speed of the vessel, while the line is being put overboard, is largely determined by the experience of the crew. If the fishermen are exceptionally well-trained and experienced in the handling of the gear, the vessel can be run at full speed. On most of the modern type long-line vessels this is about eight or nine knots.

2. The speed of the vessel is reduced to two-thirds of its normal full speed ahead, and the line is set out with the vessel following a straight course. The gear is placed overboard as quickly as when a zigzag course is followed.

The gear is set out over the stern rail of the vessel (Figure 13). Before the operation begins, baskets of long line are assembled on the after deck. Floats, flagpoles, and bait are placed nearby. The coils of line comprising a single basket have already been arranged so that the beginning of the line and the first float line are at the top, a coil of main line follows, then a branch line (line, "sekiyama," leader, and hook also arranged in a coil), then another coil of main line, a branch line, and so on to the end of the basket of gear. The line is thus ready for quick and routine handling.

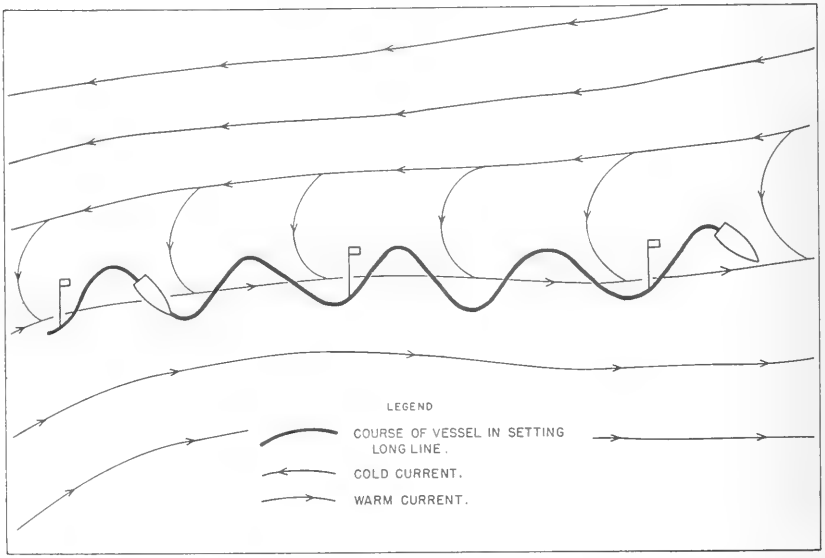

FIGURE 12 - COURSE OF VESSEL IN SETTING LONG LINE WHERE TWO CURRENTS FLOW IN DIRECTIONS OPPOSITE TO EACH OTHER. THE LINE OF CONTACT BETWEEN TWO CURRENTS IS DETERMINED BY RECORDING SURFACE-WATER TEMPERATURES. A SHARP DROP OR RISE IN TEMPERATURE INDICATES A CONTACT AREA, AND THE CAPTAIN ATTEMPTS TO SET THE LONG LINE ALONG THIS CONTACT ZONE. THE ZIGZAG METHOD OF SETTING GEAR IS MOST COMMONLY USED, BUT THE VESSEL MAY FOLLOW A DIRECT COURSE. SLACK IS THEN OBTAINED BY REDUCING SPEED TO TWO-THIRDS THAT USED WHEN RUNNING A ZIGZAG COURSE.

The setting of the line begins with the assembling of a bamboo flagpole and buoy, and their attachment to the head of the float line (Figures 6-A-1 and 7-A-1). Float line, buoy, flagpole, and the section of main line that follows are cast overboard first. The bait handler picks up a branch line from the basket, puts the bait on the hook, and then casts this section of the gear overboard (Figure 13). The next part of the main line is cast overboard, then a branch line is baited and also thrown over. This is repeated until the next float line (if more than one float line per basket is used) is reached; then a buoy is attached (Figure 7-A-6). Attaching the buoys to the float lines and baiting the hooks continues until the end of a basket is reached. The head of the main line of a new basket is attached to the tail of the old basket (Figures 6-A-5 and 7-A-5) and the process of setting is repeated.

In temperate waters where sharks do not bother fish caught on the long line, the gear is set out in the late afternoon and taken up in the early morning. Not only is the efficiency of catch greater during the night than during the day, but, when the weather is warm, fishermen prefer to haul in gear during the morning hours before the heat of the sun makes working conditions difficult. In tropical waters where sharks are abundant and will mascerate a helpless or dead tuna on the long line, the captain sets gear in the early morning (about 3 or 4 a.m.) and takes up in the afternoon. The long line is patrolled continuously during the five to

FIGURE 13 - SETTING OUT THE LONG-LINE GEAR. BAITING OF BRANCH-LINE HOOKS AND SETTING OF GEAR TAKES PLACE OVER STERN RAIL OF LONG-LINE VESSEL. IN THIS INSTANCE, FRESH SQUID ARE BEING USED AS BAIT.

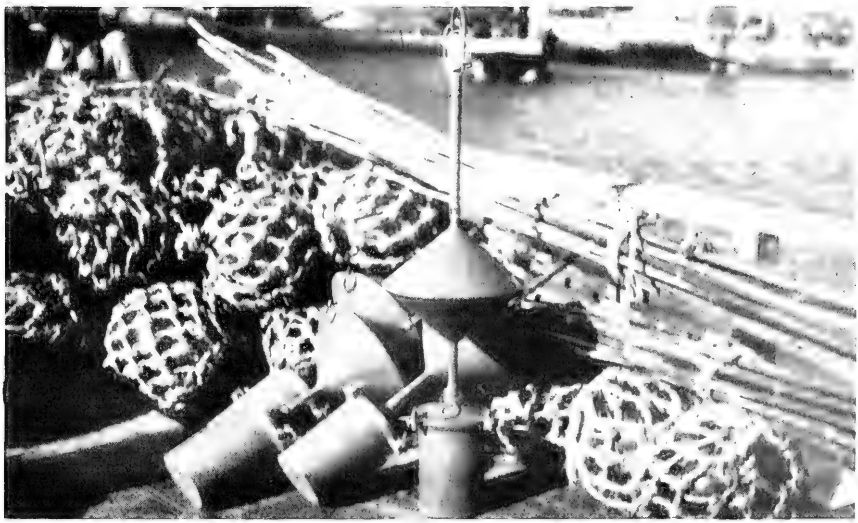

FIGURE 14 - LIGHT BUOYS USED BY LONG-LINE VESSELS. LIGHT BUOYS, IN PLACE OF GLASS, METAL, OR WOOD BUOYS, ARE PUT DOWN AT INTERVALS ALONG THE LINE TO INDICATE THE WHEREABOUTS OF THE GEAR DURING NIGHT OPERATIONS AND TO WARN OTHER VESSELS AGAINST SETTING OUT LINES IN THE SAME AREA.

FIGURE 15 - HAULING IN LONG-LINE GEAR. THE MAIN LINE IS SEEN PASSING OVER THE ROLLER INTO THE HAULER. IN THE LOWER RIGHT CORNER, TWO FISHERMEN ARE PULLING IN A BRANCH LINE.

six hours between setting and taking-up and, should evidence indicate that a fish may be on the line, that part of the line is raised and the fish removed. During a 24-hour period, a vessel operating 200 baskets will take 2 to 3 hours to set the gear and 10 to 12 hours to haul in.

Light buoys (Figure 14) in place of flagpoles and glass buoys, may be put out at intervals along the line--generally at the beginning of the first basket, at every third basket, and at the end of the last basket. These lights not only serve to indicate the whereabouts of the long line to the fisherman, if the gear should be taken in when it is dark, but they also warn away other vessels that may put their long line out in the same area. Tangling of two sets of gear creates a wearisome task of untangling for two long-liners.

The most difficult task in the operation of a long line is taking in the gear. Which end of the line is hauled in first depends on the direction of wind and the side of the vessel over which the line will be hauled. The line hauler is set on either the starboard or port-forward deck, depending on the preference of the captain. To prevent tangling the line in the propeller, the vessel heads into the gear on the lee side of the line. As the line is brought aboard, it passes over a roller on the deck rail and is fed into the line hauler (Figure 15). The usual speed of the vessel is about three knots, but the actual speed depends on many factors--the experience of the crew, the water current, the direction of the wind, the running capacity of the line hauler, the number of fish caught, and the difficulty encountered in hauling aboard fish of the largest size. Hauling in is best accomplished if too much strain is not placed on the main line. Thus,

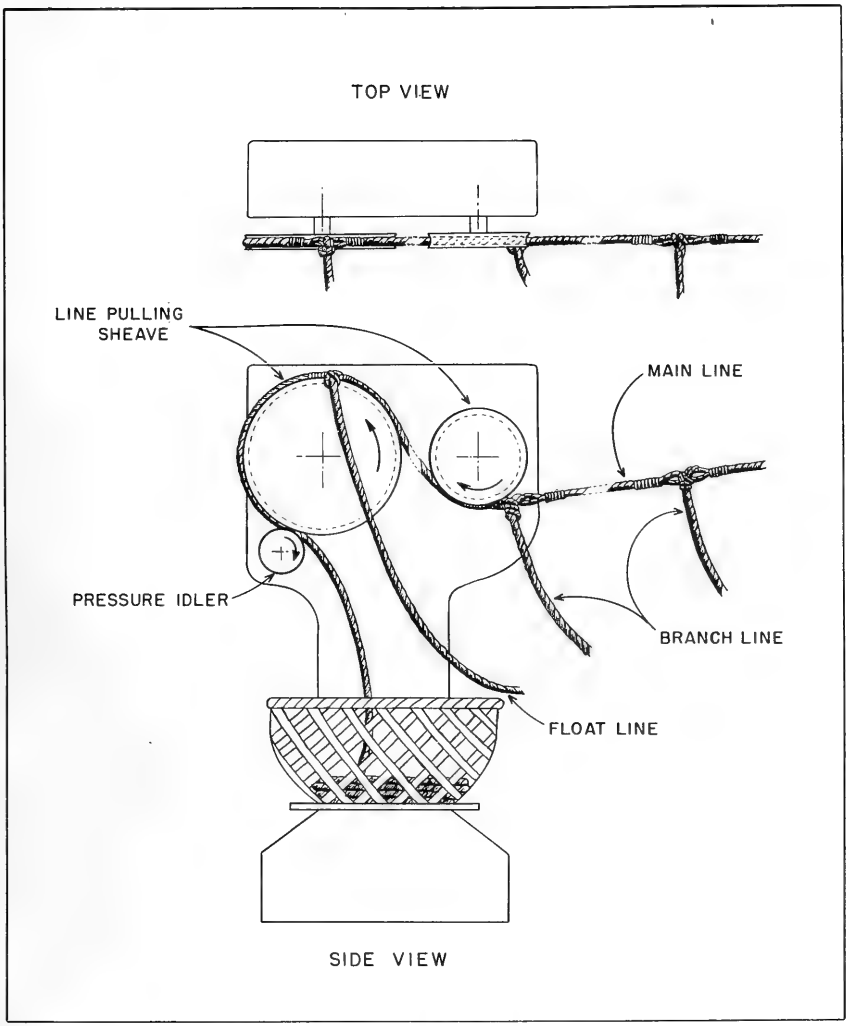

FIGURE 16 - LINE HAULER SHOWING ARRANGEMENT OF SHEAVES. THE KNOTS, ATTACHING FLOAT AND BRANCH LINES TO THE MAIN LINE, PASS AROUND THE SHEAVES WITHOUT BEING UNTIED.

during the hauling-in operation, if a consistent speed is maintained and the crew is experienced, there will be little danger of snapping the line.

As the main line comes aboard and passes over the main wheel of the line hauler, it drops into the basket placed underneath. The main line generally needs little attention at this point, for it tends to coil as it drops into the basket. The junctures of branch or float lines with the main line pass around the sheaves of the line hauler (Figure 16, see page 25). As they do, the fishermen tending the branch or float lines begin coiling them rapidly and the coils of float and branch (including hook) lines are placed in the basket. Hauling in may be stopped momentarily to untangle the line. Otherwise the taking in of the gear is a continuous operation with the crew disconnecting flagpoles, floats, and head and tail of each basket as they are reached. The remainder of the basket of gear (float, main, and branch lines) is recoiled ready for the next operation.

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OUR OYSTER INDUSTRY

DO YOU KNOW--

That oysters are taken commercially in every seaboard State except Maine and New Hampshire with an annual production totaling around 80 million pounds (meats) of this tasty seafood.

February 1950

REFRIGERATION: An unusual problem was encountered with the frozen oysters that were prepared for studies on the darkening which occurs during storage. The first monthly examination showed all samples to have decidedly pink-colored liquor upon thawing and pink to red discoloration of many of the oysters. The flavor was much towards the bad side, making taste tests impossible. Efforts are now being made to determine the cause of the discoloration. Although the color is similar to that produced by "pink yeast," it seems most unlikely that this organism would grow at the storage temperature of 0° F. or even during the short thawing period of a few hours while the oysters were still quite cold.

* * *

After 11 months in zero storage, the fish that were wrapped in vegetable parchment, then dipped in water, wrapped in moisture-vaporproof material and frozen, are still well coated with ice and show no desiccation or discoloration. This is in sharp contrast to the fish prepared by the usual methods.

* * *

Furthur examinations were made of the four packs of canned sockeye salmon prepared from frozen fish and the control pack from the fresh fish. The results have confirmed the conclusions drawn in the previous report of this study. On the basis of a combined quality rating of all factors (color, odor, texture, and flavor), the packs prepared from the frozen sockeye salmon have shown a significant loss in quality which increases with the length of storage. Further loss in quality results from such factors in the experimental packs as increased curd formation, discoloration of surface, decreased oil and free liquid, and increased turbidity of the liquid. An abnormal toughening of the flesh has been noted in most samples prepared from the frozen fish, although considerable variation is present.

* * *

SANITATION AND QUALITY CONTROL: The average pH values of the oyster samples examined this month, taken at the packing table, are as follows:

Sample	Standards	Selects
Single oyster	6.55	6.62
Three oysters	6.53	6.61
Six oysters	6.53	6.63
Liquor	6.76	6.81

The range in pH of the ground fresh meats is staying within rather narrow limits, being between 6.50 and 6.58 for the standards, and 6.58 and 6.65 for the

selects during this period. The pH of the liquor has varied between 6.72 and 6.78 for the standards, and 6.80 and 6.82 for the selects. Spoilage during storage in ice occurred at a pH between about 5.95 and 5.78.

* * *

ANALYTICAL METHODS: Vitamin B_{12} assays are still erratic. Two separate tests were carried out on the effect of the air incubator versus the effect of a constant temperature water bath. Both times, and in both cases, the assays were reasonable so that there was no chance of determining whether the water bath incubation made a difference.

The use of ascorbic acid versus thioglycollic acid was tested. Higher results were usually obtained using ascorbic acid, but this needs more investigation.

The pH of the media now appears to make a greater difference than was originally believed. Assays at pH 5.5 or 6.0 have been giving better results than assays at pH 6.5. This has happened several times, but on the other hand, good assays have resulted when the media was at pH 6.5.

* * *

BYPRODUCTS: The analysis of livers from fish brought back from the Bering Sea by the Exploratory Fishing Section has now been completed. In all, 227 livers were analyzed for oil and vitamin A. Although the data have not as yet been completely tabulated, it can be stated that no outstanding results were obtained and none of the species show any great promise of being an important source of vitamin A.

* * *

SERVICE TO STUDY FREEZING OF CRAB MEAT: A grant of $2,000 to the Fish and Wildlife Service for research studies on the freezing preservation of crab meat was approved in February by the Executive Committee of the Refrigeration Research Foundation.

It is planned to have the studies made at the Service's College Park laboratory. In view of the limited funds made available, it was decided to concentrate the research studies on only the meat from the blue crab, since this phase of the problem seems to be of greatest over-all importance.

A qualified graduate student of biochemistry from one of the local universities will be hired to carry on the work on a part time basis.

Additions to the Fleet of U. S. Fishing Vessels

A total of 35 vessels of 5 net tons and over received their first documents as fishing craft during January 1950--22 less than in January 1949, according to the Bureau of Customs of the Treasury Department. South Carolina led with 7 vessels, followed by Washington with 6 vessels and Massachusetts with 4 vessels.

Vessels Obtaining Their First Documents as Fishing Craft, January 1950 and Comparisons

Section	January 1950	January 1949	Total 1949
	Number	Number	Number
New England	4	2	35
Middle Atlantic	2	1	44
Chesapeake Bay	2	6	87
South Atlantic and Gulf	16	34	369
Pacific Coast	9	7	327
Great Lakes	-	5	38
Alaska	2	1	96
Hawaii	-	1	5
Unknown	-	-	1
Total	35	57	1,002

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

Alaska Fishery Research Effort of Fish and Wildlife Service to be Concentrated

The Fish and Wildlife Service's Alaskan Fishery Research Program will concentrate on the pink salmon fishery of Southeastern Alaska, the Director of the Service announced in March. Ten biologists and six assistants will be assigned to this project, and the amount of funds which will be available for the Fiscal Year 1951 for the project is estimated at $100,000.

Director Albert M. Day's detailed statement on this project follows:

BACKGROUND OF ALASKAN FISHERY RESEARCH: During the past 20 odd years during which the Federal Government has been doing fishery research in Alaska, a great deal has been accomplished. The basic information on migration routes, times of spawning, age at maturity, utilization of stream gravels and exploitation by the fishery has been secured. This information has been applied in preparing the annual regulations of fishing activity on the various species of salmon and the herring in the several districts. Although regulation has not been uniformly successful, it has nevertheless resulted at least in preserving a resource which still produces an income of over 100 million dollars per year. Thus, the accomplishments of our research personnel in Alaska, considering the very small appropriations made available to them, have been significant and useful.

Now that the basic information has been gathered there has been a feeling that the continuing research is not on an adequate scale to provide the complete and extensive background of knowledge needed for most effective regulation of the fisheries. The Service's biologists have been as keenly aware of this as have the members of the fishing industry and others who have pointed out the situation from time to time. The basic difficulty seems to be that the amount of research effort which the Fish and Wildlife Service can at present support has been spread too thinly over the complexities of the fishery problems of Alaska and over its vast and relatively inaccessible areas. The solution seems to be equally obvious—the concentration of our effort in one area.

SERVICE WILL CONCENTRATE ON PINK SALMON: In the past we have had four major fishery investigations in Alaska, that of the red salmon in Bristol Bay, the red salmon of the Karluk River, the pink salmon of Southeastern Alaska, and the Alaska herring. All of these fisheries and others (such as the king salmon, coho salmon, chum salmon and pink salmon of Central Alaska) are valuable and in need of further research, so that the problem of selection becomes a difficult one.

After thorough consideration of all possibilities and consultation with our own biologists and our fishery management experts, I have come to the conclusion that the most profitable fishery for concentration will be that of the pink salmon of Southeastern Alaska. This fishery resource brings in an income of about 18 million dollars a year, but at present only about 36 thousand dollars are being spent annually on research and only one professional biologist is devoting his whole time to the problem. Concentration on this area as compared to concentration on the other fisheries of Alaska would have at least three distinct advantages for the immediate future:

1. The pink salmon has a short life cycle requiring only 2 years for completion as compared with 4 to 6 years for the red salmon. Its fresh-water existence is very brief as compared with the 2 or 3 years spent in fresh-water lakes by the red salmon.

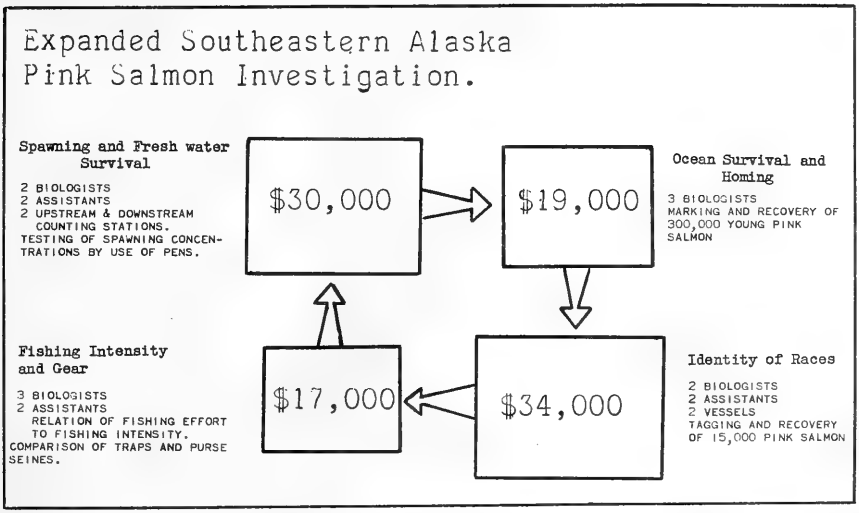
2. The amount of travel required from headquarters in Seattle is only about one-half that required to reach the more distant fisheries in western Alaska.

3. There is a very extensive and well-developed system of fishery management stations in Southeastern Alaska the work of which can be coordinated with that of the proposed expanded pink salmon program to the mutual advantage of each.

EXTENT OF PAST AND FUTURE INVESTIGATIONS OF SOUTHEASTERN ALASKA'S PINK SALMON FISHERY: A considerable amount of information on the Southeastern Alaska pink salmon already has been accumulated as a result of the small-scale investigation of the past and this information will serve as the foundation of the expanded investigation. Tagging work done some years back has indicated the major migration routes while study of meteorological conditions has indicated the factors affecting upstream migrations. At Little Port Walter, operation of a two-way counting weir has given eight years of data on fresh-water survival in one stream. An extensive statistical analysis of trap catches has provided basic information on gear operation.

Under the expanded program to be undertaken as a result of concentration, there will be four major lines of investigation:

1. Spawning and fresh water survival.
2. Ocean survival and homing.
3. Identity of races.
4. Fishing intensity and gear.

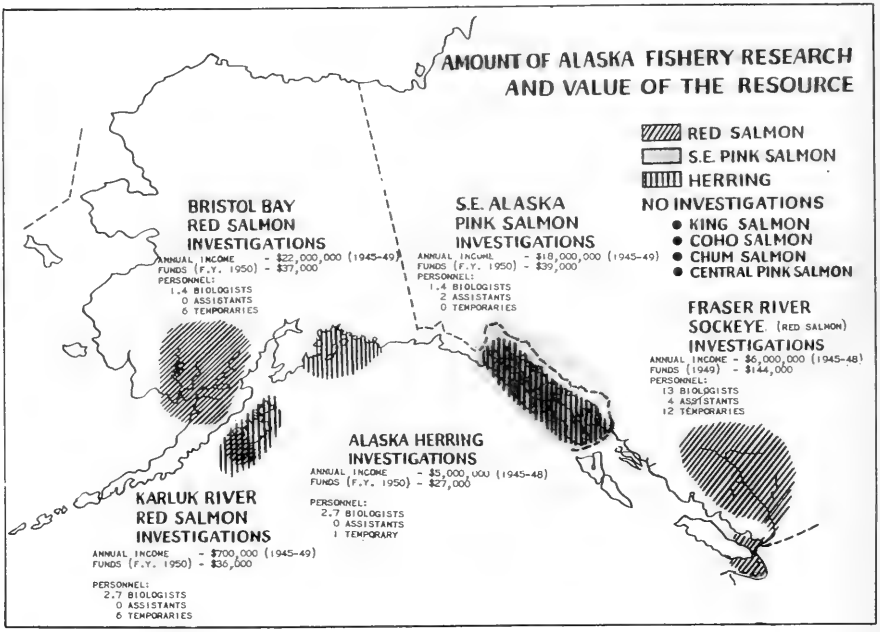


Investigations under each of these headings will yield information directly applicable to the problems of fishery management.

Knowledge of fresh-water survival plus that of ocean survival and the climatological variables which affect both will permit the prediction of the return two years hence from any known escapement and will permit the setting of fishing seasons on a reasonable basis. It will also permit the determination of the optimum escapement for each area, which again will provide for proper setting of closed seasons or other gear regulations. Knowledge of the identity of races will permit the regulation of gear in the different fishing areas so that the runs destined for individual parts of the spawning range can be permitted to pass in an amount sufficient for adequate seeding of the gravels in those parts.

Detailed information on the relationship between gear operated and fishing intensity will, of course, be essential for assessments of the correct amount of gear and time of operation. A comparison of the fishing efficiency of traps and purse seines will also be made in order that the records may be kept on a comparable basis as the predominant emphasis shifts from one form of gear to the other.

Actual field work will include the operation of six upstream and downstream counting stations instead of just one as was true until 1948. The efficiency of various concentrations of spawning fish will also be extensively studied so that the most desirable concentration for survival can be determined. Ocean survival and homing will be studied by means of marking several thousand pink salmon each year and recovering them later in the catches and in the streams. Identity of races as they pass through the fishery will be determined by tagging and recovering of 15,000 adult fish each year.



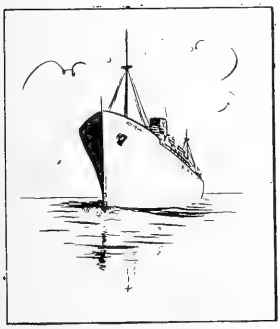
The statistical studies of fishing intensity and gear will be greatly expanded and analysis will be possible of many data collected in the past, but not heretofore worked on because of shortage of personnel. These expanded investigations will be pursued during the next few years and there is every hope that they will furnish a solid basis of factual information upon which management of the fishery can be established. Such management should lead to the production of the greatest possible annual pack from the pink salmon resource and the maintenance at the same time of sufficient spawning capacity for the future perpetuation of the individual pink salmon population. This after all is the goal of all elements interested in the salmon fisheries--fishermen, canners and conservationists alike.

Adoption of the program outlined above will funnel into the investigation of the pink salmon of Southeastern Alaska a very respectable amount of research effort. For instance, the full time services of 10 professional biologists will be available instead of the one heretofore employed. Concentrated use of planes, boats and other such facilities will increase the effectiveness of the work even more than an amount proportional to the additional monies diverted to it. For purposes of comparison with this expanded program we can refer to the investigation of the sockeye salmon populations of the Fraser River System carried on by the International Pacific Salmon Fisheries Commission. This research program has been widely acclaimed as representing the successful application of scientific procedures to fishery problems. It is interesting to note that while the Fraser River System covers an area similar to that of Southeastern Alaska, there have

in the past been put into it for research about 3½ times as much money and 10 times as much personnel. The concentrated program on pink salmon, however, will bring the amount of money and effort very close to that available for the Fraser River sockeye program.

ROUTINE OBSERVATIONS ON OTHER ALASKAN SALMON AREAS WILL BE CONTINUED: Concentration on the pink salmon of Southeastern Alaska does not mean that the other areas will be entirely abandoned. Routine observations of size of escapements will be continued in Bristol Bay and on the Karluk River and routine sampling of the herring catch will continue. These minimum observations will provide a continuing series for use in case of possible (and much needed) future studies in these areas and will provide the same basis as used in the past for the factual determination of fishery regulations. The fertilization experiments at Karluk Lake will also be continued, because of the very great promise they have shown for future improvement of the Karluk River runs. This work will require only a relatively small amount of funds and personnel.

ECA Procurement Authorizations for Fishery Products



Procurement and reimbursement authorizations for commodities and raw materials announced by the Economic Cooperation Administration during February and March included only one transaction for fishery products--$104,000 to be used for the purchase of canned fish (except shrimp, crab meat, or lobster) from the United States and Possessions for delivery to Belgium-Luxembourg.

A number of revisions and cancellations have taken place in the original authorizations and the revised total authorizations for fishery products (including fish meal and fish and whale oils) from April 1, 1948 (the beginning of the ECA program) through March 31, 1950, amounted to $29,782,000 (see Table 1). Of this total, $13,699,000 was authorized for the purchase of canned fish, $4,088,000 for salted fish, and $11,995,000 for fish meal and fish and whale oils (see Table 2).

Purchases of fishery products in the United States under the ECA program, from its inception through March 31, will total $9,191,000 ($7,063,000 canned fish and $2,128,000 fish and whale oils).

A technical assistance authorization of $30,000 for Korea was announced during February by ECA to be used to provide United States technical engineering services for fishing vessels.

Table 1 - Total ECA Procurement Authorizations for Fishery Products, April 1, 1948 - March 31, 1950

Commodity	Country of Origin	Recipient Country	Amount Authorized
			U.S.$
FISH (Edible):			
Fish, Canned	U.S. & Possessions	Belgium-Luxembourg	938,000
		Greece	304,000
		Ireland	779,000
		Italy	847,000
		United Kingdom	4,127,000
	Canada (including Newf.)	United Kingdom	6,636,000
Total Canned Fish			13,631,000
Fish, Salted	Canada (including Newf.)	French West Indies	150,000
		Greece	1,250,000
		Italy	2,688,000
Total Salted Fish			4,088,000
Total Edible Fish			17,719,000
BYPRODUCTS:			
Fish and Whale Oils	Norway	Austria	1,216,000
	U.S. & Possessions	France	23,000
	Newfoundland	France	257,000
	U.S. & Possessions	Germany	1,427,000
	Iceland	"	1,693,000
	Norway	"	2,960,000
	Belgium	"	2,201,000
	U.S. & Possessions	Netherlands	678,000
Total			10,455,000
Fish Meal	Iceland	Austria	183,000
	Canada (including Newf.)	Denmark	394,000
	Norway and Portugal	Germany	963,000
Total			1,540,000
Grand Total (Edible Fish and Byproducts)			29,714,000

Table 2 - ECA Procurement Authorizations for Fishery Products by Country of Origin and Commodity, April 1, 1948-March 31, 1950

Country of Origin	Canned Fish	Salted Fish	Total Edible Fish	Fish and Whale Oils	Fish Meal	Total Byproducts	Grand Total Fish & Byproducts
	(In U.S. Dollars)						
United States	6,995,000	-	6,995,000	2,128,000	-	2,128,000	9,123,000
Canada (including Newf.)	6,636,000	4,088,000	10,724,000	257,000	394,000	651,000	11,375,000
Iceland	-	-	-	1,693,000	183,000	1,876,000	1,876,000
Belgium	-	-	-	2,201,000	-	2,201,000	2,201,000
Norway	-	-	-	4,176,000	-	4,176,000	4,176,000
Norway and Portugal	-	-	-	-	963,000	963,000	963,000
Total	13,631,000	4,088,000	17,719,000	10,455,000	1,540,000	11,995,000	29,714,000

ECA Advocates Direct Relief for Localities Adversely Affected by Increased Imports

With reference to increased United States imports from European countries, Paul G. Hoffman, Economic Cooperation Administrator, made the following statement before a Joint Session of the Senate Foreign Relations Committee and the House Foreign Affairs Committee on February 21, 1950:

> "ECA has been subjected to some criticism because of its encouragement of increased European exports to the United States, because, it is charged, such increased exports will compete unfairly with domestically-produced goods. A percentage of exports to the U.S.A. which contributes to Europe's dollar earnings are noncom-

petitive in character. A most liberal estimate of the volume of competitive goods that Europe could sell in the United States, even in the year 1953, would be less than a billion and a quarter dollars. This billion and a quarter dollars should be measured against the total production of goods in the U.S.A. of more than $140 billion. Clearly, the absorption of any such amount of competitive goods could not have any appreciable effect upon our total economy. True, this new competition would create problems in a few localities--competition always does; but if there must be some relief in this situation, I suggest that it be given directly. Europe must have dollars to buy goods from us, and if we don't want to give her those dollars, we should let her earn them. Quite apart from the financial aspects of this problem, the relationship between the United States and Europe will never be on a sound basis until Europe is a cash-on-the-barrelhead customer, paying for what she gets."

Federal Purchases of Fishery Products

DEPARTMENT OF THE ARMY, JANUARY 1950: The U. S. Army Quartermaster Corps purchased 1,169,773 pounds (valued at $499,972) of fresh and frozen fishery products for military feeding during January 1950. This was a decline of 18 percent in quantity but an increase of 1 percent in value, compared with December 1949; but an increase of 26 percent in quantity and 45 percent in value, compared with the corresponding month a year ago.

Purchases of Fresh and Frozen Fishery Products by Department of the Army (January 1950 and 1949)

QUANTITY		VALUE	
January		January	
1950	1949	1950	1949
lbs.	lbs.	$	$
1,169,773	931,197	499,972	344,732

Fifth Record-Breaking Tuna Pack Reported for 1949

The tuna pack for 1949 set a new record for the fifth successive year—7,200,000[1] cases as compared to the 1948 record pack of 7,038,000 cases, which in turn was 1,100,000 cases more than the 1947 record.

In addition to the large pack for 1949, approximately 600,000 cases of canned tuna were imported, principally from Latin America, making a total of approximately 7,800,000 cases available for American consumption.

The average pack of tuna for the years 1935 to 1939 was 2,947,000 cases. Even during the war years (1940-45) the annual pack averaged only 3,400,000 cases.

The 1949 production of tuna would have been considerably greater if fishing had been uninterrupted throughout the year. However, as a result of disagreements between fishermen and canners over the price for tuna, tie-ups occurred in June and July and also during the fall months.

About 90 percent of all tuna canned in the United States in 1949 was canned in California. Most of the other 10 percent was canned in Washington and Oregon.

1/ Standard case of 48 No. 1/2 tuna (7 oz.) cans.

However, East Coast canners who are increasing tuna operations may become a more important factor in the future.

Tuna canned on the West Coast is caught principally off California and in Central and South American waters. However, in recent years, considerable quantities of albacore tuna have been taken off Washington and Oregon.

The operation of floating freezers, some of which have a capacity of over 1,000 tons, has recently been resumed following their tie-up with other boats last year. These ships go to the fishing grounds off Latin America to receive tuna direct from the fishing fleet and then carry the fish north to the canneries. During 1949, one freezer ship brought a load from Japan.

Fish and Wildlife in the National Economy

The role of fish and wildlife in the national economy is discussed in the publication Natural Resources Activity of the Federal Government[1/] issued early this year.

In discussing the relation of fish and wildlife to the economic welfare of the nation, the author states:

> The biological subdivision of the natural resources program of the Federal Government has had less systematic formulation and development than any of the major segments of the natural resources field. By comparison, the present program is still restricted and many of its elements lack clarification. Some subdivisions of this field, however, are well marked out. Especially is this the case with the fish and wildlife as related to recreation and sportsmanship, where the federal program is mainly one of research with some positive elements of management coupled with cooperation in state management programs.
>
> The regulation and management of the fisheries in the Alaskan waters and of the Alaskan seal herd is the most completely developed part of the federal program. This is largely due to the dominant responsibility of the Federal Government for all Alaskan affairs, and the special prominence of the biological resource of that area.
>
> Federal inaction has been especially noticeable in commercial offshore fisheries. The states have assumed jurisdiction for some degree of regulation of offshore fisheries, but their responsibility does not usually extend beyond the three, or, at most, the twelve-mile limit. The inactivity of some of the states, the inherent difficulties of their control over a migratory resource, and the location of more than two-thirds of the commercial fisheries beyond the limits of any assumed or implied state jurisdiction provide the setting for either federal activity or neglect of the field. But this is not all; the recent vigorous expansion of fishing on the high seas by many foreign nations may make America's comparative inactivity less tenable for the future. The restricted research and limited economic studies of this resource may not be in keeping with its potential position in the future program for American food resources, especially in light of the extensive program for the promotion and improvement of all other sources of food.

1/ Natural Resources Activity of the Federal Government, (Historical, Descriptive, Analytical), by J. R. Mahoney, Public Affairs Bulletin No. 76, Legislative Reference Service, The Library of Congress, Washington, D. C., January 1950, 249 p., $2.50. (This study was originally prepared for the Task Force on Natural Resources of the Hoover Commission but it was not included among the published documents of the Commission.)

Potential Development of Fishery Resources: Referring to the potential development of fishery resources and indicating that the biological resources are an important part of the expanding economy of our country and of the world, the author points out:

> Conservation of fishery resources will probably require public control, based on scientific knowledge and various measures to promote the highest continuous production at lowest cost that these resources can yield without impairing their productivity. The keystone of the conservation program must be adequate research. The greatest handicap now is lack of knowledge of the location, life processes, and potentialities of this resource.
>
> The recent average yield of the fisheries of the United States and Alaska has been about 4.5 billion pounds annually. This is considerably below the biological potential which Service scientists estimate at about 7 billion pounds under favorable economic conditions.
>
> The application of adequate conservation and management policies would increase the catch of those species that have suffered from overfishing, pollution, and loss of spawning grounds through the construction of dams and for other reasons. Such a policy may increase fish production by as much as 270 million pounds. The major portion of this increase would occur in the North Atlantic and the South Atlantic and Gulf areas where large quantities of small and unutilized species are taken in the trawl fisheries for groundfish and shrimp and might result in a total increase of 325 million pounds.
>
> The yield of a number of well-known species of fish and shellfish can be substantially increased through the intensification of existing fisheries. Production of minor species can also be increased.
>
> The application of farming methods to the growing and harvesting of oysters on depleted beds might result in a gain of 75 million or more pounds of oyster meat annually.
>
> The greatest way open to the increase of the yield of fishery products is through the construction of new modern fishing craft and the development of new grounds and fisheries. It is estimated that full development of new grounds and fisheries available to our fishermen would increase the annual catch by 1,250 million pounds. The largest increases would probably result from an expansion of our North Atlantic fishery for groundfish to the Grand Bank and Davis Straits. Our fishermen now seldom venture beyond Nova Scotia and few if any operate on the Grand Bank of Newfoundland. It is probable that an additional 500 million pounds of groundfish could be taken from these areas.
>
> In 1940 and again in 1941, the Fish and Wildlife Service conducted exploratory fishing operations in Alaskan waters for the purpose of investigating the supply of king crabs. In the search for crabs the expedition found great quantities of flatfish which would support a large fishery. Catches averaged almost a ton to a drag for 240 tows spread over 100,000 square miles of area and single tows as high as 9,000 pounds were recorded. Unexploited grounds where these fish may be taken amount to approximately 600,000 square miles of ocean, of which only about 60,000 square miles are now exploited. There is little basis for estimating the annual production that could be obtained from these waters, but it may average several hundred million pounds annually.
>
> The anchovies of the Pacific Coast are an untapped resource estimated to approach in numbers if not in weight the pilchard population which normally yields one-fourth of our present annual catch. Negligi-

ble quantities of anchovies are now being taken, although it has been estimated that the species is capable of supporting an annual catch of 250 million pounds.

Recent developments have opened to our fishermen an area which may be capable of supplying large quantities of tuna and possibly other varieties of fish. It is known that the Japanese carried on extensive tuna fishing in the Southwest Pacific. Observations by fishery investigators during the war indicate that it may be possible for our fishermen to develop an important tuna fishery in these waters. A million-dollar program to explore Hawaiian and Southwest Pacific waters is being inaugurated by the Service this fiscal year.

In the last 25 years, the fisheries catch has increased from 2.5 billion pounds to about 4.5 billion pounds annually. Whether the catch of fishery products will increase to the maximum level at which it can be maintained is mainly dependent on economic conditions and whether it is considered in the Nation's best interest to obtain additional supplies of fish by increasing our domestic catch or to secure them through imports. If demand and price are maintained at sufficiently high levels to make it profitable to expand production into new fishing areas, construct long-range vessels, and use species now discarded, the total catch can be increased rapidly.

Probably the only example of a fishery resource that has been successfully studied and conserved over most of its range is the Pacific halibut, administered by the International Fisheries Commission since 1930. This is the only fishery conservation agency that has come even close to being adequately supported in money and personnel. The commercial fisheries, taken as a whole, are probably among the least progressive industries in the United States. They are generally slow to improve products, to develop new ones, to exploit virgin resources, to correct wasteful fishing methods or to utilize the whole of their raw material. This backwardness is probably the consequence of its widespread, diffused character. The fishing industries are composed of small, independent enterprises, widely scattered along the extended coast lines; they are concerned with a great diversity of local fisheries and they are beset by a notoriously unstable supply. Most fishery companies must be conservative to survive, and they are generally too small to carry on technological research for developing new fields, except on a very limited scale. In most states, public agencies have not been equipped or staffed to help them. And the Federal Government gives only a fraction of the aid it accords other food industries.

In spite of a growing recognition of the need for regulating the commercial fisheries and for improving techniques of management, depletion of marine fisheries has continued. Some species have been exploited to the vanishing point as, for example, Atlantic salmon and sturgeon. The yields of other species, such as shad and oysters, have been impaired and little has been done to correct the situation.

Certain fundamental investigations are essential if the fisheries of a nation are to be developed to the fullest extent. From 1932 to 1948, the United States had no exploratory fishing vessel and no biological and oceanographical vessel. Having had no facilities for research at sea, little is known about the current status of some of our most important species of marine fish.

The essential elements in a program designed to enlarge this important source of food would include: biological investigations regarding variations in abundance and depletion of important species; technological studies for processing, handling, and distribution of fishery products and by-products; exploratory fishing; economic and

statistical studies on production, marketing, prices, investments, labor, and costs; development of inspection, standards and grades; consumer education; improvements in fish culture, fishery management studies; and adequate enforcement in those areas, such as Alaska, where the Department of the Interior promulgates the fishery regulations. The resulting benefits would be restricted without some means to carry to the industry by demonstration, discussion, and printed material, the results of the research program.

The following table illustrates the comparative status of the federal appropriations for the programs in the two subdivisions of our food resources, Agriculture and Fisheries.

Federal Appropriations, 1948

	Agriculture	Fisheries
Extension work	$ 28,365,000	none
Experiment stations	7,487,000	"
Economic investigations	4,100,000	$ 16,400
Statistical research	10,784,000	67,000
Marketing services	10,493,000	125,000
Commodity exchange	530,000	none
Labor supply program (1947)	12,000,000	"
Marketing agreements and adjustment programs	78,000,000	"
Conservation programs	188,000,000	1,097,000
Promotion of export and domestic consumption	44,000,000	160,000
Crop or harvest insurance	15,000,000	none
Research: basic principles of food production, marketing, distribution	6,000,000	12,000
Biological and technological research	54,500,000	545,000
Rural rehabilitation	97,000,000	none
Electrification	5,000,000	"
Loans and credit:		
Funds invested in corporations	596,000,000	"
Parity price program	274,000,000	"

Other Factors Which Affect Fish and Wildlife Resources: Abatement of the increasing pollution of our inland waters, which is causing tremendous losses in fish and wildlife, will aid in the restoration of our warm and cold water streams and will make essential habitat available to desirable forms of fish and wildlife, according to the author.

In addition, the large-scale programs for the development of the major river basins of the country now in various stages of construction and planning may cause large losses to wildlife and fishing resources, particularly in bottom land areas. The publication evinces that recent studies indicate that if properly coordinated investigations of river basins as a whole are made, a program can be developed which would facilitate the realization of all possible benefits to the many uses, including fish and wildlife resources.

Fishery Biology Notes

"ALBATROSS III" CONDUCTS SURVEYS ON WAY TO NORTH CAROLINA: The Service's North Atlantic Fishery Investigations' vessel, Albatross III, on its Cruise 30

(January 4-13) made a series of hydrographic and exploratory fishing surveys on its way to Morehead City, N. C. It left Woods Hole on January 4 and arrived at Morehead City on January 13.

A total of 1,608 salinity samples were collected; and 655 oxygen, 463 phosphate, and 277 iron determinations were made on board during this cruise.

Survey of New York City Bight: Vessel ran for the vicinity of New York on a course south of Long Island and met the tug Edmond J. Moran and the acid disposal barge Sayreville on the acid disposal area. Followed the barge during the entire dumping period, making acidity and iron determinations in the wake to determine the rate of diffusion of the effluent under winter conditions.

From January 5 through 7 an oceanographic survey was made of the New York City bight, which included Nansen-bottle lowerings; analysis on board of water samples for iron and oxygen content, collection of salinity samples for later analysis in the laboratory; continuous echo-sounder survey on all runs between stations, using two echo-sounding machines; continuous record of surface salinity and temperature; temperature records from surface to bottom; release of 16 drift bottles and 10 drift cards at each of 37 stations.

The echo sounder proved to be especially useful since it detected the wake of the barge, and later large schools of fish from one to five miles southeast of Ambrose Lightship. Fishermen who were contacted said they thought these might be mackerel which they had been catching recently. The presence of these schools was reported to fishermen and fishing columnists by radio. The anglers also reported catching haddock in the area in addition to the usual cod.

Survey Off North Carolina: On January 7, the vessel commenced the run south along the coast for North Carolina making salinity and temperature sections across the mouths of Delaware and Chesapeake Bays enroute. Released 8 drift bottles and 5 drift cards at each of the lightships, and took temperature records from surface to bottom.

From January 9 to 13, a detailed oceanographic survey of the North Carolina Coast from the Virginia to the South Carolina borders and between the shore and the 100-fathom contour, and in addition a cross section of the Gulf Stream southeast of Cape Fear were made. This involved continuous salinity and temperature record at the surface; continuous echo-sounder survey using two instruments set for high-intensity reproduction; sea-sampler lowering alternated with an auxiliary-sampler lowering every 20 minutes, and the temperature was also obtained on these lowerings; analysis on board of water samples for oxygen and phosphate content; collection of water samples for later salinity analysis; release of 16 drift bottles and 10 cards at stations located about 15 miles apart; and combined sea-sampler and Nansen-bottle lowerings at stations in the Gulf Stream.

Numerous large schools of fish were detected by the echo sounders. The echos appeared to be from five different species, and judging by the echo-sounder records, which were obtained from fishermen at Beaufort, they included menhaden and croaker. These records were plotted on a chart along with the temperature records at the surface and used as a basis for planning the trawl surveys which followed.

"ALBATROSS III" CONDUCTS EXPLORATORY SURVEY BETWEEN CAPE FEAR AND CAPE HATTERAS OFF NORTH CAROLINA: In order to determine the trawlability (i.e., to determine where trawls can be safely operated) and the available supply of food fishes oc-

TAKING A WATER SAMPLE AND TEMPERATURE WITH GREEN-BIGELOW BOTTLE ABOARD THE ALBATROSS III.

curring on the continental shelf, mainly in depths from 20 to 100 fathoms, between Cape Fear and Cape Hatteras, North Carolina, the Albatross III made four cruises. Data also were collected on many phases of the study of the ocean in the largest combined operation which the Service's North Atlantic Fishery Investigations' vessel has participated in to date. These studies covered ocean currents, basic productivity of the sea in the area, fish parasites, shrimp, chemical composition of invertebrates, and serological studies of fish blood.

A member of the Service's North Pacific Exploratory Program accompanied the vessel on all its trawling cruises as an observer. Several scientists from universities and biological laboratories on the East Coast also were aboard.

Cruise 31A (January 16 to 24, 1950): During this cruise, 45 tows were made with the No. 1½ Iceland otter trawl equipped with rollers and a tickler chain. Tows were made in depths ranging from 20 to 100 fathoms on the continental shelf from 30 to 40 miles south of Cape Lookout to 40 to 45 miles northeast of Cape Hatteras. Only two small tear-ups were experienced.

The catch of commercial species of fish was small except in the vicinity of Cape Hatteras where several large catches of "pin-head" croakers were made. Four hundred and forty-three of these fish were tagged in cooperation with the croaker program of the Middle and South Atlantic Fishery Investigations and cooperating State agencies.

Cruise 31B (January 27 to February 2, 1950): In the large triangular area encompassed within latitude 33°30' N., longitude 78°00' W. and the 100-fathom line, 48 tows (20 with rollers, 28 without rollers) were completed. Three additional tows were made on the western side of Onslow Bay in less than 20 fathoms. Three tear-ups occurred, two about 25 miles SE. x E. of Frying Pan Lightship in 60 to 70 fathoms and an entire net was lost 13 miles N. x E. of Frying Pan Lightship on an uncharted wreck in 17 fathoms.

The catch of commercial species during this cruise, like Cruise 31A, was very small. Several large tows of mixed scup, tomtate, pinfish, and pigfish were caught in the vicinity of Frying Pan Shoals. Many of these fish were below market size, however. Two hundred and sixteen scup were tagged January 29 approximately 30 to 32 miles SW. x S. of Frying Pan Lightship to provide information on their migratory patterns.

Cruise 31C (February 6 to 12, 1950): Forty-one tows, without rollers, covering the continental shelf between 20 to 100 fathoms and one outside the 100-fathom contour from 77°30' W. longitude to 76°30' W. longitude were completed

before adverse weather caused curtailment of scheduled work. Smooth trawlable bottom was encountered throughout the entire cruise, only one minor tear-up being experienced.

Fish of commercial importance were scarce, and when caught, were taken in very small quantities.

Cruise 31D (February 16 to 20, 1950): Continuing trawling operations without rollers, 22 tows, in depths ranging from 50 to 100 fathoms, and two outside the 100-fathom contour, between 76°30' W. longitude and 75°50' W. longitude were made during this cruise. Many of the tows were in close proximity to the tows completed during Cruise 31A. Winds of whole gale force and failure of electronic equipment twice forced the Albatross III to return to port before the scheduled stations could be completed. However, the southern half of the area covered during Cruise 31A was given adequate coverage; and except for one bad tear-up at 34°11.5' N. latitude and 76°06.5' W. longitude caused by coral and conglomerate rock, the bottom proved to be smooth and trawlable.

Observations on Trawlability of the Area Covered During All the Cruises: A total of 146 tows (53 with rollers and 93 without rollers) was made with the No. 1½ Iceland otter trawl, in depths ranging from 15 to 100 fathoms from latitude 35°00' N. to longitude 78°00' W. Three tows were made outside the 100-fathom contour within this area. In addition, 15 tows were made outside this area—three in Onslow Bay, six between latitude 35°00'N. and Diamond Shoals Lightship, and six about 45 miles NE. of Diamond Shoals Lightship.

In 500 miles of actual trawling operations during the four cruises, only eight tear-ups were experienced, and it can be concluded then, that the continental shelf between 20 and 100 fathoms from Cape Hatteras to Cape Fear is reasonably safe for trawling without rollers.

Notes on the Abundance of Food Fish: The catch of commercially important fish was very disappointing. Small catches (1 to 3 bushels) of vermilion snappers, weakfish, red porgy, white-bone porgy, and isolated groupers; and larger catches (3 to 10 bushels) of scup, tomtate ("red-mouth"), pinfish, and "pin-head" croakers were the best made. These food fishes, except groupers, were most abundant in the vicinity of Frying Pan Shoals and Diamond Shoals, in depths of 15 to 30 fathoms. Groupers, apparently a non-schooling species, were taken in depths over 50 fathoms.

"ALBATROSS III" MAKES SECOND 1950 OCEANOGRAPHIC SURVEY OFF NORTH CAROLINA: The objectives of Cruise 32 made by the Albatross III from February 25 through March 6, 1950, were to make a second 1950 oceanographic survey off the North Carolina coast between the shore and points three miles beyond the 100-fathom contour and to obtain a temperature profile along the 71°30' meridian from 150 to 50 fathoms. Observations involved the following:

1. Continuous salinity and temperature records near the surface using the STD apparatus.

2. Continuous echo-sounder survey using two fathometers set for high intensity reproduction.

3. Alternate sea-sampler and bathythermograph lowerings every twenty minutes to a half hour. Each BT to be equipped with a "side-saddle" water sampler and a "scoop-fish" bottom sampler attachment.

4. Release of ten or more drift bottles at each of the prescribed stations.

5. Combined sea-sampler and Nansen-bottle lowerings at one hydrographic station at 32°30' N., 77°16' W.

The Albatross III returned to Woods Hole, Massachusetts, its home port, on March 6.

ATOMIC ENERGY AND SHELLFISHERY RESEARCH: Interest in problems of pollution by fission products arises because of the possibility of widespread utilization of atomic energy in industrial plants, electric power plants, etc., according to the Service's Research Biologist in charge of this project at the Beaufort (North Carolina) Shellfish Laboratory.

The Atomic Energy Commission instigated a number of investigations regarding effects of radioactive waste pollution of air and water on our economy. In respect to effects of such pollution by waste products of industrial nuclear reacters on our fisheries, the Commission entered into two cooperative agreements with the Fish and Wildlife Service. One of these deals with the effect of radiation on fresh-water fishes, and the other concerns the action of radioactive materials on marine forms, particularly marine invertebrates. From the point of view of conservation of our fishery resources the latter is important, for it is concerned with the food chains leading to the higher fishes and man. Any break or interruption in the chain may be quite serious, as the food of the higher forms consists of other forms which, in turn, depend on still other organisms, ending with the small marine plants which obtain their nutrients directly from the environment. At the Beaufort Laboratory, the Service is concerned with this problem of pollution in marine environments.

The first and primary project is a survey of the accumulation and biological life of radioactive materials in invertebrates. While giving an answer to the Atomic Energy Commission on damages to various marine life by possible pollutants, this also gives material for evaluating food chains in all our fishery organisms. The other projects are concerned with problems in production of shellfish, both oysters and clams, of the highest marketable quality.

Radioisotopes of the various elements have proved to be a very important research tool in biology and medicine. By introducing into a compound or food an isotope of an element having an unstable nucleus and emitting radioactive particles or rays, it is possible to follow the metabolism of the tagged compound in the animal body. At Beaufort, the Service plans to use this new research tool for a study of the metabolism of shellfish in order to learn what constitutes food of oysters and clams and how this food is taken in and used by these shellfish. It is anticipated that very valuable information will be obtained that will find application in oyster culture and lead to an increased yield and a better quality product for the oyster industry.

To carry out this work, the activities have been divided into three categories of research. One is research on micro-organisms; it is concerned with small plants and animals that may serve as food. The second category deals with physiology and biology of oysters and clams in regard to mechanisms of feeding and digestion. The third is research on biochemistry of oysters and clams to learn what uses are made of various food materials eaten.

At present, the project is in the organization stage and a building is being remodeled for use as a laboratory. It is anticipated that the project will be actively under way by midyear. Preliminary experiments are being made now on the culture of phytoplankton which may be considered as the starting material in the food chain of higher animals.

REPORT ON THE CLAM RESEARCH PROGRAM: The Service's five-year clam research program is well underway, according to a report from the Chief of Clam Investigations, Boothbay Harbor, Maine.

Soft clam research is centered at Boothbay Harbor, Maine, and Newburyport, Mass. Headquarters of hard clam (quahaug) research is at Kingston, R. I., with projects at Milford, Conn., New Brunswick, N. J., and Beaufort, N. C.

In Maine, Sagadahoc Bay and Robinhood Cove were chosen for intensive studies to learn everything possible of their soft clam populations. Spawning, larval life, currents, temperature, salinity, etc. are being followed to determine factors which cause variations in setting intensity. Marked clams have been planted in various places to determine growth rate and natural mortality. Catch per unit of effort is determined from diggers' records and indicates abundance level of clams. An annual census is taken by sampling to determine number and size composition of clams in each bay. From these data it is expected to predict the number of clams which can be harvested each year while leaving enough for ensuing years. The predicted catch limit will be compared with actual production and correlated with population trends. The States can use methods developed by these studies to manage their clam fisheries on a sustained yield basis.

Depletion of soft clam resources in Massachusetts and New Hampshire has been spectacular. An experimental clam farm, established in Plum Island Sound to determine a practicable method of increasing production, provided a check on relation between variables of environment and survival and quality of clams. Horseshoe crabs invaded the planted areas and destroyed most of the seed. An unexplained mortality killed the remainder. Fencing recently seeded areas, as indicated by an experiment in 1949, may control horseshoe crab predations. Studies will be continued this summer to check the value of this method and to develop others. Pathological studies are in progress on the disease problem. Clams from many areas will be planted to find a disease-resistant strain. Disappearance of soft clams is often blamed on overfishing. Pollution has closed over half of Massachusetts' clam flats and diggers have concentrated on remaining areas. A clam population census of Plum Island Sound was taken and production records are being obtained from dealers. From these data it may be possible to determine if fishing intensity has been great enough to cause the depletion.

Hard clam research studies in Greenwich Bay, Rhode Island, are directed at developing methods for managing the quahaug fishery on a sustained yield basis. Greenwich Bay, which contains about four square miles of quahaug beds below low-tide level and supports 30-50 diggers, will be studied intensively to determine how many quahaugs it can produce yearly. As a part of the problem of regulating the fishery, the Rhode Island Fish and Game Commission asked the Service to determine relative effects of hand versus power methods of fishery. After a survey of Narragansett Bay, the Service selected a three-acre experimental area which the Rhode Island Commission closed to commercial digging. A third of the tract was fished in the summer of 1949 by hand raking; another third was dredged by a commercial power dredge; and the remaining third was held as a control. The same amount of quahaugs was taken from each plot. Following the fishing, under-

water photographs and bottom samples were taken in each part of the area to determine the effect of the digging. Dredging and raking will be repeated in the summer of 1950 and the experiment concluded. This work should provide a biological basis for determining whether one method of fishing is more desirable than the other.

Physiological and ecological studies at the Milford, Conn., laboratory of hard and soft clam larvae will give information needed to determine causes of variations in intensity of setting. Successful methods of culturing bivalve larvae developed in this laboratory have led to preparation there of samples, slides and photographs of several species of larvae. These aid greatly in identification of hard and soft clam larvae in field plankton samples.

Cooperative hard clam research with Rutgers University, New Brunswick, N. J., began last summer and will continue in 1950. Studies are being made of ecological factors affecting spawning, larval development, and setting of quahaugs along the New Jersey coast. This fundamental knowledge must be obtained before quahaug farming can be practicable, as a source of seed is the first requirement.

Recently developed methods using radioactive tracers will be applied to clam as well as oyster research. The Beaufort, N. C., shellfish laboratory's investigation of foods, feeding and metabolism of clams will furnish information necessary for evaluating the food supply in different areas and for understanding the fattening process.

THE CHESAPEAKE BAY INSTITUTE: The Chesapeake Bay Institute, sponsored and financed by Maryland and Virginia and the Naval Research Branch of the U. S. Navy, began hydrographical studies of Chesapeake Bay waters in the summer of 1949. This group, affiliated with Johns Hopkins University, established a field headquarters and a laboratory at Annapolis, Maryland. The two boats of the Institute cover the entire Chesapeake Bay and most of its tributaries.

The chief part of its investigations is concerned with water circulation and chemistry. Activities of the Institute complement the biological studies already in progress by the Fish and Wildlife Service and Maryland and Virginia organizations.

REHABILITATION AND MAINTENANCE OF OYSTER PRODUCTION POSSIBLE IN CHESAPEAKE BAY: Rehabilitation and maintenance of oyster production are possible in Chesapeake Bay, states the Chief of the Service's Chesapeake Bay Investigations in discussing the current research program for Maryland.

Brood stock levels, adequate cultch provisions, and harvesting limited to potential productivity must be known and respected. Controlled oyster cultivation must supplant irresponsible free fishing.

What Current Field Exploration Revealed: Current field exploration revealed several features of the Maryland portion of Chesapeake Bay which were either ignored or unknown as factors in oyster production. In the upper part of the Bay, flood waters frequently reduced salt content to dangerously low levels. The affects on oysters were high mortalities, inhibited growth, and retarded development of gonads and meats. As a result of periodic high mortalities and erratic recruitment in this area, many of the bars were reduced to beds of shells. This is veritably a "no oyster's land" because fluctuations in salinity change the

environment from fresh water to 15-parts-per-thousand salt within the annual period; often this radical change is accomplished within a few weeks or days.

Inventory surveys were conducted annually throughout Maryland oyster-producing waters and recently in major tributaries of Virginia. The results have given a year by year record on changes in oyster population including recruitment. From these data, gathered over the past ten years by the Department of Tidewater Fisheries of Maryland and the Fish and Wildlife Service, a recruitment potential may be calculated so that a formula composed of natural recruitment, plus planted seed (if needed), minus natural mortality, equals oysters available for commercial harvesting.

To make a program based on this formula function at a level that will permit a planned increase in production, a seed oyster supply of sufficient volume must be developed and maintained. Locations of areas or bars best suited for seed oyster development were disclosed through evidence collected on inventory surveys. At present, four areas are under development. The acreage actually used is small and entirely inadequate to increase production materially. The limitation is not on available acreage, but on available cultch.

Cultch: Shells from shucking houses constitute the bulk of cultch. Under present distribution of shells in Maryland, those available for cultch represent the portion not claimed by road construction, drainage fill, shell grinding for poultry trade, and lime for agricultural use. A further complication in procurement of shells for planting in seed areas is the necessity for the State to purchase them on a competitive market with limited funds allotted for the purpose.

The problem of supplying adequate cultch for meeting an expanding seed requirement demands a substitute for shells or locating untapped sources of shells. The first part of the problem is being studied by determining the efficiency of steel furnace slag, scrap tin, and plaster fragments from discarded broken foundry molds. The second part can be answered by utilizing the vast accumulation of shells in upper Chesapeake Bay as a local source and importing similar unused supplies.

To Stem Destruction and Bring About Rehabilitation of Oyster Beds: To stem destruction of oyster beds and to bring about systematic rehabilitation and increase in commercial production the following investigations were undertaken:

1. Setting: seasonal setting of oysters in several areas of the Bay and tributaries was determined by study of shell bags placed and removed at weekly intervals. Bags were placed well in advance of the earliest possible setting date. Fouling was recorded at the same time the bags were examined for setting of oysters. Distribution of oyster larvae and setting were observed simultaneously in many places.

   The period of maximum setting disclosed in these experiments determined the most effective time for shell planting. This information was incorporated immediately in the State shell-planting program.

   Within promising seed areas, such as Eastern Bay and Holland Straits, exploration of intensity of setting, distribution and survival of larvae, and location of spawners,

were observed with relation to water circulation, chemical and physical changes in the water, and physical condition of the bottom. These observations are still in progress.

2. Fouling organisms: the biology of major fouling organisms was studied under the same ecological circumstances. Results of some of these observations helped to determine relationship between successful seed production and failure. Barnacle setting occurred in early spring and reached a maximum by mid-May. To avoid unnecessary fouling by this organism, shell planting was concentrated between May 15 and July 1. Successful results in seed production vindicated the limited period of planting.

With other fouling, such a clear-cut freedom from shell contamination was not always possible because of similarity of timing of oyster setting and fouling. A method of control was developed through use of DDT treatment of shucking-house shells. Bryozoa, algae and barnacles were inhibited by a film of DDT, while oysters did not materially refrain from setting on these shells if a period of about 4 weeks elapsed before beginning of oyster setting.

3. Rates of growth: oysters have varying rates of growth. A controversy exists concerning whether growth tendency is inherent principally to the individual oyster or to the environment. The first approach made by Mr. Engle's staff was centered on the effect of environment on rate of growth.

Observations were made on seed oysters from Eastern Bay transplanted to growing grounds in areas having widely separate salinity levels. On the basis of observations conducted for a period of 18 months it seemed that low salinity of about 5 parts per thousand inhibited growth and in salinities from 10 to 30 parts per thousand oyster growth appeared proportional to increase in salinity. Some field evidence demonstrated that the upward change in salinity on one bar would induce a rapid increase in growth of oysters that initially appeared to be stunted. The example occurred in 1943 and 1944 on upper Bay bars. Growth was stopped practically in 1943 and early 1944 when fresh water and low salinity prevailed. A dry summer and fall of 1944 raised the salinity above 10 parts per thousand and oysters with stagnated growth increased over an inch in length and several times in volume.

4. Quality of meats: oysters are valued by the condition of their meats. The fact is well established that a wide range exists in quality of meats frequently in oysters from different parts of one bar as well as over distinctly separated areas.

A series of observations in Maryland were made to study this fact. The method employed in many investigations to measure condition was the ratio of the dry weight of the meats to the shell cavity. This is a practical measurement for determining commercial gallon yield from the collected bushel. A weakness exists in application of the method to determine exact differences in food quality. In this laboratory it was felt that glycogen is a more reliable measure of difference in quality. Glycogen in oyster varies from bar to bar and from area to area.

Why these differences exist raises also the question of inherent capacity or environmental effect on condition. The environment in two areas in the same immediate locality where oysters have been demonstrated to be different with respect to glycogen is being studied. Results to date fail to show any relationship due to changing salinity and temperature.

Fur-Seal Pups' High Mortality Due to Violent Storms

Hundreds of fur-seal pups were found dead along the coasts of Washington and Oregon after severe storms in January, the U. S. Fish and Wildlife Service announced March 16. In former years, not more than a dozen fur seals (of all ages) have been found washed ashore.

Last summer, the Service tagged 20,000 pups at the Pribilof Islands. Of these tagged pups, 16 were found among the dead animals in the vicinity of Astoria, Tillamook, Newport, and Reedsport in Oregon and on the Washington coast. This is an unusually high percentage of deaths and is an indication that many hundreds of other pups, which were not found, must have died.

The young seals apparently died in the churning seas that accompanied the low temperatures and violent 90-mile-an-hour gales of last January's storms. Like other fur seals, the pups migrate South for the winter, returning to the Pribilofs in the spring. About 3,000,000 fur seals gather in the Pribilofs yearly to breed.

TELEPHOTO SHOT OF BULLS, COWS AND PUPS ON ST. PAUL, PRIBILOF ISLANDS, ALASKA.

Under the protection and management of the Fish and Wildlife Service, the fur seals have increased from a low of 132,000 in 1910.

The present group of year-old seal pups will be ready for harvest in 1952, when the surplus three-year-old males are killed. Although the 1952 take may be reduced, the Service does not expect the loss to affect the fur market. To prevent any drastic fluctuations in supply, a reserve of skins has been built up in past years by the fur company which handles the processing and sale of the skins for the Government.

Pacific Oceanic Fishery Investigations

EXPLORATORY VESSEL "JOHN R. MANNING" ARRIVES AT HONOLULU: The exploratory fishing vessel, John R. Manning, arrived at Honolulu on March 26 after an 11-day voyage from San Pedro, California, reports the Service's Pacific Oceanic Fishery Investigations.

Constructed along typical lines of a Pacific Coast purse seiner, the vessel has a cruising range of 8,000 miles and a brine refrigeration system to preserve about 30 tons of tuna for subsequent studies on the quality of fish taken from unexploited areas.

The vessel will engage in a shakedown cruise for a period of about ten days in the vicinity of the Hawaiian Islands to thoroughly test the operation of the fishing gear before departing on a long range cruise. The John R. Manning is scheduled to depart about April 20 to the vicinity of the Line Islands to explore for new fishery resources and to conduct studies on how these may be economically exploited.

The fleet of three vessels for the Pacific Oceanic Fishery Investigations is now complete.

School-Lunch Use of Fish Increased by Demonstrations

Following the Fish and Wildlife Service's demonstrations on the use of fish in school lunches, an increase of more than 100 percent has been noted in the frequency and amount of fish that is included in the hot-lunch programs of those public schools where the demonstrations were made.

In Virginia, during 1949, 28 demonstrations were conducted by the Service. In a study of menus of 41 schools which took part in the demonstrations, it was found that the average number of times fish were served had increased 137 percent in November of 1949 as compared with November of 1947. It was also noted that the average number of pounds of fish used in these schools increased 116 percent.

That these increases were the result of work done in schools by the Service is shown by a study of menus of 8 schools selected at random for comparative purposes. These schools had not participated in the demonstration program. From

SERVICE'S HOME ECONOMIST PREPARING FISH FOR A SCHOOL-LUNCH DEMONSTRATION.

these it was found that fish was used an average of 2.2 times in November 1947 and 1.9 times in November 1949, or a decrease of 14 percent. The poundage of fish used, however, showed an increase of 2 percent.

Similar results have been experienced in Georgia and other States where school demonstrations have been held. In addition to Virginia, there were 16 demonstrations given in Massachusetts, 15 in California (principally in the Los Angeles and San Francisco regions), 10 in North Carolina, and 29 in Georgia. Other States where occasional demonstrations were conducted during 1949 were Maryland, Florida, Tennessee, Mississippi, and Washington.

The value of this school lunch educational program lies particularly in the assistance rendered by the marketing specialists in alleviating supply problems, and in acquainting school-lunch personnel and purchasing officers with new and different varieties, cuts, and packs of fishery products. Many school-lunch operators commented on the ease of preparation and increased acceptability of fish prepared by the new and different Service recipes.

In many cases, schools found that operating costs have been reduced through suggestions by the Service to blend more expensive varieties of fish, such as salmon and tuna, with less expensive varieties. An interesting fact was revealed when it was shown that country school children were more receptive to fish than city children—which indicated that rural areas hold good possibilities for fish consumption.

South Atlantic-Gulf Menhaden Fisheries, 1949

The menhaden season ended in February and the total catch for the South Atlantic and Gulf areas is expected to surpass last year's record-breaking catch, according to a report of the Service's Fishery Marketing Specialist making a survey of the area. The continued expansion of the industry in the Gulf accounted for most of the increase. Plants at Morehead City and Beaufort, North Carolina, report a poor season. The fish did not appear in that area, but at Southport (some 100 miles to the south), they had a record-breaking production.

There was increased evidence that the stickwater is being utilized more and more over the entire area.

Oil prices were lower in 1949 than in 1948, and there seems to be little hope that they will be much higher in 1950. Preliminary returns from a few firms show that they received around 35 cents per gallon for menhaden oil (less than 5 cents per pound). However, fish meal prices held up fairly well during 1949, with the bulk going at $140 to $180 per ton. Some producers viewed the 1950 season with some skepticism as a result of large inventories of pork and chicken and lower prices expected for these products.

United States Imports of Fish Nets

The imports of fish nets and netting during 1949 were only 17 percent greater in poundage and 14 percent in value over those for 1948. The volume of otter trawls did not show much increase, but that for cotton fish nets and netting nearly doubled. Gill netting of all kinds decreased in 1949 as compared with the previous year.

Table 1 - U. S. Imports of Otter Trawl and Cotton Netting, 1948-49

Country of Origin	Otter Trawl Nets (Manila Only)				Cotton Fish Nets (does not include under 50¢ a lb.)				Cotton Fish Nets & Netting, All Others			
	1949		1948		1949		1948		1949		1948	
	Lbs.	Val.($)	Lbs.	Val.($)	Lbs.	Val.($)	Lbs.	Val.($)	Lbs.	Val.($)	Lbs.	Val.($)
Canada	-	-	-	-	4,958	8,007	10,742	12,445	105	273	3,070	6,415
Mexico	-	-	19,799	17,420	-	-	-	-	-	-	-	-
United Kingdom	470,009	267,424	462,568	261,947	64	53	3,293	14,451	1	6	-	-
Portugal	-	-	805	443	-	-	-	-	-	-	-	-
France	-	-	-	-	-	-	208	869	-	-	-	-
Belgium	87,521	49,990	11,779	6,953	-	-	-	-	-	-	-	-
Netherlands	105,225	58,989	68,512	44,949	17,211	55,076	33,445	63,237	-	-	944	3,262
Denmark	-	-	-	-	400	681	-	-	-	-	-	-
Germany	-	-	4,184	2,522	98	421	268	1,535	-	-	-	-
Japan	37,203	14,910	72,906	31,710	104,042	148,448	29,108	46,214	22,911	13,849	1,023	1,153
China	1,091	388	-	-	-	-	-	-	-	-	-	-
India	-	-	-	-	1,953	5,839	5,957	15,036	-	-	-	-
Total	701,049	391,701	640,553	365,944	128,726	218,525	83,021	153,787	23,017	14,128	5,037	10,930

England remained the main source for trawl nets with the Netherlands in second place. Japan was the principal country to export cotton gill nets and netting.

The imports of linen (flax) gill nets dropped nearly 80 percent from the preceding year, while those for hemp gill nets and other gill netting increased. The volume and value of these items, however, are not significant. (See Commercial Fisheries Review, April 1949, p. 34.)

Table 2 - U. S. Imports of Gill Nets, 1948-49

Country of Origin	Gill Netting, Flax (More than $1.00 a lb.)				Gill Netting, Hemp (More than 60¢ a lb.)				Gill Netting (All Others)			
	1949		1948		1949		1948		1949		1948	
	Lbs.	Val.($)	Lbs.	Val.($)	Lbs.	Val.($)	Lbs.	Val.($)	Lbs.	Val.($)	Lbs.	Val.($)
Canada	347	1,880	1,918	4,524	-	-	140	261	353	2,524	500	400
Mexico	-	-	-	-	-	-	-	-	-	-	10	5
United Kingdom	212	821	1,016	2,144	-	-	-	-	-	-	-	-
France	-	-	-	-	21	60	-	-	116	237	-	-
Netherlands	-	-	2,344	8,840	-	-	-	-	-	-	-	-
Italy	-	-	-	-	4,589	5,715	595	659	1,272	409	699	268
Japan	1,806	3,548	5,794	12,090	-	-	-	-	1,160	348	-	-
China	-	-	-	-	720	750	667	600	-	-	-	-
Total	2,365	6,249	11,072	27,598	5,330	6,525	1,402	1,520	2,901	3,518	1,509	673

Wholesale and Retail Prices

WHOLESALE PRICES: Average prices for all commodities at the primary wholesale level advanced slightly during the week of February 14 and were 0.9 percent above four weeks earlier, but 4.0 percent below a year earlier, according to the Bureau of Labor Statistics of the Department of Labor.

All food prices advanced 1.2 percent from January 17, 1950, to February 15, 1950, and were 2.8 percent below mid-February a year ago.

Prices in February this year for all fish and shellfish (fresh, frozen, and canned), on the other hand, were 6.4 percent below January 1950, and 9.4 percent lower than in February 1949. Based on 1947 as 100, the wholesale index for all fishery products was 96.8 for February 1950. Comparing fish and shellfish prices in February with those prevailing a month earlier, the biggest declines occurred in fresh drawn, dressed, or whole (-11.7 percent); processed fresh (-4.6 percent); and canned (-3.8 percent); with a slight increase in processed frozen fish and shellfish (+0.4 percent). Compared with a year earlier, however, prices in February this year were still higher by 10.6 percent on fresh drawn, dressed, or whole; 1.8 percent on processed fresh; 4.5 percent on frozen processed; but 28.4 percent lower on canned fishery products (see Table 1).

Table 1 - Wholesale Average Prices and Indexes of Fish and Shellfish, February 1950

GROUP, SUBGROUP AND ITEM SPECIFICATION	POINT OF PRICING	UNIT	AVERAGE PRICES			INDEXES (1947 = 100)		
			Feb. 1950	Jan. 1950	Feb. 1949	Feb. 1950	Jan. 1950	Feb. 1949
ALL FISH AND SHELLFISH (Fresh, Frozen, and Canned)	-	-	-	-	-	96.8	103.4	106.8
Fresh & Frozen:								
Drawn, Dressed, or Whole:	-	-	-	-	-	109.4	123.9	98.9
Haddock, large offshore, drawn, fresh	Boston	lb.	10.588¢	14.644¢	8.445¢	110.3	152.5	88.0
Halibut, Western, 20/80 lbs., dressed, fresh or frozen	New York City	"	33.2¢	32.7¢	29.4¢	97.0	95.4	85.7
Salmon, king, lge & med., dressed, fresh or frozen	" " "	"	46.9¢	47.0¢	45.4¢	115.1	115.1	111.3
Lake trout, domestic, mostly No. 1, drawn (dressed), fresh	Chicago	"	57.0¢	56.1¢	59.0¢	125.2	123.2	129.6
Whitefish, mostly Lake Superior, drawn (dressed), fresh	"	"	48.5¢	49.6¢	55.0¢	140.2	143.4	159.0
Whitefish, mostly Lake Erie pound net, round, fresh	New York City	"	53.1¢	51.8¢	59.8¢	120.1	117.1	135.1
Yellow pike, mostly Michigan (Lakes Michigan & Huron), round, fresh	" " "	"	46.5¢	45.2¢	54.4¢	108.9	106.8	127.3
Processed, Fresh:	-	-	-	-	-	93.0	97.5	91.4
Fillets, haddock, small, skins on, 20-lb. tins	Boston	lb.	32.8¢	38.4¢	27.2¢	117.9	137.8	97.7
Shrimp, lge (26-30 count), headless, fresh or frozen	New York City	"	63.9¢	63.2¢	64.8¢	92.2	91.2	93.4
Oysters, shucked, standards	Norfolk area	gal.	$3.562	$3.95	$3.50	87.7	97.2	86.2
Processed, frozen:	-	-	-	-	-	102.4	102.0	98.0
Fillets: Flounder (yellowtail), skinless, 10-lb. boxes	Boston	lb.	30.0¢	30.0¢	28.2¢	96.8	96.8	91.2
Haddock, small, 10-lb. cello-pack	"	"	29.5¢	29.0¢	29.9¢	133.5	131.2	108.1
Rosefish, 10-lb. cello-pack	Gloucester	"	21.2¢	21.2¢	21.1¢	106.0	106.0	105.3
Shrimp, lge (26-30 count), 5- to 10-lb. boxes	Chicago	"	63.0¢	63.0¢	64.0¢	91.1	91.1	92.6
Canned:	-	-	-	-	-	88.2	91.6	123.1
Salmon, pink, No. 1 tall (16 oz.), 48 cans per cs.	Seattle	per doz. cans	$3.632	$3.632	$5.848	94.7	102.7	152.5
Tuna, light meat, solid pack, No. ½ tuna (7 oz.), 48 cans per cs.	Los Angeles	per case	$14.25	$14.250	$16.750	92.7	92.7	109.0
Sardines (Pilchards), California, tomato pack, No. 1 oval (15 oz.), 48 cans per cs.	" "	per case	$5.50	$5.50	$7.50	61.5	64.3	83.9
Sardines, Maine, keyless oil, No. ¼ drawn (3¼ oz.), 100 cans per cs.	New York City	per case	$7.50	$7.50	$9.25	73.6	71.1	90.7

NEW INDEX OF WHOLESALE FISH AND SHELLFISH PRICES: A new index of wholesale fishery products prices was released April 12 by the U. S. Department of Labor's Bureau of Labor Statistics. The new index provides, for the first time, a comprehensive measure of monthly changes in the primary market prices of edible American fishery products.

The index is computed from 18 price series (17 of which are supplied by the Fish and Wildlife Service) representing price movements for the major segments of the fisheries industry. Price series for dressed, drawn, or whole fin fish (haddock, halibut, king salmon, two series for whitefish, lake trout and yellow pike) reflect the price movements of fin fish in landed condition. Price series for processed fresh fish and shellfish (haddock fillets, shrimp, and oysters) reflect price movements of fish and shellfish which have been filleted, shucked, etc. Price series for frozen processed fish and shellfish (flounder fillets, haddock fillets, rosefish fillets, and shrimp) reflect price movements of all fish fillets and shellfish which have been frozen or otherwise processed. Price series for canned fish (pink salmon, tuna, California sardines, and Maine sardines) reflect the price movements of all canned and cured fish.

A detailed explanation of the construction of the new index of wholesale fish prices, together with tables of prices and indexes for individual items from January 1948 through February 1950 accompanied the Bureau's publication, Average Wholesale Prices and Index Numbers of Individual Commodities, for February 1950.

The base period (1947=100) for this new index is subject to change at the time when the comprehensive Wholesale Price Index is revised and a new base period adopted.

RETAIL PRICES: The retail food price index on February 15 was 194.8 percent of the 1935-39 average, 2.5 percent lower than a year ago, but 34 percent above the June 1946 level. Between mid-January and mid-February average food prices declined 0.6 percent. Compared with mid-January, February 15 retail prices of meats and poultry were higher, but lower for all fishery products (see Table 2).

Table 2 - Retail Price Indexes for Foods and Fishery Products, February 15, 1950

Item	Index No. (1935-39 = 100)	Percentage change from--	
	Feb. 15, 1950	Jan. 15, 1950	Feb. 15, 1949
All Foods	194.8	-0.6	- 2.5
All Fish and Shellfish (Fresh, Frozen, & Canned)	293.7	-2.7	-10.2
Fresh and Frozen	265.1	-2.6	- 0.8
Canned Salmon: Pink	345.6	-2.9	-25.9

Wholesale Prices of Marine Oils, 1949

Wholesale prices of all marine oils during 1949 were lower than in 1948, according to the Bureau of Agricultural Economics of the Department of Agriculture.

Record wholesale prices were paid for all marine oils (except for Newfoundland cod oil) during 1947, and since that year prices have been declining. Prices for Newfoundland cod oil reached their record high in 1948.

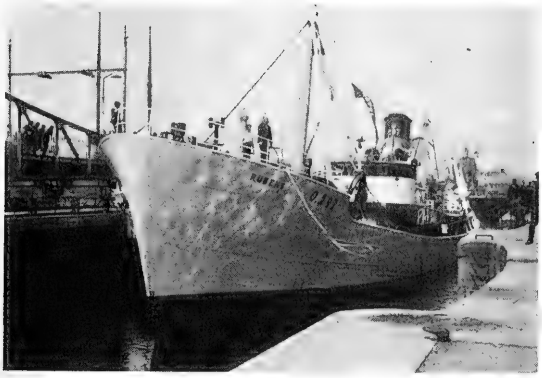
Marine Oils: Wholesale Prices at Specified Markets, Averages 1935-39 and 1937-41, Annual 1943-49

Type of Oil	1949	1948	1947	1946	1945	1944	Average 1937-41	Average 1935-39
	(cents per pound)							
Cod oil, Newfoundland, drums, N. Y. 1/	15.9	23.9	6/ 21.6	6/ 11.9	11.6	11.8	7.3	5.7
Cod liver oil, medicinal, U.S.P., Norwegian, barrels, N. Y. 2/	28.2	34.4	39.5	36.8	32.9	33.6	19.2	11.5
Menhaden oil:								
Crude, tanks (works), Baltimore	8.0	17.0	6/ 18.7	11.1	8.9	8.8	4.9	4.4
Light, refined, drums, carlots, N. Y. 3/	13.3	21.8	24.9	15.9	13.0	12.6	7.9	7.2
Sardine oil, crude, tanks, Pacific Coast 4/	7.6	18.0	6/ 22.2	11.6	8.9	8.9	5.4	4.8
Sperm oil, natural, 45°, drums, N. Y. 5/	18.8	25.4	6/ 26.9	6/ 13.1	13.1	13.1	9.3	8.7
Whale oil, refined, bleached winter, drums, N. Y.	-	-	-	6/ 12.3	12.3	12.3	9.5	8.7

1/ Barrels before July 1941. Converted from price per gallon on the basis of 7.5 pounds per gallon.
2/ Before June 1944, converted from price per barrel on the basis of 230.4 pounds per barrel. Beginning June 1944, converted from price per gallon on the basis of 7.68 pounds per gallon.
3/ Less than carlots, December 1944-December 1948.
4/ Before July 1942, converted from price per gallon on the basis of 7.5 pounds per gallon.
5/ Quoted as natural before May 1943.
6/ Average for less than 12 months.

FOREIGN

Belgium



BELGIAN TRAWLER READY TO LEAVE FOR THE FISHING GROUNDS.

REVIEW OF THE FISHERIES, 1949: Production: The Belgian fish catch in 1949 totaled 61,349 metric tons, slightly below the 1948 total, but still about 55 percent above 1938, according to American Embassy reports dated December 28, 1949, and March 2, 1950, from Brussels. The value of the 1949 catch—465 million francs ($10.6 million at predevaluation rate of exchange)—was practically the same as for the previous year.

Type of Fish: The Belgian fish catch in 1949 included 9,300 metric tons of cod, 3,763 tons of plaice, 4,500 tons of ray, 3,000 tons of haddock, 874 tons of turbot, 3,200 tons of sole, and 16,800 tons of herring. As compared with 1948, there was an increase in the catch of cod, ray, turbot, and sole; there was little change in the catch of haddock; but the herring and plaice production declined.

Table 1 - Belgian Production of Fishery Products, 1948-49 and 1936-38 Average

Year	TOTAL			PRINCIPAL SPECIES						
	Quantity	Value 1/		Cod	Plaice	Ray	Haddock	Turbot	Sole	Herring
	Metric Ton	Francs	U.S.$	(In Metric Tons)						
1949	61,349	464,672,880	10,587,476	9,299	3,797	4,516	2,947	874	3,200	16,811
1948	64,440	462,049,896	10,627,148	7,464	4,572	3,672	2,988	744	1,776	22,380
1936-38 Average	39,468	120,678,000	4,078,916	4,152	3,060	3,444	1,308	744	2,268	5,880

1/Values converted on the basis of: 1936-38, 1 Belgian franc equals 3.38 cents U.S.; 1948-49, 1 Belgian franc equals 2.3 cents U.S.

Table 2 - Belgian Trawler Fishing Fleet (Type, Horsepower, Number and Tonnage), 1948-49, and 1938

Type	Horsepower	Number of Vessels			Tonnage (Metric Tons)		
		1949	1948	1938	1949	1948	1938
I	75-75	187	201	236	3,046	3,186	3,998
II	80-115	81	80	85	2,629	2,606	3,408
III	120-230	115	112	123	8,146	7,929	9,241
IV	240-459	51	53	44	6,243	7,648	5,355
V-a	Motor 500	8	3	6	1,643	749	1,439
V-b	Steam 480-825	19	19	16	8,321	8,321	4,606
	Total	461	473	510	30,028	30,439	28,047
Total Horsepower		-	-	-	65,743	65,957	59,672

Table 3 - Belgian Consumption of Fishery Products (Round and Dressed Weight) 1948-49 and 1938

Item	1949	1948	1938
	.. (In Metric Tons).		
Production	61,349	64,440	39,468
Net Imports	40,686	53,436	50,496
Apparent Disappearance or Consumption	102,035	117,876	89,964

Fishing Fleet: During, 1949, the Belgian fishing fleet declined by three units to a total of 470 vessels. There was also a slight drop in tonnage and horsepower, according to preliminary figures. Although there are fewer vessels in the Belgian fishing fleet now than there were before the war, the tonnage and horsepower are larger than prewar.

Consumption: In 1949 the Belgian fish consumption was 102,000 metric tons (no adjustments made to a common basis of canned, smoked, fresh fish). The 1949 apparent consumption was about 13 percent less than in 1948, but was about 13 percent above 1938.

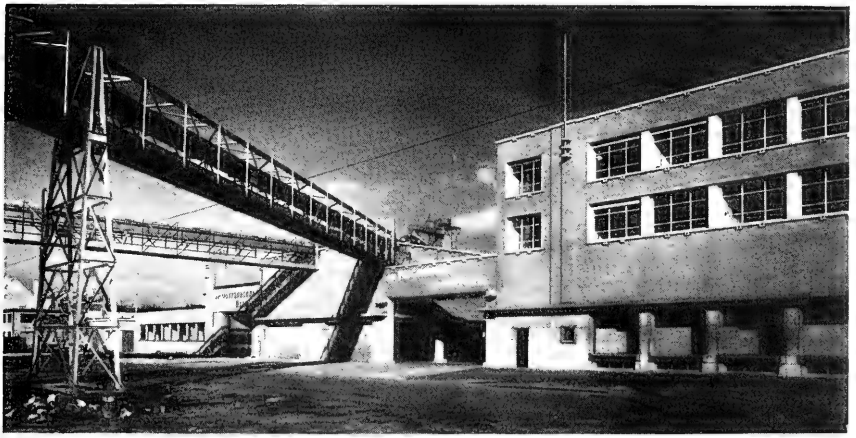
As the cost of catching fish is too great to permit fishing exclusively for manufacture of fish meal, practically all of the Belgian fish catch is destined for human consumption.

HAULING THE TRAWL NET CLOSE TO THE SIDE OF A BELGIAN TRAWLER.

Fish Meal: Although the Belgian fishing fleet does not catch fish for manufacturing purposes, occasionally, particularly during the summer months, some fish is diverted to fish meal, because of the low prices offered at the Ostend fish market. The amount of fish so diverted to fish meal is less than 1,000 tons annually (in 1947 the amount was 404 metric tons, and in 1948 the total was 961 tons).

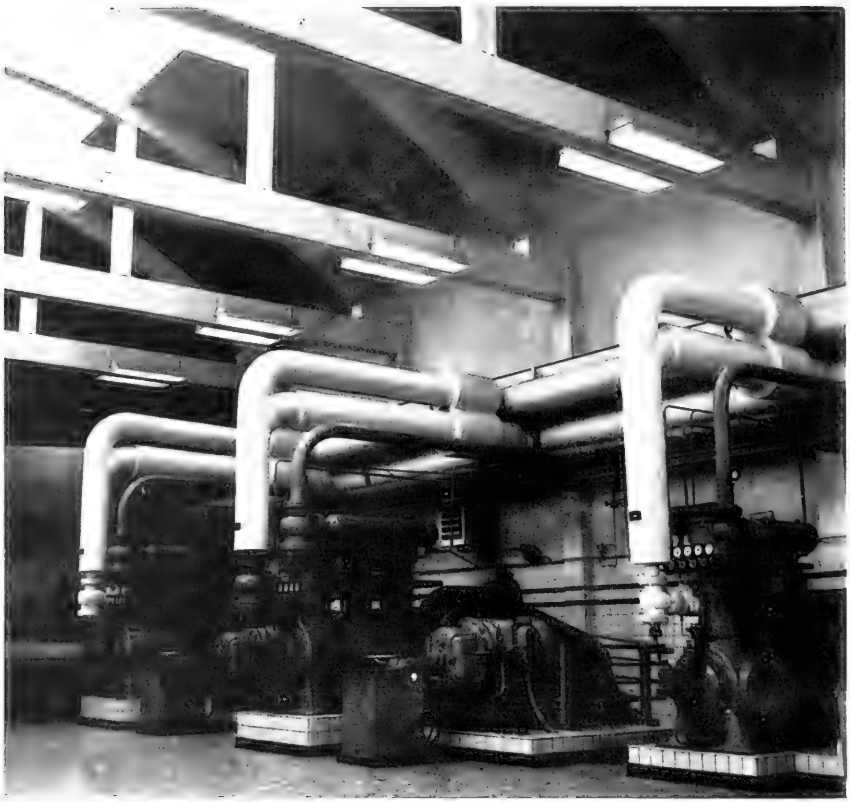
Table 4 - Belgian Foreign Trade in Fishery Products, 1948-49 and 1938

Year	IMPORTS					EXPORTS				
	Fish			Shellfish	Total Fishery Products	Fish			Shellfish	Total Fishery Products
	Fresh	Salted & Smoked	Canned	Oysters, Mussels, etc.		Fresh	Salted & Smoked	Canned	Oysters, Mussels, etc.	
	..... (In Metric Tons)					..... (In Metric Tons)				
1949	8,818	10,036	11,991	21,751	52,596	10,359	775	768	8	11,910
1948	13,116	11,220	15,624	21,708	61,668	6,384	1,428	420	-	8,232
1938	13,056	13,164	14,784	20,484	61,488	5,256	1,596	1,380	2,760	10,992



A MODERN BELGIAN FISH PLANT AT OSTEND. NOTE CONVEYOR SYSTEM ON THE LEFT.

WEIGHING AND WRAPPING FILLETS IN THE FISH PLANT AT OSTEND. ALL PHOTOGRAPHS COURTESY OF LES FRIGORIFERES DU LITTORAL, S.A., BRUSSELS.



THREE OF THE SEVEN VERTICAL REFRIGERATION COMPRESSORS IN THE MODERN FISH PLANT AT OSTEND.

Imports: During 1949 net imports totaled 40,686 metric tons, about 20 percent less than in 1948 or in 1938. Whereas previously Belgium had been on a net import basis for fresh fish (7,000 to 8,000 tons annually), in 1949 Belgium changed to a net export basis, the total net exports of fresh fish during 1949 totalling

Table 5 - Belgian Imports of Canned Fish by Type and Country of Origin, 1949

Type of Canned Fish	United States	Canada	Portugal	France	French Morocco	Norway	Netherlands	Others	Total
	(In Metric Tons)								
Sardines	2	-	3,263	78	1,129	-	-	150	4,622
Pilchards	1,925	11	-	-	-	1	-	3	1,940
Salmon	794	3,775	-	-	-	-	-	14	4,583
Other	52	-	449	-	-	181	46	118	846
Total ..	2,773	3,786	3,712	78	1,129	182	46	285	11,991

Table 6 - Belgian Exports of Canned Fish by Type, 1949

Sardines	Pilchards	Salmon	Other	Total
(In Metric Tons)				
1/170	6	2/88	3/504	768

1/Of this amount, 87 metric tons went to Bizone Germany.
2/Of this amount, 44 metric tons went to Italy.
3/Of this amount, 134 metric tons went to Bizone Germany, 102 tons to Italy, and 86 tons to Belgian Congo.

1,541 metric tons. Net imports of oysters and mussels showed little change from previous periods, but there was some decline in net imports of canned fish, and in salted and smoked fish.

Table 7 - Belgian Average Fish Prices (Landed Value - Monthly Average for Jan., July, Oct.-Dec. 1949 and Average for 1948 and 1938)

Species	1949 Jan.	July	Oct.	Nov.	Dec.	1948	1938
	(In U.S. cents per pound)						
Cod	13.6	6.8	11.9	12.8	11.2	10.4	4.5
Plaice	13.1	5.8	5.6	6.8	7.2	9.4	4.6
Ray	7.9	4.5	3.5	5.8	6.2	6.3	3.6
Haddock	12.4	3.0	7.4	8.6	7.2	7.0	4.5
Turbot	33.1	23.0	18.6	17.5	21.1	28.1	15.2
Sole	43.3	47.3	21.3	14.3	19.2	42.3	20.5
Herring	1.8	2.7	3.3	3.8	2.9	3.0	1.3

Note: Following rates of exchange were used to convert from Belgian francs to U. S. cents: 1938 - 1 Belgian franc equals 3.38 U.S. cents; 1948 - 1 franc equals 2.3 U.S. cents; Jan. thru Sept. 1949 - 1 franc equals 2.3 U.S. cents; Oct. thru Dec. 1949 - 1 franc equals 2.0 U.S. cents.

Prices: Since the beginning of 1949, there has been some decline in the prices received by Belgian fishermen on their fish catch.

Retail prices on canned sardines and canned salmon, on the other hand, have been rising.

Chile

GERMAN TRAWLERS TO FISH OFF THE CHILEAN COAST: Two of Germany's oldest trawlers will soon proceed to Chile to engage in the fishery off the Chilean coast, according to a March 2 American consular report from Bremerhaven. The two vessels are the Flensburg (279 gross registered metric tons) with a capacity of approximately 264,000 pounds, built in 1922; and the Neumuehlen (262 gross registered metric tons), capacity of 198,000 pounds, built in 1914. The trawlers will be manned by German crews.

These steam trawlers are considered too small for economic operation in the present German fisheries.

* * * * *

NEW CHILEAN FISH MEAL PLANT IN OPERATION: A Chilean fish meal plant started operations early this year in San Antonio, Chile, according to a letter received by the Service from a fishing company in Chile. The equipment was imported from the United States last year.

The new plant has a capacity of 10 tons per hour. Raw material is supplied at present by three trawlers (one Belgian and two Chilean vessels), and the company expects to increase the number of vessels to 6 or 8. Of the new vessels to be added to the company's fleet, 2 or 3 will probably come from Europe and the balance will be built in San Antonio. The production of the plant is intended principally for export.

Ecuador

AMERICAN FISH CANNERY PURCHASED FOR SHIPMENT TO ECUADOR: A firm which six months ago signed a contract with the Government of Ecuador for establishment of a fish cannery on the Ecuadoran coast has purchased the complete installations of a canning corporation in Oregon, Ecuador's President Galo Plaza announced on March 1, according to an American consular report from Quito. The fish-canning installation, which will be promptly shipped to Ecuador, is reported to have a production capacity of 1,500-2,000 cases per 8-hour day and refrigerated storage facilities for 8,000 metric tons of fish.

In his statement, the President also referred to the fish-canning project of Westinghouse Electric International, but there is no indication that substantial progress in realization of this project has been made since the signing of a contract in April 1949.

STATUS OF THE FISHERIES, 1949: Fishing remained an essentially potential industry in Ecuador throughout 1949, a March 3 consular dispatch reports. Schemes by foreign enterprises to establish fish canning and refrigeration plants in Ecuador produced no tangible results, although the Government signed three contracts of industrial protection for the building of factories for fish packing and the utilization of fishery byproducts.

Several American fishing firms operate in Ecuadoran coastal waters and in the Galapagos, and there was an increase in the number of boats operating in 1949. A large amount of fish is taken out of Ecuadoran waters without any benefit to the national economy. Inadequate patrolling by Ecuadoran authorities prevents effective control of the industry.

Cold Storage Plant: One Ecuadoran firm is completing the installation of a modern refrigeration plant in the Galapagos Islands. This plant is expected to be in operation in April 1950, with a handling capacity of 100 metric tons of fish per day and total storage space for 600 tons.

Construction of Fishing Vessels: The same Ecuadoran firm expects to finish construction of ten fishing boats of ten tons each by March 1950. The fish, which will be sold to American canneries, will be picked up at the cold storage plant in the Galapagos.

Cannery Planned: The most promising development in 1949 was the signing of an agreement with a San Diego, California, cannery firm, which has been carrying on fishing operations in Ecuadoran waters for several years. This firm expressed an interest in establishing a fish cannery in Manta in 1950.

Fish Meal Plant Planned: An agreement was signed on April 11, 1949, with the Ecuatoriano-Americano Cannery and Fishmeal Plant, providing for the establishment of a fish meal plant on the Ecuadoran coast between Manta and Salinas with $1,500,000 to be obtained from the Export-Import Bank, $200,000 Ecuadoran capital, and $700,000 private United States capital. There has been no indication as yet that the desired capital has been forthcoming for this project.

German Federal Republic

PRELIMINARY FISHERIES REVIEW, 1949: Production: The favorable trend in German deep-sea fishing continued in 1949, aided by the addition of several new trawlers to the fishing fleet, a February 3 American consular dispatch from Hamburg reports. A total of 465,000 metric tons of fish were landed in 1949—85,000 metric tons more than in 1948. Most of the landings were made at Bremerhaven, Cuxhaven, Hamburg-Altona, and Kiel. The 1949 herring season was an especially favorable one, showing landings of 168,000 metric tons. This is the first increase shown over prewar herring landings which, in 1937, amounted to 164,000 metric tons. During January 1950, reports indicate that herring fishers have suddenly encountered large schools of herring all the way from the North Sea to the banks off Iceland.

German Fisheries Production by Type of Vessel, 1949

Type of Vessel	Metric Tons
Trawlers	339,000
Cutters	86,000
Luggers	40,000
Total	465,000

GERMAN COASTAL CUTTER (OLD TYPE) AT BREMERHAVEN, SHOWING NETS HUNG UP TO DRY.

A decrease in fish imports during 1949 was also gratifying. Imports dropped from 286,784 metric tons in 1948 to 276,000 metric tons last year. Western Germany will probably, in the future, restrict fish imports to herring, since the German fishing fleet will again be in a position to provide and fill fresh fish requirements.

Fishing Fleet: Because of the age of the German fishing fleet, some 84 vessels are lying idle at present in the ports. Catches are not proportionate to the high costs of operating these old and small fishing vessels. Therefore, the German fisheries must aim at substituting these unprofitable fishing vessels by new ones. Orders have already been placed for 15 vessels of the new approved size.

At the end of 1949, the number of German fishing trawlers amounted to 225 and their average age reached 18.3 years. In 1939, Germany owned over 373 fishing trawlers with an average age of 12.7 years. The fleet of herring luggers consists of 115 vessels with an average age of 23.8 years. In 1939, these amounted to 168 with an average age of 18.9 years. The number of fish cutters has increased. In 1939, these amounted to 1,198 while today they amount to 1,414.

In order to operate these vessels on a profitable basis, it will be necessary to scrap the antiquated and unprofitable vessels.

THE FIRST TWO BUILDINGS ON THE LEFT ARE AUCTION HALLS LOCATED IN BREMERHAVEN, GERMANY. ALL FISH BROUGHT INTO THIS PORT IS LANDED AT ONE OF THESE TWO BUILDINGS.

Prices: German fishing vessels returning with their catches from the North Seas were being paid prices as low as 3/4 to 1 cent[1/] per pound just before Christmas and, even at these low prices, were unable to sell over 75 percent of their catches, the remainder of which had to be sold to the fish meal factories.

However, even in Hamburg, fish still retail at 6 cents[1/] per pound and fish fillets at 9½ to 10½ cents[1/] per pound.

1/ Converted on the basis of the postdevaluation rate of exchange of one Western Deutsche mark equals 23.8 cents U. S.

* * * * *

NEW FISH CANNING MACHINERY DEVELOPED: A mechanical fish canning process which reduces canning costs up to 35 percent has reportedly been developed by a Kiel firm, the Karl Hartmann A. G., a March 2 American consular report from Bremerhaven states.

The canning machinery used in the process takes open cans containing washed, salted, and cleaned fish, and cooks, dehydrates and oil-impregnates the fish in the cans. The cooking of the fish is done by infra-red rays rather than by steam or smoke. In addition, the machines seal, sterilize and label the cans.

The firm believes that the German fish-canning industry could compete in world markets in respect to price as well as quality if their new mechanized canning process is generally adopted.

SARDINE POPULATION INCREASING OFF GERMAN COAST: Measurements made by the Biologische Anstalt Helgoland in the summer of 1949 revealed an unusually dense concentration of sardine eggs and larvae in a 10-to 20-mile broad band along the German North Sea coast. North of the island of Borkum, sardine egg concentrations up to 3,885 eggs in the water column below one square meter of surface were found at the end of June. West of the Eiderstedt peninsula, up to 2,370 eggs per square meter were counted. All along the North Sea coast, egg densities were greater than 100 eggs per square meter, except opposite the Weser and Elbe mouths.

The former Zuider Zee and the Dollart have been known for many years to be sardine spawning areas. The maximum egg concentration ever measured in the former Zuider Zee was only 2,268 eggs per square meter in July 1912.

The studies of Biologische Anstalt show that large numbers of sardines must have spawned off the German coast between May 27 and July 31, 1949. During 1949, about 112 tons of sardines were caught by German coastal fishers, chiefly in fish weirs and fixed nets. No serious attempt was made to catch sardines by other methods. If the sardine appears off the German coast again in 1950 to spawn, it is likely that the German sardine catch will be increased through more intensive fishing for this fish.

U. S. TRAWLERS CHANGE HANDS: The three smallest trawlers of the 12 purchased by the United States Army for use in the German fisheries, the Pan Trades Andros, the Pacific (Margie and Pat), and the Josephine Ess, were returned by the charterers to the Army trustee during the winter 1949-50 because the charterers felt the vessels could not be operated profitably except during the late spring and summer.

Other charterers have been found for the vessels. No further turn-backs are anticipated at least until the end of the herring season.

Germany (Russian Zone)

NATIONALIZATION OF THE FISHING INDUSTRY: Nationalization of the fishing industry was begun in July 1949 by the Soviet Zone administration of Germany with the founding of the Vereinigung Volkseigener Betriebe Fischwirtschaft (Union of Fisheries Enterprises Belonging to the People, called VVB Fischwirtschaft for short), a January 26 American consular dispatch from Bremerhaven states.

At the present time, the VVB Fischwirtschaft is far from able to produce enough fish to satisfy the demands of the Russian Zone population.

Fishing Fleet: The VVB began with a fishing fleet of only 14 cutters, and now has 55 cutters.

Eleven are modern 79-foot vessels with motors of 120-150 h.p. capable of carrying 50 metric tons of fish. These cutters were built in Elmshorn in the British Zone and were delivered to the Soviet Zone under the East-West trade agreement.

The 44 cutters built in the Russian Zone are not so good, most being only 56 feet long with a 9-metric-ton capacity.

Eastern German shipyards have not been able to build larger vessels because of the lack of essential parts, especially motors. However, the East German yards are supposed to deliver enough cutters during 1950 to build the fleet up to 200 vessels, and some of these new cutters are to be of the 79-foot type. These cutters are designed to be able to fish in the North Sea, which the smaller boats cannot do.

The organization has its own repair yard at Gager on the Baltic.

In comparison to the expected 200-vessel VVB fleet, the private fishermen's association established before the war now has only about 120 old cutters at their

disposal, and experienced fishermen will have to accept employment on VVB vessels because of the shortage of privately-owned cutters.

Processing: In the fish processing field, the VVB Fischwirtschaft controls three processing plants and is building a fourth at Marienehe near Rostock. This fourth factory will have a capacity of 4,000 metric tons and will be the most modern in the Soviet Zone. The harbor at Marienehe is being enlarged, and eventually part of the cutter fleet will be stationed there. The organization also has leased several fish-processing plants on the island of Ruegen and along the coast of the mainland.

Distribution: The main distribution office of the VVB Fischwirtschaft is in Berlin. The shortage of refrigerated railway cars and insulated trucks has greatly limited the distribution of iced fish in the Soviet Zone. In the first 6 months of 1950, some 50 refrigerated railway cars are scheduled to be imported from Western Germany. Trucks with refrigerated cargo compartments also are to be put into operation soon, so that iced fish will increasingly displace salted fish in Eastern German stores. The VVB makes little use of private wholesalers or middlemen in its distribution system, and in time will no doubt be the sole dealer in fish in the Eastern Zone.

Effects of Nationalization: However, the fishing interests of Western Germany have not been pleased by the developments in the Soviet Zone. The loss to the West of the East German market may have been made permanent through the introduction of separate currencies in the two sectors. East Germany now is not only increasing its own fish-producing facilities but is building up trade connections with other European countries. Denmark, for example, is exporting fresh herring, plaice, and frozen mackerel fillets to Eastern Germany. Many West German fishermen are bartering their fish catches in Soviet Zone Baltic ports, especially Sassnitz and Stralsund. An average of 227 West German cutters are reported to land cargoes in the Russian Zone each month. Nets are the goods chiefly received in exchange for the fish.

Not only has the West German fishing industry been excluded from the Eastern Zone Market, but some physical assets of West German firms have been expropriated there. These have lost all their retail stores in Eastern Germany, which have been converted into "Volkseigene" stores.

The nationalization of the fishing industry in the Soviet Zone has thus brought losses, both actual and potential, to West German fishing interests.

DEVELOPMENT OF FISHING INDUSTRY IN SOVIET AND POLISH-OCCUPIED REGIONS: Introduction: Fish is one of the commodities which before 1939 was exported from Western Europe to Central and Eastern Europe. The great decrease in East-West trade has reduced trade in fish as well as other products. The German regions behind the Iron Curtain have been cut off from their normal sources of supply in Western Germany. The Western German fishing industry, now seeking to find additional markets, follows with great interest the efforts of the Soviet and Polish officials to develop alternate sources of supply behind the Iron Curtain.

Fishing Ports: Sassnitz on the island of Ruegen and Marienehe near Rostock are being developed into major fishing ports for the Russian Zone of Germany. Sassnitz is being developed not only as a fishing port but also militarily. The 24-meter cutters being built for Sassnitz fishery will be excellent military craft which could be used in the same way as the KFK cutters (70 feet long) were used by the German navy in World War II.

For the Polish-occupied regions, Swinemuende is being developed as a fisheries port. The Polish economic development plan provides large sums of money for the construction of quick-freezing and cold storage plants, for canning and other processing factories.

Fishing Fleet and Vessel Construction: In the development of the East German fisheries, fishing vessel construction has been emphasized at the expense of improvements in the fish distribution system. In the Russian Zone, 9 of the 11 shipyards employing 500 workers or more were occupied principally with fishing vessel construction.

A shipyard in Stralsund is building most of the drifters, which are the largest fishing vessels of any type built in an East German yard since the end of the war. They are 126 feet long, with a 25-foot beam, and a draft of 10 feet. A 300 h.p. motor gives the vessels a speed of about 9 knots. Loaded, the drifters displace 500 metric tons; empty, 400 tons. By utilizing sectional construction methods, the Stralsund shipyard plans to complete 100 drifters in 1950. Part of the engines for these vessels were either obtained from Western Germany before the counterblockade was imposed in the summer of 1948, or else were imported from the Czechoslovakian Skoda works or the Italian Fiat factory. In time, a plant in Magdeburg, now owned by a Soviet corporation, or one in Rostock are expected to be able to supply Diesel engines for the drifters. The cost of a drifter is approximately 1,000,000 East marks (about $80,000). All drifters built pass into Russian ownership as reparations. The planned drifter construction for 1950 totals 158 vessels.

The next largest fishing vessel under construction is the seiner--34 are to be built in 1950, all for Russian ownership as reparations. Presumably the seiners are to be used in the Black Sea. The vessels are 85 feet long, with a beam of 20 feet and a draft of $7\frac{1}{2}$ feet. A 300 h.p. engine gives the seiners a speed of 10 knots. Loaded, the seiners displace 150 metric tons; empty, 135 tons. Two shipyards are building seiner sections which are assembled by other shipyards.

The third type of fishing vessel being built is the cutter. Some of the cutters are to be 79 feet long and the remainder 56 feet. The 79-foot cutters have a beam of 16 feet, a draft of 6 feet, a displacement of 45 tons, and a capacity of 10 tons. Motors of 80 to 100 h.p. give the smaller cutters a speed of 8 knots. One shipyard is to build 100 wooden-hulled cutters in 1950. Another shipyard in Berlin-Koepenick is building part-iron, part-wood cutters. The 1950 cutter construction calls for 159 vessels of both types, of which 87 have so far been allocated to the Sassnitz fishery. The remainder, as now planned, are to go to the Russians as reparations, and the planned development of the Sassnitz cutter fleet to 200 vessels in 1950 appears to be dependent upon the ability of the Eastern German regime to secure cutters from outside its territory.

Although the Russians are able to secure smaller fishing vessels from Eastern German yards free of cost as reparations, they have been forced to purchase larger fishing vessels in countries west of the Iron Curtain because of material shortages in Eastern Germany. A trawler of 1,213 gross registered metric tons was recently completed for the Soviet Union by a Belgian shipyard at Tamise. Five trawlers (700-gross-registered-tons) are now under construction for the Soviet Union in a shipyard at Uddevalla, Sweden. Vessels larger than cutters so far have not been used to supply fish to the East German population.

Outlook for Development of Fisheries: Despite the rapid construction of fishing vessels in the German territories behind the Iron Curtain, West German fishing interests still hope to be able to supply fish to Eastern Germany. The over-emphasis, apparently for military reasons, on vessel construction and the high proportion of vessels taken over by the Russians as reparations, has slowed up greatly the development of a balanced Eastern German fishing industry. The East German production goal for fish in 1950 is 50,000 metric tons, or about one-fourth of the real demand for fish. This demand is so great that Eastern Germany agreed to accept fish under the East-West trade agreement and some 125 metric tons of fish (processed weight) were delivered through legal channels to the Russian Zone in the months of October and November 1949. West German fishing interests hope that this amount is only the beginning.

Honduras

STATUS OF FISHING INDUSTRY: In the Honduran economy the fishing industry remained a negligible factor in 1949, according to a March 2 American consular economic report from Tegucigalpa.

The organization of two or three companies with the intention of exploiting the marginal seas, particularly in the Gulf of Fonseca, has shown no results. Interest had been expressed by some in fishing in the waters off the northeast coast of Honduras, and in establishing a base at Puerto Castilla or Trujillo, but nothing has come of these plans.

Except in some coastal areas, fish was practically non-existent in the Honduran diet. Only 93,126 pounds of dried and salted fish were exported, all to El Salvador, during the year ending June 30, 1949.

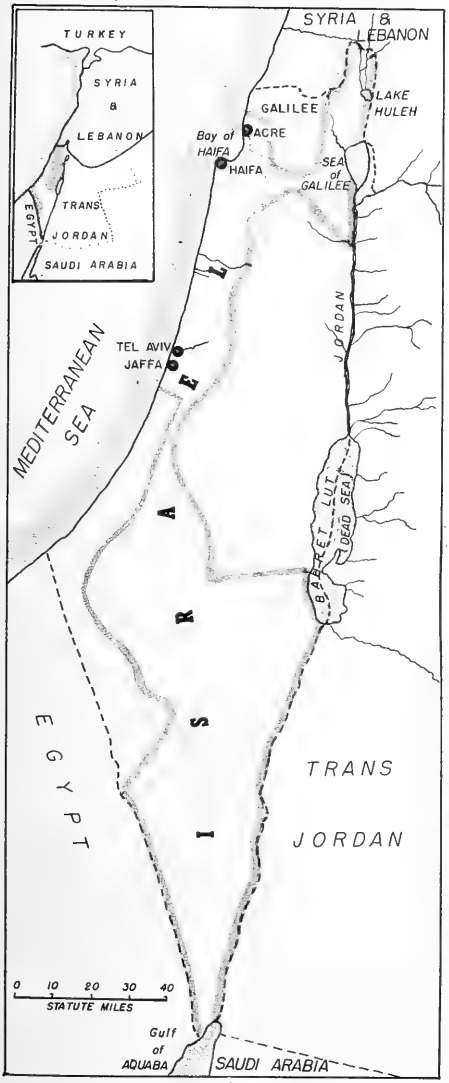
Israel

REVIEW OF THE FISHERIES: Expansion of Fisheries Planned: Plans for the expansion of all branches of the local fish production are being prepared by the Department of Fisheries of the Israel Government, states a February 3 American consular report from Tel-Aviv. It is expected that increased local production will make Israel more nearly self-sufficient.

The aim of the Department is to have by the end of 1952 about 5,000 fishermen employed in all branches of the industry, with an expected production of approximately 15,000 metric tons of fish, or about three-quarters of the country's consumption.

The cost of the program of the Department of Fisheries is estimated at about $9,800,000,[1/] which the Government and the industry would finance. It will require a total of 75 trawlers (against the present 20), 60 motorboats for surface fishing, 500 smaller rowboats and motorboats for close-to-the-shore fishing in the Mediterranean and in lakes, and 9,880 acres for fish ponds.

1/Based on official postdevaluation rate of exchange of 1 Israel pound equals U.S.$2.80.



ISRAEL (AREA ENCLOSED BY STIPPLE BORDER) WAS ORIGINALLY PART OF PALESTINE (BIGGER AREA ENCLOSED BY DOTTED LINE AND THE RIVER JORDAN).

The general belief is that large amounts of foreign currency would be saved and a considerable number of people employed in the new venture. This has been described by a Government spokesman as ambitious but not visionary.

Fishing Ports: One of the main reasons for Israel's small fishing industry has been lack of proper harbor facilities. The Department of Fisheries stated that the present construction of a harbor at Sdot Yam will greatly benefit the industry and increase the amount of locally-caught fish. Sdot Yam is expected to become the center of the fishing industry, while a smaller fishing harbor is being built at Mishmoret near Kfar Vitkin. The construction of a harbor south of Jaffa would also be of great value since fishing waters in the south are far richer than those in the north.

Exploratory Fishing: A Department of Fisheries mission, investigating fishing conditions in the waters of Elath (Gulf of Aquaba) since last September, reports that only a small number of edible fish has been found there and that commercial fishing would not be practical in that area at present. However, the Department is of the opinion that the best method for fishing in the tropical waters of Elath may not as yet have been discovered and, therefore, plans to keep the mission in Elath for several months longer.

Other experiments will include Danish fishing methods in deep-sea waters and English and American methods, using radar, depth-control devices, and assorted types of nets.

Another effort to increase the country's fish supply will be the Department's experimenting with the breeding of fresh-water fish in the sand-dune areas around Sdot Yam (Caesarea). Should these experiments become successful, large parts of the Negev would also open up for settlement and development.

Types of Fisheries: LAKE FISHING: The local fishing industry may be divided into three sections: lake fishing, fishing in the Mediterranean, and fishpond culture.

The smallest branch is lake fishing, yielding 10 percent of the total production. The Sea of Galilee yields about 76 percent, the Huleh about 23, and the remaining one percent comes from the Jordan River. The Department of Fisheries has built a hatchery in Galilee and is stocking the two lakes. Breeding ponds for trout and other cold-water fish have been set up at the Dan and Daphne settlements in the north, and it is planned to place the young fish in the swift streams in the area, including Tel el Kady.

SEA FISHING: Fishing in the Mediterranean is the second largest branch, producing 18.5 percent of the total and is done mainly by trawlers owned by agricultural settlements and urban cooperative groups. At present, 20 trawlers are in operation and each accounts for about 50 metric tons of fish annually. It was realized that this important branch of local fishing could bring in a larger amount and, therefore, experts have been brought from Italy. An increased daily catch has already been noted. Trawling on offshore banks has also been in operation for some years and this method has been considerably extended during World War II.

Surface fishing has been introduced by a group from Tripoli who brought with them their equipment and have had excellent results in taking Mediterranean sardines. Their fishing methods, however, were already used by fishermen of Haifa, Acre, and Zeeb during the Palestine Mandate, adopting the Syrian lampara methods which involve fishing at night, using strong lights to attract the fish into a special type of net.

At present, small groups of fishermen, consisting mainly of new arrivals and discharged soldiers, fish all along the coast but their favorite spot is Haifa Bay. They bring in very small hauls and the Department of Fisheries is giving them special instructions in modern fishing methods.

POND FISHERY: The third and largest branch of the industry is the pond fishery which yields 71.5 percent of Israel's fish production. There are now 67 fishing farms which cover an area of some 4,700 acres and are located mainly in northern Galilee, the Beisan Valley, and the Zebulun Valley. The average yield is at present 1,369 pounds per acre, and new methods are being used to increase output. In 1933-34, experiments on a commercial scale were made by two experienced carp breeders from Europe at a place near Acre and proved that the pond culture of carp could be a profitable enterprise. Since that time, this method of fish farming made steady progress. Production of pond fish in 1942 was 221 metric tons, 416 metric tons in 1943, 703 in 1944 and reached 1,229 tons in 1945.

Production and Consumption: Fish production by Jewish fishermen increased from 235 metric tons in 1941 to 360 tons in 1942, to 682 tons in 1943, and to 1,245 tons in 1944. The 1947-48 output of sea, lake, and pond fishing amounted to 2,491 tons (see table).

During the Hebrew year ending September 1949, Israel's population consumed about 21,000 metric tons of fish, or approximately 48.5 pounds per person. The high consumption is attributed to the Government's austerity regime under which the consumption of only small quantities of meat is allowed. During the same

Israel's Fishery Products Production from Pond, Lake and Sea, 1940-41, 1947-48, and January-June 1949

Type of Fishery	January-June 1949			1947-48			1940-41	
	Quantity	Value		Quantity	Value		Quantity	Value
	Metric Ton	I£	U.S.$	Metric Ton	I£	U.S.$	Metric Ton	I£
Pond	801	394,045	1,588,001	2,254	1,032,452	4,160,782	39	5,837
Lake	177	89,924	362,394	125	28,849	116,261	72	4,140
Deep-sea ..	242	83,929	338,234	111	28,970	116,749	117	5,901
Inshore-sea	99	57,860	233,176	1	1,119	4,510	7	589
Total	1,319	625,758	2,521,805	2,491	1,091,390	4,398,302	235	16,467

Note: U. S. dollar values are based on predevaluation rate of exchange of 1 Israel pound equals U. S. $4.03.

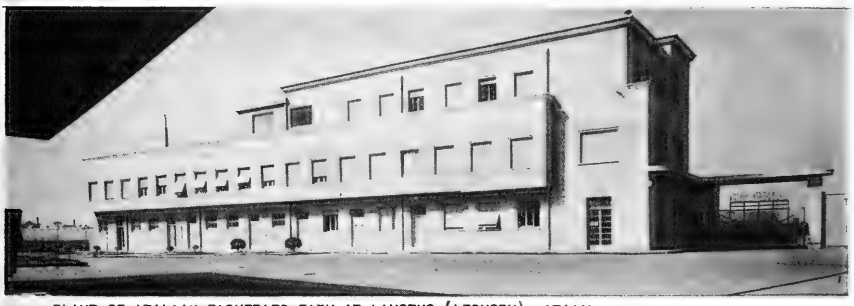
period, the local fish industry supplied about 3,500 metric tons, amounting to less than 16 percent of the total consumed. The remainder (valued at $9,216,610 2/) was imported chiefly from Norway, South Africa, the United Kingdom, and Denmark. Despite the small amount produced by the local industry during that year, there was a 30 percent increase over the previous year's production, but the increase went practically unnoticed as a result of the large influx of immigrants. Imports consist of fresh, frozen, brined, dried, salted, smoked, and canned fish.

2/ Based on official predevaluation rate of exchange of 1 Israel pound equals U.S. $4.03.

Italy

FISHERIES EXPANSION PROGRAM: The Italian Government has announced the following program for the expansion of its fisheries, according to a February 11 American consular report from Rome:

1. Study new fishing areas at Taranto considered suitable for oyster and other shellfish breeding.
2. Increase consumption of shellfish by eliminating sanitation hazards.
3. Augment fish populations in the lakes of central and southern Italy.
4. Utilization of fishery byproducts.
5. Development of preservation methods for fishery products (freezing and facilities for storage).
6. Biological studies of mackerel and other fish.



PLANT OF ITALIAN FISHERIES FIRM AT LIVORNO (LEGHORN), ITALY.

Japan

FISH MEAL PROCESSING INDUSTRY: About 5,800 fish reduction plants in Japan have an average production capacity of 100 metric tons of fish meal per plant annually. Only 202 of these plants can produce more than 4.4 metric tons in a 10-hour day. Only the few large, modern plants in Japan have a capacity for processing 35 to 50 metric tons of raw fish per day, the January 28 Weekly Summary of SCAP's Natural Resources Section reports.

The bulk of the plants are usually operated as home industries and are crude and primitive. Collection of statistics on the amount of raw material used or fish meal produced by these home plants is not possible, and only rough estimates are available. The usual equipment includes a cast iron pot, three to four feet in diameter and three feet deep, which is bedded in a sand beach with a fire hole beneath the pot. A wooden press also is required, with a few buckets and rice-straw mats. The fish are pressed in a hand-operated wooden press similar to that used for wine. The extracted stickwater and oil settle in a pan under the press where the oil is skimmed off and collected in buckets. The meal is spread on mats for sun-drying.

Sardines, herring, and flatfish are commonly used for oil and meal extraction in Japan when a glut occurs in the normal distribution channels. These fish are caught and processed during the entire year in various regions of Japan. The herring season in Hokkaido usually extends from March through May.

Japan has one floating fish-meal factory with a capacity of about 3,000 metric tons annually. Actual production during 1947 was only 80 metric tons, mainly owing to operating expenses and difficulties in obtaining raw material through ration channels.

Maximum annual production of fish meal in Japan from its approximately 5,800 processing plants is estimated to be 20,000 metric tons. In the United States during 1946, 184,657 short tons of fish meal were produced by probably less than 200 plants.

COASTAL WHALING CATCH, 1949: The coastal whaling catch for Japan during 1949 was 1,476 whales. Production of sperm oil, meat, blubber, bone meal, and other byproducts amounted to 21,853 metric tons. The whaling catch consisted of 208 fin, 755 sei, 499 sperm, and 14 blue whales.

LANDINGS OF FISHERY PRODUCTS, 1948 (REVISED): Estimated total Japanese production of marine fishery products during 1948 (excluding aquiculture and Antarctic whaling) totaled 2,512,729 metric tons, compared with the estimated 2,827,550 tons in 1947.

Taking only the data from official reports of landings of marine products (estimated to be between 85-95 percent of the actual total landed), the reported catch for 1948 was 2,135,824 metric tons. This was 213,074 tons more than the reported catch in 1947 (estimated to be 60-70 percent of the actual total landed).

During the past year, omissions and errors have been discovered in the tabulated data of 1948 landings of marine products, which were reported by the Natural Resources Section and published in Commercial Fisheries Review, May 1949, p. 43. The data given on the preceding page supersedes all previously published summaries of 1948 Japanese marine products landings.

Japanese Official Reported Landings of Marine Products by Species, 1948 (Revised)

Species	Quantity	Species	Quantity
Fish:	Metric Tons	Fish (Continued):	Metric Tons
Herring	182,561	Sharks	93,350
Atka mackerel	52,396	Others	482,692
Sardine	317,278	Total	1,646,239
Bonito or skipjack	46,585	Other Marine Products:	
Tuna	31,503	Shellfish	72,154
Mackerel	80,068	Crustaceans	29,094
Horse mackerel	21,329	Cuttlefish and octopus	284,314
Flatfish	90,600	Sea cucumber	6,834
Sea bream	25,640	Coastal whales	1/45,575
Skipper	39,626	Seaweed	51,614
Cod and pollock	162,808	Total	489,585
Yellowtail	19,803	Grand Total	2,135,824

1/ Coastal whaling production is computed by multiplying an average weight of 25 metric tons per whale by the number of whales caught. This change from the 40 metric tons previously used is based on data obtained from sample weighing studies of whales at coastal stations.

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FISHERIES RIGHTS REFORM: After two years of study, the Japanese Ministry of Agriculture and Forestry, assisted and advised by SCAP's Natural Resources Section, drafted a new fisheries law which was promulgated on December 15, 1949, which provides for a complete reformation of the fishing rights system. Final cancellation of the old rights and issuance of the new rights will be completed March 15, 1952; the two-year interval will allow for the preparation, planning, and actual cancellation and issuance of rights without disruption of fishing operations which are so vital to the food supply of Japan.

The following summarization of the progress of fishing rights reform in Japan was prepared by SCAP's Natural Resources Section and was issued as Information Bulletin No. 37, "Fisheries Rights Reform in Japan," by the Public Information Office, General Headquarters, (U. S.) Far East Command, on March 3, 1950.

FISHERIES RIGHTS REFORM IN JAPAN

The following summary of fisheries rights reform in Japan was prepared by officials of the Fisheries Division of SCAP's Natural Resources Section:

The pressure for additional sources of food and employment for the Japanese people has resulted in the development of property rights in aquatic resources to a far greater degree in Japan than in any other country.

The government favored this development because it provided a means of limiting the number of fishermen and at the same time relieving the government of the responsibility of arbitrating disputes between fishermen. The individual fisherman favored it because it gave him control of his particular fishing grounds.

Such rights, if properly governed, serve to protect the fishermen's sources of livelihood from exploitation by others, just as property rights on land protect the land owner. Consequently, property rights in fisheries tend to encourage management practices designed to provide the maximum sustained production of aquatic products.

Fishery rights in Japan are in the form of long-term franchises, with automatic renewal, issued by the government and granting the holder the sole right to carry on specific-type fisheries in specified areas of waters. They have the local characteristics of real property rights and are subject to sale, rental, mortgage and other tests of private property.

Despite the desirable features of these property rights, they may be manipulated to the detriment of the bona fide fishermen if not governed by suitable legislation. The legislation governing the Japanese system of fisheries rights evolved from the feudal era and was not adapted to modern fishing techniques nor was it modified to meet the changing economic and social conditions.

This resulted in excessive concentration of fishing rights, absence ownership, exorbitant rental rates, forced membership in juridical bodies holding rights, bureaucratic control by government officials and other abuses similar to those found in agriculture.

The problem of fisheries rights and its relation to the over-all democratization of Japan was recognized by the Supreme Commander for the Allied Powers early in the Occupation. Natural Resources Section conducted a comprehensive investigation of the system of fisheries rights and licenses. This was necessary to provide

a basis for guidance and advice to the Japanese government and other interested groups.

The system of fisheries rights applies only to fisheries operated in coastal waters. Contrary to the public conception of the Japanese fishing industry, the bulk of Japanese marine production comes from coastal fisheries operated by small-scale fishermen, rather than from deep-sea operations.

Owing to the density of population and the importance of marine products in the inadequate Japanese diet, coastal fishing in Japan is the most intensified in the world. Because of this intensification the privilege of fishing is valuable and greatly desired.

High seas fisheries such as tuna and trawl fisheries are governed by licenses issued by the national government. In addition prefectural governments license certain inshore fisheries such as sardine purse-seine boats.

In January 1947 the Japanese government, recognizing the need for fisheries reform and encouraged by the Supreme Commander for the Allied Powers, began drafting legislation to accomplish this reform.

In the Allied Council Meetings of Feb. 5 and Feb. 19, 1947, all members agreed and recommended that the enactment of a law providing for the reformation of the fisheries system in Japan was desirable. Owing to the complexity of the problem and the many unique problems presented, the final draft of this legislation was not completed for submission to the Diet until April 1949.

During the intervening time, Natural Resources Section assisted and advised the Japanese Ministry of Agriculture and Forestry in the drafting of the legislation. The Fisheries Law was enacted by the Diet Nov. 29, 1949 and promulgated Dec. 15, 1949.

The Fisheries Law provides for complete reformation of the fishing rights system of Japan. Major provisions of the law are outlined below:

1. Cancellation of all existing fisheries rights and compensation to the holders of such rights for their loss with government bonds maturing over a 25-year period.

2. Improved utilization of fishing grounds by the issuance of rights, the contents and location of which are better adapted to current conditions and fishing techniques. The new law sets forth the priority and eligibility schedule for the issuance of rights. The schedule is designed not only to make "right ownership" available to the maximum number of fishermen, but also to give priority to those who are most experienced.

3. Authorization of three types of rights. All sub-leasing of these rights is prohibited, thereby preventing absentee ownership. The holders of rights pay a yearly fee to the Government in an amount sufficient to offset the cost of compensating former holders of the cancelled rights. These fees are to be discontinued after the compensation is paid in full. The three new rights are outlined below:

a. Common Fisheries Rights: Collection of uncultivated, more or less stationary marine life, and the operation of certain small-scale fisheries which are dependent on the placing of gear in specified locations. Common fisheries rights are in the form of ten-year franchises, with indefinite renewal privileges as long as the holder meets the requirements set forth in the law.

b. Fixed Net Rights: Operation of fixed nets in waters 27 or more meters in depth, and of all fixed herring and salmon nets. Fixed net rights are in the form of five-year franchises, with provisions for review of the priority of all applicants and reissuance of the rights according to priority at the end of each five years.

c. Demarcated Rights: All aquaculture. The rights are in the form of five-year franchises, with automatic renewal, provided the holder complies with stipulations set forth in the law.

4. Authorization of two types of licenses:

a. Fisheries carried on in coastal waters for catching nonstationary marine life with gear not limited to specific locations.

b. Deep sea fisheries, such as tuna fisheries.

5. Establishment of fisheries adjustment committees. These committees are established in each fisheries region. A fisheries region, of which there will be about 150, is a coastal area where the same fishing practices and economic conditions exist. The committees are composed of ten members, seven of which are elected by the fishermen residing in the sea area, and the other three appointed by the governor of the respective prefectures.

A central committee appointed by the Ministry of Agriculture and Forestry, with the approval of the cabinet, is also established for the purpose of guiding and advising the national government in the administration of the law.

The final cancellation of old rights and issuance of new rights is scheduled to be completed March 15, 1952. The geographic boundaries of the sea areas are to be announced when the law becomes effective March 15, 1950. The Central Fisheries Adjustment Committee is to be appointed in April and the election of the Sea Areas Adjustment Committees is scheduled for August 1950.

Public notification of rights to be issued under the new law is to be made in January 1951. Between February and June 1951 allocation of the rights is scheduled to take place and the successful applicants are to be notified before July 1, 1951.

Actual cancellation of present rights and issuance of new rights will be accomplished in three phases. One transfer consisting principally of fixed nets operated in the summer season is scheduled to take place in August 1951. The second group, comprised of autumn-operated fixed nets, is to be transferred in December 1951. Transfer of the remainder of the rights is to be consummated in March 1952.

The two years allowed for the preparation, planning and actual cancellation and issuance of rights makes possible the accomplishment of the reform without disruption of fishing operations.

The Fisheries Law and Japan's experience with the problems involved in its drafting and enforcement may serve as a guide to other nations in meeting similar problems.

JAPANESE GOVERNMENT

Korea

FOREIGN CAPITAL SOUGHT FOR DEVELOPMENT OF FISHERIES: The Korean Government in February expressed interest in having foreign capital assist in the development of all phases of the fisheries industry. According to official statements, contracts entered into under this proposal will guarantee fair treatment, moderate taxation, and relief from foreign currency controls in order to permit investors to recover their capital and to remit profits abroad, a March 11 American consular dispatch from Seoul states.

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CUSTOMS TARIFF LAW: A new Customs Tariff Law was promulgated by South Korea on November 23, 1949, according to a March 4 American consular report from Seoul. Under this new law, which affects fishery products and supplies, raw materials are duty free and likewise exempt from internal revenue sales taxes; luxury goods are subject to heavy duties; and materials for use in the production of finished goods are subject to an average duty of 10 to 20 percent.

List of Approved South Korean Import Items With Applicable Customs Duties and Sales Tax Rates

Fishing Equipment	Customs Tariff Rate	Sales Tax Rate
Fishing boats	20 percent	No tax
Fish-Boat engines	10 "	" "
Fishing nets	25 "	" "
Canvas	40 "	" "

Supplies directly imported by the Korean Government under the Economic Cooperation Administration program are specifically exempted from customs duties.

Selected Group of Luxury Items with Applicable South Korean Customs Duties and Sales Tax Rates

Foodstuffs	Customs Tariff Rate	Sales Tax Rate
All canned goods	40 percent	No tax
Fresh fish	35 "	" "

Norway

HERRING FISHERIES, 1950: A near-record catch was established by the Norwegian herring fisheries for the 1950 season, a March 2 American consular dispatch from Oslo reports. The catch is estimated at 758,322 metric tons, valued at $12,600,000. The previous record was established in 1948 with a catch of 820,260 tons.

This year's catch was so enormous that shore facilities were unable to handle all the fish, despite three-shift operations of 73 fishing factories, with the result that the Government authorities stopped sea fishing for the period February 11 to 19 inclusive to prevent further spoilage. This resultant loss of potential foreign exchange has prompted increased pressure for enlargement of the herring industry capacity.

A new herring oil and meal plant began operations at Stavanger immediately after the start of the present season. It is capable of processing approximately 600 short tons of herring per 24 hours.

Of this season's catch, the press reports that to date 27,270 metric tons have been sold directly for export, 40,500 tons for salting, 4,230 tons for canning, and 686,322 tons to herring oil factories. Only 1,800 tons have been sold for domestic consumption.

Next year's herring catch is expected to exceed the latest record. Plans call for a larger proportion of that catch to be used for herring meal production.

It is reported that the 1950 catch of brisling sardines will be packed for export in olive oil instead of sild-sardine oil. This may mean increased sales on the American market, where dissatisfaction occasionally has been expressed with the sild-sardine oil. A price increase of 45 to 60 cents per case, however, is anticipated.

EXPERIMENTAL STORAGE SILOS FOR FRESH FISH: It is reported that the Fishery Directorate is constructing experimental storage silos in which fresh fish can be stored and preserved by harmless chemicals without affecting their quality. Thereafter, the fish may be processed in canneries, freezing plants, or converted into oil and meal. Preliminary tests are said to have given promising results.

EXPORTS OF FISHERY PRODUCTS: Increased foreign competition is reported to have reduced the export potential of Norwegian fish. With the exception of herring oil, the 1949 volume of exports of all types of fishery products was below that of 1948.

The export value of herring and other fresh fish in 1949 was $65,386,750, and that of canned fish was $20,956,000.

For 1950 the National Budget anticipates exports of $66,092,000 of fresh fish and $22,568,000 of canned fish.

NET FLOATS AND BUOYS: All Norwegian requirements for fishing-net floats and buoys (from 35 to 40 thousand per year) are now being met by three Norwegian factories. The largest factory, at Kopervik, began operations in 1946 and present capacity is some 18,000 per year.

The floats and buoys are made of cotton cloth which has been impregnated with plastic for waterproofing. They have been very well received by Norwegian fishermen because they are so much lighter and easier to work with than foreign types and demand has been increasing steadily. It appears from newspaper accounts that the impregnation and inflation steps in manufacture have been successfully combined into one process. The production secret is the chemical which makes the plastic-impregnated cotton material retain its pliability after use in salt water.

One type of float has a light at the top; current being supplied by either dry cells or storage batteries. The light is automatically extinguished when the floats are not in use, i.e., going out when they are placed on their sides or upside down. This type is said to be very successful.

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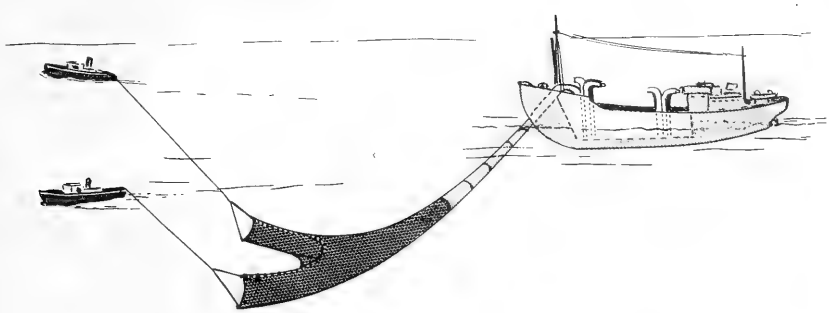
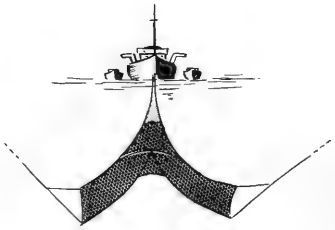
A VESSEL WHICH FISHES AND LOADS CONTINUOUSLY: A project involving a vessel which fishes and loads continuously has just been laid before the Fishery Directorate by Thor Kringstad of Langevag near Alesund, Norway, according to the February 2 Fiskaren, a Norwegian fishery periodical. Mr. Kringstad has recently received world patents on his invention. It consists of a catching device which is adjustable in the water ahead of the vessel and is so constructed that the catch is carried continuously directly on board the vessel by means of a suction arrangement. Conveyors carry the catch to storage rooms and special unloading equipment along the vessel's sides. The vessel can operate on the fishing grounds, fishing continuously, while lighters or other transport vessels lie alongside and load, either while it is stopped or under way.



As may be noted from the sketch, the inventor envisions a trawl-like catching device with an extended hose-like pipe of canvas (reinforced by rust-free metal spirals) which is connected directly to the fishing vessel. Vacuum or suction equipment continuously draws the catch directly from the trawl into the vessel. The trawl may be towed by one or two vessels.



A VESSEL WITH A DEVICE WHICH FISHES AND LOADS CONTINUOUSLY.

The inventor maintains that his fishing method, applied to herring, for example, not only will produce greater catches than at present, but also will permit operations in weather which now hinders purse seiners and gillnetters. Large losses of gear, which occur when herring catches are especially great, also will be eliminated.

* * * * *

REPORT ON THE REHABILITATION OF THE FISHERIES AND WHALING INDUSTRIES: Recovery after the devastation caused by the World War II is continuing at a rapid pace, and in the fisheries and whaling industries production and equipment have almost been brought up to prewar levels, according to a "Report on Economic Developments in Norway up to December 31, 1949," submitted by the Norwegian Government (Ministry of Commerce) in accordance with Article VII of the Agreement of July 3, 1948, concerning economic cooperation between the United States and Norway.

The Norwegian merchant fleet, and the whaling and fishing fleets are now completely restored.

Survey of Economic Developments in the Fisheries: During and for a period after the war, it was found necessary to ration fishing equipment. The supply of

fishing equipment, however, has gradually improved and rationing was finally abandoned on July 1, 1949. Restoration of the fishing fleet is now considered to have been completed and Norway today has a more modern and effective fishing fleet than before the war.

Weather conditions were extremely unfavorable along the whole coast, especially in the beginning of 1949, and the catch was, therefore, smaller than expected. The total catch in 1949 is estimated at 1,035,000 metric tons. This is a decrease of 260,000 tons, or 20 percent, as compared with the record catch in 1948. However, as compared with an average catch of 914,000 tons during the 1930's, the 1949 catch must be considered more than satisfactory.

The herring catch in 1949 amounted to 728,000 tons as compared to 820,260 metric tons in the record year of 1948. The cod catch was 129,000 tons in 1949, compared to 150,000 tons in 1948, which was also a bad year for cod. In the 1930's the average catch of cod was roughly 173,000 metric tons annually.

Survey of Economic Developments in the Whaling Industry: At the end of 1939 the Norwegian whaling fleet consisted of 13 floating factories totaling 155,000 gross registered metric tons, and about 100 whaling boats. About 50 percent of the whaling fleet was lost during the war. At the end of 1949, the whaling fleet consisted of 10 floating factories, totaling 142,000 gross registered tons, and about 130 whaling boats. Thus it can be said that the recovery of the whaling fleet has been completed.

During the 1948/49 season, 6,926 Norwegians were employed by foreign whaling expeditions.

Since the beginning of pelagic whaling on a large scale in the Antarctic, towards the end of the 1920's, more whales were caught than the existing stock could stand. Therefore, in recent years, both the length of the hunting season and the number of whales to be caught have been limited by international agreements. The 1948/49 season was limited to 3½ months, but the total number of 16,000 blue-whale units[1/] allowed to be caught was reached before the end of the season. The Norwegian catch totaled 16,119 whales as against 15,656 in 1948. The total quantity of oil produced was 168,487 metric tons. Apart from this, there was a considerable production of byproducts, such as, 800 tons of salted whale livers, 59 tons of vitamin oil, 4,100 tons of whale-meat meal and 10 tons of meat extract.

The 1949/50 season also has been limited to 3½ months, but began on December 22, 1949, one week earlier than last year. The quota of 16,000 blue-whale units also has been maintained.

Exports to the United States: Exports of canned fish during 1949 to the United States were a good deal below the 1948 level (6,562 metric tons in 1949, compared with 9,697 tons in 1948). Exports of frozen fish fillets, on the other hand, increased from 228 metric tons in 1948 to 925 tons in 1949.

1/ 2 fin or 6 sei whales equal one blue-whale unit.

* * * * *

FISH CANNING SCHOOL: The world's first fish canning school will soon be built in Stavanger, according to a March 25 report from the Norwegian Information Service.

It will give theoretical and practical instruction to men who wish to become foremen, superintendents, and managers of fish canneries.

PURSE-SEINING FOR COD: Purse-seine fishing of cod in Lofoten has been very successful—1,000 metric tons of cod were caught in 4 days by only 30 purse-seine boats. Purse-seine fishing this year is allowed for the first time on a limited scale.

SEALING: A large Norwegian sealing fleet has been sent to Newfoundland, among them the largest of Norway's sealers, the 700-ton Buroy with a crew of 40. This vessel hopes to catch 25,000 seals, producing oil to a value of almost a million dollars and skins valued at about 1.5 million dollars. Another sealer is the Norsel, which sailed direct from South Africa after having landed the Norwegian-British-Swedish Antarctic Expedition on Queen Maud's Land.

NOTE: Values for 1950 converted on the basis of the postdevaluation rate of exchange: one Norwegian krone equals 14 cents U.S.; for 1949: one krone equals 20.15 cents U.S.

Panama

NEW CORPORATION TO DEVELOP PANAMA'S FISHING INDUSTRY: A new corporation has been organized in Panama to develop that country's fishing industry, using modern methods and equipment, according to an announcement in the local press. It is understood that the new firm will catch and preserve fish, and also handle meat products, a March 20 American consular report from Panama states.

The corporation, which was organized on March 16, 1950, with an alleged initial capital investment of $687,500, is backed by a number of prominent Panamanian businessmen.

Peru

PRODUCTION OF FISHERY PRODUCTS, 1949: Peru produced an estimated 58,468 metric tons of fishery products during 1949, according to the Division of Statistics, Direccion de Pesqueria y Caza, reports a March 16 report from the American Fisheries Mission in Peru. Of the total production, 22,958 metric tons were canned, with the bulk being exported.

Since there is very little local demand for fish meal, the bulk of Peru's production of 2,708.4 metric tons was exported. Most of the meal produced (2,166.7 tons) was bonito waste from canneries, and the balance of 541.7 tons was from whole fish of other species, such as, anchovetas, machetes, bonitos, sharks, cojinobas, etc., or represented 2,708 tons of fresh fish. Only a very small amount of fish oil was produced and exported.

Peru's Estimated Production of Fishery Products, 1949

Production of:	Fresh Basis	Processed Weight	
	Metric Tons	Metric Tons	Cases
Fresh:			
Greater Lima	10,912	10,912	-
Rest of Peru	16,368	16,368	-
Salted2/	4,500	1,500	-
Frozen3/	3,730	2,612	-
Canned4/	22,958	6,887	573,953
Exported	20,662	6,199	516,560
Peru	2,296	688	57,393
Total5/	58,468	-	573,953

1/Bonito are not weighed but sold by the dozen; average weight is estimated at 88 pounds per dozen fish.
2/All consumed in Peru, except 7 metric tons exported to Ecuador.
3/Frozen exports consisted of approximately 75 percent swordfish and 25 percent yellowfin tuna. Possibly 25 metric tons of swordfish were consumed in Peru.
4/Canned fish consisted of 90 percent bonito (Sarda chilensis) and 10 percent yellowfin tuna. Packed mostly solid, in vegetable oil, 7 oz. round can.
5/In addition, 2,708.4 metric tons of fish meal were exported.

Portugal

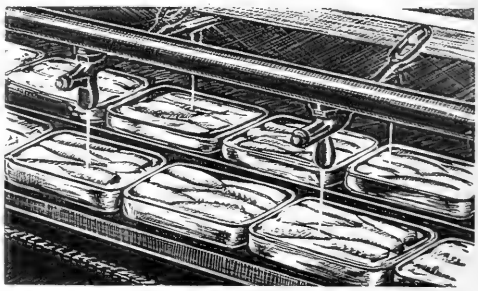
FISHERIES OF THE AZORES ARCHIPELAGO: Introduction: The Azores Archipelago consists of nine islands which represent an integral part of Portugal and not a colonial possession. It is divided politically and for purposes of administration into three districts: Ponta Delgada District (islands of Sao Miguel and Santa Maria), Angra District (islands of Terceira, Graciosa, and Sao Jorge), and the Horta District (islands of Faial, Pico, Flores, and Corvo). The chief occupations in the entire archipelago are farming and fishing.

Production: Statistics showing the total catch of fish in these islands are not available. However, the production for the Island of Sao Miguel indicates that 6,174,427 pounds of fish (valued at $237,896) were caught during 1949 off the Island as compared to 5,614,028 pounds (valued at $244,139) in 1948, a February 13 American Consular report from Ponta Delgada states.

Fish Canning Industry: Since the year 1929, the canned fish industry in the Azores has been steadily increasing. There are at present 5 large and 6 small canneries, the principal ones being located on the islands of Sao Miguel and Terceira. They employ about 60 motor launches, with a crew of some 1200 fishermen, and a number of other smaller boats. When the industry is at its height, the total number of persons employed is estimated at around 2,500, including fishermen, some of whom are occasionally recruited from Madeira Island for their superior skill over the Azorean fishermen.

Tuna is the principal fish used for canning, though "bonito" (a fish resembling a small tuna, the size of a good mackerel) is also largely used, as are mackerel, pilchards and sardines, whenever a large quantity is available.

Although this industry has not reached the normal production of prewar days, which was estimated at about 1,500 metric tons per annum, valued at roughly $1,500,000, the production in 1949 was considered the best in recent years with the total estimated at 1,000 metric tons, valued at $1,000,000; compared with the 1948 production of 500 metric tons, valued at $500,000.



PORTUGUESE SARDINE ASSEMBLY LINE SHOWING OIL MACHINES AUTOMATICALLY ADDING OLIVE OIL TO FILL THE CANS.

The bulk of the Azorean products of canned fish is exported to the United States, Italy, France, Switzerland, Belgium, and Brazil (to a limited extent). The principal market is Italy, which is capable of absorbing the total production of the Azores. Since World War II, however, the United States was the leading consumer market up to 1949 when the Azorean product seems to have met serious competition from Japanese canned tuna and some Peruvian canned fish packed in cottonseed oil.

It is stated the larger production of canned fish in 1949 is possibly due to replenishing of the normal abundance of fish in Azorean waters which almost disappeared during the war on account of depth charges and target practice in the neighborhood of the Islands.

Foreign Trade: Canned fish attains second place in importance in the export trade of the Islands, with whale oil also a principal export item.

United States Imports From the Azores Archipelago, 1946-49 (Quantity and Value)

Commodity	QUANTITY				VALUE			
	1949	1948	1947	1946	1949	1948	1947	1946
	Lbs.	Lbs.	Lbs.	Lbs.	U.S.$	U.S.$	U.S.$	U.S.$
Fish, canned (in oil)..	147,948	431,895	666,482	330,376	66,630	160,483	321,541	172,345
Fish, salted	2,940	2,618	820	-	260	167	85	-
Total	150,888	434,513	667,302	330,376	66,890	160,650	321,626	172,345

WHALING INDUSTRY OF THE AZORES ARCHIPELAGO: Whaling, which appears to have started some two centuries ago in the Azores, is one of the oldest industries which has contributed greatly to the economy of the Islands. It is now an established activity on almost every Island, especially Sao Miguel where there is one good modern plant for the production of whale oil, fertilizers, fish meal, and what is termed "ivory" from the teeth of the cachalot. With the exception of a limited quantity of fertilizer, and "ivory" utilized in the manufacture of souvenirs for the tourist trade, all other products are exported principally to foreign markets.

Catch of Whales and Quantity and Value of Whales Produced on Sao Miguel, 1940-49

Year	Whales	Oil Produced	Est. Value
	No.	Metric Tons	U.S.$
1949	-	411	86,224
1948	-	574	120,420
1945	103	340	71,329
1944	76	254	53,287
1943	93	337	70,699
1942	64	270	56,643
1941	39	230	48,252
1940	84	295	61,888

There are no recent figures indicating the production of whale oil in the Islands, but the scale of the industry can be judged from the production on the Island of Sao Miguel (see table).

During the war there was a great demand for whale oil in Europe, but exports were irregular and subject to strict allied control. For this reason, markets were procured in the United States, which proved profitable, and exports valued at $35,649 and $61,532 were made in 1946 and 1947, respectively. Due to unfavorable prices, no oil was exported in 1948, and in 1949, only 6,600 pounds of oil, valued at $600, were exported from the Azores.

This industry which is considered important in the economy of the archipelago has been improved in recent years with the acquisition of machinery and motor launches.

* * * * *

TO FISH FOR SARDINES OFF FRENCH MOROCCO: To recoup partially the losses due to the highly unsatisfactory local sardine catch during the season recently closed, Portuguese Government representatives are sponsoring the sending of trawlers to the area offshore from Agadir, French Morocco, where the catch is proving to be heavy and presumably steady, according to a February 28 dispatch from the American Embassy at Lisbon.

The Government is taking steps to acquire a fast ship with refrigeration facilities to permit the rushing of the catch from this area to Portuguese canneries.

Ryukyu Islands

REHABILITATION OF FISHERIES: Completion of construction of 35 fishing boats in the Ryukyus is planned by March 1950 in order to permit their utilization at the opening of seasonal operations, the February 11 Weekly Summary from SCAP's Natural Resources Section reports. The success of the fishing boat construction program should significantly increase aquatic production in 1950.

Indications are that the construction cost of the fishing boats will exceed the purchase price which Ryukyuan fishermen feel they can pay on the basis of prevailing costs of fishing and other economic considerations. The industry representatives are preparing a statement to justify their request for a purchase price below the construction cost. This request will be considered by proper authorities in establishing a reasonable price for the vessels consistent with the policy of expending United States relief funds for the rehabilitation of the Ryukyus.

Union of South Africa

YZERFONTEIN PROCESSING FACTORY IN OPERATION:[1/] A South African fishery firm has started operating a large, modern canning and byproducts plant at Yzerfontein, 60 miles up the west coast of South Africa from Cape Town. The fishing harbor built in this area will be used as a base for pilchard and tuna fisheries to supply the canning and fish-reduction plant, according to the January 1950 issue of The South African Shipping News and Fishing Industry Review.

The reduction plant building is 120 ft. long and 38 ft. wide. A meal storage shed, 98 ft. long by 38 ft. wide, is also part of the reduction factory. A cannery, 360 ft. long by 50 ft. wide, is now being built. The plant will be equipped with a 150-metric-ton-an-hour capacity vacuum pump which pumps the fish from the boat hold to a dewatering elevator. All fish are elevated from the flume to the weighing house, where they are weighed by a continuous scale. They are then flumed into two 150-ton capacity concrete bins in the reduction building, or, later in the year, into the refrigerated tanks of the cannery.

When completed, the tuna cannery will have an intake capacity of 125 metric tons of raw fish a day. The plant will handle both pilchards and mackerel, packed in either oval or round cans as demand dictates. Tuna-canning equipment also will be installed.

In addition, there is a shark-liver oil factory with an intake capacity of two metric tons of raw livers a day.

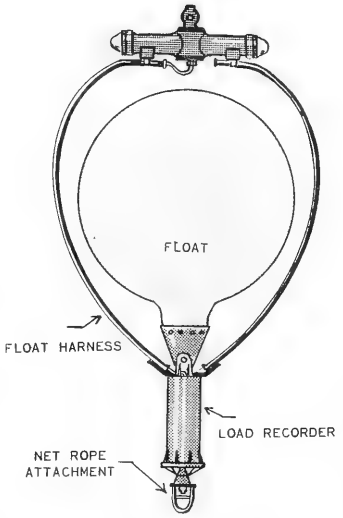
Three American pilchard purse-seine boats were purchased by the company as models for future boat construction in South Africa. The largest of the three, North Cape, is 82 ft. long and has a cruising radius of 6,000 miles. The other two are smaller boats and will be used as short-range craft.

1/ See Commercial Fisheries Review, October 1949, p. 57

United Kingdom

NEW NET LOAD INDICATOR INVENTED: A net load indicator has been invented by Maurice Elliott, a British engineer from Beccles, Suffolk, according to the January 28 issue of the British periodical The Fishing News.

Over a year ago, the inventor decided to investigate the possibility of a device to enable herring drift-net fishermen to know when fish were in their gill nets. The first experiments were with a radio signalling device, but although this proved its worth, the question of cost and the advice of members of the industry and that of other interests in America decided the inventor to look for a much cheaper and simpler method of visual signalling. A simpler device has been perfected and tried out aboard the English drift-netter Dauntless Star. The skipper of this vessel is convinced that this new device will provide another valuable "eye" for fishermen to supplement their other scientific aids.



NEW NET LOAD RECORDER.

The system is operated by a device harnessed to an ordinary herring net float and "powered" by only a cycle lamp battery. After the nets are set, the indicator gives an intermittent light. When the nets begin to load with fish, the signal changes to a steady, upward beam, indicating that hauling should commence. For the experiments, only one indicator was used at the far end of the nets. However, it was always possible to see where the nets lay (which of itself is a very great advantage). The indicator proved itself one-hundred percent, according to reports. Nothing ever went wrong with the device, even in the worst weather. Better results are expected with a series of indicators along the line of nets to show heavy catches in various parts of them. The vital parts of the device are the subject of undisclosed patents.

It is claimed by the inventor that the net load indicator can be adapted to other methods of fishing besides drift-net fishing.

Venezuela

FISH CANNERY RESUMES OPERATIONS: A Venezuelan fish cannery located at Caiguire, which had ceased operations because of difficulties encountered in selling its product, has resumed operations at one-third capacity, a March 3 American consular dispatch from Caracas reports. The company is packing 700 cases of canned sardines daily, and employing 205 workers. It has found a market for some of its product in Columbia on an exchange agreement for rice.

The Venezuelan canners still believe they need protection against imported canned fish, according to an editorial which appeared in El Universal on March 1, 1950. The editorial stated that the Venezuelan consumer still preferred the imported fish.

International

WORLD PRODUCTION OF MARINE OILS, 1949: World production of marine oils (whale and fish) in 1949 is estimated at 684,000 tons, 10 percent above that of 1948, though still well below prewar. This increase resulted principally from a substantial expansion in the production of fish oil, about one-fourth greater than in 1948, the March 6 Foreign Crops and Markets of the U. S. Department of Agriculture reports. The increase of whale-oil output, however, was small because the catch of baleen whales during the 1948-49 Antarctic whaling season again was limited to a maximum of 16,000 blue-whale units under the regulations of the 1946 International Whaling Convention.

Table 1 - World Production of Marine Oils, 1949 With Comparisons

Commodity	1949 (Est.)	1948	1947	Average 1935-39
	(in short tons)			
Marine Oils:				
Whale (excluding sperm)	392,000	385,000	363,000	585,000
Fish	292,000	237,000	220,000	460,000
Total	684,000	622,000	583,000	1,045,000

World production of all fats and oils in 1949 was up 50 percent over 1948, and exceeded the prewar level of production for the first time since the end of hostilities. In spite of this, the world remains short of fats and oils compared with the per capita level of consumption before the war, and even shorter if inadequate prewar diets for many peoples are taken into account.

Table 2 - World Exports of Marine Oils, 1949 and Forecast for 1950 With Comparisons

Commodity	Forecast 1950	Estimate 1949	1948	Average 1935-39
	(in short tons)			
Marine Oils:				
Whale (excluding sperm)	385,000	385,000	380,000	584,000
Fish	100,000	90,000	102,000	150,000
Total	485,000	475,000	482,000	734,000

Much of the increase in production of all fats and oils since prewar has occurred in the United States, and exports from the United States during 1949 made the largest single contribution to the alleviation of the world shortage. Indications are that United States exports will decline somewhat during 1950 because of the intensified shortage of dollar exchange in importing countries. As exportable surpluses of fats and oils accumulate in dollar areas, shortages will be intensified in certain non-dollar areas.

FEDERAL ACTIONS

Department of Commerce

FURTHER EXTENSION OF CONTROLS ON TIN AND TIN PRODUCTS NOT CONTEMPLATED: In a brief discussion of controls on tin and tin products, The Department of Commerce's Tenth Quarterly Report Under the Export Control Act of 1949 and the Second Decontrol Act of 1947 stated that it did not appear that further extension on this product would be necessary beyond its present expiration date of June 30, 1950. As of June 30, the only controls over tin will be through the Export Control Act under which export licenses will continue to be required for the shipment of tin and tin products abroad.

Interdepartmental Committee on Trade Agreements

FISHERY PRODUCTS INCLUDED IN TRADE-AGREEMENT NEGOTIATIONS: Plans for further tariff negotiations on about 2,500 items (including a number of fishery and allied products) were announced simultaneously by the Interdepartmental Committee on Trade Agreements, the Committee for Reciprocity Information, and the United States Tariff Commission. Detailed announcements by these agencies appeared in the Federal Register of April 14, 1950.

This is preliminary to the International Trade Conference which will be held at Torquay, England, on September 28, in which the United States will take part and at which it will negotiate with seventeen countries on possible tariff cuts.

The notice indicated that trade-agreement negotiations are contemplated with the following countries, including in each case areas in respect of which the country has authority to conduct trade agreement negotiations: Australia, Austria, Belgium, Brazil, Canada, France, the Federal Republic of Germany, Guatemala, Korea, Luxembourg, New Zealand, the Netherlands, Norway, Peru, Turkey, the Union of South Africa and the United Kingdom. It is proposed to enter into negotiations with these countries for the purpose of negotiating mutually advantageous tariff concessions. Negotiations with Austria, the Federal Republic of Germany, Guatemala, Korea, Peru, and Turkey will also be for the purpose of their accession to the General Agreement on Tariffs and Trade.

Concessions to any country at these trade-agreement negotiations will apply to all other countries under the "most favored nation" clause.

The list of articles annexed to the notice contains descriptions of articles imported into the United States which it is proposed should be considered for possible modification of duties and other import restrictions, imposition of addi-

tional import restrictions, or specific continuance of existing customs or excise treatment in the trade-agreement negotiations which are proposed with the countries specified. Included are the following fishery and allied products, and reference is made in the list to the paragraph numbers of the Tariff Act of 1930 or section numbers of the Internal Revenue Code:

Schedule 1--Chemicals, Oils and Paints:

34. Drugs of animal origin (except dried insects, shark oil, and dogfish oil, and except fish-liver oils other than halibut-liver oil).

52. Oils, animal and fish: Seal; all other animal and fish oils, fats and greases, not specially provided for (except shark and dogfish oil and shark-liver and dogfish-liver oil).

56. Other oils and fats (not including hydrogenated or hardened oils and fats), the composition and properties of which have been changed by vulcanizing, oxidizing, chlorinating, nitrating, or any other chemical process, and not specially provided for.

57. Combinations and mixtures of animal, vegetable, or mineral oils or of any of them, with or without other substances, and not specially provided for.

Schedule 7--Agricultural Products and Provisions:

717. (a) Fish, fresh (whether or not packed in ice), whole, or beheaded or eviscerated or both, but not further advanced (except that the fins may be removed): Mackerel

(b) Fish, fresh or frozen (whether or not packed in ice), filleted, skinned, boned, sliced, or divided into portions, not specially provided for: Cod, haddock, hake, pollock, cusk, and rosefish.

718. (a) Fish, prepared or preserved in any manner, when packed in oil or in oil and other substances: Bonito and yellowtail; and sardines, neither skinned nor boned, valued at over 18 but not over 23 cents per pound, including the weight of the immediate container.

(b) Fish, prepared or preserved in any manner, when packed in airtight containers weighing with their contents not more than fifteen pounds each (except fish packed in oil or in oil and other substances): Salmon; herring; sardines; and fish cakes, balls, and puddings.

719. Fish, pickled or salted (except fish packed in oil or in oil and other substances and except fish packed in airtight containers weighing with their contents not more than fifteen pounds each):
(1) Salmon
(4) Herring, whether or not boned, in immediate containers weighing with their contents more than fifteen pounds each and containing each not more than 10 pounds of herring, net weight; or in immediate containers (not air-tight) weighing with their contents not more than fifteen pounds each.

720. (a) Fish, smoked or kippered (except fish packed in oil or in oil and other substances and except fish packed in airtight containers weighing with their contents not more than fifteen pounds each):
(1) Salmon.
(6) Other fish (not including fish provided for in subdivisions (2), (3), (4), and (5) of paragraph 720 (a), Tariff Act of 1930).

721. (b) Razor clams (Siliqua patula), clam juice, clam chowder, and clam juice in combination with substances other than clams, packed in air-tight containers.

(c) Fish paste and fish sauce.

(d) Caviar and other fish roe for food purposes (except sturgeon), if boiled and packed in air-tight containers, whether or not in bouillon or sauce.

Schedule 10--Flax, Hemp, Jute, and Manufactures of
1006. Gill nettings, nets, webs, and seines, and other nets for fishing, wholly or in chief value of flax, hemp, or ramie, and not specially provided for.

Schedule 15--Sundries:
1535. Artificial flies, snelled hooks, leaders or casts, finished or unfinished; fishing rods and reels, and parts thereof, finished or unfinished, not specially provided for; fish hooks, artificial baits, fly books, and fly boxes, finished or unfinished, not specially provided for.

Free List:
1677. Fish imported to be used for purposes other than human consumption: Aquarium fish (except goldfish).

1722. Seaweeds, and vegetable substances, crude or unmanufactured, not specially provided for (not including moss and except a number of other non-fishery products).

1761. Shellfish, fresh or frozen (whether or not packed in ice), or prepared or preserved in any manner, and not specially provided for (not including shrimps, lobsters, and pastes and sauces, and except

crabs, clams, quahaugs, oysters, prawns, abalone, and scallops).	
Articles Provided for in the Internal Revenue Code:	
Sec. 2491. (a) Fish oil (except whale oil,	shark oil, and shark-liver oil, including oil produced from sharks known as dogfish, sod oil, herring oil, menhaden oil, eulachon oil, and fish-liver oils classifiable under paragraph 34 or 1669, Tariff Act of 1930); marine-animal oil; tallow, inedible animal oils, etc.

In the case of each article in the list with respect to which the corresponding product of Cuba is subject to preferential treatment, the negotiations referred to will involve the elimination, reduction, or continuation of the preference, perhaps with an adjustment or specification of the rate applicable to the product of Cuba.

No article will be considered in the negotiations unless it is included in this list or unless it is subsequently included in a supplementary public list. No duty or import tax imposed under a paragraph or section of the Tariff Act or Internal Revenue Code other than the paragraph or section listed with respect to such article will be considered for a possible decrease, although an additional or separate duty on an article included in the annexed list which is imposed under a paragraph or section other than that listed may be bound against increase as an assurance that the concession under the listed paragraph or section will not be nullified.

The negotiations will also include consideration of proposals to change the date in Article XXVIII of the General Agreement on Tariffs and Trade from January 1, 1951, to a later date. Article XXVIII now provides that the concessions negotiated at Geneva in 1947 and at Annecy in 1949 on individual products may be modified or withdrawn on or after January 1, 1951, after negotiation and consultation with other contracting parties without the necessity of terminating the entire agreement. If the date in Article XXVIII is changed to a later date, it would mean that the contracting parties would be precluded from the effective date of the amendment until such later date from invoking Article XXVIII to modify or withdraw concessions. The proposed change would affect all products on which the United States might make concessions at the forthcoming tariff negotiations as well as those in Schedule XX made at Geneva, Switzerland, and Annecy, France.

In addition to the governments listed which are seeking accession to the General Agreement on Tariffs and Trade, the Government of the Philippines has also indicated its acceptance of the invitation of the contracting parties to undertake tariff negotiations for the purpose of accession. However, the United States will not undertake tariff negotiations with the Philippines at the forthcoming tariff negotiations in view of section 508 of the Philippine Trade Act of 1946 which provides, in effect, that during the effectiveness of the agreement on trade and related matters between the United States and the Philippines, concluded pursuant to that Act, the President shall not enter into a trade agreement with the Philippines under the Trade Agreements Act. Moreover, if the Philippines should accede to the General Agreement, which has been entered into by the United States pursuant to the Trade Agreements Act, it is intended that the United States would invoke Article XXXV of the General Agreement, by virtue of which the General Agreement would not apply as between the United States and the Philippines.

The Committee for Reciprocity Information announced that all applications for views in regarding to the foregoing proposals, which must indicate the product or

products on which the individuals or groups desire to be heard, were to be submitted to the Committee not later than May 10, 1950, and all information and views in writing were to be submitted not later than May 17, 1950.

Public hearings were to be held before the Committee at which oral statements were to be heard. The first hearing was to be held on May 24, 1950, in the Tariff Commission Buildings, Washington, D. C. Witnesses who make application to be heard were to be advised regarding the time and place of their individual appearances.

Information, with respect to all dutiable commodities, on rates of duty, import, export, and production statistics, and pertinent data concerning competition is contained in the Summaries of Tariff Information prepared by the United States Tariff Commission in 1948. Among other things, the Summaries show the 1945 rates of duty which are the basis for application of the 50 percent limitation on the authority of the President to increase or decrease rates under the Trade Agreements Act. The Summaries also show the rates of duty applicable in 1948, which for most commodities are the rates now in effect. Information as to the few changes in rates of duty since 1948 may be obtained on request from the various offices of the Bureau of Customs throughout the country or to the United States Tariff Commission, Washington 25, D. C.

The Summaries of Tariff Information are available for reference in the offices of the Tariff Commission in Washington, D. C., in the Custom House in New York City, in the Field Offices of the U. S. Department of Commerce located in most of the large cities, in the main libraries of most of the large colleges and universities, and in the principal public libraries in the larger cities.

Separate pages from these Summaries for a particular commodity may be obtained by addressing a request to the United States Tariff Commission, Washington 25, D. C.

A compilation entitled "United States Import Duties (1948)" and "Supplement II" gives up-to-date information concerning existing rates of duty.

Interstate Commerce Commission

RAILWAY EXPRESS' REQUEST FOR INCREASE IN ICE CHARGES DENIED: In connection with the request of the Railway Express Agency for increases in the ice charges for fish and shellfish shipments, the Interstate Commerce Commission has declared the proposals by the Company as unjust and unreasonable. The schedules containing these increases, which had been suspended, were ordered cancelled and the proceeding before the Commission discontinued.

The Express Agency proposed to add to less-carload fresh and frozen fish express shipments (using water ice as a refrigerant and shipped in boxes or other containers) 25 precent more than currently added to the net weight and, accordingly, to the billing weights (See Commercial Fisheries Review, November 1949, p. 69). The report of the Interstate Commerce Commission on this case (Investigation and Suspension Docket No. 5612, "Billing Weights on Iced Fish and Shellfish—Express") was submitted on February 23, 1950, and decided upon and an order released by the Commission on March 22, 1950.

The Commission entered upon a hearing of this case by an order dated November 19, 1948, and it suspended the operation of the proposed schedules up to and including June 21, 1949. Voluntarily the Railway Express Agency postponed the effective date of the suspended schedules until April 22, 1950. However, the present order requires the Company to cancel the schedules on or before May 1, 1950.

Department of State

UNITED STATES-CANADIAN CONVENTION FOR EXTENSION OF PORT PRIVILEGES TO HALIBUT FISHING VESSELS: The Department of State announced signature on March 24 of a convention between the United States and Canada for the extension of port privileges to halibut fishing vessels on the Pacific Coast of the two countries.

The United States Ambassador and the Canadian Minister of Fisheries signed the convention in Ottawa.

Under the terms of this agreement, Canada will grant to United States halibut fishing vessels the privilege of landing catches and obtaining supplies, repairs and equipment in Canadian ports on the Pacific Coast. In return, the United States will grant the same privilege to Canadian halibut fishing vessels in Pacific Coast ports of Alaska and the Continental United States.

This convention puts on a permanent basis an arrangement which has been made year by year in the past.

* * * * *

UNITED STATES DOES NOT CLAIM SOVEREIGNTY OVER CORONADOS ISLANDS: The Department of State has been asked whether the United States has any claim to the sovereignty of the Coronados Islands which lie off the coast of Mexico. The inquiry arose in connection with action in the courts of California concerning a fishing vessel.

The Department has replied that the United States has never made any objection to Mexico's claim of sovereignty over the islands of Los Coronados. On the contrary, in the span of a hundred years, various agencies of the United States Government have acknowledged on many occasions, either by implications or in official documents, that these islands are a possession of the United Mexican States. The Government of the United States does not now have any reason to change position with respect to the claim by Mexico of sovereignty over the Coronados Islands, according to a March 9 State Department press release.

* * * * *

PARTICIPATION OF JAPAN IN INTERNATIONAL TECHNICAL AGREEMENTS AND CONFERENCES PERMITTED: With a view to facilitating the participation of Japan in technical agreements and conferences, the United States Government on February 21, 1950, issued an interim directive to SCAP authorizing him "to permit Japan to participate with other nations or groups of nations in such international agreements, conventions, and conferences of a technical character as Japan may be invited to enter into, accede to, or attend, and as the Supreme Commander shall consider to be in the interests of the occupation."

Because the question of Japanese participation in technical conferences and agreements is a constantly recurring one and because a majority of the members of the Far Eastern Commission recognize the desirability of Japan's participation in such conferences, the United States issued this directive in accordance with paragraph III, 3, of the "Terms of Reference of the Far Eastern Commission," a February 25 State Department press release states. This paragraph provides that:

> "The United States Government may issue interim directives to the Supreme Commander pending action by the Commission whenever urgent matters arise not covered by policies already formulated by the Commission; provided that any directives dealing with fundamental changes in the Japanese constitutional structure or in the regime of control, or dealing with a change in the Japanese Government as a whole will be issued only following consultation and following the attainment of agreement in the Far Eastern Commission."

The text of the interim directive follows:

> "1. The Supreme Commander for the Allied Powers, subject to his discretion and continued control, should permit Japan to participate with other nations or groups of nations in such international agreements, conventions, and conferences of a technical character as Japan may be invited to enter into, accede to, or attend and as the Supreme Commander shall consider to be in the interest of the occupation.
>
> "2. Before leaving Japan, Japanese representatives appointed in accordance with the provisions of this policy decision, should be instructed to refrain from engaging in propaganda or subversive activities of any kind.
>
> "3. The Supreme Commander should direct the Japanese Government to fulfill any obligations which it assumes in accordance with the provisions of this policy.
>
> "4. The Supreme Commander should inform the Far Eastern Commission of any any action taken in accordance with the provisions of this policy."

Eighty-first Congress (Second Session)

MARCH 1950

Listed below are public bills, resolutions, etc., introduced and referred to committees, or passed by the Eighty-First Congress (Second Session) and signed by the President during March 1950, which affect in any way the fisheries and fishing and allied industries. Public bills, resolutions, etc., are mentioned under this section only when introduced and, if passed, when they are signed by the President.

PUBLIC BILLS AND RESOLUTIONS INTRODUCED AND REFERRED TO COMMITTEES:

House of Representatives:

H. R. 7523 (Blatnik) - A bill to reestablish a Civilian Conservation Corps; to provide for the conservation of natural resources and the development of human resources through the employment of youthful citizens in the performance of useful work, including job training and instruction in good work habits; and for other purposes; to the Committee on Education and Labor.

H. R. 7547 (Kilday) - A bill to amend the Interstate Commerce Act, as amended, with respect to motor carriers excepted from certain provisions of part II of such Act; to the Committee on Interstate and Foreign Commerce. ("That section 203 (b) (6) of part II of the Interstate Commerce Act, as amended, is amended to read as follows: '(6) motor vehicles used in carrying property consisting of ordinary livestock, live poultry, and other agricultural commodities (not including the products of slaughter, nor preserved, frozen, or manufactured products), and fish (including shell fish but not including preserved, frozen, processed, or manufactured products), if such motor vehicles are not used in carrying any other property, or passengers, for compensation; or...'"

H. R. 7553 (Mitchell) - A bill to stabilize income of herring fishermen in Alaska and prices of products of the Alaska herring industry; to the Committee on Banking and Currency.

H. R. 7624 (Monroney) - A bill to amend the customs laws of the United States, as amended, in order to protect American commerce against discrimination by foreign nations; to the Committee on Ways and Means.

H. R. 7693 (Bennett) - A bill to transfer the vessel Theodore N. Gill from the United States Maritime Commission to the Fish and Wildlife Service; to the Committee on Merchant Marine and Fisheries.

H. R. 7786 (Cannon) - A bill making appropriations for the support of the Government for the fiscal year ending June 30, 1951, and for other purposes; to the Committee of the Whole House on the State of the Union. (Includes appropriations for the Fish and Wildlife Service).

H. R. 7797 - An act to provide foreign economic assistance; read twice and ordered to be placed on the calendar. (Includes Title I - Economic Cooperation Act of 1950; Title II - United Nations Palestine Refugee Aid Act of 1950; Title III - Act of International Development (Point IV).

H. R. 7808 (Stockman) - A bill to authorize the administration of fishing and other activities of the Indians who have been fishing at or in the vicinity of Celilo Falls in the Columbia River, Oregon, and for other purposes; to the Committee on Public Lands.

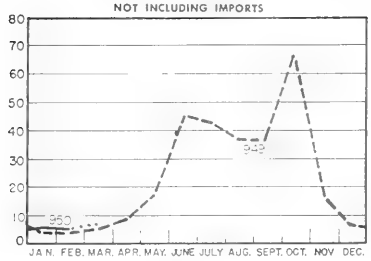
H. R. 7849 (Kennedy) - A bill to further encourage the distribution of fishery products, and for other purposes; to the Committee on Merchant Marine and Fisheries.

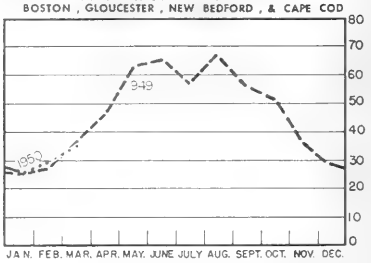
H. R. 7887 (Thompson) - A bill granting the consent and approval of Congress to an amendment to the Atlantic States marine fisheries compact, and repealing the limitation on the life of such compact; to the Committee on Merchant Marine and Fisheries.

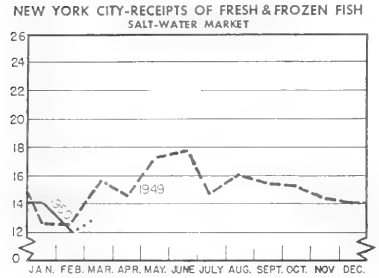
H. R. 7914 (Miller) - A bill to amend chapter 61 (relating to lotteries) of title 18, United States Code, to make clear that such chapter does not apply to contests wherein prizes are awarded for the species, size, weight, or quality of fish caught by the contestant; to the Committee on the Judiciary.

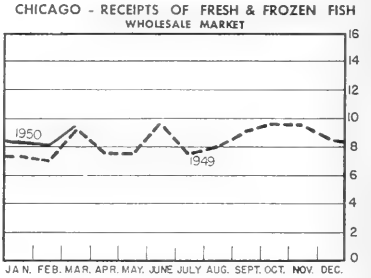
LANDINGS AND RECEIPTS

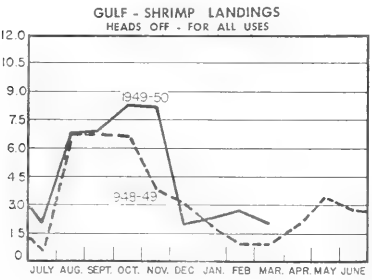
In Millions of Pounds

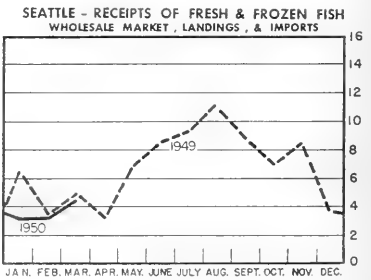




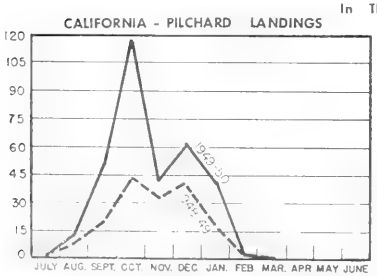


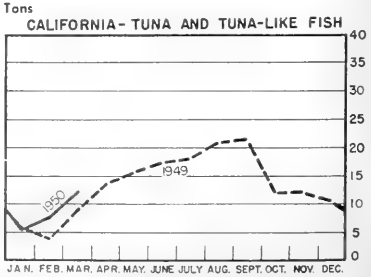






In Thousands of Tons



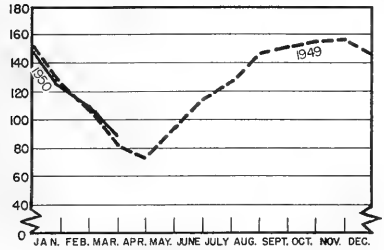


•••••••• ESTIMATED

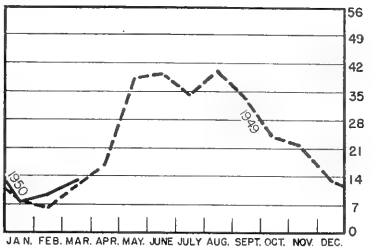
COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

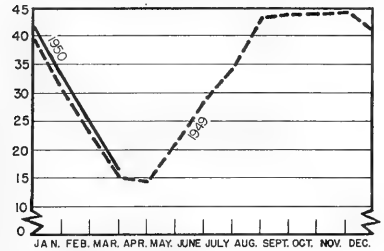
U.S. & ALASKA - HOLDINGS OF FROZEN FISH



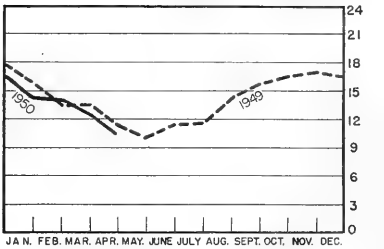
U.S. & ALASKA - FREEZINGS



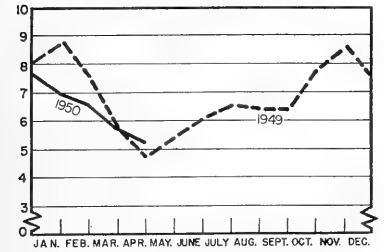
NEW ENGLAND - HOLDINGS OF FROZEN FISH



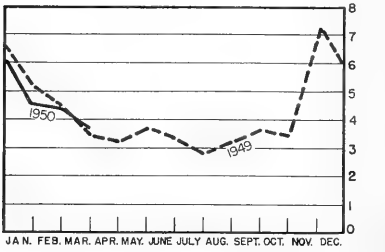
NEW YORK CITY - HOLDINGS OF FROZEN FISH



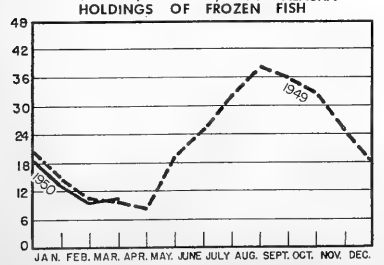
CHICAGO - HOLDINGS OF FROZEN FISH



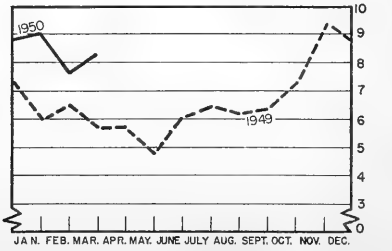
GULF - HOLDINGS OF FROZEN FISH



WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH



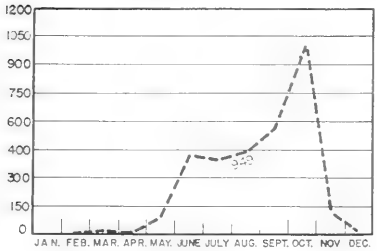
CALIFORNIA - HOLDINGS OF FROZEN FISH



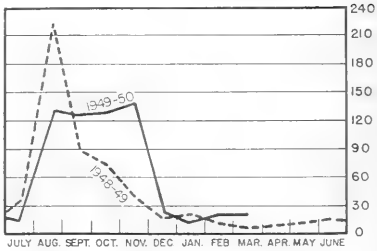
CANNED FISHERY PRODUCTS

In Thousands of Standard Cases

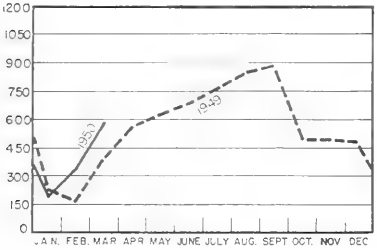
MAINE - SARDINES, ESTIMATED PACK



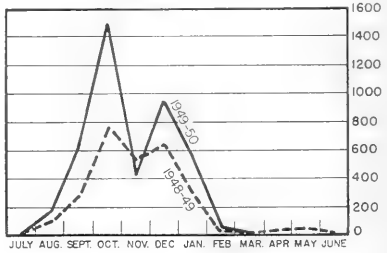
UNITED STATES - SHRIMP



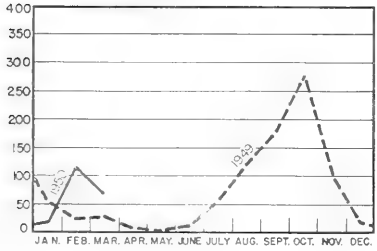
CALIFORNIA - TUNA AND TUNA-LIKE FISH



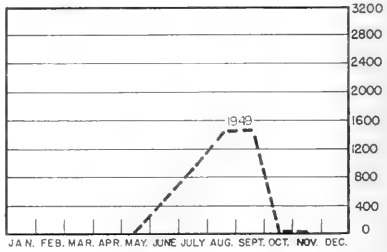
CALIFORNIA - PILCHARDS



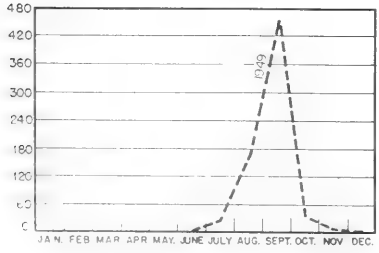
CALIFORNIA - MACKEREL



ALASKA - SALMON



WASHINGTON - PUGET SOUND SALMON

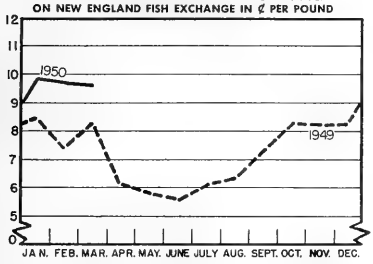


STANDARD CASES

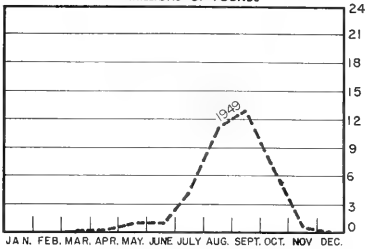
Variety	No. Cans	Can Designation	Net. Wgt.
SARDINES	100	1/4 drawn	3 1/4 oz.
SHRIMP	48	—	5 oz.
TUNA	48	No. 1/2 tuna	7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
MACKEREL	48	No. 300	15 oz.
SALMON	48	1-pound tall	16 oz.

PRICES , IMPORTS and BY-PRODUCTS

BOSTON - WEIGHTED AVERAGE PRICE
ON NEW ENGLAND FISH EXCHANGE IN ¢ PER POUND

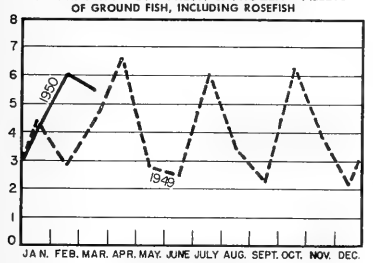


MAINE - IMPORTS OF FRESH SEA HERRING
IN MILLIONS OF POUNDS

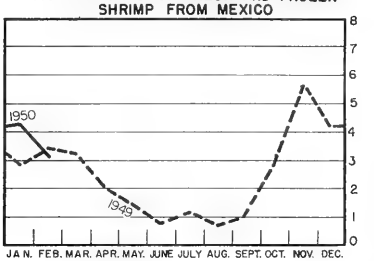


In Millions of Pounds

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

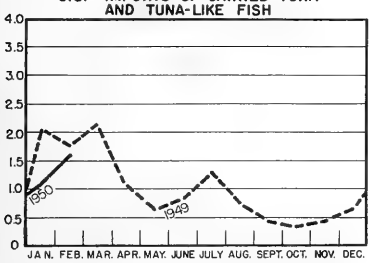


U.S. - IMPORTS OF FRESH AND FROZEN
SHRIMP FROM MEXICO

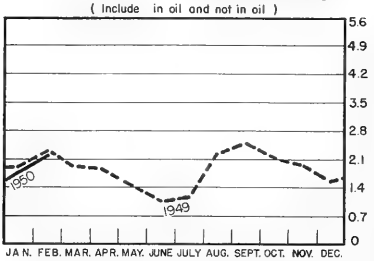


In Millions of Pounds

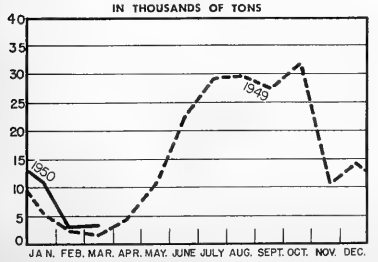
U.S. - IMPORTS OF CANNED TUNA
AND TUNA-LIKE FISH



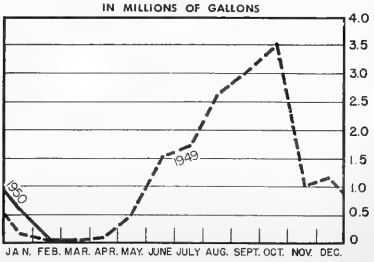
U.S. - IMPORTS OF CANNED SARDINES
(Include in oil and not in oil)

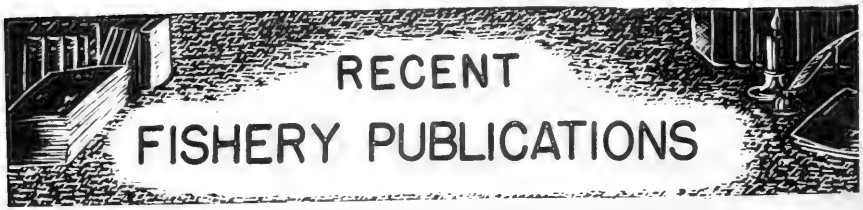


U.S. & ALASKA - PRODUCTION OF FISH MEAL
IN THOUSANDS OF TONS



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

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-488 (Revised)	- Pacific Coast Fisheries, 1947 Annual Summary, 6 p.
CFS-523	- Frozen Fish Report, February 1950, 10 p.
CFS-525	- Middle Atlantic Fisheries, 1947 Annual Summary, 6 p.
CFS-526	- Maine Landings, December 1949, 4 p.
CFS-527	- Fish Meal and Oil, January 1950, 2 p.
CFS-528	- Texas Landings, January 1950, 4 p.
CFS-529	- Frozen Fish Report, March 1950, 10 p.
CFS-531	- Texas Landings, February 1950, 4 p.
CFS-533	- Massachusetts Landings, October 1949, 14 p.
CFS-534	- New England Fisheries, 1947 Annual Summary, 6 p.
CFS-439 (Revised)	- Packaged Fish, 1947 Annual Summary, 4 p.
FL-355	- The Trouts of North America, 13 p.
FL-361	- S.S. Pacific Explorer, Part V - 1948 Operations in the North Pacific and Bering Sea, 161 p.
FL-362	- Information Sources for Students of Commercial Fisheries, 20 p.
Sep. 246	- The Fish and Wildlife Service--Ten Years of Progress
Sep. 247	- A New Fishery for Grooved Shrimp in Southern Florida
Sep. 248	- Vitamin A in 155 Grayfish Livers

* * * * *

An Investigation of Oyster Producing Areas in Louisiana and Mississippi Damaged by Flood Waters in 1945, by Philip A. Butler, Special Scientific Report: Fisheries No. 8, 38 p., processed, December 1949. Limited distribution. This report discusses the desirability and methods for the rehabilitation, replanting, and maintenance of the oyster beds in Louisiana and Mississippi damaged by flood waters. The major sections of the report describe the scope of the Fish and Wildlife Service survey, equipment and methods used, laboratory and field data and their interpretation, rehabilitation of oyster reefs, and suggestions for future work. Under laboratory and field data and their interpretation, the following subjects are covered: condition of oyster reefs in May 1949; growth; mortality; oyster quality; parasites and fouling organisms; turbidity; hydrogen ion concentration; temperature; salinity; and pertinent conclusions which may be derived from the data collected for each of the areas surveyed.

Possibilities for Oyster Culture in Puerto Rico and the Virgin Islands, by Walter A. Chipman and Paul E. Thompson, Special Scientific Report: Fisheries 9, 19 p., processed, January 1950. Limited Distribution. The Govern-

ments of Puerto Rico and the Virgin Islands requested advice and assistance of the Fish and Wildlife Service in a study of their respective oyster resources and of possibilities for the development of an oyster industry through cultivation. This report covers the survey made in March-April 1949 by the authors, together with the recommendations made to the officials of the two governments. Included is a discussion of the survey of areas in Puerto Rico and the Virgin Islands; and discussions and recommendations regarding oysters of Puerto Rico and the Virgin Islands, conditions affecting oyster production, and possibilities of oyster culture. In their conclusion, the authors state that introduction of a new species of oyster rather than improvement in the native oyster now present seems to be the best solution for the development of any oyster industry in Puerto Rico and the Virgin Islands. Although the magnitude of the industry could never be large, it would be adequate to meet the needs of the market in these islands.

ARTICLES BY FISH AND WILDLIFE SERVICE AUTHORS IN OTHER PUBLICATIONS

"Conditioning V. Mercenaria for Spawning in Winter and Breeding its Larvae in the Laboratory," by Victor L. Loosanoff and and Harry C. Davis, The Biological Bulletin, February 1950, vol. 98, no. 1, pp. 60-5, illus. The Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass., $1.75 per issue. Some simple principles and rules are given in this article on how to obtain mature sperm and eggs of clams (V. mercenaria and several other species) on almost a year-round basis, and how the larvae can be grown to the setting stage even in the middle of winter.

MISCELLANEOUS PUBLICATIONS

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

Annual Report of the Fisheries Department, Federation of Malaya and Singapore for the Year 1948, by D. W. Le Mare, 72 p., printed. For sale by Government Publications Bureau, General Post Office, Fullerton Building, Singapore, 1949. Reviews the status of the fisheries during 1948. Information by districts is given, in addition to data on number of boats operating, number of fishermen, number and type of gear used, total landings, average market prices, and imports. Among the departmental developments discussed are carp culture and supply of fry, traditional sea-transportation of fry, postwar transportation of carp fry by air, fish fry imported by air from Hongkong, and fish cultivation.

Annual Report on the Fisheries Branch (Colony of Mauritius) for the year 1948, 10 p., printed, 15 cents. J. Eliel Felix, Government Printer, Port Louis, Mauritius, May 1949. Discusses systematic studies of fish, large net fishing, cooperatives, offshore and inshore fishing, production (together with actual data for 1948 and comparative information), and marketing and distribution of fish for the Colony of Mauritius.

"B. C. Salmon Spawning Report--1949" and "Lower Fraser District Has Successful Season," articles, Trade News. February 1950, vol. 2, no. 8, pp. 7-12, illus., processed. Department of Fisheries, Ottawa, Canada. The first article discusses the 1949 British Columbia salmon run, spawning, and escapement. It states that escapement of salmon to spawning grounds was good generally throughout British Columbia in 1949. The Second article reports on the 1949 fishing season of the Lower Fraser Inspectoral District, which includes the Fraser River and areas south to Boundary Bay. This article concludes that the 1949 fishing season of the Lower Fraser Inspectoral District was a successful one in the general opinion of the fishermen.

Family Fare Food Management and Recipes, Home and Garden Bulletin No. 1, 96 p., printed, 25 cents. Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C., February 1950. (For sale by Superintendent of Documents, Washington 25, D. C.) Offers suggestions and other helps with reference to serving enjoyable meals, keeping the family well nourished, practicing thrift when needed, and saving time and energy whenever possible. Fish is specifically covered under buying hints and main dishes, and is mentioned in connection with meat and poultry

in other sections of the booklet. The nutrition section aims to bring the homemaker up-to-date quickly and to show the importance of food for health. The food planning section shows an orderly way to provide meals that contain the vitamins and other nutrients in the quantities which different individuals need. The cooking principles and recipes are modern. The sections dealing with fish were made up with the cooperation of the Fish and Wildlife Service.

"Fisheries Exports in 1949 (Canada)," article, Trade News, February 1950, vol. 2, no. 8, pp. 15-7, processed. Department of Fisheries, Ottawa, Canada. An analysis of the Canadian exports of fisheries products. Gives some information on the export market situation.

"Fishing in Arabia," by Donald S. Erdman, article, The Scientific Monthly, January 1950, vol. LXX, no. 1, pp. 58-65, illus., printed, single copies of magazine 75 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave., N. W., Washington 5, D. C. The author, scientific aide in the Division of Fishes, U. S. National Museum, was a guest of an oil company at Dhahran, Saudi Arabia, from March to August 1948 and assisted in a local fishery survey conducted to supplement the food of company employees. This article describes this survey, the types of fish caught, methods of capture, and other information for the Bahrein Island area in the Persian Gulf, around Jidda on the Red Sea, and at the interior oasis of Al Hasa.

Forty-Third Annual Report of the South Carolina State Board of Fisheries 1948-49 to the Governor and General Assembly, 9 p., printed. State Board of Fisheries, 91 Broad Street, Charleston, S. C., 1949. This annual report on the fisheries of South Carolina is divided into four sections: Section I, Advisory Committee; Section II, Law Enforcement; Section III, Fisheries; and Section IV, Bears Bluff Laboratories. The section on fisheries discusses shrimp, oysters, shad, menhaden, crabs, clams, exploratory research, and sport fishing. No over-all fisheries statistics are given.

Het bederf van dierlijke voedingsmiddelen bij lage temperaturen (Deterioration of Animal Foodstuffs at Low Temperatures), by C.J.H. van den Broek, 44 p., illus., printed in German, reprinted from Chemisch Weekblad, Vol. 45 (1949), pp. 777-84 and 813-20. Centraal Institut voor Voedingsonderzoek T. N. O., Utrecht. This publication is divided into two parts. Part I (Development of Our Knowledge of the Deterioration Processes) reports that although quick-freezing can preserve the natural freshness of perishable foodstuffs in a better way than any other means of preservation, it has to combat its own characteristic deterioration processes. To describe the peculiar character of these processes, so little known outside the freezing industry, a historical survey is given of the earlier scientific work in this field. It is shown how after some misconceptions, a few of which still prevail in practice, research in 1935 led to an understanding of the complex nature of this kind of deterioration. Part II (Recent Research on the Preservation by Cold) is a survey of modern investigations on the deterioration of animal foods in freezing, including meat, poultry, and fish. In fish, the extreme liability to spoilage at ordinary temperatures led to an increased appreciation of the influence of freshness at the moment of freezing on the quality of the frozen product, according to the author. While in lean fish, "drip" and the denaturation of proteins are most intensively studied, in fatty fish these phenomena are overshadowed by the deterioration of the fat. The possibility of preventing "drip" by a treatment with salt solutions led to an investigation into the action of sodium chloride and the pH on muscle proteins. The various fishery products of invertebrate origin, recently added to the list of frozen foods, offer interesting aspects for a comparison of their forms of deterioration with those of the other foodstuffs mentioned. Both parts contain an extensive bibliography.

"The Import Market for Fish in Switzerland," article, Trade News, February 1950, vol. 2, no. 8, pp. 24-6, processed. Department of Fisheries, Ottawa, Canada. Contains an analysis of Switzerland's 1949 imports of fishery products, and includes comparative data for 1948. Reports on types of fishery products imported and countries from which they were shipped. Of greatest interest to United States exporters are the pilchards and herring in tomato sauce and canned salmon in containers weighing less than 6½ pounds. The United States, which was the largest supplier of these commodities in both 1948 and 1949, increased considerably the shipments of these items to Switzerland in 1949. Canada was the second largest supplier of canned pilchards and salmon in 1949.

Income of Fishermen on Boston Fish Pier Fleet, 1948, by Kermit Mohn, LS 50-1116, 13 p., processed. Bureau of Labor Statistics, U. S. Department of Labor, Washington, D. C., 1949. A study measuring the earnings of the fishermen of the Boston Fish Pier Fleet during 1948 made by the Bureau of Labor Statistics. This report discusses the methods used for and gives a summarization of the data obtained from this study. The

data is based on records of the Atlantic Fishermen's Union, supplemented by the records of individual vessel owners. The entire study pertains to the activities of only 51 vessels. Included are tables giving the distribution of fishermen in the Boston Fish Pier Fleet by annual earnings and occupation, and by annual earnings and number of days worked; and a table each for deckhands, cooks, captains, mates, chief engineers, and second engineers showing the distribution of each of these categories by annual earnings and number of days worked.

International Organization in which the United States Participates, 1949, Publication 3655, Series I-8, 343 p., printed, 65 cents. Department of State, Washington, D. C., February 1950. (For sale by the Superintendent of Documents, Washington, D. C.) Contains 66 summaries outlining the character and general purposes of multilateral international organizations in which the United States was a participant on June 30, 1949. The summaries are grouped in the following classes: General (covering a wide field of responsibilities); Agriculture and Fisheries; Commodity; Economic and Financial; Educational; Scientific and Cultural; Occupation and Peace-making; Political and Legal; Regional; Social and Health; and Transport and Communications. Information is included regarding the origin and development of each organization; its membership, purposes, powers, functions, structure and finances; relations with the United States; relations with other international organizations; and citations to pertinent basic texts and publications.

Italian Importers of U. S. Commodities, 176 p., printed. Prepared by the Trade Division, ECA Special Mission to Italy, Rome, Italy, 1950. Available from the Economic Cooperation Administration, Washington 25, D. C. Lists the names and addresses of Italian importers that have imported merchandise (including fishery products) from the United States between April 1, 1948, and July 1, 1949. Firms are listed by the type of commodity imported according to the Department of Commerce schedule "B" statistical classification. A number of firms that imported fish and marine oils and edible fishery products are included.

Japanese Whaling Industry Prior to 1946, by William M. Terry, Report No. 126, 47 p., processed. Natural Resources Section, Supreme Commander for the Allied Powers, Tokyo, March 1950. (Reports may be purchased in photostat or microfilm from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.) A report of a survey of available data on the history of systematic Japanese whaling operations prior to and during World War II. Much of the data used in this report has been drawn from records prepared by the whaling companies and the Japan Whaling Industry Fisheries Association (Nippon Hogeigyo Suisan Kumiai), and from available reports of government whaling inspectors who accompanied expeditions to the Antarctic. Includes information and data on pelagic whaling in the Antarctic and the Bering Sea and Arctic Ocean; and coastal and colonial whaling. Discusses the organization and regulation of the industry and lists the major whaling companies.

"The Lamprey Fishery at Willamette Falls, Oregon," article, Fish Commission Research Briefs, December 1949, vol. 2, no. 2, pp. 23-27, illus., printed, free. Fish Commission of Oregon, Portland, Oregon. Describes the Pacific or three-toothed lamprey fishery in the Willamette River and the commercial utilization of this vertebrate. A short discussion of the life history of the Pacific lamprey (Entosphenus tridentatus) is also given. Taking the lamprey on a commercial scale was first attempted in 1941, and the results of the first year's fishery were sufficiently successful to encourage further development, and consequently it has been continued annually, according to this article. Production has varied from a low of 72,708 in 1944 to a high of 397,260 pounds in 1946. The 1949 production was 114,685 pounds. A system of traps and flumes has been developed to capture the lamprey. The earliest known use of lamprey from this region was for food by the Indians. Present-day anglers use them for bait in sturgeon fishing, and a limited quantity are used by fur trappers. Lamprey taken commercially on the Willamette River are transported to a reduction plant at Warrenton, Oregon, where the vitamin oil is extracted; the residual material is manufactured into protein food for livestock and poultry or fertilizer (fish meal).

Marketing Frozen Foods--Facilities and Methods, by J. Stanford Larson, James A. Mixon, E. Clinton Stokes, 175 p., illus., processed, free. Marketing Facilities Branch, Production and Marketing Administration, U. S. Department of Agriculture, Washington, D. C., June 1949. This study of the frozen-food industry was made, to find out the kind of facilities being used for the handling of frozen foods and to discover some of the inadequacies of such facilities, and what types of facilities and methods of handling seem to be most efficient, with consideration being given each step through the marketing channel. This publication gives the conclusions arrived at by the

authors as to efficient and inefficient facilities and handling methods. Many problems relating to frozen-food marketing facilities have been uncovered by this study, and these should be investigated more closely at a later date, state the authors. In addition, this publication covers the following subjects: Frozen foods—a new development in marketing perishables; the processor's role in marketing frozen foods (includes frozen fish products); transportation facilities; warehouse facilities; the wholesale distributor; delivery facilities and methods; retail facilities; institutional and industrial facilities; locker plants; and home storage facilities. Although fishery products are mentioned only very briefly in one section, the general contents of this publication will be of value to those interested in the production, marketing, and distribution of frozen fishery products.

"The Mossbunker—An Atlantic Schmooz," by James R. Westman, article, The New York State Conservationist, February-March 1950, vol. 4, no. 4, pp. 28-29, illus., printed, Subscription $1.00 per year. New York State Conservation Department, Albany, N. Y. Discusses the menhaden fishery in New York State, giving some data on seasons and the species other than menhaden captured when fishing for menhaden. The Bureau of Marine Fisheries reports that during the past six years repeated examinations of menhaden netting operations in New York State waters have established the fact that the relative number of food fish caught was even less than previously reported in other studies.

"The Preparation of Marinated Herring," article, Trade News, February 1950, vol. 2, no. 8, pp. 5-6, processed. Department of Fisheries, Ottawa, Canada. Typical methods for the preliminary curing of marinated herring and the final bottling or packing in spiced sauces and onions are given in this article. Formulas for various types of pickling (including a spice mixture, preparation of onions to be used with the herring, and a sauce) are given.

Provincial Department of Fisheries Report with Appendices (For the Year ended December 31, 1948), 112 p., printed. Department of Fisheries, Victoria, British Columbia, Canada, 1950. The first part of this report contains data on British Columbia's 1948 pack of canned salmon, pilchard, herring, and shellfish; halibut production; fish oil and meal production; net-fishing in non-tidal waters; salmon-spawning grounds; and herring and shellfish investigations. Also the value of the Canadian fisheries and the standing of all Provinces for 1947,are given. The second part of the report consists of the following papers: Contributions to the Life-History of the Sockeye Salmon; Results of the West Coast of Vancouver Island Herring Investigation, 1948-49; Biologist's Report; Report of International Fisheries Commission, 1948; Report on Investigations of the International Pacific Salmon Fisheries Commission for 1948; Salmon-Spawning Report, British Columbia, 1948; and a series of tables giving additional data on the British Columbia fisheries.

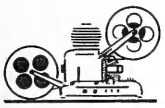
Report of the Newfoundland Fisheries Board and General Review of the Fisheries for the Year 1948 with Statistical Survey, 53 p., printed. Department of Fisheries, Ottawa, Canada, 1949. Reviews Newfoundland's salted and frozen cod industry; the herring, lobster, salmon, halibut, smelt, and seal fisheries; and the fish meal, marine oils, and whaling industries. Included in this report are detailed statistics on all phases of Newfoundland's fisheries for 1948 and comparative data for 1947.

Second Annual Report of the Board of Control of the Fishing Industry Research Institute, 15 p., processed. Fishing Industry Research Institute, P. O. Box 1233, Capetown, Union of South Africa. Discusses the organization of the Institute and reports on the projects and services undertaken by the Institute. The Institute has conducted research in connection with the manufacture and use of tomato puree for fish canning; crawfish canning, freezing, and offal drying; freezing and canning of snoek; canning of pilchards; and salting and drying of stockfish. Some preliminary tests have been made also in regard to the chilling of stockfish. Also included is a list of publications issued by the Institute.

Selling to the Government (Businessmen's Guide in Dealing with Federal Buying Agencies), 64 p., printed, 50 cents. Department of Manufacture, Chamber of Commerce of the United States, Washington 6, D. C., 1950. Advice on how to do business with the United States Government is the purpose of this booklet. There is presented in Part I a brief summary, giving the names and addresses, of the outstanding military and civilian central supply organizations without detailed discussion of their field purchasing activities. This is followed, in Part II, by a concise enumeration of principal government and private publications and similar sources of comprehensive information about the operations of these and other procurement agencies. Part III outlines some typical procurement procedures from the point of view of the businessman, and Part IV describes in some detail the procurement organization of various government agen-

cies, including their field operations. Finally, appendixes list important sources of information on all phases of the procurement operations, with special emphasis on those which will be directly useful in becoming better able to compete for government business. Although fishery products are not specifically mentioned, this booklet is of value to anyone doing or hoping to do business with the Government.

United States Imports of Fresh, Frozen and Canned Tuna, Bonito and Yellowtail, and Factors Affecting Current Trade, by Maurice W. Wallar, World Trade in Commodities--Supplement, Foods and Related Agricultural Products, vol. VIII, part 6-7-8, sup. no. 1, January 1950, 6 p., processed, 5 cents. U. S. Department of Commerce, Washington, D. C. Briefly discusses canned tuna trends. This report gives imports of fresh or frozen tuna, canned tuna and bonito, and exports of canned tuna from January through November 1949, with comparative information for 1948, together with country of origin and destination. In its conclusion and outlook, the report states that there is little doubt that the United States will remain the principal world market for tuna for some time. Imports of both fresh and frozen tuna (the raw material of the canneries) and of canned tuna likely will be maintained at or above present levels. Prices of canned tuna have declined substantially from the peak reached in 1948. This decline may have some effect on United States imports of canned tuna, since the declining profits will tend to close high cost plants and lessen sales efforts abroad.



MOTION PICTURE

The following motion picture is available only from the source given in listing.

ECA Means Business, 16 mm. black and white, sound, 15 minutes. Shows the Marshall Plan in operation and how businessmen may participate in the program. Produced to explain ECA's small business program and demonstrate field counseling in action, it also depicts the basic procedures involved in doing business under the European Recovery Program. Available for showings before business and related groups, according to ECA's Office of Small Business. Prints of the film may be obtained at any of the field offices of the U. S. Department of Commerce.

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Processing -- Miscellaneous Service Division

Illustrator -- Gustaf T. Sundstrom **Compositors -- Jean Zalevsky, Betty Cady**

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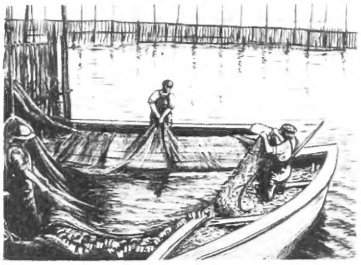
FISHERIES OF NEW BRUNSWICK (CANADA)

An analysis of New Brunswick's fisheries and a short historical resume are to be found in Fishery Leaflet 356, Fisheries of New Brunswick (Canada).

Most of the data in this 26-page leaflet is for 1948, although in a number of cases historical statistics back to 1920 are given. In addition to discussing production in general, the publication describes the sardine, lobster, herring, cod, smelt, oyster, and salmon fisheries individually. Information on consumption, foreign trade, wholesale prices, fisheries research, and the outlook for New Brunswick's fisheries is also included.



The war years left New Brunswick's fishing industry in a greatly improved condition, according to the author. The individual fisherman has paid his debts and emerged as a small businessman. Cooperative groups have been established for purchasing of supplies and marketing of products. The fishing processing industry has modernized its plants and increased capitalization and production.

Fishery Leaflet 356 is available free upon request from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

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