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A. W. Anderson, Editor

R.T. Whiteleather, Associate Editor

Wm. H. Dumont and J. Pileggi, Assistant Editors

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THE UNITED STATES FISHERY MISSION TO VENEZUELA

(MAY 1947 - DECEMBER 1948)

By R. O. Smith*

INTRODUCTION

The Venezuelan Ministry of Agriculture requested a fishery mission from the United States primarily to study the sardine canning industry, which accounts for from 25 to 30 percent of the entire fishery production of the country.

Although a small sardine canning industry has existed in Venezuela for 10 years, it became of real economic importance only during and after the war. Prior to then, the production was largely exported to other countries of the Caribbean area. During the war, considerable production was assigned to Lend-Lease, and

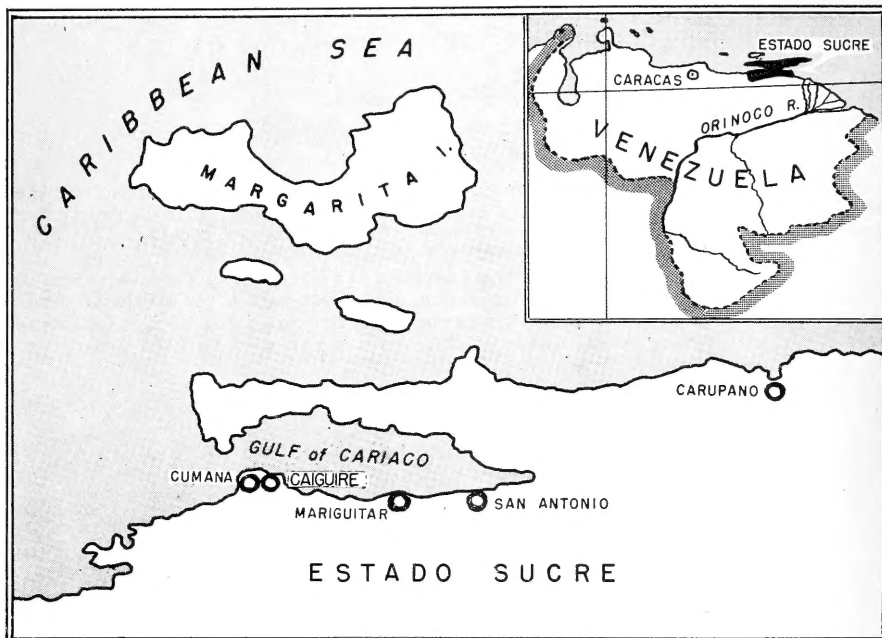


UNLOADING SARDINES AT CANNERY LOCATED AT CUMANA, VENEZUELA

until the end of the war, relatively little was consumed locally. Since then, the rapid change from a barter economy to a money economy has made increased demands on processed foods of all kinds, so that, since 1948, about 70 percent has been consumed in the country.

*Aquatic Biologist, Office of Foreign Activities, Fish and Wildlife Service, and Chief of the Fishery Mission.

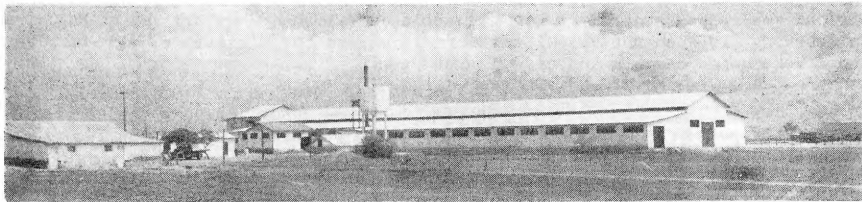
The importance of the fishery resources of Venezuela from the standpoint of the United States is not a matter of quantity production, for these resources are insufficient either for exploitation by United States fishermen or as a source of competition to United States fisheries. Nevertheless, important strategic and diplomatic elements are involved because of the position of Venezuela in world oil production.



Although oil has been produced in Venezuela for over 25 years, the country remained an agricultural nation until the advent of World War II. Before that, Venezuela was an exporter of food commodities to other countries of the Caribbean area. These exports included such basic items as beef, rice, beans, fish, and some edible fats and oils. But the tremendous increase in demand for crude oil coincident with the beginning of the war created a demand for labor which could be supplied only from rural areas. The movement away from the land was accelerated not only by higher wages, but by the attraction of improved working conditions, better housing, medical attention, and social security benefits. With a rapidity scarcely to be equalled elsewhere, Venezuelans became, except for crude oil, a nation of consumers instead of producers. By the end of the war, it was necessary to import not only the items formerly exported, but many others.

However, the majority of people in the lower income brackets are not able to purchase meats to fill all their protein requirements. They still must depend to a large extent on fish. The national consumption of fish amounts to 35 pounds per capita annually, but fish taken for personal use by commercial and casual fishermen are not included, and much of the population in the interior, especially

in cattle growing sections, rarely have access to fish. It is believed that consumption of fish along the coast is more nearly 100 pounds per capita annually.



SARDINE CANNERY LOCATED AT CUMANA, VENEZUELA.

Important as the fisheries are during peace time, they take on even greater value during a war, particularly in the case of Venezuela, whose main fishery production is obtained close to shore.

HISTORY OF THE MISSION

In October 1946, the Venezuelan Ministry of Agriculture (Ministerio de Agricultura y Cria) requested, through diplomatic channels, the loan of fishery specialists for biological and technological studies of:

- A. The sardine canning industry.
- B. Methods of dry-salting fish.

At the time, personnel was not available, and it was not until May 1947 that an aquatic biologist could be assigned to Project A. After a preliminary survey of the fisheries in Venezuela, plans were prepared for approval by the Venezuelan Government.

Approval was transmitted in August 1947, following which the process of assembling supplies and equipment began. In November, the Chief of the Fisheries Section, Ministry of Agriculture, arrived in the United States to complete the purchases, particularly that of a vessel to be used for exploratory and experimental fishing. The ves-



RAW FISH READY FOR PRECOOKING

sel selected was a 65-foot steel shrimp trawler, Gulf Coast type, which was re-named Golfo de Cariaco. After reconditioning and refitting in New Orleans, it sailed on January 26, 1948, to Pensacola, Florida, where additional fuel and provisions were taken aboard. It left Pensacola on February 1, and arrived at Laguaira on February 21, when the vessel was turned over to the Ministry of Agriculture, and a Venezuelan captain and crew placed aboard.

SARDINE INDUSTRY

Although at least three species of small herring-like fishes occur in Venezuelan waters, only one, Clupanodon or Sardinella pseudohispanicus (locally called sardinas or arenque), is commercially important. This sardine is believed to be sufficiently different to warrant reclassification to a separate species or sub-species.



PLACING PRECOOKED SARDINES IN CANS

Six canneries were in operation during 1948. A seventh will open early in 1949. All of these plants are small, capacities varying from 300 to about 750 cases per day. However, balancing the relatively small daily output is the long season, extending from 200 to nearly 300 working days in some years.

Machinery is generally of the most modern design from United States and European manufacturers. Some operations are still done by hand in varying degree, especially cutting off the head and tail, filling the cans, and adding oil or sauces. Unfortunately, no mechanical method of removing the scales has been found, so all Venezuelan sardines are packed with scales on. This is due to the softness of the flesh, which makes it impossible to remove the scales without tearing the meat. This, coupled with lack of uniformity

in processing, renders the product unsuitable for the United States trade, though the fish itself has excellent flavor and texture, with no lingering after-taste characteristic of some other species.

On reaching the cannery, the fish are cut to size, washed, precooked, packed, sealed, and processed. About half the pack is in round cans of 140-150 grams net (4.75-5.35 oz.), but the change is being made to flat cans of similar capacity as rapidly as they are available.

Some 20 different kinds of pack are turned out, of which the most common for sardines are:

- a. Natural (in water)
- b. In oil (olive or peanut)
- c. Tomato sauce
- d. "Picante" (various combinations of vinegar, chili peppers, onion, oil)
- e. "Escabeche" (pre-roasted, various condiments)
- f. "Estofada" (literally, "stewed" with vegetables and other flavorings)

In addition to sardines, the canneries put up small quantities of bluefish (pez azul or anchoa); goatfish (salmonete); Spanish mackerel (macarel); frigate mackerel and common bonito (both called cabaña); roe of various species, especially that of crevalle (jurel) and cabaña; pearl oysters (ostras madre perlas); and a mussel-like shellfish (pepitona, Arca occidentalis); turtle soup (sopa de tortugas marinas), mostly from the green turtle.

In order to obtain the maximum production for human consumption, the Government has prohibited the use of any food fish in reduction plants. A small amount of fish meal is produced from cannery wastes.

Sardines are found in greatest abundance in a triangular area of which Cumana to Carupano (Estado Sucre) forms the base line, and Porlamar (Island of Margarita) the apex.



ADDING OIL TO SARDINES (FOREGROUND) AND SEALING THE CANS (BACKGROUND)

All six canneries are located along the south shore of the Gulf of Cariaco, which extends eastward from Cumana for a distance of 35.5 miles, and has a maximum width of 10 miles.

Canneries are located at Cumana (1); Caiguira, two miles east of Cumana (3); Mariguitar (1); and San Antonio (1). These are all along the south shore because of transportation requirements, but the fishing camps are along the north shore.

Only beach seines may be used. Purse seines were tried and found successful, but were prohibited by the Government in 1947 because of the large quantities of sardines wasted. It was not uncommon for the purse seines to take 25 to 75 tons of sardines in one set. Since the factory capacity does not exceed 15 tons per day, and no refrigerated storage is available, the unused balance had to be dumped. The beach seines, on the other hand, may take a similar quantity of sardines, but instead of hauling the catch ashore, the net is left in the water, where

the sardines remain alive and in good condition for as long as three weeks. The disadvantage of the seine is that at times the sardine schools either move offshore beyond their reach, or leave the Gulf entirely, causing the canneries to close.

SARDINE INVESTIGATIONS

It was this periodic disappearance of the sardines from the Gulf of Cariaco which prompted the Government to undertake an investigation of the life history, and especially to chart the migratory movements of the sardine.

A house was rented in Caiguire to serve as a temporary laboratory and to house the collections, at present amounting to over 2,000 specimens.

The investigations are proceeding along three lines.

1. The Commercial Catch: Daily samples of sardines are obtained from the canneries in Caiguire, from which data are obtained on size, sex, sexual development, weight, age, and relative fatness. Although the work has not extended over a sufficient length of time to draw definite conclusions, an analysis of the data points to a finding that the sardine population of the Gulf of Cariaco is a migratory rather than a resident one; that there is some spawning throughout the year, and that this spawning takes place mostly outside the Gulf of Cariaco.
2. Field Surveys: Regular trips are being made aboard the Golfo de Cariaco to collect samples of sardines, not only in the Gulf, but within a radius of 50 miles. Records are taken of ocean temperature, salinity, color, transparency, relative alkalinity, and depth. In addition, bottom samples are taken.

An experiment was made in which live sardines, obtained from a commercial seine, were marked by cutting the upper lobe of the tail, and liberated at the entrance to the Gulf. A number of them appeared a week later in a seine not far from where they had been secured, a distance of approximately 20 miles from point of liberation.

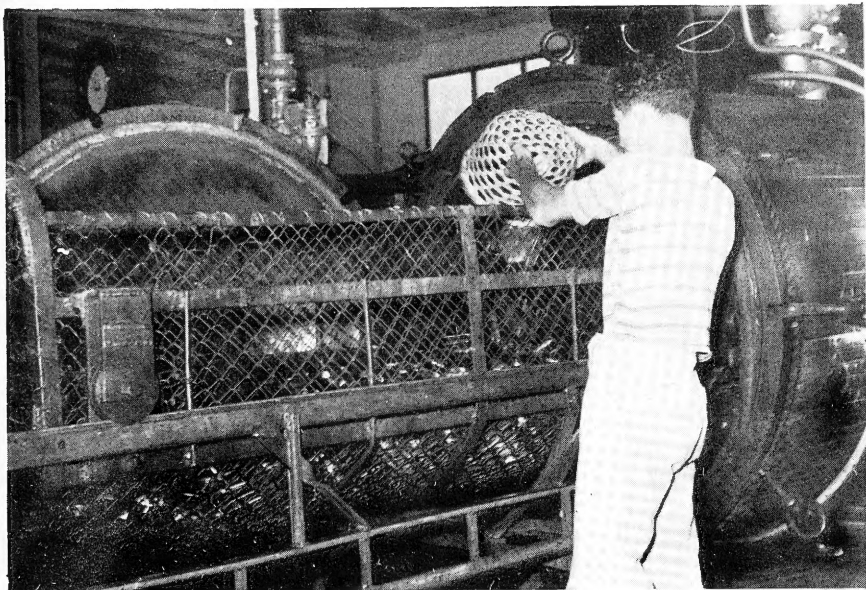
3. Relation of Sardines to Other Fishes: Sardines provide an important source of food for many predatory fish. Examinations are made of the stomach contents of various species of fish, as this provides information on sizes and distribution of sardines which would be difficult or impossible to secure otherwise.

EFFECT OF SEISMOGRAPHIC EXPLORATION ON FISHERIES OF LAKE MARACAIBO

The Lake Maracaibo region is not only important as a center of crude oil production, but also is the second most important area for fishery production. So far, there has been comparatively little interference between the two industries, for the oil fields are located in the northeast section of the Lake, while the fisheries are, for the most part, along the western side.

Recently, evidence has accumulated of possible oil deposits beneath other parts of the Lake, and several petroleum companies have applied to the Government for permission to carry on extensive seismographic explorations. The method consists in exploding charges of dynamite, either just below the surface of the water, or in a pipe below the Lake bottom, and recording the echoes on seismographic instruments.

The fishermen of Lake Maracaibo were concerned as to the probable effect of these explosions on the fisheries, for the charges were to be exploded every quarter of a mile over most of the western and southern portion of the Lake. To protect



FINAL PROCESSING OF SARDINE CANS IN ORDER TO CLEAN THEM OF OIL

their interests, they lodged a protest with the Ministry of Agriculture. At the request of the Ministry, and with the cooperation of the petroleum companies, a series of experiments was made in the Lake to determine the effect of explosions on fish. Twenty-four experiments were made in all, 4 in March, and 20 in September-October, 1948. The tests simulated, as nearly as possible, actual working conditions during seismographic explorations, including the use of recording instruments.

It is obvious that danger to the fisheries from exploration, positive though it is, must be, in any case, of a temporary nature, whereas actual production would, at least semipermanently, end commercial fishing, not necessarily by destroying fish, but by cluttering the fishing grounds with well rigs. An interesting angle to the problem is that since the Government's share of oil production is 50 percent, it would seem to be in the position of deciding for or against itself in the matter of restriction of exploration.

PEPITONAS

This mollusk, Arca occidentalis, grows abundantly in the seaweed on sandy bottom in shallow water (1 to 2 fathoms), and supports a minor commercial fishery in the Gulf of Cariaco, where it is taken by dredges from November to May. The entire catch is canned, either natural, in oil, or with chili pepper sauce. Since

the Ministry of Agriculture was concerned with the possibility of overfishing, an investigation has been under way since May 1948, to discover the life history, and to recommend conservation measures. In particular, a program of shell planting is being undertaken because no shells have been returned to the bottoms in the past.

OYSTERS

At one time, there were a number of natural oyster beds, and in addition, a supply from setting on mangrove roots. The quantity was not large as compared with United States production, but was sufficient to add measurably to the diet of the coastal population. During the years, the beds were stripped without regard to conservation, so that now the annual production is probably not over a thousand bushels. After a preliminary study, it is believed that the industry can be revived by proper methods of culture, and a program of planting based on the use of brush and other types of collectors will be undertaken.

COLLECTIONS

With the exception of fresh-water fishes, the aquatic fauna of Venezuela has received little attention from ichthyologists.

In cooperation with the Director of the Caguire Laboratory, collections are being made of fish, shellfish, and other marine organisms as rapidly as possible.



THE CUBAN FISHING INDUSTRY

Fish, other sea food, and byproducts constitute only about one percent of the value of all imports into Cuba. The total import value rose from an average of 1.4 million dollars during prewar years to 2.5 million dollars in 1945; and the average value per pound rose from 6.2 cents to 23.7 cents. The quantity, however, dropped from an average of 22.7 million pounds in 1937-41 to only 10.6 million pounds in 1945.

Codfish, stockfish, and canned sardines comprised 85 percent (19 million pounds) of the total Cuban imports in prewar years, but only 51 percent (7.5 million pounds) in 1945. Imports of herring and canned tunny combined increased from about one million pounds before the war to 2.4 million pounds in 1945.

Substantial quantities of canned squid, oysters, shellfish, and cod liver oil were also imported. Among the fish of lesser importance in Cuba's imports are hake, salted skate, and haddock, and canned salmon and mackerel.

VITAMIN A IN LIVER OF THE ALASKA FUR SEAL

By F. B. Sanford,* K. W. Kenyon,** and V. B. Scheffer**

ABSTRACT

In the economic management of the fur-seal herd of Alaska, it is necessary to kill a considerable proportion of the young males when they are three years old. The pelts are sold for tanning and the carcasses are rendered for oil and meal. This investigation of the livers of these seals was made for the purpose of ascertaining whether or not the supply of vitamin A-bearing oils could be augmented by rendering them separately from the carcasses. The results of this study indicate that there is some question as to the value of seal livers as a source of vitamin A-bearing oil. The most valuable of these livers from the standpoint of vitamin A was one containing \$4.25 worth of vitamin A, while others were valued at as low as \$0.25.

INTRODUCTION

Every summer, about 3,500,000 fur seals (*Callorhinus ursinus*) come to the Pribilof Islands, Alaska, to rest and breed. About 1,000,000 young, known as pups, are produced each year. From December to April, the seals are widespread at sea, and the Islands are deserted. Government employees, during the months of June and July, kill about 65,000 seals for the fur trade. The men attempt to select bachelors from the 3-year class but, for reasons beyond their control, they take a number of other young males as well as a few females. It is safe to assume that 80 percent of the

kill consists of males whose true age is 3 years. For commercial purposes, the age of a male seal is estimated by reference to certain age-length standards. The standards were established years ago on the basis of branded seals

of known age. About 80 percent of the annual harvest of seal skins comes from St. Paul Island and 20 percent from St. George Island.

A byproducts plant on St. Paul Island salvages nearly all of the skinned carcasses there. On St. George, and to a limited extent on St. Paul, the carcasses are left on the killing fields, are eaten by the resident Aleut natives, or are saved for fox food. The byproducts plant at St. Paul not only handles the carcasses from the killing fields, but also renders oil from the blubber which is scraped from the skins. From 3 to 20 hours after the kill, the carcasses are hauled to the plant. The blubber reaches the plant on the day after the kill. The bachelor seal of commercial size, 2 to 4 years old, weighs about 55 pounds. Of this weight, the freshly stripped pelt with attached blubber accounts for 10 pounds, and the carcass, 45 pounds.

Statistics of the operations on St. Paul for 1948 are given in Table I. While statistics of meal and oil production for the years preceding 1948 are available,

*Chemist, Fishery Technological Laboratory, Branch of Commercial Fisheries, Seattle, Wash.
**Biologists, Branch of Wildlife Research, U.S. Fish and Wildlife Service, Seattle, Wash.

Seals Killed	Seal Carcasses Rendered	Output of Seal Meal		Output of Seal Oil	
		Amount	Value	Amount	Value
			f.o.b. Seattle		f.o.b. Seattle
Number	Number	Lbs.	Dollars	Gals.	Dollars
58,280	54,746	684,000	\$37,000	48,100	\$50,500

they do not give as clear a picture of the byproducts operations as do the data for 1948. This is because, during the war and shortly thereafter, the flow of materials through the plant was irregular.



REEF FUR-SEAL ROOKERY ON ST. PAUL ISLAND, ALASKA

The value of a seal carcass in terms of its reduction products f.o.b. Seattle is about \$1.60. In 1946, an investigation was started to explore the possibility of increasing this value through the recovery of vitamin A from seal liver. Studies at that time revealed the need for a better method of estimating vitamin A in low-fat livers and a need for larger samples (Miyachi and Sanford, 1947A). As a result, the 1947 studies were on a revised and expanded scale.

COLLECTING THE SAMPLES

From June 16 to July 31, 1947, 196 fur seal livers were collected systematically on St. Paul Island. (Also collected, for comparison, were the livers of 4 sea lions and 3 porpoises.) On the killing field, the livers were removed from the seals at the rate of 1 per man per minute, within 1 hour after the death of the animal. Sand, blood clots, and grass were washed off the livers with cold water. The livers were then placed in waxed-paper and cellophane bags in a refrigerator at 14° F. to 26° F. After 24 hours, the bags were packed in barrels and held at

the same temperature. In August, the samples were shipped, at temperatures of 20° F. to 25° F., to Seattle.

ANALYTICAL PROCEDURE

At the laboratory, the livers were stored at approximately 0° F. The analyses were started in February and completed in early June 1948. Since the livers had been taken in the preceding summer, they were in storage for from 6 to 12 months.



A BREEDING BULL, PRIBILOF ISLANDS, ALASKA

However, if the rate of decomposition of vitamin A in seal livers is similar to that in grayfish livers, it seems unlikely that any appreciable amount of vitamin A was lost during this time. In an earlier experiment, no measurable loss of vitamin A was found in grayfish livers stored for 9 months at -8.5° F. (Miyachi and Sanford, 1947.)

The livers were put through a meat chopper and then further homogenized in a Waring Blendor. Approximately 5 g. of the homogenized sample were weighed in a tared 2-ounce shaking bottle, and about 10 g. powdered pumice, exactly 25 ml. ethyl ether, and about 20 g. anhydrous sodium sulfate were added. The bottle was then shaken for 2 hours. At the end of this time, it was centrifuged and an

aliquot of 5 ml. was removed for oil analysis and another of 1 ml. was taken for vitamin A analysis.

The 5 ml. aliquot was placed in a tared, 50 ml. beaker and carefully evaporated on an air bath over a hot plate. Three minutes after the ether was gone, the beaker was removed and allowed to stand at least 45 minutes at room temperature before it was weighed. The 1 ml. aliquot was diluted with isopropanol and the

Table II - Oil and Vitamin A in Livers of Male Fur Seals, Summer of 1947

Age ¹	Livers In Sample	Weight of Liver			Oil Concentration in Liver			Vitamin A in Liver Oil		
		Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
Yrs.	No.	Grams	Grams	%	% by weight	%	%	"Spec." ⁴ /units	per gram of oil	%
2	29	649	131	20	3.212	0.602	19	42,590	40,500	95
3	95	980	159	16	2.99	0.372	12	57,430	38,800	68
4	24	1,243	177	14	2.97	0.222	7	91,670	59,160	65
6	9	1,977	479	24	3.403	1.420	42	84,900	92,830	109

¹The age is known for the 2- and 6-year olds; estimated for the 3- and 4-year olds.

²Omitting the two highest percentages in this group, 4.92 and 5.17, the mean would drop to 3.07.

³Omitting the highest percentage in this group, 7.12, the mean would drop to 2.93, the standard deviation to 0.267, and the coefficient of variation to 9.

⁴2000 x E (1%, 1 cm., 328 mmu., isopropanol).

optical density of the solution at 328 mmu. was measured by means of a Beckman spectrophotometer. All measurements were in duplicate. For both the oil and the vitamin A estimations, the mean range of error of the duplicate measurements was about 2.7 percent. The vitamin A measurements are reported in spectrophotometer (spec) units.

RESULTS

The findings are summarized in Tables II and IV. The liver of the fur seal is moderately variable in weight and oil content and extremely variable in vitamin A potency. The wide fluctuation in potency (found

also in the liver of fishes) obliges the researcher to collect and analyze a large number of samples. The mean weight of the seal liver in males of known age increases from 1.43 pounds in the 2-year-old to 4.35 pounds in the 6-year-old. (A female pup in the collection had a liver weighing 0.75 pounds.)

Table III - Oil & Vit. A in Livers, Selected for Pale Color, of 10 Male Fur Seals, July 12, 1947

Weight of Liver	Oil Concentration in Liver		Vitamin A in Liver Oil
	Grams	Percent by weight	"Spec." units per gram of oil
1,245	14.33		1,900
795	3.16		14,100
1,180	2.66		37,800
900	3.68		46,200
930	3.11		54,000
990	3.14		66,700
890	3.72		66,800
1,255	3.86		367,000
1,010	3.87		415,000
1,065	4.56		584,000

Seasonal variation in weight, oil content, and potency is not demonstrable in our material. While the June livers were found to

be richer in vitamin A than the July ones, the difference is not significant. Given a larger sample and a longer study period, the difference might prove significant.

The vitamin A potency of the liver oil shows variation with the age of the seal. The potency increases as the seal grows older. This seems to be true, at least, within the age range of 2 to 6 years. The potency in the combined 4- and 6-year classes is significantly greater than the potency in the combined 2- and 3-year

groups. The differences between the individual year groups; 2 and 3, and 4 and 6, are less, and are not statistically significant. It seems to be true among marine mammals and fishes that, as the individual matures, the vitamin A potency of the liver increases.



BARRELING FUR SEAL SKINS ON ST. PAUL ISLAND, ALASKA, FOR SHIPMENT

Sex variation in the vitamin A potency of the liver is suggested by the findings. The potency of the liver oil in 3-year males is significantly higher than that in females of unknown age, but of similar body weight. Without knowing the age of the females, it is not possible to establish the true difference in potency between males and females. Sufficient to say that, of the seals killed in the natural course of the harvest, the males were richer in vitamin A than the females. The females from which we recovered liver samples were neither the youngest or the oldest females on the killing grounds. They were probably 4 to 8 years old. This makes it increasingly probable that the concentration of vitamin A in the male liver is greater than in the female, since the comparison was made with males which were undoubtedly younger than the females. (In the soupfin shark, the male commonly yields a liver oil of higher vitamin A potency than does the female.)

In male and female fur seals of similar body size, the livers are of similar weight. The mean weight of the liver in 3-year males was 980 g. and in killing-ground females, 911 g. While their age is not known, the females accidentally killed are the same size as the 3-year males.

Certain puzzling variations associated with the color of the livers were noted. Bearing in mind that we examined only 10 pale, yellowish livers as compared with 186 "normal," maroon-colored ones, it was noted that:

1. The pale livers are slightly richer in oil than are the livers of any other group. (One pale liver containing 14.33 percent oil, nearly 5 times the mean value for fur seals, is perhaps pathological, and we have treated it specially in preparing Table IV.)
2. The vitamin A potency of pale-liver oil is significantly greater than that of 3-year-male liver oil. (We make this comparison because the average weight of a pale liver is close to that of a 3-year-male liver.)
3. Three out of the ten pale livers yielded oil of unusually high potency (Table III). In this group of 10 livers, the highest potency is 307 times that of the lowest. (Hence, the danger of drawing conclusions from a sample containing only a few livers is readily apparent.) The variation in potency within the pale-liver group is so extreme that we are inclined to believe the group is heterogeneous and should not be compared with any other group. Possibly, the apparent relationship between paleness and potency is a spurious one. Certainly, the data at hand do not show that a pale liver is invariably rich in vitamin A.

The values for oil content and vitamin A potency in the liver of the Dall porpoise and the Steller sea lion correspond roughly to the values for fur seal liver. We must emphasize, though, that our samples of porpoise and sea lion

Table IV - Oil and Vitamin A in Livers of Miscellaneous Marine Mammals, Summer of 1947

Species	Sex	Livers in Sample	Weight of Liver			Oil Concentration in Liver			Vitamin A in Liver Oil		
			Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
		No.	Grams	Grams	%	% by weight	%	Spec. units per gram of oil		%	
Fur seal ¹	M	9	1,012	141	14	3.55	0.571	16	83,600	212,300	116
Fur seal ²	M	1	625	-	-	3.30	-	-	35,600	-	-
Fur seal ³	F	1	340	-	-	3.01	-	-	15,300	-	-
Fur seal ⁴	F	27	911	146	16	3.12	0.405	13	21,800	13,700	63
Porpoise ⁵	-	3	1,578	475	30	3.79	0.455	12	16,500	11,100	67
Sea lion ⁶	-	4	1,206	161	13	3.927	1.820	46	23,300	9,400	40

¹Livers selected for pale color; mean units of vitamin A per pound, 2.94 million. There were originally 10 livers in the sample (see Table III). One was omitted from the tabulation because it contained 14.33 percent oil, twice as much as any other, and nearly five times the mean. This particular liver was also unusual in that its oil contained only 1,900 units of Vitamin A per gram.

²A seal with reddish-orange blubber.

³A pup, or first-summer young.

⁴Assorted females of medium age.

⁵Phocoenoides dalli, adult male, adult female, and sub-adult male from British Columbia and Alaska.

⁶Eumetopias jubata, sex unrecorded, pups, St. Paul Island, Alaska, July 22.

⁷Omitting the highest individual percentage in the group, 6.71, the mean would drop to 2.99.

livers are very small and are not truly representative of age and sex groups. Consequently, we can draw no conclusions from them.

CONCLUSIONS

The average vitamin A content of fur seal liver is so low that it is questionable whether the liver could be handled profitably under existing conditions. At the prevailing price for vitamin A, about 15 cents per million units, the bachelor seal liver is worth about 25 cents. On the other hand, a few livers, representing perhaps 10 percent of the total, seem to be rich enough in vitamin A to warrant commercial exploitation at present prices. These are the pale yellowish-colored livers. Of 10 such livers examined, the most valuable one contained \$4.25 worth of vitamin A. It remains to be seen whether the relationship between pale color

and high potency is accidental or real. It also remains to be seen whether color can be used as a practical basis for segregating, on the killing field, the profitable from the unprofitable livers.

Other criteria which might be used for separating livers are the size (or age) and sex of the seal. We find measurable differences in vitamin A potency related to these criteria. But there would be no point in segregating the livers by size and sex, as long as the mean potency for neither group is high enough to warrant exploitation.

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- 1947A. Vitamin A content of fur seal oils. Commercial Fisheries Review, Vol. 9, No. 11, pp. 5-8.



THE FISH LIVER OIL INDUSTRY

In considering the sources of raw materials for the production of liver oils, the volume of livers and viscera available from the fish landed from an active fishery can be readily approximated. Fishermen usually have some general ideas about the types of fish that are taken on their gear but are not brought to port. The abundance of such bothersome species may not always be properly estimated by the fishermen since they may be biased unduly by a relatively small number of valueless fish appearing in the catch. For example, to the early halibut fisherman, grayfish were a pest, since they were not salable then and each one on the hook cut down the potential haul of halibut per skate of gear. In such cases, the fisherman may overestimate the abundance of these nuisance species. Unless accurate biological studies have been made of a fishery, the level of sustained production that may be expected cannot be predicted. For example, the halibut fishery of the North Pacific is believed to be sufficiently well regulated as a result of years of study that in the future a definite annual poundage can be reasonably expected. For such a fishery, the livers and viscera available can, therefore, be rather accurately estimated. On the other hand, the abundance, life cycle, etc., of albacore tuna are not known well enough to give even a general idea as to the probable catch in future years.



February 1949

College Park, Md.

Further studies on the effect of fluctuating storage temperatures on the keeping quality of frozen mackerel fillets showed relatively high scores for fillets stored at a constant temperature of -10° F. and for fillets subjected to 3-day fluctuating temperatures between -10° F. and 0° F. Fillets held at 0° F. storage were on the borderline of acceptability, while those held at 15° F. and subjected to 3-day fluctuating temperatures between 0° F. and 15° F. were in poor condition. Of these two lots, the latter received the much better score. The same was substantially true for the mackerel fillets undergoing daily storage temperature fluctuation, although the scores were, in general, lower for corresponding samples.

Boston, Mass.

In connection with the classification studies on bacterial flora in fish, some cultures have shown a peculiar characteristic—the deposition or precipitation of shiny needle-like crystals within and surrounding the area of growth—which was first observed in tubes of semi-solid agar and later in agar slants and nutrient broth cultures of the same organism. In nutrient broth tubes, the crystals were suspended from the pellicle where formed, or in the bottom of the sediment. These crystals appear unlike the "struvite" crystals occasionally found in canned fish.

* * *

A preliminary re-evaluation of the fillet yield data tabulated four months ago, when fish frozen in the round at sea and fish gutted and iced were filleted for quality and flavor studies, have demonstrated that the fillet yield from fish frozen at sea is better and, in some cases, as high as 4 percent greater than the fillet yield from fish iced at sea. There are two possible explanations: (1) the filleter can cut cleaner and work his knife better on the more firm round flesh; and (2) the ratio of fillet flesh to bone and waste is lower in the iced fish due to leaching from melting ice and its pressure. Further study will be required to check these suppositions.

Ketchikan, Alaska

The Researcher, the Laboratory's floating laboratory and transportation vessel, was overhauled and new engines installed.

Seattle, Wash.

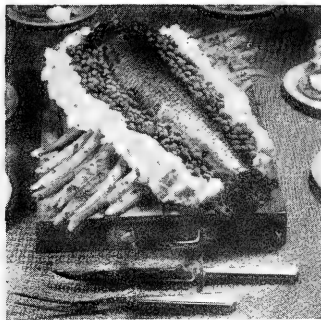
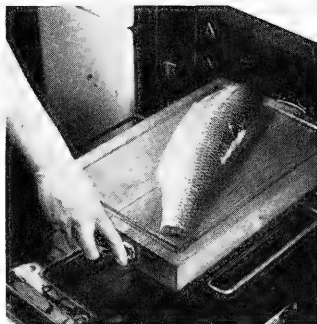
Studies have been completed on increasing the storage life of rockfish fillets by removing and discarding the dark fatty flesh which tends to oxidize and become rancid and discolored in from 3 to 6 months of cold-storage, depending upon the species of rockfish. An alternate procedure was to divide the fillet into two portions. The outside portions containing the dark flesh might possibly be sold fresh. The studies indicate that the remaining white meat portion could be frozen and held in storage for at least one year without becoming rancid or discolored. The dark flesh was removed by use of the newly developed fish skinning machine which also could be adjusted for splitting the fillets. The results will be published in a future issue of this Review.



PLANKED SHAD

- 3 or 4 pound dressed shad
- $1\frac{1}{2}$ teaspoon salt
- $1\frac{1}{8}$ teaspoon pepper
- 4 tablespoons butter or other fat
- Seasoned mashed potatoes
- Seasoned cooked vegetables (peas, carrots, cauliflower, tomatoes, or onions).

Clean, wash, and dry fish. Sprinkle inside and out with salt and pepper. Brush with melted fat. Place fish on the hot oiled plank or on a greased oven glass or metal platter. Bake in a moderate oven 400° F. for 35 to 45 min-



utes or until fish flakes easily when tested with a fork. Remove from oven and quickly arrange a border of hot mashed potatoes around fish. Place in a preheated broiler until potatoes are slightly browned, about 5 minutes. Remove and arrange two or more hot vegetables around fish. Garnish with parsley and lemon or tomato wedges. Serve immediately on the plank. Serves six.

Other dressed fish may be used in the above recipe.



TRENDS AND DEVELOPMENTS

Abstract

STUDIES OF BACTERIOLOGICAL AGAR: Fishery Leaflet No. 335, "Studies of Bacteriological Agar," recently issued by the Service consists of two parts: I - "Physical and Chemical Properties" by Leonard S. Stoloff and Charles F. Lee; II - "Bacteriological Studies" by Leslie A. Sandholzer, Margaret E. Dean, William Arcisz, and Martha C. Bradley.

The physical and chemical properties have been determined for 73 samples of Japanese agar from the U. S. Government wartime stockpile and for 7 special agars representative of the commercial product of bacteriological grade. Data on 12 properties of the stockpile agars are presented in tabular form, and also in histograms. The relative importance of the various tests in determining (1) the type and source of seaweed used, (2) the grade of purity of the gum extract, and (3) the suitability of the gels formed from the extracts, for bacteriological use, are discussed. The critical properties determining the suitability of agar for bacteriological use are stated and limits of tolerance for certain of the properties are suggested.

Both lots of agars were used in the preparation of media for a number of standard bacteriological procedures. The effect of differences in the presumably inert agar base upon total plate count and colony size was studied using several different inocula in different nutrient broth mixtures. Differences occurred apparently due to nutrients in the agars, and vitamin supplements were added in an attempt to identify the nutritive agent or agents responsible. The possibility of an effect of differences in the agar base upon the colonial and cultural characteristics of a number of pure strains of several genera of bacteria was studied through 10 serial transfers. A sample of *Gracilaria* extract was included in several of the test series for comparison. The agars tested were generally satisfactory for bacteriological purposes. However, the nutritive level of some of the standard media would appear to be undesirably low in some factors, so as to permit an affect upon plate counts and colony size of small quantities of unknown impurities present to some extent in all commercial agars.

A copy of this leaflet may be obtained free upon request from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.



Additions to the Fleet of U. S. Fishing Vessels

A total of 57 vessels of five net tons and over received their first documents as fishing craft during January 1949--12 more than during January 1948, according to the Bureau of Customs of the Treasury Department. Texas led with 11 vessels documented during January 1949, while Louisiana had 9 vessels.

Vessels Obtaining Their First Documents as Fishing Craft, January, 1949

Section	January		Total 1948 Number
	1949 Number	1948 Number	
New England.....	2	2	52
Middle Atlantic.....	1	-	40
Chesapeake Bay.....	6	1	59
South Atlantic and Gulf.....	34	18	541
Pacific Coast.....	7	16	347
Great Lakes.....	5	1	51
Alaska.....	1	6	81
Hawaii.....	1	1	12
Total.....	57	45	1,183

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



ECA Procurement Authorizations for Fishery Products

The procurement authorizations for commodities and raw materials announced during March 1949 by the Economic Cooperation Administration included \$1,440,000 for the purchase of fishery products (all from the United States and Possessions) compared with \$415,000 during February 1949. The total amount authorized through March 31, 1949, for purchases in the United States and Possessions is \$3,481,800.

ECA Procurement Authorizations for Fishery Products, March 1949

Product	Country of Origin	Procuring Agency	Recipient Country	Amount Authorized
Fish, canned ^{1/}	U.S. & Possessions	Ireland	Ireland	\$ 500,000
	U.S. & Possessions	Belgium	Belgium	300,000
	U.S. & Possessions	Italy	Italy	350,000
Oil, fish	U.S. & Possessions	Bizone Germany	Bizone Germany	290,000
Total.....				1,440,000

Total ECA Procurement Authorizations for Fishery Products, April 1-March 31, 1949

Fish, canned	U.S. & Possessions	Greece, Italy & Belgium	Greece, Italy & Belgium	2,228,800
Fish, salted	Newf. & Canada	Italy & Fr. W. Indies	Italy & Fr. W. Indies	5,179,000
Fish Meal	Canada, Iceland, Norway & Angola	Denmark, Austria, & U.S. Dept. Army	Denmark, Austria, & Bizonia	3,457,361
Oil, herring ", seal	Iceland	U.S. Dept. Army	Bizone Germany	1,594,000
	Newfoundland	France	France	257,600
" , shark liver	Latin America except Argentine & Brazil	France	France	250,000
" , fish	U.S. & Possessions	Bizone Germany	Bizone Germany	290,000
" , technical fish	U.S.	U.S. Dept Army	Bizone Germany	100,000
" , whale	Netherlands, Belgium, Norway & U.S.	Austria, France U.S. Dept. Army	Austria, Bizone Germany & Fr. Zone Germany	7,074,150
Vit. A (Commercial Grade, for stock feed)	U.S.	Netherlands	Netherlands	567,000
Grand Total Authorized.....				21,097,911

^{1/}Where the recipient country is shown as the procuring agency, the Government of the participating country or its authorized agents or importers do the purchasing.

^{2/}Except salmon and tuna.

On March 24, the ECA announced that the period during which delivery of goods may be made against Fourth Quarter 1948 procurement authorizations has been extended to June 30, provided contracts were completed before April 1. This is an extension of 90 days over the previous expiration date. Letters of commitment on these authorizations have already been extended to July 31. Deliveries against First Quarter 1949 procurement authorizations must also be made by June 30. The provision that suppliers must promise delivery within the quarter specified on the authorization was eliminated. Contracts, however, must have been made before April 1.

Regarding authorizations issued against the Second and Third Quarters 1948, ECA stated that if participating governments supply lists of outstanding contracts for goods undelivered on March 31, delivery dates will be extended to June 30.

The rulings do not apply to authorizations containing specific delivery dates. The extensions were made because of delays encountered by participating countries in contracting and obtaining deliveries.



Federal Purchases of Fishery Products

DEPARTMENT OF THE ARMY, January 1949: Purchases of fresh and frozen fishery products during January 1949 by the Army Quartermaster Corps for the U. S. Army, Navy, Marine Corps, and Air Force for military feeding amounted to 931,197 pounds valued at \$344,732 compared with 1,309,139 pounds valued at \$509,674 in January 1948.



Fish Meal and Oil Plant in Utah

A new processing company in Utah constructed a plant in the summer of 1948 on the shores of Deer Creek Reservoir near Charleston, Utah, in order to process trash fish, according to the Utah Fish and Game Bulletin. Although yet in the experimental state, the plant, installed at a cost of \$60,000, is capable of handling about 10 tons of trash fish per hour. The machinery in the plant consists of large rotary steam cookers, presses, dryers, and grinder. The trash fish consist of carp, chubs, and suckers seined from nearby waters.

Besides aiding in the removal of undesirable species (which are quite numerous) in the fishing waters of Utah, this new plant will produce both green and dry fish food for hatcheries, and for mink and fox farms; fish meal for poultry feeding; fish oil, pressed from the trash fish; and body water for fertilizer to be used by local farmers.

By July 1948, about 100 tons of trash fish had been removed from Strawberry Lake and processed by the plant.



Florida West Coast Fisheries Trends, March 1949

MACKEREL: The Gulf of Mexico "mackerel" season lasted longer than usual this winter due to the unusually warm weather, according to a March 15 report from the Service's Fishery Marketing Specialist conducting a survey on the west coast of Florida. Catches of both Spanish and king mackerel had been good. The "bonito" of the Gulf, now believed to be the little tuna, usually follows the run of mackerel and considerable quantities were caught by fishermen trolling for king mackerel.

PACKAGED FISH: More southern varieties of fish and shellfish are being marketed in frozen packaged form. Dressed Spanish mackerel and spotted sea trout are packaged in cellophane and cardboard containers, while red drum is cut into slices or steaks and also packaged in cellophane.



Hawaiian Fish Production, 1948

The production of fish in 1948 for the Hawaiian Islands is estimated at 14,595,000 pounds from the sea fishery. Tuna and tuna-like fishes account for over 68 percent of the total. The most important species was skipjack with a production of about 8,000,000 pounds. The greatest landings were made during the months of June to September. Yellowfin, albacore, bluefin, and big-eyed tuna totaled 1,872,000 pounds and were taken throughout the entire year. Bonito and little tuna were taken also during the entire year, but March and April were the months of heavy catches. The total for these two species was only 131,000 pounds.



Hoover Commission Recommendations on Federal Fisheries Functions

INTRODUCTION: In accordance with Public Law 162, Eightieth Congress, approved July 7, 1947, the Commission on Organization of the Executive Branch of the Government in March 1949 submitted its report^{1/} on the Department of the Interior, and the related task force report^{2/} on Natural Resources prepared in January 1949.

The functions of the Department of the Interior, including those of the Fish and Wildlife Service, were studied by the Natural Resources Task Force or Committee. The report of the Natural Resources Committee makes certain important recommendations with reference to the commercial fisheries functions of the Fish and Wildlife Service that will be of vital interest to the fishing industries.

In general, the Commission recommends the return of the commercial fisheries functions of the Service to the Department of Commerce. Four of the twelve Commissioners dissented on the Commission's recommendation, and eight members did not accept the recommendations of the Natural Resources Committee.

^{1/}Department of the Interior, a report to the Congress, March 1949, the Commission on Organization of the Executive Branch of the Government. (For sale by Superintendent of Documents, Washington, D. C., 25 cents per copy.)

^{2/}Task Force Report on Natural Resources (Appendix L), prepared for the Commission on Organization of the Executive Branch of the Government, January 1949. (For sale by Superintendent of Documents, Washington, D. C. 50 cents per copy.)

TASK FORCE REPORT ON NATURAL RESOURCES: In January 1949, the Task Force Report on Natural Resources (Appendix L) prepared for the Commission on Organization of the Executive Branch of the Government was issued. The part dealing with the fish and wildlife resources covers the major problems, separation of fishery functions from those concerning wildlife, relationship with other federal agencies, and a summary of recommendations. In addition, this section of the report is supported by Appendix 15, "Commercial Fisheries; Importance, Government Activities and Problems".

Fish and Wildlife Service Resources: In presenting the major problems, the Task Force in its report states that the fish and wildlife resources are important and essential parts of the Nation's basic natural resource foundation and, as such, are closely interrelated with water and land resources.

Of all the Nation's fish and wildlife resources, commercial fisheries have had the least systematic development. Many of the fishery resources of the world are unexplored and not being fully utilized. Some of these undeveloped resources are in waters within and bordering the continental United States and Alaska, others lie thousands of miles from any American port.

If these resources are to be developed by the United States, either independently or in cooperation with other nations, the Federal Government should adopt a policy of increased participation in scientific exploration and experimental fishing. Some of the older fisheries which are showing signs of being overworked should be placed on a sound management basis.

The activity of the Federal Government is not sufficiently focused on these fishing problems and this may have resulted from combining the administration of fisheries with that of terrestrial wildlife in a single federal agency, according to the Committee.

The following is a summary of the recommendation of the Committee:

1. That the Federal functions dealing with fishery resources be consolidated in a Fisheries Service.
2. That the other responsibilities of the Fish and Wildlife Service be placed under a Wildlife Service.
3. That both the Fisheries Service and the Wildlife Service be placed in a Department of Natural Resources.
4. That basic data and research activities of the Fisheries Service and the Wildlife Service be made adequate to assure the development of sound policies and effective administration.
5. That the Federal Government give adequate attention to the need for sound development of fishery and wildlife resources and the needs of an expanding fisheries industry.
6. That adequate provision be made for the coordination of the work of the two Services with each other and with other agencies of the Department of Natural Resources and other departments.

Commercial Fisheries: Appendix L, "Commercial Fisheries; Importance, Government Activities, and Problems" discusses the importance of the industry, policy of

the Federal Government regarding commercial fishing, Governmental assistance to the industry, evaluation of present services, present and future fishery problems, and the separation of fishery functions from those concerning wildlife.

In regards to the importance of the industry, the Committee states that fishing is economically as all-important to certain segments of the population living in coastal ports, as is farming or lumbering to other communities. In times of national emergency the American fishing industry, the second largest in the world, not only supplies food but also provides vessels and men for defense purposes.

Commercial fishing is of growing importance. Unused sea resources offer one promising means of increasing food supplies. This possibility is of particular importance in view of increasing population pressures in the United States and throughout the world. Planning of future Government activities must take cognizance of possible expansion of the fishing industry.

Discussing the policy of the Federal Government regarding commercial fishing, it further states that examination of existing legislation and of executive programs concerning fisheries reveals no discernible well formulated Federal policy with respect to assistance and services rendered the fishing industry. Congress has expressed itself from time to time as desirous of fostering, promoting, and developing the fisheries industry. Whereas the Federal Government, however, provides numerous services to farmers those to fishermen are less extensive in scope and less adequately supported by appropriations.

With respect to regulated use of fishery resources, the Federal policy has been more consistent and clear until recent years. In 1945, a new Federal policy concerning jurisdiction of sea fisheries was stated in a Presidential proclamation. Waters of the continental shelf and high seas in which coastal fishing is engaged in were declared subject to Federal regulation through the establishment of conservation zones. To date, there has been no implementation of this policy.

The evaluation of the present services brings out that the Federal Government's operations in relation to fisheries is, in general, adequate insofar as the scope of work is concerned, but the diverse services which are being performed are inadequately financed. These are being performed on a budget of \$450,000 (fiscal 1949). Not only have expenditures been too small to provide adequate services, but the variability of the funds appropriated has reduced the effectiveness of these services. For example, although eight field offices were once established for market news work, only six are open at present. Of these, only four have been operated continuously for the past 10 years. Similarly, port reporters stationed at landing ports vary widely in number from year to year. Consequently, the Government's market news work respecting fishery products has been an unsatisfactory half-measure.

The work of the Federal Government has also been incomplete in providing statistical surveys of the country's fisheries production. There have been only two complete statistical surveys of the fisheries of the United States since 1880.

Biological research is similarly deficient. Studies have never been undertaken for many of the major commercial species. Investigations of the condition of some important fishing resources have been initiated only to be dropped in subsequent years. A large portion of the work done has been in response to emergency situations, and therefore, lacks the depth and continuity necessary to provide sound data. For many years prior to 1948, the Fish and Wildlife Service did not

have a research vessel suitable for going more than a few miles from shore. Consequently, little is known about the current status of some of our most important species of marine fish.

According to the Committee, the major fishery considerations of the United States are the development of unused ocean fisheries, management of other sea fisheries, and maintenance of inland fisheries.

The following is the Committee's summary of Appendix L:

A fisheries industry occasions problems of development, conservation, and management; problems of a jurisdictional nature, frequently involving other nations; and problems concerning the conduct of business on a sound economic basis. These problems, viewed against a background of restricted biological and technological research, very limited economic studies, and confused jurisdiction over this basic resource, warrant the clarification of Federal policy, and increased and consistent Federal assistance in the field of fisheries. Because the fishery resources are largely beyond "territorial waters" or transcend State boundaries, and because the type of biological, technological, and economic research needed is of a long-term nature, the Federal Government must necessarily play an important role.

It is the opinion of the committee that the activity of the Federal Government should be more clearly focused on these problems and that there is need for greater efficiency and better service in the protection, development, and use of the Nation's fishery resources. The inclusion of fishery functions in an agency also concerned with terrestrial wildlife has not facilitated adequate attention to fisheries problems. The committee recommends the separation of fishery functions from those of wildlife. It recommends the establishment of both a Fisheries Service and a Wildlife Service in the proposed Department of Natural Resources.

REORGANIZATION OF THE DEPARTMENT OF THE INTERIOR: Transfer of Commercial Fisheries to Commerce: In its report to the Congress, on the reorganization of the Department of the Interior, the Commission on Organization of the Executive Branch of the Government in March 1949 (Recommendation No. 3) recommends that the Commercial Fisheries from the Fish and Wildlife Service be transferred to the Department of Commerce. Further in its report it also states that other than commercial fisheries functions of the Fish and Wildlife Service remain in Interior or the proposed Department of Natural Resources.

BUREAU OF COMMERCIAL FISHERIES IN COMMERCE: In the recommendations^{3/} for the reorganization of the Department of Commerce, the Commission (Recommendation No. 13) recommends that all commercial fishery activities of the Department of the Interior be transferred to a Bureau of Commercial Fisheries in the Department of Commerce.

^{3/}Letter from the Chairman on Organization of the Executive Branch of the Government Transmitting the Commission's Report on "Reorganization of the Department of Commerce," Department of Commerce, House Document No. 100, 81st Congress, 1st Session, 1949. (For sale by the Superintendent of Documents, Washington, D. C., 15 cents per copy.)



Maine's Commercial Fisheries, 1948

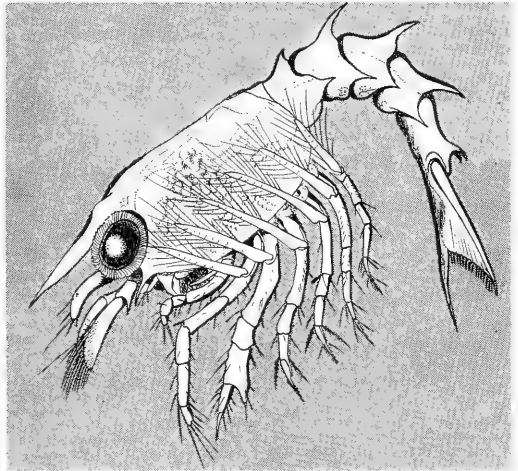
Maine's production of fishery products during 1948 increased in poundage and value. The State's production amounted to 305,037,517 pounds, about 85,000,000

pounds greater than in 1947, and the value of the catch to the fishermen was \$16,183,596, about \$4,000,000 higher than in 1947, according to statistics collected jointly by the Maine Department of Sea and Shore Fisheries and the Fish and Wildlife Service. The total poundage would have been much higher if a market existed for the menhaden that has been appearing more abundantly for the past three years in this area. Herring accounted for 60,000,000 pounds of the total production; followed by rosefish with 49,000,000 pounds; mackerel, 3,000,000 pounds; and groundfish and clams made up most of the balance.

There have been several large draggers, herring carriers, and a large number of 25- to 35-foot boats added to the fleet during 1948.

A new freezer is being built at Vinalhaven which will buy fresh fish and fillet, as well as freeze and store.

LOBSTERS: Lobster production dropped off 2,354,040 pounds and the value to the fishermen was \$376,722 lower than in 1947. The average price to the fishermen in 1948 was 40.4 cents per pound, 3.7 cents higher than in 1947. This was much higher than the 15.6 cents average for 1939. There were 950 less lobster fishermen in 1948 than in 1947, which would partially account for the drop in catch. In addition, the individual fishermen did not catch as many pounds of lobster per trap as in 1947. It is estimated that there were 2,000,000 pounds of lobsters being held in the pounds along the Maine coast as of January 1949. The catch of lobsters would have been much less had it not been for the excellent weather that prevailed throughout the summer and fall along the Maine coast.



A YOUNG LOBSTER IN THE FIRST STAGE OF DEVELOPMENT (8 MM.). CUTICLE IS WHOLLY TRANSPARENT WITH INTERNAL ORGANS VISIBLE.

CANNERIES: Six new sardine canneries started operations during 1948, and one cat and dog food plant, which accounted for some of the increased fishing for herring. Two canneries, late in 1948, put up experimental packs of tuna with good results. In addition, some smoked tuna was packed by another plant.

ROSEFISH: Landings of rosefish hit an all-time high for Maine. The production of 49,041,410 pounds is about 9,000,000 pounds more than in 1947.

SMELT: Due to the lack of very cold weather in Maine the latter part of 1948 and the lack of ice in the bays and rivers, smelt production was low.

CLAMS: The clam fishery showed an increase over 1947 of about 1,000,000 pounds. This was due to the clam canneries resuming packing operations in 1948 and an increase in demand for the fresh clam trade.

Markets for Airborne Seafood

Markets for Airborne Seafoods, by S. A. Larsen, W. Reitz, and K. K. Burgum, is a study under the Air Cargo Research conducted by the School of Business Administration, Wayne University, under express authority of the Detroit Board of Education and sponsored by five corporations.

This study seeks to point the way to a larger market for seafoods and to blueprint a plan for the achievement of this objective. The study should be of special interest to fish producers and distributors, transportation agencies, packaging concerns, home economists, and government officials—all of whom have a part to play in bringing about an improvement in the quality, and thereby strengthening the demand and increasing the consumption of fresh fish.

Excerpts from a synopsis of the study follow:

INTRODUCTION: The fishery industry has endeavored in many ways to improve the market for its products. Advertising campaigns have urged the public to eat more fish. Housewives and students have been given instructions and demonstrations on a variety of ways to cook fish. These efforts doubtless have been productive. Nevertheless, this study suggests one other method of strengthening the market for products of the sea. Its approach to the problem can be summed up in a few words—give the consumer fresher fish.

This study indicates that people in this country would like to consume an additional half billion pounds of fresh fish. A goodly portion of this 62 percent increase above present consumption could be achieved if improved methods of producing, cooling, transporting and merchandising were employed to bring to market in prime condition the delectable products of the sea.

This study defines new markets for fresh fish and estimates the potential volume of air traffic in strictly fresh seafood. In addition, it is offered as a guide to the development of a vast market for a product which of necessity must be kept at low temperatures and speeded to the consumer if it is to be offered to the public as strictly fresh.

PRESENT MARKETING AND CONSUMPTION OF FRESH FISH: The United States cannot be regarded at present as a nation of fish eaters, despite the great sources of supply suggested by its 8,300 miles of coastline and 45,000 square miles of inland waters. Per capita consumption of fresh fish—as distinguished from processed fish—amounts to only 6.89 pounds annually. Even with the inclusion of canned, smoked and salted fish, and the sportsman's catch thrown in for good measure, the annual per capita consumption figure of 14.8 pounds is not impressive.

In a comparison with fish consumption in other countries, the United States is found to rank 14th among the nations, although in production of fish it is exceeded only by Japan.

Furthermore, this low national average of fresh fish consumption is by no means evenly distributed. Fish is enjoyed most nearest its sources of supply, with the result that residents of tidewater states are found to consume well above the national average of fresh fish. The states of Massachusetts and New York, for example, show a per capita average of 12.8 and 12.4 pounds, respectively.

As the distance between the consumer and the source of supply increases, consumption drops off, until we find seven West North Central states averaging only 3.3 pounds per capita and Oklahoma and Idaho down to 2.2 and 2.3 pounds, respectively.

A high association also was found between population density and fresh fish consumption, illustrated by the 17.9 pounds per capita consumption in Maine cities against

a 7.6 pounds figure for Maine's rural population, or by the contrast between urban consumption of 5.7 pounds in Nebraska and that state's rural use of only 1.4 pounds. The overall tabulation shows roughly 62 million urbanites consuming an average of 11.35 pounds of fish while 69 million ruralists eat only 2.82 pounds per head each year. It is further estimated that the 38 million residents of the nation's first 92 cities in size consume 555 million pounds of fresh fish annually, or 61 percent of the total.

To obtain a close-up of urban fish consumption, the localities which will benefit most by the development of airborne seafood, direct consumers' surveys were made in Kansas City, Chicago and Detroit, both of home- and restaurant consumers.

In general, it may be stated that the poor showing of fresh fish on the American menu is due to poor merchandising, lack of consumer education and the adverse effect on quality of existing methods of packing, shipping, handling and temperature control.

Doubtless the quality factor should be placed at the top of the list, for no amount of smart merchandising or of consumer education as to selection and preparation of fish can improve the quality and materially boost the market demand for these delicacies which, so quickly deteriorate once taken from their native waters.

Strictly speaking, there is hardly such a thing today as a really fresh fish outside of the immediate vicinity where it is caught. Under present conditions of harvesting, shipping and marketing, it cannot be otherwise. This is, of course, more true of some species of fish and operations than of others. As a rule the "freshest" salt water fish served in a Midwestern home is 8-12 days old. Unlike meat, which requires a period of ageing and therefore gains in flavor and texture with the passage of the days following the kill, a fish begins to deteriorate immediately upon leaving the water.

Fishing boats commonly remain at sea several days to a week or more. Then the boats return to port, fish for the markets are packed in boxes with flaked ice and sent on their way via truck or rail to ultimate destinations, some of which are well over 1,000 miles distant, at an average speed of 25 to 35 miles an hour. After one to four days in transit, plus another day or two at terminals, wholesale houses and retail outlets, they are available to the consumer for the skillet or the oven.

Then, too, throughout the entire period of storage, shipping and marketing in the conventional manner, melting ice leaches out valuable minerals, proteins and flavor. In fact, few species retain their high sea flavor beyond 6 or 7 days.

That consumers have been aware of this deterioration in quality is evidenced by surveys made in Kansas City, Chicago and Detroit.

POTENTIAL CONSUMPTION OF AIRBORNE FISH: Consumers in the 3 cities surveyed expressed virtually a unanimous desire for strictly fresh seafood of an infinite variety and voted an overwhelming willingness to pay premium prices, if need be, in order to obtain it.

Employing a formula, in which proper weight was given to the factors of distance from seafood production centers and population characteristics, an optimum fresh fish consumption by urban and rural population groups in the 43 states was computed. This shows that the greatest potential increase may be experienced in the urban centers of the Central and West North Central states, running to 170 percent, as contrasted with the 28 percent gain for the city dwellers of the Middle Atlantic states. Average increase estimated for all urban population: 61 percent.

For the United States as a whole, the estimated increase in fresh fish consumption in terms of per capita is from 6.89 pounds to 11.12 pounds, with total annual poundage increasing 557,956,000 over an estimated 1940 consumption of 906,500,000.

If only the distance factor were considered in computing potential consumption—and the longest airborne operation could be considered the equivalent of an overnight truck haul—then the country's per capita consumption increase would be in the neighborhood of 200 percent, to about 21 pounds per person. However, the distance factor in the formula amounts to only 30 percent while other factors account for 70 percent.

GUIDE TO PACKAGING AND MARKET DEVELOPMENT: Indications are that these predicted increases in fresh seafood consumption can be achieved by prompt unloading of the catch, coupled with new methods of packaging, speedy transportation, temperature control and alert merchandising. The consumer has indicated a willingness to support such a program.

In the tri-city survey consumers expressed their preference for the species of fin and shellfish most desired for air shipment, some of which they are at present unable to procure. Top 10 on the list are pompano, red snapper, shrimp, salmon, lobsters, swordfish, oysters, sturgeon, crabs and scallops.

Other factors weigh with force in any determination of the species of fish most amenable to air shipment. Price per pound is given considerable weight, as previous experience in predicting air cargo potential have indicated that relatively high priced perishables benefit doubly from highspeed transportation. Rate of perishability also weighs importantly as does the effect of seasonal variation in supply. Volume of catch is weighed inversely.

Using the formula, nearly 100 species of fish were given an air propensity index and grouped into 3 classifications: excellent, good and fair. The salt water fish judged most likely to lead the air cargo list was sturgeon, with an index of 96. Leader in the fresh water fish league is brook trout, with an index of 100, although annual catch of only a few thousand pounds over a wide area may prove unattractive to air freighters. Whitefish, on the other hand, rated at 75, totals 4,431,000 pounds of annual production and should be attractive air cargo.

It may be significant to the air carrier that almost all (95.5 percent) of the total annual catch of about 400,000,000 pounds of shellfish rates excellent on the propensity index, and the remaining 4.5 percent rates good. In this field lies a vast potential of airfreight. The prospective air transporter of seafoods will be interested at the outset in those species which show the highest propensity to air carriage and that at the same time are caught in sufficient quantities to provide worthwhile loading on a regular basis.

In the salt water category of fin fish, the 7 species rated excellent gross 30,957,000 pounds annually. In the fresh water division, the 8 species earning top ratings gross 25,513,000 pounds annually, while the top-rate shellfish are produced at the rate of 376,586,000 pounds per

year. Total annual production of seafood judged excellent or highly amenable to air shipment is 433,060,000 pounds. This volume represents about 25 percent of the estimated total of fresh fish which annually goes to market.

There is considerable seasonal variation in the catch of some species, a factor which must be weighed in the planning of any air transport operation.

Exports and imports of fresh fish, which in 1941 amounted to 215 and 305 million pounds, respectively, suggest further possibilities for air cargo activity, as most of the external commerce in fresh fish is with the neighboring countries and possessions.

EXPERIMENTAL SHIPMENTS OF AIRBORNE FRESH FISH: A research program such as this in the field of transportation is more convincing if experimental shipments are made in order to test the validity of the predictions propounded. As a result 65 air shipments were made from the 8 major fish producing areas to Detroit. The results were enlightening and encouraging.

These shipments revealed clearly the need not only of speed in the marketing of seafood but also emphasized the critical importance of constant temperature control and the elimination of useless weight—a factor to contend with in the successful operation of aircraft. A combination of temperature control, reduced weight and high speed was achieved through the development of a new type of packaging for airborne seafood.

Under prevailing methods of shipping fish by rail or truck, fish are packed with chipped ice in wooden boxes. As the ice melts, water laden with protein matter and other food values seeps away. This seepage not only adversely affects the quality of the fish but is highly corrosive to the vehicles in which it takes place. Since the container developed and used in the experimental shipments is externally dry this waste is overcome. A moisture proof insulated container unit makes possible a 40 percent saving in gross weight as compared to the conventional shipments made in wooden boxes with cracked ice as a refrigerant.

The method of packaging the seafood for these experimental shipments (and now used in commercial operations) was to precool the contents of the container to just above the freezing point before shipping. It was found that the average temperature rise in transit was at the rate of .6 degree per hour. Even on the longest flights from Alaska, Seattle and the Gulf, fish arrived in excellent condition. Fish shipped by air thus packaged were served to a critical consumer panel and to the public in dining places and invariably adjudged of the highest quality.

The shipments ranged from shrimp, oysters and lobsters to rainbow trout and Alaskan salmon. This insulated container was found suited to the shipment of whole fish, fillets and shucked shellfish.

COMPARATIVE TRANSPORTATION COSTS: Costs of shipping fresh seafood by air are by no means discouraging, particularly when it is borne in mind that airborne fish, if fresh at shipping point, will be of top quality upon arrival at their destination and will therefore bring top market prices.

Airborne costs per net pound of seafood from Norfolk to Detroit including packaging is 6.4 cents—predicated on the air cargo rate now being offered by air transport operators. Via railway express, a mode of transportation commonly employed for the shipment of fresh fish, the cost per net pound is 6.9 cents—or .5 of a cent less by airfreight. From other representative origins studied, shipping costs are slightly lower for rail express. From Boston costs of shipping seafood are 1.6 cents less per net pound; from Jacksonville 4.5 cents less; from New Orleans 1.9 cents less; from San Francisco 4.2 cents less; and from Seattle to Detroit 3.7 cents less per pound by rail express.

The shipping costs given here include the expenses of packaging, which for the conventional wooden box-and-ice method runs to 1.25 cents per net pound of fish and for the iceless insulated pack comes to 1.5 cents per pound,

or an additional packaging cost for the airborne product of only $\frac{1}{4}$ of a cent per pound.

Fourteen of the 65 experimental shipments were studied in detail to obtain a cross-section of actual shipping data. An average of 37 hours is found to have elapsed between the time of catching and the time of shipping, while an additional 19 hours on the average was spent in transit to Detroit, including truck pick-up and delivery. Thus it is seen that the fish, on the average, were only 56 hours out of the water at the time they reached Detroit distributors.

It is believed that even this encouraging time factor can be improved upon as shipments of airborne fish become a regular practice and air-ground transport becomes more closely integrated and as the speed of transport aircraft increases with the introduction of more advanced models.

Consumer acceptance of sample airborne shipments was enthusiastic, and bodes well for expanding operations of this nature, both from the viewpoint of a satisfied consumer and from that of the profit-minded producer and shipper.

If whole consumer areas of the interior can be brought within fresh-fish range of the major salt water fish producing centers via the air transport bridgeway, then it may be assumed that many species now unfamiliar to consumers will come into popular demand.

POTENTIAL TRAFFIC ESTIMATES: As part of its guide to the market development of airborne fish, this report contains an estimate of the potential ton-miles of seafood cargo which reasonably may be expected to materialize.

Few figures are available relating to existing gross traffic in fresh fish. But using the information at hand

and applying to it a formula carefully evolved an estimate of 517 million actual ton-miles annually for the United States as a whole is arrived at, broken down into 402 million ton-miles for the urban and 115 million for the rural trade.

Obviously, not all of the gross traffic in fresh fish will become available to air transport. Short distances are best suited to truck haulage, and for this reason air distances of less than 200 miles are not regarded as within the province of aircraft utilization.

Using the excellent, good, and fair air cargo propensity indices as a yardstick, it appears that more than 173 million ton-miles of top propensity fish in due time may be expected to go by air, of which 137 million ton-miles or 80 percent will go to urban areas--now most expeditiously served by air transport.

It is further estimated that some of the 231 million ton-miles of good propensity fish may become available for air transportation, as well as some of the 443 million ton-miles of fair propensity seafood. For the initial period of air traffic development it may be that only upwards of 173 million ton-miles of peak propensity product will enter the picture. This constitutes 20 percent of the optimum gross traffic and sets up a modest goal at which to aim.

A rough translation of the 173 million ton-miles of traffic into actual flight operations has been worked out, using 1,400 miles as the average haul of airborne fish and 8 tons as the cargo load for a DC-4--a standard commercial aircraft in use today. It is estimated that top propensity potential fish traffic would amount to 18,985 plane loads annually, or an average of 52 flights daily.



New Florida Shark Fishing Vessel Ready

For several months, a Florida shark oil firm has been refitting a large shark fishing vessel, according to a Stuart, Florida, trade periodical dated February 21. This boat, the Sachem, has been revamped so that she will be able to fish far from the home port of Stuart, Fla. The vessel is well equipped for shark fishing with the latest type depth recorder, a very powerful radio-telephone, and all the equipment necessary to let the boat navigate in waters far from home. Many shark fishing boats going out on long trips depend on finding their bait in the area where they fish. The Sachem, however, will carry more than 32,000 pounds of frozen bait.

The crew consists of only four men with each person responsible for a particular job in the operation of the vessel plus acting as a shark fisherman.

It is believed that the Sachem will open up some entirely new production areas for shark.



New Jersey Fisheries Notes

EEL GRASS RETURNS: Reports indicate that eel grass, once abundant in New Jersey's bays and rivers, is beginning to reappear after an absence of many years. The return of the eel grass, which provides food for waterfowl and refuge for

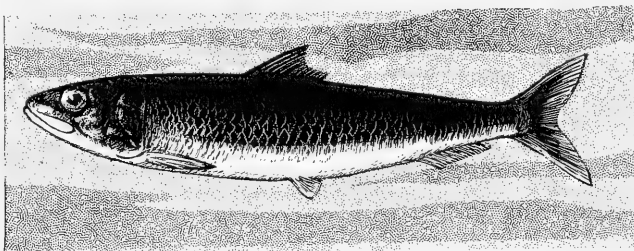
shrimp and bay scallops, has increased the catches of bait shrimp in the Barnegat Bay, according to a mid-February report from the Service's Marketing Specialist conducting a survey of New Jersey fisheries.

OYSTER INDUSTRY: The State's oyster industry in the Atlantic Coast area has suffered the past few years due to the high price of Connecticut seed oysters. Heavy mortality of seed oysters from drills makes the higher seed price prohibitive.



Pacific Coast Two-year Sardine Fishery Survey

A small fleet of ships, nearly 100 investigators, and three governmental agencies are fishing for the facts on the decline of sardine populations in waters of two States and Mexico, according to the March 9 issue of Outdoor California of the California Division of Fish and Game.



CALIFORNIA SARDINE (SARDINA CAERULEA)

Leading off in the 2-year survey is the Bureau of Marine Fisheries, California Division of Fish and Game. Their 100-foot research vessel, the N. B. Scofield, has put out to sea on the first of a series of offshore investigations.

The Scofield has been joined by the 120-foot Crest of the Scripps Institute of Oceanography and will be followed by the 132-foot Black Douglas of the U. S. Fish and Wildlife Service, operated by the other two parties to the three-way research program. Eventually, other specially-equipped craft will ship out from California ports for coordinated ocean operations.

With \$800,000 appropriated by the State Legislature to the Scripps Institute, and \$200,000 from a special tax on California sardine processors, the staff of investigators will attempt to find out: (1) is there a chance for sardine fishing to recover? (2) is there a way to predict seasons and long-range trends?

Cruising as far as 500 miles offshore, the floating laboratories will range Pacific waters from the Columbia River in Oregon to Cedros Island, Mexico. The extent of sardine spawning waters, relationships between survival of eggs, young, and oceanographic conditions, and causes of fluctuation, will be studied.

At sea, the Black Douglas will occupy a regular series of about 40 stations distributed along four lines running offshore from the Oregon coast for about 500 miles. Work at each station will include plankton collection by fine-meshed nets hauled in the upper layers of the sea; temperature observations and collection of water samples, taken at various depths down to 1,000 meters, to provide information on the currents and the biological and chemical characteristics of the water. Enough of these observations, properly distributed in space and time, should provide information of the causes of fluctuations in the abundance of young pilchards and allied problems.

Research on Artificial Propagation of Clams



ing and setting or ecological conditions required by the larvae in nature.



Scientific Conference on Conservation and Utilization of Resources

The Secretary-General of the United Nations announced on March 25 that the United Nations Scientific Conference on the Conservation and Utilization of Resources, authorized by the Economic and Social Council, will be held at Interim Headquarters of the United Nations, Lake Success, New York, from August 17 to September 6, 1949.

The Conference is to be devoted to an exchange of ideas and experience on the techniques of resource conservation and utilization, their economic costs and benefits and their inter-relations. The Conference will have no policy-making responsibilities; it will not bind governments nor will it formulate recommendations to them.

Individuals who have been invited to contribute papers to the Conference include scientists, engineers, resource technicians, economists, and other experts. They have been selected on as wide a geographic basis as possible with the advice of the Preparatory Committee and Member Governments. (Several Service experts are preparing papers.)

Section meetings on Wildlife, Fish, and Marine Resources will be held on the following topics and dates:

1. Changes in Abundance of Fish Populations--August 22.
 - (a) The effects of natural conditions. (Natural fluctuations in the abundance of marine fishes and their probable causes such as poor survival of young, unfavorable hydrological conditions, food supply, population pressures, excessive natural mortalities.)
 - (b) The effects of fishing. (Reaction of fish stocks to fishing; evidences of overfishing; species most susceptible to overfishing; the optimum catch.)
2. Management and Cultivation of Fresh Water Fish--August 24.
 - (a) Pond culture of warm water fishes. (Role of pond culture in food production, pond management; selection of species, pond

fertilization, stocking, cropping; potential possibilities of pond culture as an additional source of food.)

- (b) Management of cold water fish resources. (Principles and practices of hatching, stocking and management in streams, lakes, and artificial impoundments; carrying capacity of waters; population balance; introduction of exotic species; effects of various rates of cropping on production; regulation of fishing.)

3. Fisheries Statistics--August 25.

- (a) Statistics on economic features. (Craft and gear used; catches; price; cost of production; marketing; development of Fisheries; organization of industry; domestic and foreign trade.)
- (b) Biological statistics. (Resource evaluation; catch per unit of effort; measurements of fish at markets; statistical treatment of biological data.)

4. Research in the Conservation and Utilization of Marine Resources--September 1.

- (a) Research in fishery conservation. (Techniques used in studying fisheries; the integration of hydrological, biological, and other studies in a well-rounded marine fisheries research program.)
- (b) Utilization of algae. (Location and composition of algae of actual or potential value; quantitative survey methods and findings; growing, harvesting and processing techniques and equipment; food, industrial and agricultural utilization of algae and algal chemicals; seaweed conservation.)

5. Technological Development in Fisheries--September 2.

Recent advances in methods of handling, distribution, preservation, and processing of fish; new products and byproducts. Also notes on the factory ship, echo ranging and echo sounding and aerial detection of fish, navigation aids, etc.

6. Developing Fishery Resources--September 5.

- (a) Latent fishery resources and means for their development. (Location of undeveloped fisheries, methods of exploration and development; evidence of the existence of oceanic stocks; potential contribution to world food supply; international cooperation in exploitation.)
- (b) Propagation and transplantation of marine fish. (Possibilities of hatching, stocking and transplanting; methods employed.)

Section meetings on Water, of interest to the fisheries, will be held on the following topics and dates:

1. Water Supply and Pollution Problems--August 22.

- (a) Utilization of surface, underground and sea water. (Latest developments in water supply methods, including control of chemical and biological equality of water; co-ordination of domestic and industrial use of waters; use of sea water.)
- (b) Control and utilization of polluted waters. (Effects of stream pollution on domestic and industrial water supply and on fish and wildlife; developments in pollution control and use of polluted waters.)

2. Comprehensive River Basin Development--August 23.

A symposium on the co-ordination of plans for flood control, navigation, domestic and industrial water supply, irrigation, power,

fish and wildlife protection, and watershed management in the preparation of multi-purpose plans for river basins. (Data required for comprehensive planning; methods of correlating engineering studies; review of selected reports of experience in multi-purpose water development programs.)

3. Hydro Power and Other Water Uses--September 1.

- (a) Protection of fish and wildlife. (Costs and benefits of constructing fishways and other protective devices for fish; utilization of water control projects for wildlife protection; administration of fish and wildlife benefits of water projects.)



Sockeye Salmon Fishing Regulations for 1949

The Chairman of the International Pacific Salmon Fisheries Commission, on February 9, announced the 1949 sockeye salmon fishing regulations as promulgated by the Commission at their meeting on January 23, 1949, in Vancouver, B. C.

The Commission's regulations this year are designed to meet the views of the fishing industry, allow greater escapement to the spawning grounds, and provide for an equal take by both American and Canadian fishermen, according to the Chairman of the Commission.

No restrictions were placed on waters of the Pacific Ocean outside of a line projected from Tatoosh Island to Bonilla Point, on Vancouver Island.

Regulations pertaining to U. S. Convention Waters:

1. Opening date for sockeye fishing: July 19, 6:00 a. m.
2. Closing date for sockeye fishing: To be recommended by Commission on the basis of the U. S. catch equalizing the Canadian catch.
3. Period of weekly closed season:
 - July 19th to August 21st - 48 hours, for gill nets;
 - 60 hours, for all other gear.
 - After August 21st - 36 hours for all gear.
 - (Subject to modification on the advice of the Commission through its Chairman.)
4. Gill nets: Size of mesh permissible:
 - (a) Not less than 8 inches prior to July 19th;
 - (b) Not less than 8 inches during any period prior to August 21st when U. S. Convention Waters may be declared closed for fishing for sockeye in accordance with regulation 2, above.
5. Sale, purchase, or possession is prohibited of sockeye taken in U. S. Convention waters--
 - (a) Prior to July 19th, 6:00 a. m.;
 - (b) At any time prior to August 21st when U. S. Convention Waters may be declared closed to sockeye fishing.

Regulations pertaining to Canadian Convention Waters:

1. Opening date for sockeye fishing:
 - (a) That portion of the Canadian waters of Juan de Fuca Strait lying

- within Areas 19, 20, and 21, as defined in the British Columbia Fishery Regulations - July 19th, 6:00 a. m.;
- (b) Fisheries District No. 1 (Fraser River) and including Areas 17 and 18 - July 25th, 6:00 a. m.
2. Closing date for sockeye fishing:
To be recommended by Commission on the basis of the Canadian catch equalizing U. S. catch, including estimated fall catch.
 3. Period of weekly closed time: 72 hours.
(Subject to modification on the advice of the Commission through its Chairman.)
 4. Gill nets - Size of mesh permissible:
 - (a) Not less than 8 inches prior to July 25th, 6:00 a. m.;
 - (b) Not less than 8 inches at any time prior to August 29th, 6:00 a. m. when Canadian Convention Waters may be declared closed for fishing for sockeye in accordance with regulation 2, above.
 5. Sale, purchase, or possession is prohibited of sockeye taken in Canadian Convention Waters--
 - (a) In that portion of the Canadian waters of Juan de Fuca Strait lying within Areas 19, 20, and 21, as defined in the British Columbia Fishery Regulations, prior to July 19th, 6:00 a. m.;
 - (b) Fisheries District No. 1 (Fraser River) and including Areas 17 and 18 prior to July 25th, 6:00 a. m.;
 - (c) All Canadian Convention Waters from time of closure of sockeye fishing until August 29th, 6:00 a. m.
 6. Minimum time notice in applying closures, additional closed times etc.:
24 hours.

The Commission recognizes that, under ordinary conditions, the 1949 cycle of the sockeye runs has been one of the smallest of the Fraser River runs, and for this reason, it is necessary to continue for this season regulations that will allow greater escapement to the spawning grounds in order to build up this run. The Commission feels these regulations will greatly aid the 1953 cycle.



Surf-clam Fishery

The surf-clam industry of Long Island is showing signs of increased activity, according to a March 19 report from the Service's Marketing Specialist stationed in Long Island. One plant is again canning minced surf clams. A former surf clam canner has, according to reports, interested the State of Massachusetts in investigating the possibility of dredging surf clams for canning. He has introduced the New York clam dredge to the Massachusetts fishermen. It is expected that the increased production possible with the dredge will result in a lowering of the price of \$3.00 per bushel for the first part of 1949 in Massachusetts while the Long Island vessels, during the same period, were getting about \$1.00 per bushel for their surf clams.



U. S. Imports of Fish Nets

The imports of all kinds of fish nets and netting into the United States during 1948 were nearly six times greater than the preceding year. Manila trawl net imports are approaching the prewar amount, according to import data of the Bureau of the Census.

Table 1 - U. S. Imports of Otter Trawl and Cotton Netting, 1947-1948

Country of Origin	Otter Trawl Nets, (manila only)				Cotton Fish Nets (does not include under 50¢ a lb.)				Cotton Fish Nets and Netting, all others			
	1948		1947		1948		1947		1948		1947	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Canada	-	-	-	-	10,742	12,425	3,803	4,741	3,070	6,415	3,821	2,440
Mexico	19,793	17,420	7,055	5,818	-	-	45	67	-	-	-	-
United Kingdom	462,568	261,947	108,043	60,357	3,293	14,451	576	1,515	-	-	185	1,459
Portugal	505	443	-	-	-	-	-	-	-	-	-	-
France	-	-	-	-	208	859	387	944	-	-	-	-
Belgium	11,775	6,953	-	-	-	-	-	-	-	-	-	-
Netherlands	68,512	44,949	-	-	33,445	63,237	7,664	11,818	941	3,252	-	-
Germany	4,184	2,522	-	-	268	1,535	-	-	-	-	-	-
Italy	-	-	-	-	-	-	-	-	-	-	295	89
Japan	72,906	31,710	-	-	29,108	16,214	2,432	4,050	1,023	1,153	-	-
India	-	-	-	-	5,957	15,036	6,271	15,631	-	-	-	-
Total	640,555	355,944	115,098	66,175	85,021	153,787	21,168	32,816	5,037	10,930	4,361	3,985

again entered the picture for the first time since the war, and the Netherlands. Cotton nets, including cotton trawl nets, are still far below the prewar average of 500,000 pounds. The Netherlands was the leading shipper in 1948 with Japan a close second.

Table 2 - U. S. Imports of Gill Nets, 1947-1948

Country of Origin	Gill Netting, Flax (more than \$1.00 a lb.)				Gill Netting, Hemm (more than 60¢ lb.)				Gill Netting, (all others)			
	1948		1947		1948		1947		1948		1947	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Canada	1,918	4,524	450	1,300	140	261	-	-	500	400	680	130
Mexico	-	-	-	-	-	-	-	-	10	5	-	-
United Kingdom	1,016	2,144	723	2,459	-	-	-	-	-	-	-	-
Netherlands	2,344	8,840	218	850	-	-	-	-	-	-	-	-
Italy	-	-	-	-	595	659	100	105	999	268	-	-
Japan	5,794	12,090	-	-	-	-	-	-	-	-	-	-
China	-	-	-	-	667	600	-	-	-	-	-	-
India	-	-	-	-	-	-	420	660	-	-	-	-
Total	11,072	27,598	1,391	4,609	1,402	1,520	520	765	1,509	673	680	130

The total of all kinds of fish gill nets is about one-fourth of the imports for the prewar year of 1939, when nearly 50,000 pounds were entered. (See table in the November 1948 Commercial Fisheries Review, page 35). Japan started to ship linen (flax) gill nets for the first time in several years. Before the war, Japan accounted for only 4 percent of the total imports of this type of netting, but in 1948, she contributed 55 percent of the total.



Wholesale and Retail Prices

The wholesale index for all commodities as of February 15, 1949, continued to drop and was 1.3 percent lower than January 11, 1949, and 0.9 percent less than the comparable period in 1948, according to the Bureau of Labor Statistics of the Department of Labor. The rate of decline in foods was greater than the previous month. The wholesale food index was 3.3 percent below the previous month and 6.5 percent lower than on February 17, 1948.

During February 1949, there were no changes in the wholesale prices of canned pink and red salmon compared with January 1949; however, compared with February 1948, pink canned salmon prices were 13.1 percent higher and red canned salmon, 2.9 percent higher. Wholesale prices of cured cod during February 1949 increased 0.8 percent and were 6.9 percent higher than February 1948.

Wholesale and Retail Prices

Item	Unit	Percentage change from--		
		Feb. 15, 1949	Jan. 11, 1949	Feb. 17, 1948
Wholesale: (1938 = 100)				
All commodities	Index No.	158.5	-1.3	-0.9
Foods	do	159.0	-3.3	-6.5
Fish:				
Canned salmon, Seattle:		<u>Feb. 1949</u>	<u>Jan. 1949</u>	<u>Feb. 1948</u>
Pink, No. 1, Tall	\$ per doz. cans	5.848	0	+13.1
Red, No. 1, Tall	do	6.587	0	+ 2.9
Cod, cured, large shore, Gloucester, Mass.	\$ per 100 lbs.	15.500	+0.8	+ 6.9
Retail: (1935-39 = 100)				
All foods	Index No.	<u>Feb. 15, 1949</u>	<u>Jan. 15, 1949</u>	<u>Feb. 15, 1948</u>
Fish:		199.7	-2.5	- 2.4
Fresh, frozen, and canned	do	327.2	-1.4	+ 3.9
Fresh and frozen	do	267.2	-1.9	- 3.3
Canned salmon:				
Pink	¢ per lb. can	61.2	-0.4	+18.4

The continued drop in retail food prices, much more than the usual seasonal decline, marked the seventh consecutive monthly decrease. The retail food index on February 15 was 8 percent below the July 1948 peak. Following the general food trend, the mid-February index of 327.2 for fresh, frozen, and canned fish was 1.4 percent lower than mid-January 1949, but 3.9 percent higher than mid-February 1948. However, the fresh and frozen fish prices on February 15, 1949, showed a more marked decline and were 1.9 percent lower than mid-January 1949 and 3.3 percent less than mid-February 1948. Canned pink salmon prices also declined slightly compared to the previous month, but were still 18.4 percent higher than the corresponding period in 1948.



PACKAGING FROZEN FISHERY PRODUCTS

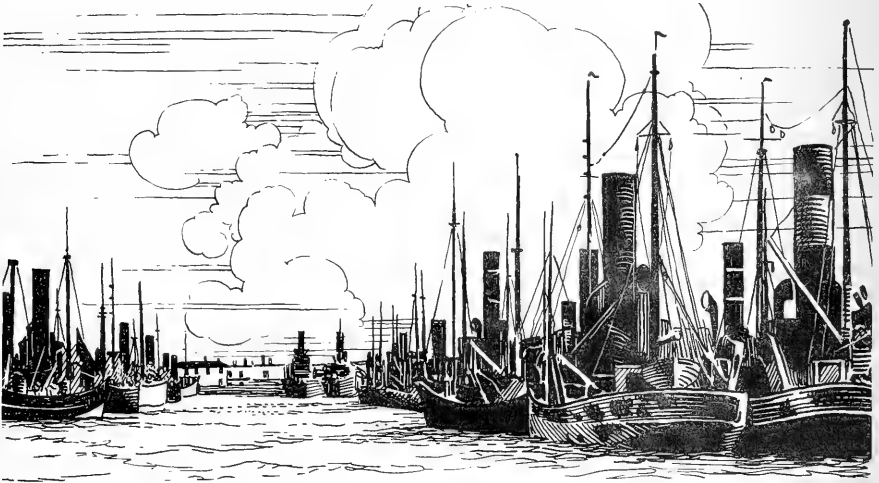
The quality of frozen fish and shellfish is determined to a large degree by the quality of the product at the time of freezing and the manner in which it is stored. The function of the package is to help maintain that quality from the time the product is prepared for freezing until it is opened by the consumer. Care in selection, processing, and storing may be entirely wasted unless the product is adequately protected until it is consumed.



Bizone Germany

1948 HERRING SEASON DISAPPOINTING: The 1948 German deep-sea herring season just closed is generally declared by experts as having been disappointing. The quantity disappointed less than the quality, according to a January 21 report from Bremen, Germany.

The varying sizes of the herring are due to biological and hydrographical conditions, which are difficult to investigate. British researches have shown that the nourishment for herring during 1948 was poor and below average. Seventy percent of catches on the Dogger Bank yielded fish of from three to four years old, as compared with from five to six years old caught formerly.



PORT OF BREMERHAVEN SHOWING FISHING VESSELS IN PORT

Deep-sea fishing companies state that storms which occurred earlier this year than in preceding years greatly impeded fishing and may be the reason for the premature spawning of the herring. Catches of 1948 exceeded in quantity those of 1947 by almost 8 percent. The ports of Bremerhaven, Cuxhaven, and Hamburg recorded a total catch of 235,237,000 pounds of herring during 1948, compared to 215,749,000 pounds in 1947.

A proper evaluation of the catches must take into consideration that the fishing fleet increased by approximately 15 percent during 1948 as compared with 1947. During 1948, there were 169 herring fishing vessels operating out of the three main German ports compared to 144 in 1947.

Therefore, it was neither lack of ability of the crews nor the consequences of the economic development which accounted for the unusually small catches. The fishing companies now have to face serious financial problems on account of the poor quality catches of the past season.

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TRADE AGREEMENT WITH NORWAY: Agreement was finally reached with Norway in the latter part of December 1948 for the delivery during the first half of 1949 to the Bizone of 130,600 metric tons of fish valued at \$16,000,000, according to a January 6 report from the American Consulate General at Hamburg (see table). It is reported that a compromise price was established at somewhat less than the Norwegian demand for a 15 percent increase over the 1948 prices which had previously disrupted negotiations. In 1948, Norway supplied almost 50 percent of Bizone Germany's imports, and Iceland nearly 25 percent. An agreement concluded in December 1948 will make the Bizone a large importer of Icelandic fish in 1949 also.

Fish to be Delivered by Norway to Bizone Germany, First Half of 1949	
Type	Metric Tons
Herring, fresh	69,000
" , frozen	17,000
" , salted	35,000
Cod, fresh	2,000
Haddock, fresh	2,000
Cod fillets, frozen	100
Ling fillets, frozen	300
Other fresh and frozen fish	4,500
Other frozen fillets	700
Total	130,600



Brazil

GRANTS DUTY EXEMPTION FOR IMPORTS OF VESSELS FOR FISHING: Brazilian Law No. 630 dated February 24, 1949, published March 8, 1949, grants duty exemption to all firms and individuals acquiring vessels destined for the Brazilian fishing industry, according to a March 10 American consular report from Rio de Janeiro. The law, which entered into effect on the date of publication, provides that it is retroactive and would apply to imports of such vessels entered under bond between the date of issue of the law and the date of publication.

* * * * *

JOINT BRAZIL-UNITED STATES TECHNICAL COMMISSION: The Joint Brazil-United States Technical Commission has completed the task assigned to it and has submitted its Report to the Government of Brazil and the Government of the United States, according to a March 9 release from the U. S. Department of State. The Commission was created by authority of President Truman and President Dutra pursuant to the request of Brazil for the assistance of technicians of the United States Government to collaborate with technicians of the Brazilian Government in an analysis of the factors in Brazil which tend to promote or to retard the economic development of the country.

The United States delegation arrived in Rio de Janeiro on September 7, 1948, whereupon the Commission was organized into a Central Commission and a number of

sub-Commissions assigned to study certain subjects, among which were included fishing and fisheries.

Following is a summary of the part of the Report dealing with fisheries:

Brazil is not, at present, a large producer of fish, when its population is taken into consideration. A long-range program has been drawn up, with the goal of a three-fold increase in the production and distribution of fresh, canned, and salted fish. This program envisages operation of an expanded fishing fleet, of receiving ports, and of refrigerated transportation and marketing facilities, with Government financial aid and supervision. It includes also technical and educational work to promote the sound development of the fishing industry.



Canada

ADDITIONAL FISHERY PRODUCTS REMOVED FROM EXPORT CONTROL: The number of products which require export permits has been reduced during the past year by the Canadian Government, according to the February 19 issue of Foreign Trade. In the latest relaxation, effective February 8, 1949, the following fishery products were removed from export control: fresh and frozen halibut, fish livers, cod liver oils, and sperm (whale) oil.

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FISHERIES PRODUCTION, 1948: West Coast: Generally, landings of sea fish on the Canadian Pacific Coast during 1948 were at a high level, according to the February 1949 issue of the Canadian Department of Fisheries Trade News. Landings of herring were very large. However, those of salmon, halibut, and shellfish were lower than in 1947. (Table 1.)

The total landed value of fish, shellfish, and livers reached \$31.7 million for the calendar year. This was a record for the British Columbia fisheries to date, being \$9.4 million more than in the preceding year and twice the 1943 figure.

The higher prices paid for salmon were mainly responsible for the increase in total landed value.

SALMON: Catch of salmon amounted to 141.8 million pounds in 1948, 21 million pounds less than in 1947 and the lowest figure for several years. Canned salmon pack totaled 1.3 million cases, a relatively small figure. Disposition as fresh and frozen dressed, at about 40 million pounds, was 2.5 million pounds less, and the quantity filleted, at about 1.3 million pounds, was also slightly less than in 1947.

In 1948, the landed value of salmon was \$20.1 million, as compared with \$12.6 million in 1947. The average price to fishermen for all species of salmon was \$14.15 per cwt. compared with \$7.72 in 1947 and \$8.55 in 1946.

HALIBUT: Landings of halibut, at 18.8 million pounds, were 5.3 million pounds less than in 1947 when special circumstances contributed to the high catch. Reference to earlier years indicates that the quantity taken in 1948 was at a satisfactory level. About 17.5 million pounds of the halibut catch were marketed fresh

or frozen. The production of steaks or fillets would seem to have been about 750,000 pounds, a sizable increase in this form over that of the last few years.

Table 1 - British Columbia Catch of Fish and Shellfish, 1947-48

	1948 ¹		1947	
	Landings	Landed Value	Landings	Landed Value
Salt-water Fish and Shellfish:	lbs.	\$ per cwt.	lbs.	\$ per cwt.
Salmon	141,833,200	14.15	162,810,000	7.72
Halibut	18,878,200	15.08	24,119,300	16.11
Other flatfish	11,118,600	5.34	6,373,100	4.78
Herring	386,608,400	1.10	256,340,300	0.96
Groundfish	8,516,100	7.92	7,383,700	6.41
Tuna	2,171,600	28.24	796,500	26.57
Oysters	5,161,600	4.81	4,860,400	4.07
Clams	873,200	4.29	6,420,500	2.59
Other shellfish	1,968,400	9.65	1,980,700	8.12
Other seafood	735,800	4.10	4,564,400	2.64
Total salt-water fish and shellfish	577,865,100	5.12	475,648,300	4.32
Livers, etc:				
Groundfish	241,800	150.22	173,500	129.20
Halibut	304,300	83.79	353,200	96.43
Grayfish	3,355,300	32.80	3,759,300	28.94
Other	127,600	36.06	134,500	27.38
Viscera	586,200	21.50	595,600	17.90
Total livers, etc.	4,615,200	46.79	5,016,100	35.83
Grand Total	582,480,300	5.45	480,665,000	4.65

¹/Preliminary figures.

OTHER FLATFISH: Catch of other flatfish--flounders, soles, etc.--reached 11.1 million pounds, an increase of 4.8 million pounds over 1947. Production of flatfish fillets was 2.5 million pounds and the quantity marketed dressed, 0.5 million pounds. A greater percentage of the raw fish was disposed of in the filleted form in 1948 than in 1947.

HERRING: The herring catch in the calendar year 1948, at 386.6 million pounds, was 130.3 million pounds greater than in the preceding calendar year. The landings were at an exceptionally high level in the first months of the 1948-49 season.

Table 2 - Production of Herring Products, British Columbia, 1946-48

Product	Unit	1948	1947	1946
Canned	In thousands of cases,			
	48 lbs. to case	416	1,412	1,318
Oil	In thousands of pounds	26,112	11,437	7,745
	Tons	32,202	11,765	8,461
Dry salted	Tons	300	2,620	4,339

GROUND FISH: The 1948 groundfish catch (including lingcod, sablefish, and the rockfishes) reached 8.5 million pounds with a landed value of \$675,000. The previous year's catch was 7.4 million pounds, valued at \$473,000. The production of fresh and frozen dressed groundfish totaled 5.6 million pounds (4.1 million in 1947), and filleted production amounted to 1.1 million pounds (0.9 million in 1947). With the exception of sablefish (black cod), a greater percentage of raw groundfish in 1948 was processed into fillets for marketing.

OTHER: Except for the clam production, which was drastically reduced in 1948 as compared with previous years, the production of shellfish was at a normal level. Total landings of all species last year amounted to 8.0 million pounds, as compared with 13.3 million pounds in 1947, with corresponding landed values of \$524,000 and \$475,000.

The tuna fisheries expanded substantially in 1948, yielding 2.2 million pounds landed weight and a value to fishermen of more than \$600,000. Most of the tuna was canned. The total pack amounted to almost 60,000 cases (48 7½-oz. cans). Tuna canning may establish itself as a permanent phase of the West Coast fishing industry in the years to come.

The anchovy fishery was a failure in 1948, contributing only \$5,000 in landed value, as against \$71,000 in 1947.

East Coast: Landings of fish and shellfish on the Canadian Atlantic Coast in 1948 were generally heavy. Most significant was the increase in the catch of groundfish and of lobster over that of the previous year. Herring and "sardines" were the only important items to register a drop as compared with 1947 (Table 4).

The landed value for all fish, shellfish, and livers amounted to \$30.9 million, \$5.4 million more than in 1947. Higher landings of groundfish and of lobster, together with firmer prices for groundfish, "sardines," and some other species were the principal factors contributing to the increase in 1948 over 1947.

COD AND RELATED SPECIES: Landings of cod and related species (haddock, hake, etc.) totaled 351.1 million pounds in 1948, valued at \$11.3 million. Although the catch was below the record levels of 1945 and 1946, it was quite satisfactory and substantially above that of the previous year.

The disposition in the fresh or frozen forms showed a substantial increase from 1947. The quantity marketed as fresh or frozen dressed was about 19 million pounds, compared with 15.2 million pounds in 1947. The production of fillets was about 47 million pounds, or 17 million pounds more than in the previous year. Of the total fillet production, cod accounted for 31.3 million pounds compared with 21.4 million in 1947. In 1945 and 1946, the production of cod fillets was 54.2 and 53.6 million pounds, respectively. This, however, occurred in years when landings were exceptionally high and European markets were taking large quantities of frozen fillets. Production of haddock fillets in 1948 was 14.6 million pounds, 6.6 million pounds more than in the previous year.

Salted Groundfish	1948 ¹	1947
	(Quantities in millions of lbs.)	
Dried.....	37.0	40.3
Boneless	7.0	5.5
Wet-salted	9.7	5.7

¹/Estimated.

In 1948, about 1 million pounds more raw groundfish was salted than in 1947. A substantial increase was shown in the marketing of wet-salted groundfish and of boneless salted fillets. The production of salted fish in the final marketable forms is now believed to compare with that of 1947 (Table 3).

Production of smoked cod, haddock, etc., in 1948 was at about the same level as for the preceding year, i. e., approximately 9 million pounds. A very large decrease was registered in the production of the canned product.

LOBSTER: Landings of lobster reached 35.8 million pounds, with a landed value of \$9.7 million. Although the catch was 4 million pounds higher than in 1947, it was still below the 1945 and 1946 catches (37.2 and 38.3 million pounds, respectively). In those years, higher prices resulted in higher values as well.

From year to year, the quantities of lobster marketed in shell or alive tend to increase. During 1948, about 21.5 million pounds were marketed in this form--

a record to date. In 1947, the quantity marketed in this form had amounted to 18 million pounds. Exports of "live" lobster increased substantially over the previous year. Production of chilled lobstermeat amounted to 11 million pounds in 1948. The total pack of canned lobster last year, including lobster paste, appears to have been about 60,000 cases, compared with 54,661 cases in 1947.

OTHER SHELLFISH: The 1948 clam production of 14.8 million pounds, although 3 million pounds less than in 1947, compared favorably with the levels of earlier years. The quantity marketed in the shucked form was only slightly below that of the previous year, while the quantities marketed in the shell and canned dropped substantially. The catch of oysters, at 55,000 barrels last year, showed an increase of 15,000 barrels over that of 1947. Prices were also very satisfactory. The catch of scallops, at about 83,000 gallons (shucked), was some 10,000 gallons below that of the preceding year.



CANNING LOBSTER MEAT IN A CANADIAN CANNERY

HERRING: Catch of mature herring was low in 1948, particularly the second half of the year. The fall run, in fact, was almost a complete failure. Landings of 127.2 million pounds for the year were 10.2 million pounds lower than in the

Table 4 - Canadian East Coast Catch of Fish and Shellfish, 1947-48

	1948		1947	
	Landings	Landed Value	Landings	Landed Value
Groundfish:	lbs.	\$ per cwt.	lbs.	\$ per cwt.
Cod	249,801,900	3.22	232,175,800	2.76
Haddock	51,544,100	4.55	31,557,600	4.34
Other groundfish	49,746,200	1.88	44,048,100	1.85
Total groundfish	351,092,200	3.22	307,781,500	2.79
Shellfish:				
Lobsters	35,866,300	27.14	31,884,000	25.95
Clams	14,373,700	2.17	17,948,000	1.92
Oysters	11,010,600	3.80	8,051,400	4.05
Other shellfish	1,074,000	42.38	1,595,200	28.65
Total shellfish	62,824,600	17.40	59,478,600	15.81
Other:				
Salmon	2,193,000	30.88	2,037,000	27.92
Halibut	2,320,200	19.68	1,917,500	20.63
Other flatfish	7,441,800	2.66	5,003,100	2.66
Herring	127,232,300	1.00	137,779,900	1.08
Sardines	89,777,600	2.47	101,586,000	1.53
Macarel	25,249,500	3.99	26,262,900	3.17
Smelts	7,634,900	15.08	5,322,500	15.95
Swordfish	2,288,300	36.49	1,791,600	39.17
Other sea fish	23,368,600	1.51	17,565,700	2.16
Total salt-water fish and shellfish	701,423,000	4.35	666,526,300	3.73
Miscellaneous:				
Cod and hake livers	5,524,500	3.78	5,478,700	3.14
Halibut livers	20,100	29.27	37,700	33.96
Other livers	86,600	21.80	149,700	10.21
Total livers, etc.	5,631,200	7.42	5,666,100	9.44
Grand Total	707,054,200	4.37	672,192,400	3.80

1/Preliminary figures.

previous year and 22.3 million pounds below those of 1946. However, in the early months of the year, large quantities of fresh herring were exported in the fresh form, so that the marketing of herring in that form is indicated as higher than in the previous year.

Production of kippered herring does not seem to have exceeded a million pounds. That of bloaters and bloater fillets appears to have been about 350,000 boxes (of 18 lbs. each) as compared with 475,000 boxes in 1947.

Production of pickled herring was substantially below that of 1947. However, more vinegar-cured herring was produced than in the previous year--approximately 18,000 barrels.

Landings of "sardines" (immature herring) were high at the beginning of the season but dropped in later months. Total landings for the year amounted to 89.8 million pounds, 11.7 million pounds below those of 1947. However, owing to higher



LOADING SARDINES FROM A WEIR TRAP INTO BOATS OFF NEW BRUNSWICK, CANADA. THESE WEIRS ARE FOUND ALONG THE SHORES OF SOUTHERN NEW BRUNSWICK AND THE STRETCH OF COAST EXTENDING FROM LUBEC TO ROBINSTON IN PASSAMAQUODDY BAY.

prices in 1948, the landed value reached \$2.2 million as compared with \$1.6 million in the preceding year. The amount disposed of as fresh on the United States market dropped by about 8.4 million pounds and the production of canned sardines dropped by almost 200 thousand cases, as compared with 1947.

FLATFISH:

Catch of halibut on the East Coast was normal last year, about 2.3 million pounds. More

significant was the increase in the landings of other flatfish (plaice, yellow-tail, etc.) by 2.3 million pounds over the 1947 figure. The total quantities of flatfish (including halibut) marketed dressed, fresh or frozen, would appear to have been 3.9 million pounds, and the production of flatfish fillets was above 1.3 million pounds.

OTHER SEA FISH: Mackerel landings, at 25.2 million pounds, showed no important variation from the level of recent years. Production of pickled mackerel was slightly higher than for the previous year.

Salmon landings were only slightly higher than in 1947, the total of 2.2 million pounds being marketed in the fresh and frozen form.

The smelt fisheries were particularly successful in the latter months of the year. The commercial smelt fishery, of course, is a winter fishery, with highest catches in December and January. The total landings for the calendar year 1948 amounted to 7.6 million pounds, 2.3 million more than for the previous year. The Province of New Brunswick contributes about 70 percent of the annual landings.

The swordfish fishery had a satisfactory season in 1948, with landings amounting to 2.3 million pounds, marketed in the fresh or chilled form.

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INVESTIGATION OF ATLANTIC COAST SEALS: An associate biologist of the Fisheries Research Board of Canada stationed at St. Andrew's Biological Station will be engaged in work in connection with the control of the harbour seal and also will investigate the seal fishery of the Atlantic Coast, according to the February 1949 issue of the Canadian Fisheries Department Trade News.

The director of the St. Andrew's Biological Station told the Atlantic Subcommittee of the Board that there was urgent need for getting basic knowledge of the biology of the seal for conservation purposes, as well as need for studying means of reducing the numbers of harbour seals, which are considered to be predators of commercial fisheries.

There is evidence of growing interest in commercial sealing on the Atlantic Coast and for the adequate control and administration of this fishery. The results of the contemplated investigation are expected to be valuable.

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EAST COAST FISHERIES CONFERENCE: Some 200 representatives of fishing interests in eastern Canada and Newfoundland attended the third annual East Coast Fisheries Conference which was held in Halifax, Nova Scotia, on February 2-4, 1949, according to a February 15 report from the American Consulate General at Halifax. The Conference is sponsored by eastern Canadian organizations affiliated with the Fisheries Council of Canada and the wholesale trade centered in Montreal and Toronto.

The agenda of topics covered a wide field of East Coast fisheries problems. Discussion on the first day was on research. The second day was devoted to problems of the industry as related to interested agencies of the Federal Government; and to inspection and marketing matters. The final day was reserved for inspection of local fish plants and the holding of group discussions.

It appeared to be agreed among the various fish dealers and producers attending the Conference, that 1948 was one of the worst years on record for Nova Scotian shore fishermen. The high cost of fishing gear, coupled with the poor catch of last season, was creating difficulties for fishermen who need to replace worn-out equipment.

The Minister of Fisheries, speaking before the Conference, stated:

"We have arrived, without a doubt, at a more decisive moment in our history. The pattern of world trade is changing and we are faced with a tightening up of many of our export markets. The action we take within the next year or two will determine whether the industry is to expand and prosper or whether it is to suffer a very serious setback."....

The minister emphasized that Canadians are potentially the fishing industry's best customers, but so far the industry has just begun to meet their needs. "Our own Canadians could and would--if we cultivate their interest--provide for us a rich and reliable market for our products. They could guarantee for us a high level of employment and prosperity--if we give them half a chance....."

"Through joint action of this kind to improve our methods of selling, merchandising and distribution, I am convinced that the domestic consumption of fish products in Canada can be doubled and perhaps trebled in the very near future."

SALT FISH DEMAND EXCEEDS SUPPLY: The Canadian Department of Trade and Commerce reports that, although Canada's salt fish production has been maintained at a high level, demand in Western Hemisphere areas has been so heavy as to preclude the possibility of supplying possible European markets, according to a February 15 report from the American Consulate General at Halifax. Canadian trade representatives have been requested to refrain temporarily from active promotion of salt fish. Canada has been unable to fill European Recovery Program orders in sufficient quantities of desired types as defined by specifications and the alternative was to persuade the countries concerned to accept substitutes.



Colombia

SHARK LIVER OIL: Annual production of shark-liver oil in Colombia is reportedly about 2,205 pounds, according to the report, "Colombia as a Source of Crude Drugs and Essential Oils," issued January 1949 by the Office of International Trade of the Department of Commerce. In 1947, arrivals of raw fish livers from Colombia in the United States totaled 41,763 pounds, valued at \$9,826.

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SHRIMP REPORTED IN COLOMBIAN WATERS: A member of the Danish Biological Institute in Copenhagen, who recently returned to Denmark from Colombia, has investigated the possibilities for an expansion of the fishing industry in Colombia, according to the British periodical, The Fishing News, dated February 19.

The investigations, which were financed by the Colombian Government, proved that enormous quantities of shrimp exist off the Colombian coast. It is reported that a Danish firm has already decided to spend approximately \$1,000,000 to build a canning factory in Colombia.



Costa Rica

RULES AND REGULATIONS TO MARITIME FISHING AND HUNTING LAW: The Government of Costa Rica has enacted Decree No. 363, "Rules and Regulations to Law No. 190¹/₁ of September 28, 1948, on Maritime Fishing and Hunting Law," dated January 11, 1949, published in the Diario Oficial of February 3, 1949; Decree No. 414, dated February 4, 1949, published in La Gaceta--Diario Oficial of February 27, 1949, which amends certain of the tax and fee provisions of Decree No. 363; and Decree No. 426, dated March 8, 1949, published in La Gaceta--Diario Oficial of March 13, 1949, 1/See Commercial Fisheries Review, February 1949, p. 40

amending Article 9 of Decree No. 363.

The decrees consist mainly of certain rules, regulations, taxes, and fees for fishing off Costa Rica. It will affect shark fishing and tuna fishing (both bait boats, purse seiners, and tuna motherships). The law does not reassert Costa Rican sovereignty beyond the three-mile limit, but its implications are that it may be enforced within the 200-mile limit over which Costa Rica has claimed sovereignty. Decree No. 414 changed Articles 27 through 32 of Decree No. 363 eliminating the discriminatory taxes and fees established by the latter Decree, changing the basis of certain taxes, and making other minor changes that clarify provisions of the law. Decree No. 426 modified Article 9 in that authority for maritime fishing and hunting may be granted by the Ministry of Agriculture and Industries for one-year periods. The certificate, "Annual Registration of Craft," issued to fishing craft is not transferable and will show the type of fishing authorized.

Because Decree No. 414 made no provision to the contrary, it is assumed that all Decrees entered into effect on the date Decree No. 363 went into effect, March 9, 1949.

The following is a summarization of the decrees with a few of the more pertinent articles of interest to the United States fishing industry given in full:

Article 1. Classifies marine fishing as follows:

- (1) Short Distance Fishing, that which is done by ships that go no more than 12 miles from the coast;
- (2) Medium Distance Fishing, that which is done by ships that go out to sea more than 12 miles and less than 200 miles from the coast.
- (3) Long Distance Fishing, that carried on by ships that go more than 200 miles from the coast.

Articles 2 through 8 are general ones which define different types of fishing, methods of fishing, and types and use of equipment and gear. All such items as "ordinary nets, flexible nets, cables provided with floats, lines or heavy bodies that extend in any direction in the sea" are classified as fishing equipment. Fishing methods are classified as double craft; other trawl; purse seine; pole, line and bait system (tuna fisherman); "hand nets with lines to shore"; drifting floating equipment; and fixed gear. All of the above, including all types of lines, are legal and permitted. Purse seine nets shall not have the mesh (bar) smaller than 70 mm. (2.76 inches), and they will not be over 450 meters (1,476 feet) in length. However, the use of longer nets will be permitted with the payment of a special tariff per additional lineal meter. The minimum opening of the mesh (bar) used with double-craft and other-trawl systems will be 35 mm. (1.38 inches).

Article 9. Establishes a closed season from July to November on sardines in the Gulf of Nicoya and Golfo Dulce, forbids the catching of porpoise, the use of equipment not authorized by the current regulations as well as the use of explosives, chemical or poisonous products and, except for operations from the land, forbids the use of dragnets within a six-mile limit.

Article 10. Deals with the registration and documentation of fishing craft. It also specifies documents, receipts, and certificates that must be carried by every company and physical or juridical person engaged in fishing or in the fishing industry. The following certificates are included: certificate of inscription in the Registry to be maintained by the Ministry of Agriculture and Industries through the Department of Fishing and Conservation; original certificate of payment of the Annual Registration Fee in the case of craft in general; certificate that all members of the crew possess their "Fisherman's License", in the case of fishing craft with their base in the national ports;

original certificate of having paid the Annual Bait-fishing Tax, in the case of shark or tuna (pole and line) fishing craft; original certificate of having paid the Fishing and Export Tax, in the case of craft that do not deliver their catch to motherships or floating plants anchored in Costa Rican waters, or to plants established on the national territory; and original certificate of having paid the Export Tax, in the case of motherships or floating plants.

Articles 11 through 13 deal with infractions of the rules and regulations. Practices which are considered as infractions are specified and classified under the two general classifications of "minor" and "serious".

Articles 14 through 18 establish the amount and kind of penalties that may be imposed and the rules for the administration of this part of the law.

Articles 19 through 25, under the heading "General Dispositions", rules and regulations are laid down about disposition of catch and certain personnel requirements are established:

Article 19 states that craft of national registry selling their products abroad must obtain a permit from the Department of Fishing and Conservation, shall pay the corresponding export taxes and that if such craft belong to national companies they shall be subject to the provisions of the Law of Control of Export Products.

Article 20 exempts fish caught by craft of Costa Rican registry with a Costa Rican crew from all taxes, if the catch is discharged in Costa Rican territory for consumption or industrialization in the country; and that if the fish is transferred to motherships or factory ships, or reexported for exportation, the catch shall be exempt only from tax applicable to the fishing craft.

Article 21 states that all national fishing craft must sell their catch to packing or refrigerating companies established in the country provided that the price paid by these is not lower than that paid by motherships or factory ships.

Article 22 states that packing or refrigerating plants may not export unprocessed fish, directly or indirectly, as long as such material is needed to maintain local production uninterrupted.

Article 23 states that all persons engaged in fishing from aboard national or foreign craft must register with the Bureau of Embarkation of the Department of Fishing and Conservation, and that ship owners or their representatives must apply for necessary men for their crews to this office, and that these men may be chosen from existing lists.

Article 24 specifies that a sailor must possess a permit issued in his name by that Bureau before he may embark, that if this requirement is not complied with, both the captain of the craft and the sailor himself will be punished.

Article 25 specifies that captains of motherships and factory ships, before sailing, and the managers of land plants, monthly, must make sworn declarations showing the quantity of fish received; the name of the fishing craft and of its captain; and the prices paid.

Article 26, under the heading "About Registration Fees, Taxes and Their Payment", states that all taxes and duties established in the law must be paid to the Office of the Collector of Revenue or to its branch offices, or to authorities appointed for that purpose by the Ministry of Agriculture and Industries.

Article 27. Establishes the fee for annual registration of vessels in U. S. dollars and states that national ships may pay the equivalent in colonies at the official rate. Every ship engaged in fishing, or in the transportation or commercialization of its products, must pay an annual registration tax valid from the date of issuance and according to the following scale:

- | | |
|-----------------------------|--------------------|
| (1) Shark-fishing craft | - \$200,00 (U. S.) |
| (2) Tuna purse seiners | - \$250,00 (U. S.) |
| (3) Tuna bait-fishing craft | - \$125,00 (U. S.) |
| (4) Motherships or plants | - \$500,00 (U. S.) |

Article 28. Provides that the fishing tax for shark and tuna will be paid in advance, in accordance with the net tonnage of each craft. This tax will be assessed in accordance with the following tariff:

(1) Shark-fishing craft which deliver their load directly abroad, \$2,00 (U. S.) per net ton of fish capacity, for each voyage not exceeding three months.

(2) Shark-fishing craft which deliver their load to motherships or plants, \$2,00 (U. S.) per net ton of fish capacity, each four months.

(3) Tuna-fishing craft carrying their load directly abroad, \$2,50 (U. S.) per net ton of fish capacity, for each voyage not exceeding six months.

(4) Tuna-fishing craft which deliver their load to motherships or plants, \$2,50 (U. S.) per net ton of fish capacity, each three months.

Article 29. All bait-fishing craft shall pay a tax of \$250,00 (U. S.) per year.

Article 30. The Export Tax on tuna and shark shall be assessed in accordance with the following tariff:

(1) Shark-fishing craft carrying their load directly abroad, \$4,00 (U. S.) per ton of fish, for each voyage and payable in advance.

(2) Tuna-fishing craft carrying their load directly abroad, \$4,00 (U. S.) per ton of fish, for each voyage and payable in advance.

(3) Motherships or plants, \$4,00 (U. S.) per ton of fish.

(4) Land plants, \$2,50 (U. S.) per net ton exported.

Article 31. Provides that fishermen from craft which deliver their catch to motherships or plants must obtain a Fishermen's License valid for one year and for which they will pay a tax of \$15,00 (U. S.).

Article 32. The tax on nets will be in accordance with the following tariff:

Per lineal meter of each net in excess of 650 meters, (2,133 feet), \$1,00 (U. S.) per year, payable in advance.



Denmark

FISHERIES REVIEW, 1948: Production: The Danish fishing industry in 1948 was favored with unusually large catches, according to a February 10 report from the American Embassy at Copenhagen. In weight, they exceeded the unprecedented large 1947 catch by about 30 percent. Danish fishery expeditions to Greenland and Iceland waters took place for the first time in 1948 and were aimed at permanently expanding Danish fishing operations.

Exports: The export of fishery products of all kinds brought large amounts of foreign exchange to Denmark. This income in 1947 amounted to \$36,257,598, but was increased in 1948 to about \$39,383,253, an increase of about 9 percent.

Trade Agreements and Exchange of Products: As Denmark was obligated under its bilateral trade agreements, especially with the United Kingdom, to export most of its agricultural produce, fishery products became of increasing importance to the Danish economy when negotiations with other countries for the exchange of products were in progress. However, export quotas necessary to meet obligations under completed bilateral agreements proved to have been set too high, despite

1/Rate of exchange: U. S. \$1.00 = 4.799 Danish crowns (par value).

increased catches of fish, and towards the end of the year, export to certain non-treaty markets had to be curtailed.

Canning: There was increased activity in industries dependent on fishing. Existing fish product factories and canneries were expanded, new ones began operations, and new lines of production were started.

Fishing Fleet: The fleet of fishery vessels was not increased to any extent, but a considerable amount of repair and modernization work, particularly on marine engines, was performed.

Independent Ministry of Fisheries: The year 1948 was the first complete year during which an independent Ministry of Fisheries was in operation. This Ministry has been very active in the interest of the fishing trade and its affiliated industries. It was instrumental in establishing a national propaganda committee for the consumption of fish during the year and took the initiative in having fishery attaches sent to a number of Danish missions abroad.

* * * * *

NEW FLOATING TRAWL NET: A new floating trawl was actually tried by several fishing vessels in November 1948 and reports state that it proved successful, according to the February 19 issue of the British periodical, The Fishing News. The floating trawl, the idea of a Danish fisherman, Robert Larsen, has been in the experimental stage for the past 13 years. However, a Swedish fisherman claims that the same type of trawl is being made in a factory in Gothenburg, Sweden, and that it was invented in Sweden first.

Since the new floating trawl can be pulled or drawn through the water at a higher level free of the sea bottom, it will be suitable for catching herring and mackerel. The inventor also intends to experiment with a heavier type of floating trawl for catching cod. The cost of the new floating trawl is estimated at approximately \$700.

With the use of an echo-sounder, it will be possible to determine at what depth to fish the trawl, which can be set at any desired depth. Secured between two boats and pulled for about 15 minutes, the new trawl is then handled like a regular otter trawl.



Ecuador

NEW LAW GOVERNING FISHING AND ESTABLISHMENT OF FISH PROCESSING PLANTS: The Decree passed by the 1948 session of the Ecuadoran Congress concerning fishing in Ecuadoran territorial and insular waters and the establishment of fish processing plants in Ecuador became effective with its publication in Registro Oficial No. 101, dated January 4, 1949, according to a January 18 report from the American Embassy at Quito.

The new Decree does not revoke the existing laws and regulations governing fishing in Ecuadoran waters, but rather confirms certain regulations about which there was considerable discussion and adds to them basic regulations to govern the signing of contracts with fishing and fish processing enterprises. Before the

draft of the present Decree was presented to Congress, and during the time it was under discussion in that body, Ecuador's policy with regard to fishing in its waters was the subject of bitter controversy between two groups who held opposite viewpoints on the subject of fishing with nets. The text of the Decree, as passed by Congress and as finally approved by the President of the Republic, is a compromise between the positions of the opposing groups.

A summarization of the main features of the Decree follows:

Article 1 of the Decree confirms the policy of permitting both bait and net fishing, specifically mentioning "purse seiners" and "motherships," and provides that the product of the fishing may be disposed of freely. However, the first part of this article is modified by the second paragraph of Article 3, to the effect that, after two years' trial, the Executive may prohibit partially or completely either system, if he finds it destructive, and the second part is subject to the requirement set forth in Article 4 that the Executive is obliged to issue a regulation for the progressive establishment of a fish-processing industry in the country, requiring, at the end of four years, that all fish caught in Ecuadoran waters be processed in Ecuador.

Article 2 states that licenses shall be issued after the formalities prescribed in the Regulation issued with Decree No. 1206-A, of July 2, 1948, have been fulfilled, and shall include the right for fishing vessels of the two systems to fish for a period of 90 days and motherships to take on a full load once on each trip. These provisions will be rigorously enforced.

Article 3, in addition to the modification it places on part of Article 1, authorizes the renewal of licenses if damage to vessels or gear prevents fishing for the period covered by the license.

Article 5 grants certain tax exemptions to new processing industries which establish factories, canning or refrigerating plants, etc., in Ecuador.

Article 7 seems to grant to exclusively fishing enterprises (as distinguished from canning or processing enterprises) a period of two years' grace, counted from the initiation of their activities, before they have to submit to the requirement that the product of their fishing be processed in Ecuador, and furthermore introduces the provision that the Government shall determine whether all or part of the fish caught must be processed in Ecuador after consideration of the needs of the national industry.

Other sections of the Decree establish a new validity period for fishing licenses, charge the Ecuadoran consular authorities with the enforcement of the licensing requirements, provide for the distribution of the proceeds from fishing taxes, grant the Executive authority to prohibit factory ships, and make him responsible for carrying out a strict watch over the country's waters to safeguard the national interest therein.

This Decree does definitely establish a new policy of the Ecuadoran Government with regard to fishing in its territorial and insular waters—that of requiring the processing in Ecuador of fish caught in Ecuadoran waters. Interpretative regulations to follow or actual application of the Decree will probably clarify certain parts of the Decree and will reveal the effect of the new policy on American fishing interests.



Iceland

COMMERCIAL AGREEMENT WITH THE NETHERLANDS: On December 17, 1948, in The Hague, a commercial agreement between the Netherlands and Iceland was signed. The agreement calls for an exchange of goods during the year ending November 30, 1949, valued at \$5,600,000, according to a January 14 report from the American Legation at Reykjavik.

Icelandic sales to the Netherlands will consist mainly of various types of meal, cod liver oil, quick frozen and salted fish fillets, and fish skins. The Netherlands will sell a variety of products (no fishery products included) to Iceland.

Proposed Icelandic Exports of Fishery Products to the Netherlands (Dec. 1, 1948-Nov. 30, 1949)

Product	Quantity or Value	Product	Quantity or Value
Herring meal	- 30% of the entire 1948-49 winter production in which quantity the 25% already contracted for is included. 3,000 metric tons.	Offal meal	- 280 metric tons
		Cod liver oil	- 800 " "
		Salted fish fillets	- 4,000 barrels
Fish meal	- If fish meal is not available to the full quantity, the balance will be delivered in herring meal.	Fish and fur skins	- \$96,009
		Quick frozen cod fillets	- 4,500 metric tons

DISPUTE BETWEEN SEAMEN'S UNIONS AND TRAWLER OWNERS: The early part of February 1949, the Icelandic trawler owners announced through their Association the discontinuation, effective February 11, of the payment of war risk bonuses to the officers and crews operating trawlers, according to a March 3 report from the American Legation at Reykjavik. The seamen's unions are unwilling to accept the elimination of the bonus which they consider as an integral part of seamen's wages. Because of this dispute between the seamen's unions and the trawler owners, no trawlers sailed from Reykjavik after February 17.

The special war risk bonus mentioned is paid only to officers and members of the crew who make the trip to German and British ports. The officers generally make every trip, whereas deckhands make, on the average, four trips per annum. The annual bonus for the captain and officers amounts to approximately \$5,390 each and for deckhands, \$1,232. In addition to the war risk bonus, the crew as well as the officers are paid a basic wage, and all share in the liver oil proceeds. A deckhand's annual wages range between \$5,082-6,776; captains average \$23,100; mates, \$15,400; engineers, stokers, and radio operators each average \$12,320. (These wages consist of a basic wage multiplied by the cost of living index of 300, a percentage of the liver oil proceeds, and the war risk bonus.) The assistant cook, usually a young boy, receives only a basic wage multiplied by the cost of living index.

Negotiations are being carried on between members representing the Icelandic trawler owners and the labor representatives of the seamen's unions. Both parties agreed to the appointment of a Government mediator, who is assisted by a member of the Ministry of Industries and a Supreme Court judge. This board is endeavoring to draw up an agreement which will reconcile the two parties in the dispute.

In recent years, the operational cost of trawling has mounted. Consequently, in order to continue the operation of trawlers fishing for iced fish, which

in 1948 was Iceland's most important export product (about \$13,860,000), the trawler owners decided to eliminate the war risk bonuses, which they consider no longer applicable in peacetime. Iced fish exports are not subsidized by the Government. The tie-up is a test which, if the trawler owners succeed, may be a prelude to a gradual lowering of the seamen's wages to bring them more into line with wages paid to persons engaged in other industries. Indications are that an agreement will be reached only after protracted negotiations. Although they are the highest paid workers, the seamen are extremely reluctant to accept a cut in their compensation. As of March 2, 18 new "reconstruction" trawlers and one old trawler have put into port and remain idle, out of a total of 29 "reconstruction" and 18 old trawlers.

NOTE: Values converted to U. S. currency on basis of 1 kronur equals 15.4 cents U. S.

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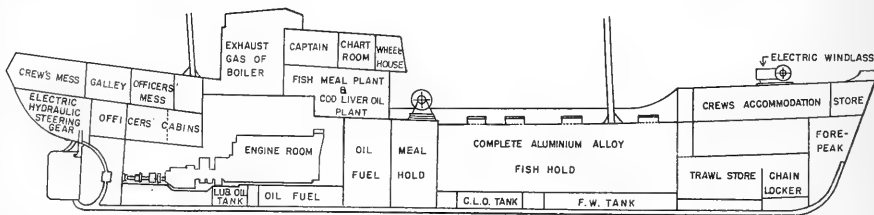
NEW TRAWLER WITH FISH MEAL AND OIL PLANT ABOARD: A new Icelandic trawler, Jorundar, was launched at Lowestoft, England, early this year, according to the February 12 issue of the British periodical Fishing News.

Several improvements have been incorporated in its construction, and it is more than a fishing vessel because it contains a complete fish meal and liver oil extracting plant aboard.

The vessel's length is 167 feet; breadth, 28 feet; depth, 15 feet; gross tonnage, 470 metric tons; and estimated service speed, 12 knots. Using diesel engines, some of the outstanding features are: a superstructure of non-corrosive aluminum alloy; a fish hold (12,000 cubic feet) constructed of and lined with non-corrosive aluminum and standardized aluminum pen "boards"; and a hydraulically-operated trawl winch (consisting of two drums each taking 1,200 fathoms of three-inch warp) reported to be the largest of its kind on any fishing craft.

Capacity of the fish hold is 518,000 pounds. The fish meal plant can produce 23 metric tons of ground fish meal from the fish waste, which is bagged and stored in specially constructed meal holds. It can produce as much as 10 metric tons of meal every 24 hours. A steam-operated liver oil plant produces 20 metric tons of liver oil per trip. When extracted, the oil is stored in separate, specially constructed tanks. Large capacity electric pumps discharge this cargo immediately on arrival in port.

Accommodations for captain and crew include hot and cold running water and showers, mess room, and lounge. Accommodations throughout the vessel are air conditioned.



PROFILE OF NEW ICELANDIC TRAWLER

REVIEW OF FISHERIES, 1948: Importance of the Fisheries: The total fish catch in 1948 amounted to 409,208 metric tons, five percent less than in 1947, according to February 10 and March 1 reports from the American Legation at Reykjavik. This represents the largest catch per capita of any nation in the world and places Iceland third among European countries in over-all fish production (following Norway and the United Kingdom). Other industrial resources in Iceland are practically non-existent, and the possibilities of agricultural development are limited, chiefly by the climate. As a result, Iceland must export the products of its fisheries in order to import most manufactured articles and many basic foodstuffs, such as grain. Fish and related products constituted 92 percent of all Icelandic exports in 1948.

Fish Production and Utilization: There are two major types of fishing in Iceland: the cod fisheries (including other white fish) and the herring fisheries. The utilization of the fish has varied considerably over recent years (Table 1 and Figure 1).

Cod Fisheries and Fleet: The cod fisheries are carried on by large trawlers on the high seas and smaller craft (including motor boats) off the coasts of Iceland (Table 2).

The trawlers usually operate the year around. They place their catch on ice (after removing the livers for oil) and take the fish directly to foreign markets (United Kingdom and Germany). Fish livers are processed aboard the trawlers and the oil brought back to Iceland to be combined with the oil from the fish brought in by the small boats (oil is not processed on small boats). In the year 1948, the trawler catches amounted to 143,000 metric tons as compared to 72,000 in the preceding year and 60,000 in 1946. This great increase was caused by the rebuilding of the trawler fleet which has been going on since the end of the war.

The average catch of the new trawlers has been approximately 265 metric tons compared to around 148 metric tons for the old trawlers.

There are at present 18 old and 28 new trawlers in Iceland. Four more are expected during the beginning of this year, which will complete the original order for 32 placed in the United Kingdom in 1945. In October 1948, the Icelandic

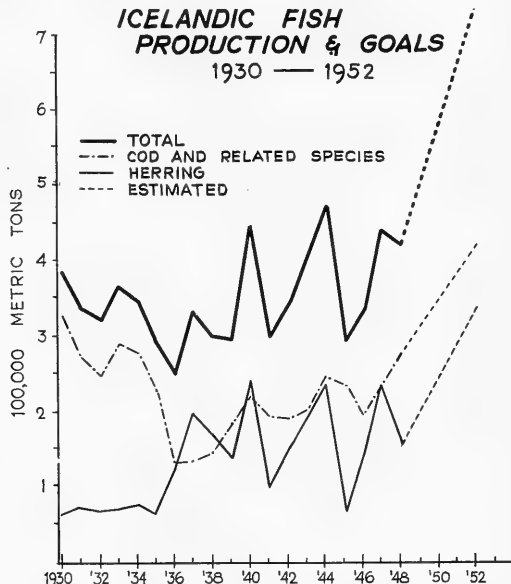


FIGURE 1 - OVER-ALL ICELANDIC FISH PRODUCTION, AND COD AND HERRING PRODUCTION FOR 1930 THROUGH 1948. INDICATED ARE THE GOALS FOR 1952 UNDER ICELAND'S LONG TERM ECONOMIC PROGRAM.

Government placed orders for 10 more (8 to be built at Aberdeen), and two additional ones have been ordered by private owners. These 12 new orders are not expected to be completed until 1950 and 1951. These trawlers are to be 183' 6" in length, 1200 hp. motor, and an estimated speed of 13 knots. Each vessel's fish hold will have a capacity of 840,000 pounds. The vessels are to be fitted with the most modern navigational equipment, including wireless, telephones, direction finders, depth sounding apparatus, and radar.

Species	Utilization	Metric Tons
Cod (and other white fish) ^{1/}	Fresh, on ice	154,365
	To freezing plants	76,424
	For wet salting	28,070
Herring ^{2/}	For salting	14,255
	For oil and meal	129,861
Other	For canning	434
	For home consumption	2,940
	Other uses (includes some cod and herring)	2,855
Total.....		409,203
^{1/} Drawn fish.	^{2/} Whole fish.	

The new trawlers are gradually intended to replace the old ones (which operate at a loss), and the development of the fishing capacity of the trawler fleet is the major undertaking related to

the fisheries contemplated in Iceland's long term economic program. Total cost of the 10 trawlers ordered in the United Kingdom by the Icelandic Government has been estimated at \$6.2 million payable in sterling.

The main cod season for the small boats (25 to 100 GRT) starts in January and ends in the middle or end of May. In this season, fisheries are carried on almost without interruption in the area off the south, southwest, west, and north-west coasts. The greatest concentration is at the south and southwest coasts (between the Westmann Islands and Snaefellsness). In 1948, the catch of cod and related species by vessels other than trawlers amounted to 116,000 metric tons. These catches are all brought ashore fresh, where the greater part is taken to the freezing plants and some salted.

The freezing plants (Table 3) which are located all around the coast and are almost entirely privately owned, produce mostly quick frozen fillets. Approximately 80 percent of the freezing plants are members of the Iceland Freezing Plants Corporation. This organization is set up largely for the purpose of marketing abroad the products of the various plants. Very little expansion of the refrigerating plants is anticipated in the long term economic program. Total estimate of dollar expenditures for these constructions for the period 1949-50 to 1950-52 is \$170,000.

Herring: Up to 1946, there was only one main season for the herring fisheries: the period from July to September, off the north coast of Iceland. During the winter of 1946-47 and particularly 1947-48 (Nov. to Jan.), herring was caught in great quantities off the southwest coast (particularly around Hvalfjordur). The 1948-49 winter season, however, was a total failure.

Herring fisheries are carried on, for the most part, with purse-seine nets by the smaller boats. These craft (Table 2) are able to convert from one type of fishing to the other as the cod and herring seasons do not generally coincide. Herring

Type and Size	No.	Gross Registered Metric Tons
Trawlers	46	25,653
Other fishing vessels (steamers)	11	2,583
Motor vessels:		
More than 100 GRT	44	6,423
35-100 "	201	12,074
12-34 "	213	4,161
Under 12 "	136	981
Total.....	651	51,875

from both the summer and winter catches is processed into oil and meal. Salted herring has, up to the present, been produced almost entirely during the summer season owing to the better quality of the summer fish.

Most of the larger herring processing plants (which reduce herring into oil and meal) are located in the north, around Siglufjordur and Akureyri (Table 4). In view of the record winter catch of 1947-48, it was decided to expand processing facilities in the south and to build a floating herring factory. Most of the 2.3 million dollar ECA loan taken by Iceland in 1948 was used for this purpose, and the floating herring factory, Haeringur, is now ready for operation. No further significant development of herring processing plants is anticipated in the long term economic program. A great part of the 1948 production of the summer herring catch was salted and less processed into oil and meal.

Canning: A small amount of both herring and cod go to the canning factories. The most important of these are located in Reykjavik (Table 5).

Whaling; The year 1948 saw the resumption of whaling operations which proved highly successful. Plans are being laid for the expansion of this industry.

Exports of Fishery Products: Iceland's total 1948 exports, the highest in Icelandic history, amounted to \$60,826,724 of which \$56,944,286 constituted fishery products (Table 6), compared with \$41,128,687 for 1947. Part of the winter herring oil production (1947-48) was exported in 1948, as well as other types of fishery products. It is not likely that 1948's carry-over production, which will be exported in 1949, will be so great in value as 1947's carry-over production, exported in 1948. In value, about 25 percent (\$15,371,253) more fish and fish products were exported during 1948 as compared with 1947. The value of fish exports tends to present an exaggerated picture of Iceland's total 1948 exports.

Iceland markets a sizable part of its fish production in countries with which it has concluded trade agreements. The prices on these markets are relatively high. However, in return Iceland must purchase from these countries high-priced commodities.

Fish on ice was Iceland's most important export product. The United Kingdom, Iceland's best customer, and Germany were the only importers of this product. The new reconstruction trawlers were solely responsible for effecting such a tremendous (more than double that of 1947) increase in the catch of fish. The old trawlers will gradually be replaced by new modern diesel-powered and steam trawlers (Table 2).

Next in importance was herring oil exports which were about 50 percent greater than that of 1947. The larger part of the output was exported to the United Kingdom, Germany, and the Netherlands. The unusual 1947-48 winter herring catch was responsible for the large herring oil production. Unless the 1949 summer herring catch is extraordinarily large, the 1949 output will be considerably lower than that of 1948, because of the exceptionally poor 1948 summer and 1948-49 winter herring catches.



HERRING

Plants	Production Capacity per 16 hrs.		Storage Capacity
	No.	Metric Tons	
74	881	35,700	

Plants	Production Capacity per 24 hrs.	Storage Capacity	
		Meal	Oil
No.	Metric Tons		
23	15,443	59,250	63,000

Frozen fish fillets was Iceland's third most important fish export commodity. The production was slightly less than that of 1947. The United Kingdom, Czechoslovakia, and the Netherlands received the greater part of the export production of frozen fish. The production of frozen fish could be easily stepped up provided the export prices were increased. Unfortunately,

the Icelanders have been encountering difficulties in marketing abroad this particular type of fish.

Other important fish exports were: herring meal (last year's production was three and one-half times greater than that of 1947); cod liver oil (the production was one-third greater last year than in 1947); and salted herring exports (almost double exports of 1947).

The statistics indicate that subsidized fish export products, such as salted fish and frozen fillets were lower, particularly the former, a sign that there is less desire to produce these types of fish products which the Government must subsidize.

Outlook for Fisheries: As all fish catches (particularly herring) are highly unpredictable, it is difficult to make any long-range forecasts (Figure 1).

Table 6 - Iceland's Exports of Fishery Products and Quantity Exported to United States, 1948

Product	Total Icelandic Exports				Quantity Exported to United States			
	1948		1947		1948		1947	
	Metric Tons	Value	Metric Tons	Value	Metric Tons	Value	Metric Tons	Value
Fresh Fish:								
Herring	2,937	\$ 176,999	842	\$ 62,758	-	-	-	-
Other	125,401	13,913,483	61,312	6,569,993	-	-	-	-
Frozen Fish:								
Herring	1,097	158,356	25	5,975	-	-	-	-
Other	22,240	9,799,864	25,437	10,640,012	1,935	\$ 585,519	1,086	\$ 364,555
Salted Fish:								
Herring	11,019	3,510,348	6,603	2,038,760	1,016	378,762	540	217,624
Other, prepared	1,506	635,606	300	121,900	-	-	-	-
" , unprepared	13,309	3,721,990	26,600	7,134,377	24	5,867	5	1,745
" , pressed	173	56,004	-	-	-	-	-	-
" , in barrels	404	129,290	-	-	-	-	-	-
Fish wings	667	194,447	23	5,907	-	-	-	-
Fish Meal:								
Herring	34,118	5,453,048	11,155	1,667,780	7,000	1,051,125	420	57,453
Other	5,499	918,608	5,467	861,841	-	-	-	-
Oil:								
Herring	28,336	11,444,240	20,527	7,977,121	-	-	-	-
Cod liver	8,035	5,184,619	5,407	3,521,010	2,982	1,956,092	2,152	1,470,776
Whale	773	330,194	-	-	-	-	-	-
Canned Fish:	959	647,348	340	222,346	90	59,720	114	98,123
Miscellaneous:								
Fish, dried	6	2,088	1/	550	6	1,719	-	-
Roe, frozen	107	22,042	4	645	1	302	-	-
Roe, salted	1,000	199,697	1,621	297,712	4	1,331	2	1,241
Whale meat, frozen	864	443,433	-	-	-	-	-	-
Fish skins, salted	3	2,582	-	-	-	-	-	-
Total.....	258,653	\$56,944,286	165,663	\$41,128,687	13,058	\$4,040,437	4,319	\$2,211,517

1/ Less than a metric ton.

Plants	Production Capacity
No.	No. of Cans per Day
8	124,000-137,000

Herring catches in recent years make it appear somewhat unlikely that the goal for herring can be achieved. If the herring show up, however, there should be no production or marketing problems. Facilities for processing, in both the north and south of Iceland, are now well developed, and the market is likely to remain good.

Catches of cod and other white fish, as a result of the planned addition of new trawlers, should continue to increase. The goals set for 1952, however, may again be somewhat optimistic. Production facilities for salted, iced, and frozen fish should be adequate, but the marketing problems may be difficult to solve. A fish working party of the OEEC has estimated that there may be a surplus of demersal fish in 1952. Whether this will actually materialize depends on many intangible factors such as (a) whether Iceland and other nations will actually achieve the production goals planned in their programs, and (b) the extent to which the consumption of fish can be increased. In the case of Iceland, it is unquestionable that the country's continued ability to export large quantities of fish represents its only chance of achieving viability at anything close to its present standard of living.

NOTE: Rate of exchange used for conversion of values based on 1 kronur equals .154 cents U.S.

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STATEMENT ON INTERNATIONAL NORTHWEST ATLANTIC FISHERIES CONVENTION: In a news release giving information about Iceland's participation in the Northwest Atlantic Fisheries Conference held at Washington, D. C., January 26 to February 8, 1949, the Icelandic Foreign Office stated that Iceland's action in signing the Convention agreed to at the Conference is not incompatible with the execution of the Icelandic laws governing protection of the coastal shelf inasmuch as the convention "has differentiated between the limits of territorial waters and the jurisdiction of a coastal state over fisheries, even though these fisheries are outside territorial waters," according to a March 2 report from the American Legation at Reykjavik.

The release continues: "In many respects the agreement coincides with the agreement concerning the size of meshes, etc., signed in London on April 5, 1946, which is to be in force for the area east of 42nd degree of Western longitude." However, Iceland has not found it possible to sanction the London Agreement because it has not been possible to get a decision as to whether participation in the Agreement is compatible to the execution of Act No. 44 of April 5, 1948, concerning the protection of fishing grounds on the coastal shelf. It was thought possible that such participation by the Icelanders might be interpreted as an admission on their part that no unilateral protective measures could be effected outside the virtual territorial waters.

With reference to the latest Convention, the press release further states: "This is the first time that an international agreement has differentiated between the limits of territorial waters and the jurisdiction of a coastal state over fisheries, even though these fisheries are outside territorial waters. Participation in this agreement cannot, therefore, be considered incompatible with the execution of the Icelandic laws on the protection of the coastal shelf, although such execution naturally has not been granted the approval of the contracting Governments."

India

FISHERIES REVIEW: The fisheries of India, potentially rich, have not as yet been fully exploited. Fishing and fish trade have historically been relegated to a class of people socially inferior and lacking both finance and education to improve the industry. Nevertheless, considerable progress has been made in recent years as a result of the zeal and initiative of the provincial fisheries departments, according to the report, "Marketing Areas in India," issued by the Office of International Trade, Department of Commerce, in December 1948.

The Provinces of Bengal (East and West) and Orissa in the Calcutta marketing area have extensive supplies of fish. In Bengal, about 2 percent of the population are engaged in fishing and its connected trades. Fresh-water and estuarine fishing are the most important in this region, sea fishing having been little exploited. The most important inland commercial fish is the hilsa (Hilsa ilisha). Other river and tank fishes are the rohu (Labeo rohita), the katla, and mrigal (Cirrhina mrigala). Large supplies of bhekti (Lates calcarifer) are available from the estuaries along the Sunderbans. Foreign trade in fish from this area is unimportant. With the exception of some dried fish (salted or unsalted) exported to Ceylon, there is little shipment to other countries.

The food situation in South India has necessitated exploitation of the available fisheries. Methods used, however, are not modern and there is much waste. Coastal waters provide a potential source of food fish and Government authorities are planning the development of an organized, modern industry.

Bombay Province and the Indian States of Gujerat and Kathiawar in the Bombay marketing area have been favored with a long coast line which abounds with suitable bases for the fishing craft. Deep-sea fishing continues throughout the year except during the months of June, July, and August when the southwest monsoon is severe. Over 100,000 metric tons of fish are reportedly caught every year by fishermen of the Bombay Province. To provide quick transportation of the fish to consuming centers, the Bombay Government has a fleet of 17 motor launches. A total of 3,000,000 pounds of fresh fish was brought by these launches to Bombay during the year ended March 31, 1946. Mackerel, catfish, pomfrets, Indian salmon, tuna, and sardines are some of the important kinds caught in the Arabian Sea. Since demand for fresh fish has been constantly outstripping supply, fish canning has not been attempted. The success of the Government's venture has stimulated the flow of private capital into the fishing industry. At least two large companies have been formed to exploit deep-sea fishing in the Arabian Sea with modern appliances and methods.

Although it was known that oil of high potency could be extracted from sharks inhabiting coastal waters, production of shark liver oil on a commercial scale was not attempted until the war, when supplies of cod liver oil from Norway were cut off. The Bombay Fisheries Department devised a simple process for the extraction of the oil which could be used with ease by the uneducated fishermen. Considerable progress has been made in the past few years. Refining of the oil is done in Bombay under the supervision of the Fisheries Department. Current output is reported to be 4,800 gallons with an average potency of 15,000 international units per gram. Plans are under way for stepping up production and development of the export trade. Similar facilities for the manufacture of shark liver oil also exist in Baroda State.



Japan

DECLINE IN SARDINE FISHERY: The catch of sardines in 1947 and 1948 was considerably below the prewar average for 1933-37. The catch for 1947 and 1948 was reported at 390,000 and 317,000 metric tons, respectively, as compared to the annual average of 1,442,000 metric tons for 1933-37. This period includes the years of peak production in the Japanese sardine fishery, according to the February 19 Weekly Summary of the Natural Resources Section of SCAP.

The area from Aomori to Chiba prefectures for 1933-37 accounted for about 40 percent of the total sardine production for Japan, compared to 27 percent in 1947 and 9 percent in 1948.

Sardine fishermen are facing financial difficulties at present, as are many other fishermen in Japan. The exact amount of financial help needed for sardine fishermen has not been determined, but it is expected to be a considerable part of the ¥142,000,000 (approximately \$525,925) recently authorized for four types of fisheries, including the sardine fishery.

Japanese aquatic research workers have advanced various theories as to the cause of the decline in the sardine fishery, based principally on factors affecting water temperatures and changes in migration and availability, but the real cause or causes have not yet been determined.



Libya (Tripolitania and Cyrenaica)

FISHERIES, 1948: Tuna: The six tuna fishing and canning companies operating in Libya caught approximately 1,000 metric tons of fish in 1948, of which approximately 500 tons were canned or otherwise processed, according to a March 8 report from the American Consulate at Tripoli, Tripolitania. This figure was approximately 10 percent higher than the 1939 catch and 30 percent higher than in 1947, previously the highest production year since the occupation.

Sardine: The six sardine fishing and canning companies also had a good year in 1948. Over 340 metric tons of sardines were canned, of which a large part was exported.

Sponges: The production of sponges was 32 metric tons in 1948, of which 12 tons were harvested by Greek fishermen and 20 tons by Tripolitans. The 20 metric tons harvested by Tripolitans was valued at approximately \$270,000; Greek sponge fishermen pay the Administration certain fees but land and sell their catch in Greece.

Figures furnished by the Administration evaluate the prewar production (1935-38) at an average of about 35 metric tons annually. However, local sources state that average production for the prewar period was more in the neighborhood of 75 to 100 tons taken by both Greeks and Tripolitans. Practically none of the sponges harvested in Tripolitanian waters remain in the country.



Norway

EXPANSION OF TRAWLER FLEET: A special Norwegian Government committee on nationalization of the fisheries proposes legislation to permit the construction and operation of a modern trawling fleet, according to a February 21 report from the American Embassy at Oslo. In contrast to neighboring countries, Norway now has only eight trawlers. However, the proposed legislation would not sanction trawling in Norwegian waters.



Republic of Panama

DECREE CONCERNING BAIT FISHING WITHIN PANAMANIAN WATERS: The Government of Panama, by Decree No. 6 of January 13, 1949, amends previous Decrees on bait fishing, namely, Decree No. 408 of April 27, 1946, and Decree No. 564 of August 3, 1948, according to a January 17 report from the American Embassy at Panama, R. P.

DECREE NUMBER 6 (of January 13, 1949)

by which Decrees, Numbers 408 of April 27, 1946, and 564 of August 3, 1948, are amended.

The President of the Republic
in the exercise of his legal powers, and in compliance
with the authority granted him by Article 244 of the
Fiscal Code, and with the approval of the Cabinet Council,

D E C R E E S:

Article 1. Article 2 of Decree No. 408 of April 27, 1946, is amended to read as follows: The owners or captains of vessels fishing for bait (sardines) must apply and obtain a license at the Ministry of Agriculture, Commerce and Industries, and a Navigation License at the Ministry of Treasury and Finance.

Article 2. Fishing by the method known as "Purse-Seine" or any other method prejudicial to fisheries in general, is prohibited.

Article 3. The Sole Article of Decree No. 564 of August 3, 1948, is amended to read as follows: Fishing for bait (sardines) is permitted only in the waters to the South of eight degrees thirty minutes (8° 30') North Latitude.

Article 4. Article 7 of Decree No. 408 of April 27, 1946, is hereby canceled.

Article 5. This Decree becomes effective on the day of its approval.

BE IT COMMUNICATED AND PUBLISHED,

Given in the city of Panama, on the thirteenth day of the month of January of one thousand nine hundred and forty-nine (1949)

(Signed) DOMINGO DIAZ A.,

The Minister of Agriculture, Commerce and Industries

(Signed) G.MO. MENDEZ P.

United Kingdom

NEW ARCTIC RESEARCH VESSEL: The British fisheries research vessel, the Ernest Holt, of Grimsby, sailed on her maiden voyage to the White Sea grounds early this year with a complement of 32 men, according to a news release received from England by the British Commonwealth Scientific Office. The new ship's program of investigation includes the use of echo-sounders in fishing operations, investigation of the factors which govern the movement of cod, relationship of temperature to fish population, taking a census of fish in the Arctic, and the research in the connection between the supply of fish foods and the fishery.



GENERAL VIEW OF THE ERNEST HOLT

The British Ministry of Agriculture and Fisheries intends to carry out fishery research in the Arctic. There is fishing at all seasons of the year, and many of the fishing grounds lie far within the Arctic Circle. Although these areas, such as the Barents Sea, are made workable by the Atlantic water that extends so far north, they are for half the year nearly completely dark, and their northern border is the Polar icefield. Some of the best fishing areas lie in the North Atlantic storm track.

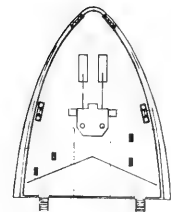
The task of Fishery Research in this region is to find out, with the use of the Ernest Holt, the necessary facts on which advice could be given to improve or maintain this fishery. The quantity of fish landed in Great Britain should, if possible, be increased, and the quality improved. Both these requirements might be met from better knowledge of the cod's habits and movements.

For research in these regions, the Ministry decided to rely on the type of vessel that has proved successful in fishing the area. The Ernest Holt is a well-tried commercial trawler type of modern design, suitably modified for research, but intended to be equivalent to a commercial vessel in catching power per hour's fishing.

The principal modifications compared with a standard Arctic trawler are two. Bunker oil is carried in flat tanks under the floors of normal bunker space and

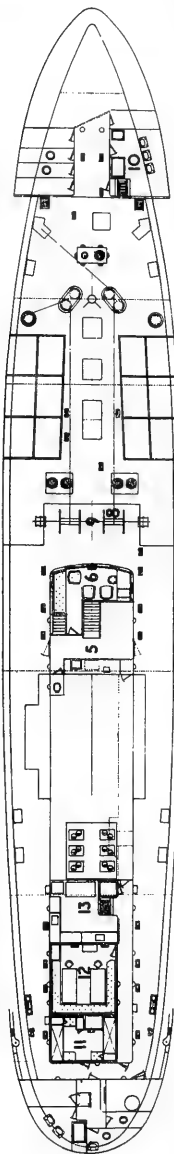
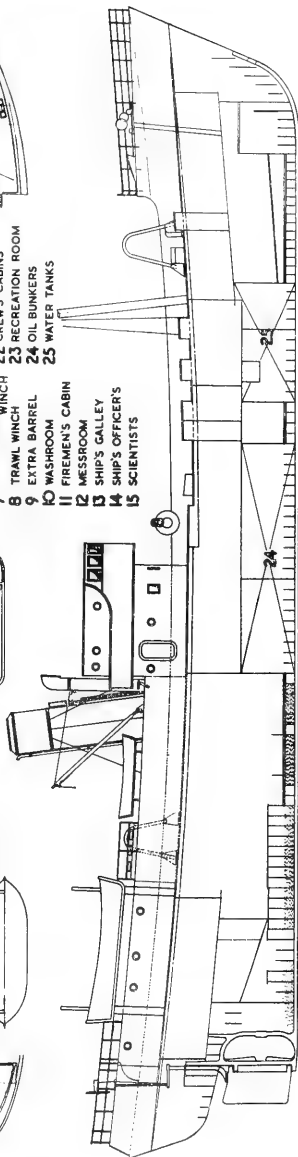
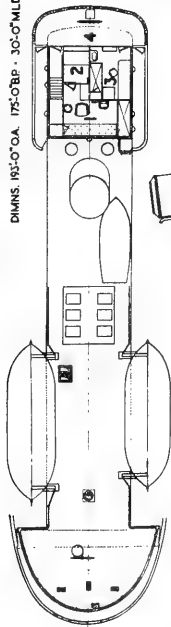
ARCTIC RESEARCH VESSEL 'ERNEST HOLT'

DIMENS. 193'-0" OA. 175'-0" BP. - 300'-0" MLD. - 16'-0" MLD.

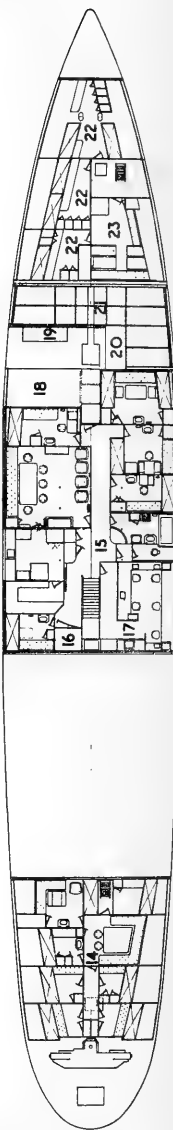


- 16 MASTER CYRO
- 17 MAIN LABORATORY
- 18 REFRIG. MACHINERY
- 19 QUICK FREEZER
- 20 LOW TEMP. STORE
- 21 FISHROOM
- 22 CREW'S CABINS
- 23 RECREATION ROOM
- 24 OIL BUNKERS
- 25 WATER TANKS

- 1 MASTERS CABIN
- 2 CHART ROOM
- 3 WIRELESS ROOM
- 4 WHEELHOUSE
- 5 DECK LABORATORY
- 6 STUDY
- 7 HYDROGRAPHIC W/CH
- 8 TRAWL W/CH
- 9 EXTRA BARREL
- 10 WASHROOM
- 11 FIREMEN'S CABIN
- 12 MESSROOM
- 13 SHIP'S GALLEY
- 14 SHIP'S OFFICER'S
- 15 SCIENTISTS



SCALE 0 5 10 15 20 25 FEET



"fishroom" space, to provide a main laboratory below decks for oceanographical and for biological work and to provide accommodations. The space occupied by the skipper's berth has been increased to allow a small deck laboratory and shelter for silk nets against freezing, for a small lounge, and for access to the quarters below, the Master being accommodated on the enlarged bridge above. The scientific winches are two, namely, extra drums on the main fishing winch for the heavier gear, and a light winch in a sheltered position on the casing abaft the bridge for lighter apparatus.

There has been a certain amount of strengthening for ice in the form of thickened plates at bow and stern and along the waterline. Apart from this and other minor changes, the construction conforms to standard trawler practice.

Dimensions of <u>Ernest Holt</u>	
Length over-all	193'0"
Length between perpendiculars ...	175'0"
Beam moulded	30'0"
Depth moulded	16'0"

In general appearance, she differs only a little from a commercial trawler. The amidships deckhouse and bridge superstructure are approximately 3' 6" longer fore and aft than in the normal trawler so as to provide space for a deck laboratory and biologist's study on the main deck. Above are the Master's cabin, the wireless room and small chartroom, all of which are abaft the wheelhouse. There is no mizzen mast, though this is absent too in several trawlers recently completed.

The main engines and boiler are of the triple expansion type developing 900 i. hp. Saturated steam is used as the running of the vessel involves many halts for scientific observations, but wherever possible, provision has been made



A CORNER OF MAIN LABORATORY ABOARD THE ERNEST HOLT

for a change to superheated steam should it be ultimately found desirable. The propeller is of "Scimitar" type.

Because of the space taken up by the laboratory and scientists' accommodation, the "fishroom" and experimental machinery space has been reduced to a total capacity of approximately 1,500 cubic feet.

This part of the ship is divided into three sections, (a) the insulated "fishroom" which has chilling grids on a brine circulation calculated to maintain a temperature of 0° C., (b) a pilot scale air-blast/contact quick-freezing plant of 5 cwt. total capacity and a low temperature store working at -10° C., (c) the machinery space which contains all compressors, circulators, etc., grouped for ease of maintenance and supervision.

The deck laboratory, which opens onto the deck abaft the winch, is used for the reception of all samples collected by a variety of nets and gear. It is an "L" shaped space, with a teak topped bench occupying the after bulkhead. A flap top is fitted at either end of the bench, in order to allow access to and from the storm passage. It is fully equipped for fishery research work.

* * * * *

PLAN FOR REORGANIZATION AND DEVELOPMENT OF FISHING INDUSTRY: The Fisheries Group of Great Britain's Parliamentary Labour Party urges that "the Government pursue a policy calculated ultimately to bring the deep-sea section of the industry to a position where it will be ripe for being wholly taken over by the State and organized as a food-producing social service," according to the March 5 British periodical, Fish Trades Gazette.

The main provisions of the plan the group advocates calls for "systematic planning" of processing, canning, marketing, and distribution; State ownership of deep-water trawlers; guaranteed prices at all stages; complete elimination of inland wholesaler and the small wholesaler at the ports; and sixteen of the larger fishing ports to be Government selling places for disposal of all fish in all forms of processing.

For the inshore fishermen, cooperatives for fishermen are recommended who "might be encouraged to engage in retailing fish under special licenses issued for the exclusive sale of inshore fish."

* * * * *

RESTRICTIONS ON U. S. AND CANADIAN CANNED FISH CONTINUED: The British Ministry of Food has been concerned about the complete absence of, or the great reduction in, supplies of canned fish, according to a December 10 report from the American Embassy at London.

Canned tunny from Turkey will soon be another British substitute canned fish product to replace higher-grade salmon, pilchards, and sardines. The Ministry has made the first, and quite appreciable, purchase of canned tunny to be packed in Turkey. It is expected to be six months before the product is on sale in British grocery stores.

Contrary to many expectations, canned snoek has proved acceptable to the British public, which bought all of it. The Ministry has sent a representative to South Africa to negotiate for the purchase, not only of snoek, but of many

other foods. A total of 225,000 cases of snoek, each containing 48 $\frac{1}{2}$ -pound cans, had been purchased up to December 10, and grocers were asking for more, according to the Ministry.

An appreciable quantity of sardines from Yugoslavia to supplement Portuguese and American sardines have been purchased by the Ministry.

The Ministry stated that there appeared to be little hope of obtaining American or Canadian dollars. The United Kingdom is having difficulty in paying for absolutely essential foodstuffs, such as wheat, bacon, and some eggs, and canned fish could not be said to rank with those priorities.



International

WORLD PRODUCTION OF MARINE

Commodity	Total in oil or fat equivalent			
	Average 1935-39	1946	1947	1948
		1,000 short tons		
Whale oil.....	585	159	377	397
Fish oil.....	315	160	212	209
Total marine oils	900	319	589	606

OILS, 1948: Production of marine oils has increased slightly, due primarily to an increase in the whale oil output of 1948, according to the February 21 issue of Foreign Crops and Markets issued by the Office of Foreign Agricultural Relations, U. S. Department of Agri-

culture. The number of whales taken is still limited by international agreement, and except for the catch by a limited number of land stations, production of whale oil during the next few years is unlikely to exceed that of 1948 or 1949. The fishing industry has not yet recovered to the point where fish oil production is equal to prewar.

Commodity	Total in oil or fat equivalent			
	Average 1935-39	1947	Estimate 1948	Forecast 1949
		1,000 short tons		
Whale oil	584	283	323	440
Fish oil	150	67	92	90
Total marine oils	734	350	415	530



Interstate Commerce Commission

TRANSPORTATION OF SHRIMP BY QUALIFIED UNLICENSED TRUCKS: The Chairman of the Interstate Commerce Commission, in reply to an inquiry from the Associate Solicitor of the Department of Agriculture concerning the decision in the Chester Morton Love Case, 77 F. Supp. 63, stated on March 14:

"The Commission has concluded that it will not seek review of this decision and will attempt to follow it nation-wide, so far as concerns the transportation of shrimp."

As a result of this action, shrimp may now be transported by motor vehicles not licensed by the Interstate Commerce Commission if such motor vehicles are not used for carrying for compensation any passengers or property other than exempt property as defined in Section 203 (b) (6) of the Motor Carriers Act and subsequent decision of the Interstate Commerce Commission.



Eighty-first Congress

MARCH 1949

PUBLIC BILLS AND JOINT RESOLUTIONS INTRODUCED AND REFERRED TO COMMITTEES: Listed below are all the public bills and joint resolutions introduced and referred to committees by the Eighty-First Congress during March 1949 which affect in any way the fisheries and fishing and allied industries. The bills are listed in the order in which they were introduced:

House of Representatives:

- H. R. 3190 (Lesinski) - A bill to provide for the amendment of the Fair Labor Standards Act of 1938, and for other purposes; to the Committee on Education and Labor.
- H. R. 3206 (Phillips of Calif.) - A bill to confirm and establish the titles of the State to lands beneath navigable waters within State boundaries and natural resources within such lands and waters and to provide for the use and control of said lands and resources; to the Committee on the Judiciary.
- H. R. 3243 (Holifield) - A bill to confirm and establish the titles of the States to lands beneath navigable waters within State boundaries and natural resources within such lands and waters and to provide for the use and control of said lands and resources; to the Committee on the Judiciary.
- H. R. 3387 (Anderson of Calif.) - Same as H. R. 3243; to the Committee on the Judiciary.
- H. R. 3389 (Hinshaw) - Same as H. R. 3243; to the Committee on the Judiciary.
- H. R. 3390 (Johnson) - Same as H. R. 3243; to the Committee on the Judiciary.
- H. R. 3398 (Sheppard) - Same as H. R. 3243; to the Committee on the Judiciary.
- H. R. 3415 (Allen of Calif.) - Same as H. R. 3206; to the Committee on the Judiciary.

- H. R. 3421 (Jackson of Wash.) - A bill to grant to fishermen's cooperatives the same exemption from income tax as is allowed to farmers' cooperatives; to the Committee on Ways and Means.
- H. R. 3442 (Jackson of Calif.) - Same as H. R. 3206; to the Committee on the Judiciary.
- H. R. 3484 (Scudder) - Same as H. R. 3206; to the Committee on the Judiciary.
- H. R. 3591 (Werdel) - Same as H. R. 3206; to the Committee on the Judiciary.
- H. R. 3605 (Rogers of Fla.) - A bill to provide for the documentation of the Canadian-built vessel North Wind owned by a citizen of the United States in order that it may be operated as a commercial fishing vessel; to the Committee on Merchant Marine and Fisheries.
- H. R. 3636 (Horan) - A bill to establish a Columbia Interstate Commission, and for other purposes; to the Committee on Public Works.
- H. R. 3655 (Poulson) - Same as H. R. 3206; to the Committee on the Judiciary.
- H. R. 3779 (Engle) - Same as H. R. 3206; to the Committee on the Judiciary.
- H. R. 3838 (Report No. 324) (Kirwan, from the Committee on Appropriations) - A bill making appropriations for the Department of the Interior for the fiscal year ending June 30, 1950, and for other purposes; to the Committee of the Whole House on the State of the Union.
- H. Res. 147 (Thompson) - Resolved, That the Secretary of State be, and he hereby is, requested to cause an immediate study to be made of the effect on the domestic fishing industry of increasing imports of fresh-water and salt-water fresh and frozen fish, especially groundfish, fillets, into the United States; and, with the advice of and in coordination with appropriate executive departments and independent agencies of the Government to recommend the means by which the United States fishing industry may survive and be saved harmless against the inroads of foreign-caught and foreign-processed fish; and that, because of the urgency of the situation, he be requested to make his report and recommendation to the House of Representatives not later than May 15, 1949; to the Committee on Merchant Marine and Fisheries.
- H. Res. 155 (Eates of Mass.) - Resolution to investigate costs of production on domestic and foreign fresh and frozen groundfish fillets; to the Committee on Ways and Means.
- H. Res. 174 (Weichel) - Resolution requesting the Secretary of State, the Secretary of Commerce, and the Tariff Commission to investigate the domestic fishing industry; to the Committee on Merchant Marine and Fisheries.
- H. J. Res. 202 (Potter) - Joint resolution to amend the act of August 8, 1946, relating to investigation and eradication of predatory sea lampreys of the Great Lakes, and for other purposes; to the Committee on Merchant Marine and Fisheries.

Senate:

- S. Res. 88 (Tydings) - Resolved, That the Senate Committee on Armed Services, or any duly authorized sub-committee thereof, is authorized and directed to conduct a full and complete study and investigation to determine what legislation may be appropriate to define and delimit the territorial waters of the United States, which definition shall (a) be consistent with the sovereignty of the several States and the international rights and obligations of the United States (b) give due regard to the requirements of the national defense, of commerce, and of the conservation, development, and utilization

of the resources of the marginal seas, and (c) observe the constitutional rights of the several States in their relationship to the national economy and the national defense. The committee shall report its findings, together with its recommendations for such legislation as it may deem advisable, to the Senate at the earliest practicable date.

Sec. 2. For the purposes of this resolution, the committee, or any duly authorized sub-committee thereof, is authorized to employ upon a temporary basis such technical, clerical, and other assistants as it deems advisable. The expenses of the committee under this resolution, which shall not exceed \$35,000, shall be paid from the contingent fund of the Senate upon vouchers approved by the Chairman of the committee; to the Committee on Armed Services.

S. Res. 92 (Brewster) - Resolved, That the Secretary of the Interior be, and he hereby is, requested to cause an immediate study to be made of--(1) the differences in the costs of domestic production of fresh and frozen fish, especially groundfish fillets, and the costs of foreign production of similar fish; and (2) the effect on the domestic fishing industry of increasing imports of fresh and frozen fish, especially groundfish fillets, into the United States, and with the advice of, and in coordination with, the Department of State, the Department of Agriculture, the United States Tariff Commission, the Bureau of Customs of the Department of the Treasury, and other appropriate executive departments and independent agencies of the Government to recommend means by which the United States fishing industry may survive and be saved harmless against the inroads of foreign-caught and foreign-processed fish; and that, because of the urgency of the situation, he be and hereby is requested to make his report and recommendation to the Senate within 30 days after the adoption of this resolution; to the Committee on Interstate and Foreign Commerce.

MEMORIALS PRESENTED AND REFERRED:

House of Representatives:

Memorial of the Legislature of the Territory of Alaska, urging legislation to require the canned-salmon industry to employ certain percentages of resident fishermen over a period of years; to the Committee on Public Lands.

TREATY PRESENTED:

Senate:

Treaty Between U. S. and Mexico for Establishment of an International Commission for the Investigation of Tuna (Exec. K), was received and referred to Committee on Foreign Relations.

BILLS, RESOLUTIONS, ETC. PASSED, AND OTHER ACTION:

House of Representatives:

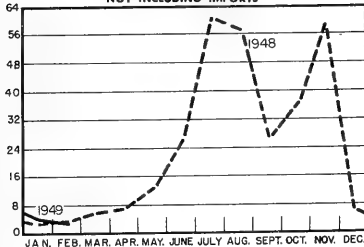
H. Res. 124, Adopted, Commercial Fishing: Making in order the consideration of H. R. 2363, a bill granting the consent and approval of Congress to an interstate compact relating to the better utilization of the fisheries of the Gulf coast and creating the Gulf States Marine Fisheries Commission. Then, by unanimous consent, the House proceeded to consider an identical Senate measure (S. J. Res. 42) which was passed with a perfecting amendment. H. R. 2363 was tabled.



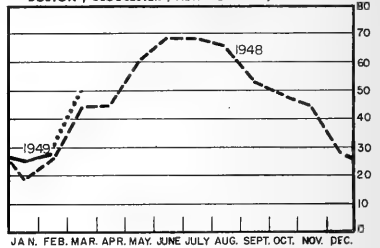
LANDINGS AND RECEIPTS

In Millions of Pounds

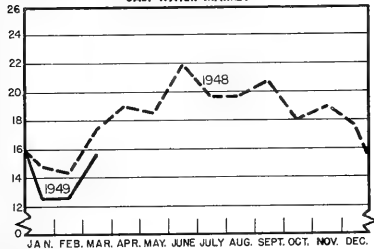
MAINE - LANDINGS
NOT INCLUDING IMPORTS



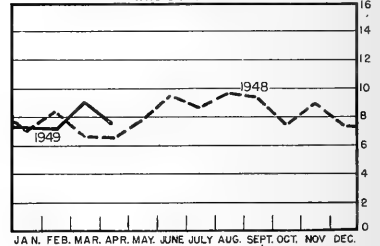
MASSACHUSETTS - LANDINGS
BOSTON, GLOUCESTER, NEW BEDFORD, & CAPE COD



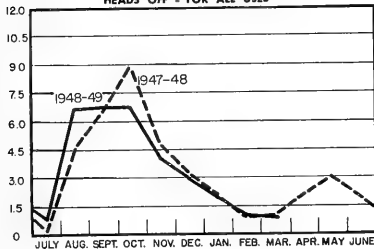
NEW YORK CITY - RECEIPTS OF FRESH & FROZEN FISH
SALT-WATER MARKET



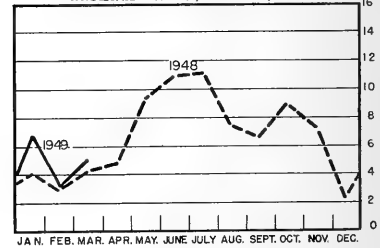
CHICAGO - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKET



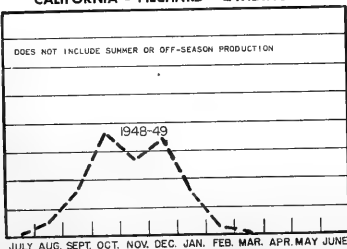
GULF - SHRIMP LANDINGS
HEADS OFF - FOR ALL USES



SEATTLE - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKET, LANDINGS, & IMPORTS

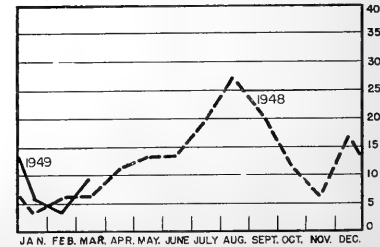


CALIFORNIA - PILCHARD LANDINGS



In Thousands of Tons

CALIFORNIA - TUNA AND TUNA-LIKE FISH

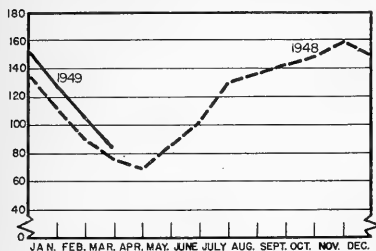


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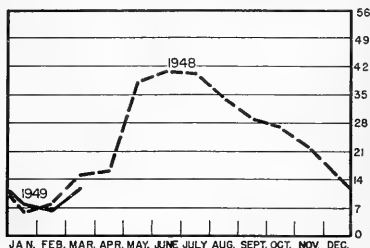
COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

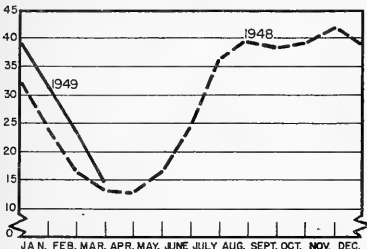
U.S. & ALASKA - HOLDINGS OF FROZEN FISH



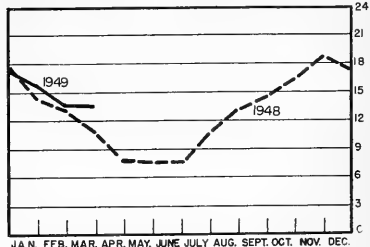
U.S. & ALASKA - FREEZINGS



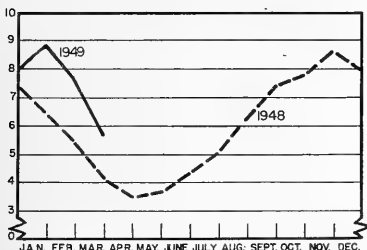
NEW ENGLAND - HOLDINGS OF FROZEN FISH



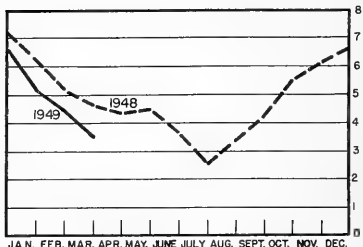
NEW YORK CITY - HOLDINGS OF FROZEN FISH



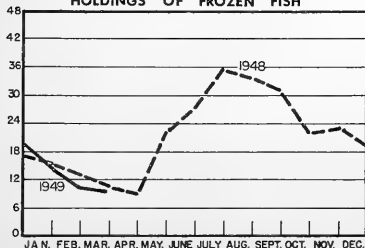
CHICAGO - HOLDINGS OF FROZEN FISH



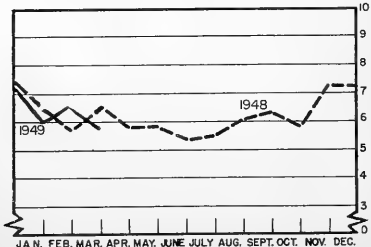
GULF - HOLDINGS OF FROZEN FISH



WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH



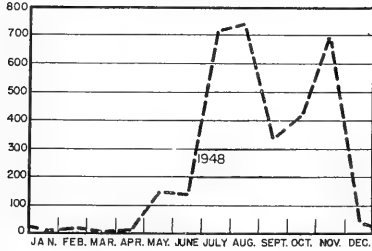
CALIFORNIA - HOLDINGS OF FROZEN FISH



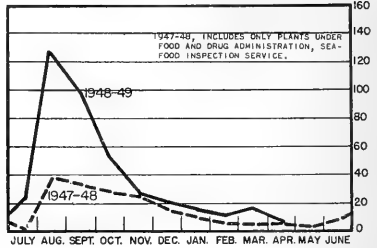
CANNED FISHERY PRODUCTS

In Thousands of Standard Cases

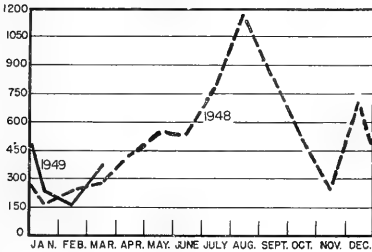
MAINE - SARDINES, ESTIMATED PACK



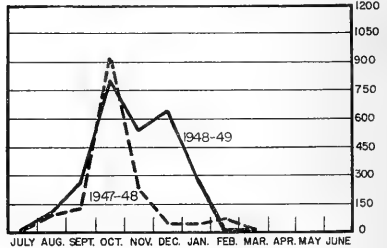
UNITED STATES - SHRIMP



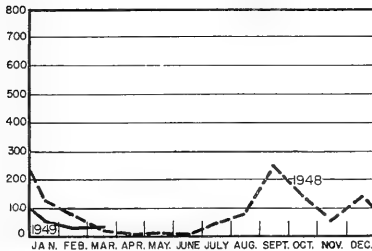
CALIFORNIA - TUNA



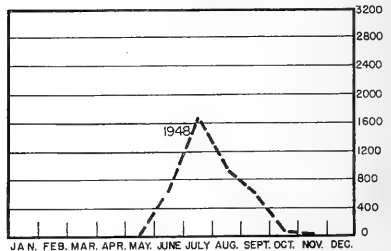
CALIFORNIA - PILCHARDS



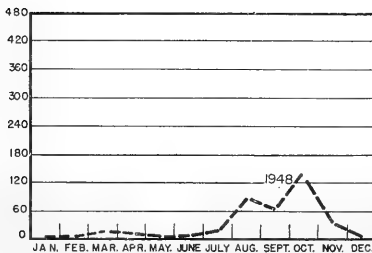
CALIFORNIA - MACKEREL



ALASKA - SALMON



WASHINGTON - PUGET SOUND SALMON

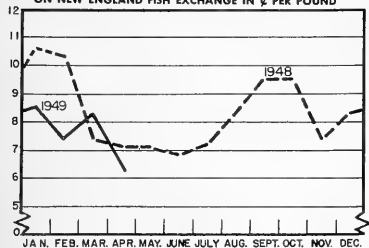


STANDARD CASES

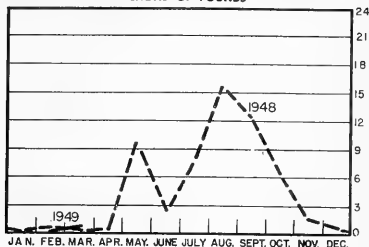
Variety	No. Cans	Can Designation	Net. Wgt.
SARDINES	100	1/4 drawn	3 1/4 oz.
SHRIMP	48	No. 1 picnic	7 oz.
TUNA	48	No. 1/2 tuna	7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
MACKEREL	48	No. 300	15 oz.
SALMON	48	1-pound tall	16 oz.

PRICES, IMPORTS and BY-PRODUCTS

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

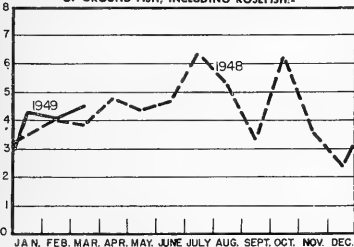


**MAINE - IMPORTS OF FRESH SEA HERRING
IN MILLIONS OF POUNDS**

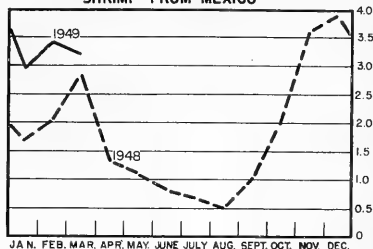


**U.S. - IMPORTS OF FRESH & FROZEN FILLETS
OF GROUND FISH, INCLUDING ROSEFISH...**

In Millions of Pounds

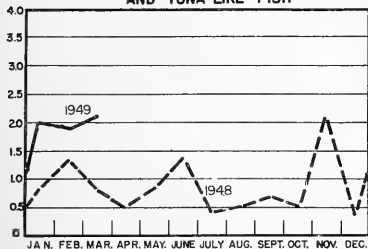


**U.S. - IMPORTS OF FRESH AND FROZEN
SHRIMP FROM MEXICO**

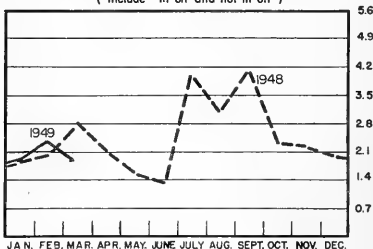


**U.S. - IMPORTS OF CANNED TUNA
AND TUNA-LIKE FISH**

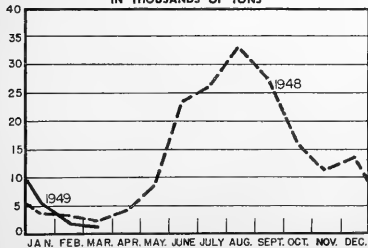
IN MILLIONS OF POUNDS



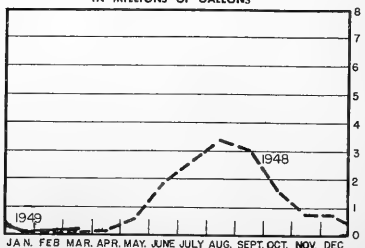
**U.S. - IMPORTS OF CANNED SARDINES
(Include in oil and not in oil)**

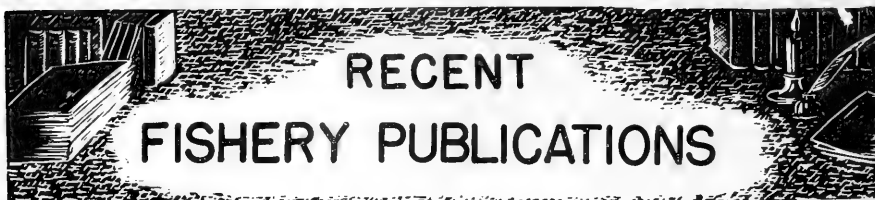


**U.S. & ALASKA - PRODUCTION OF FISH MEAL
IN THOUSANDS OF TONS**



**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.
 MDL - MARKET DEVELOPMENT SECTION LISTS OF DEALERS, LOCKER PLANTS, ASSOCIATIONS, ETC.
 SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
 SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-447	- Massachusetts Landings, August 1948
CFS-448	- Maine Landings, October 1948
CFS-449	- Fish Meal and Oil, December 1948
CFS-452	- Massachusetts Landings, September 1948
CFS-453	- Frozen Fish Report, February 1949
CFS-455	- Fish Meal and Oil, January 1949
CFS-456	- Maine Landings, December 1948
CFS-459	- Frozen Fish Report, March 1949
FL-325	- The Nutrition of Fish in Hatcheries--A Literature Review
FL-326	- SS Pacific Explorer, Part IV--Personnel and the Movement of Materials
FL-327	- The Fishing Industry and the Market for Fish in Sweden
FL-328	- Fishing Industry of the Gulf of Aden (Arabia)
FL-329	- Fishing Industry in Brazil
FL-333	- Aquatic Resources of the Ryukyu Area
FL-334	- The Effect of a Seafood Diet on the Red Cell Count, Hemoglobin Value, and Hematocrit of Human Blood
SL-106 (Revised)	- Firms Canning Shad or Shad Roe, 1947
SL-108 (Revised)	- Firms Canning Salmon Eggs for Bait, 1947
SL-118 (Revised)	- Firms Canning Groundfish Flakes, 1947
SL-119 (Revised)	- Firms Canning Squid, 1947
SL-156 (Revised)	- Firms Manufacturing Pearl Essence, 1947

Sep. 225 - Fishery Exploration in the Western Pacific
 Sep. 226 - E Value Ratios for Some Commercial Vitamin A Oils

A Bibliography of Lobster Culture, by L. W. Scattergood, Special Scientific Report 64, 26 p., processed, January 1949. Limited distribution and for the official use of Federal, State, or cooperating agencies. In view of the interest shown in the artificial propagation of the lobsters (*Homarus vulgaris* and *Homarus americanus*), the author has assembled in this publication references pertaining to this activity and also the early life history of the genus. Reports issued by State and Federal Governments are included in this bibliography. Translations have been made of all references in foreign languages mentioned and they will be available in the future to those interested.

Conditions Affecting Shellfish Production in Lynnhaven Bay, Virginia, and the Possibilities of Improving Them by Increasing Tidal Flow, by W. A. Chipman, Jr., Special Scientific Report No. 61, 20 p., maps and graphs, processed, December 1948. Limited distribution and for the official use of Federal, State, or cooperating agencies. The purpose of the survey reported upon in this publication was to estimate the

shellfish production in Lynnhaven Bay and to consider what effect increased tidal flows produced by the suggested improvements would have on it. Besides a description and a discussion of the shellfish production, pollution, and suggested improvements of the area, the report gives the survey observations on water conditions, tide and tidal flow, exchange of water by tidal action, character and distribution of the oyster-growing bottoms, and a set of conclusions.

Growth of Oysters During Different Months of the Year, Bulletin No. 2, Vol. 13, February 15, 1949, 3 p., mimeographed, free. Available upon request from Fishery Biological Laboratory, Fish and Wildlife Service, Milford, Conn. Gives some additional observations on the growth of oysters in addition to those reported in Bulletin No. 1 of April 1947. The observations were made on individually marked adult oysters kept in Milford Harbor. On the basis of frequent comparisons, however, the report states that it is believed that they also reflect the general trend of the monthly growth of oysters in Long Island Sound proper. Included is a table showing percent of increase in length, width, and volume of oysters during each month of the year.

Investigations of the Oyster Reefs of Mississippi, Louisiana, Alabama Following the Hurricane of September 19, 1947, by James B. Engle, Special Scientific Report No. 59, 71 p., processed, November 1948. Limited distribution and for the official use of Federal, State, or cooperating agencies. This publication reports on the surveys and investigations which were carried out to determine the extent of the damage to the shellfish and the shellfish bottoms of Mississippi, Louisiana, and Alabama by the hurricane of September 19, 1947. The report is divided into three parts: Part I deals with the damage to the oyster reefs in the State of Mississippi caused by the hurricane; Part II is a report of the investigation of the oyster reefs of the State of Louisiana following the hurricane; and Part III is a report of the investigation of the oyster reefs of the State of Alabama following the hurricane. Each part concludes with a set of recommendations for the early rehabilitation of the reefs.

A Survey of the Columbia River and its Tributaries with Special Reference to the Management of its Fishery Resources (2. Washington streams from the mouth of the Columbia River to and including the Klickitat River - Area I), by F. G. Bryant, Special Scientific Report No. 62, 110 p., illus., processed, January 1949. Limited distribution and for the official use of Federal, State, or cooperating agencies. This publication covers Area I of the Columbia River watershed, which for the purpose of the Columbia River Stream Survey has been divided into several survey areas. The survey has been conducted to provide data for the evaluation of each stream, or portion of stream, from the standpoint of its present and potential value in relation to the maintenance of the salmon resources of the Columbia River. Area I covered by this report includes all tributaries entering the Columbia River on the north, or Washington side, in the 180 miles from the mouth to and including the Klickitat River. The Cowlitz system is treated as a separate sub-area in Part 2 of this report. Besides a map of the stream-survey areas and an introduction, each of the two parts of the report consists of a map of the area surveyed, a list of streams, a discussion of the survey, a description of streams, and a table giving the obstructions and diversions.

ARTICLES BY FISH AND WILDLIFE SERVICE AUTHORS IN OTHER PUBLICATIONS

"The Turbulent Oyster Trade, Part II: In the Twentieth Century," by James Wharton, The Commonwealth, March 1949, Vol. XVI, No. 3, pp. 13-15, 34-35, illus. Virginia State Chamber of Commerce, Richmond, Va., 15 cents per issue. In this article, which is part of a series dealing with Virginia's seafood resources, the author reviews the ramifications of the oyster industry in this State in the twentieth century. The first part of this article dealing with the oyster industry in the nineteenth century appeared in the November 1948 issue of the magazine.

MISCELLANEOUS PUBLICATIONS

THE FOLLOWING PUBLICATIONS MAY BE OBTAINED, IN MOST INSTANCES, FROM THE AGENCIES ISSUING THEM.

Annual Report of the Secretary of the Interior, Fiscal Year Ended June 30, 1948, 427 p., printed, indexed. U. S. Department of the Interior, Washington, D. C. For sale by the Superintendent of Documents, Washington, D. C., \$1.00. Part I of this report deals with some of the more critical problems in the field of this Nation's natural resources, and concludes with recommendations for action. Fish is listed among one of the critical fields and the Secretary states: "...that our fishery resources are renewable, if properly used. If overused, however, they can be destroyed, just as surely as our soil resources can be destroyed in the same way." Part II contains the annual reports of the Bureaus and Offices of the Department. It includes, among others, the annual report of the Director of the Fish and Wildlife Service to the Secretary. This latter report gives information on the Service's activities during the year in marine fishery research; the conservation of Alaska fisheries; salmon conservation in the United States; utilization of fishery resources (covers mostly the commercial fisheries activities of the Service); maintaining the inland fisheries; cooperation with American Republics; rehabilitation of the Philippine fisheries; proposed international treaties; polar expeditions; whaling; wildlife; etc.

The Art of Fish Cookery, by Milo Miloradovich, 473 p., printed, indexed. Doubleday & Co., Inc., Garden City, N. Y., 1949, \$3.50. The first chapter of this book gives many strange facts about the use of fish in antiquity. It is a complete book of recipes, and contains rules for selecting, buying, storing, preparing, and cooking practically every kind of edible fish and shellfish sold in the United States. Part I gives names, seasons, forms, sizes, types, and producing areas for fresh and salt-water fish. This basic information is followed by general information on cooking (with charts) showing the time required for various kinds of cooking, baking, broiling, boiling, pan frying, etc. Includes a large number of recipes with variations ranging from chowders and stews to puffs, salads, sandwiches, sauces, and recipes for smoked, salted, and canned fish. Part II is devoted to shellfish (clams, crabs, lobsters, scallops, shrimp, turtles, etc.) along the same lines as the first part of the book on fish.

The Care of the Trawler's Fish, by G. A. Reay and J. M. Shewan, Food Investigation Leaflet No. 3 (Revised 1948), 12 p., printed. Department of Scientific and Industrial Research, Cambridge, England, 1949. (For sale by His Majesty's Stationery Office, London, England, 4d or approx. 7 cents U. S.) A leaflet intended to help owners, skippers, mates, and crews of trawlers and other types of vessels that catch "white" or demersal fish to care for their fish and to land it in the best possible condition. The treatment of pelagic species, e.g., herring, is not considered in this publication. First issued in 1933, this edition has been revised and extended. Contains data on the general scientific principles involved in the spoilage of fish, practical notes on the care of the trawler's fish, a chart giving the organoleptic characteristics of fresh and spoiled fish, and a suggested code of practice for officers and fishermen that might be kept continuously before them by display on board fishing vessels.

Commercial Fishing in the Great Lakes Area (Hearings before the Subcommittee on the Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, Eighty-First Congress, First Session, March 8-9, 1949), 100 p., printed. Available only from the House Committee on Merchant Marine and Fisheries until exhausted. This publication contains the statements on the commercial fishing of the Great Lakes by the various members of the fishery industries and the Fish and Wildlife Service. In addition, it gives a message from the President of the United States, transmitting a convention between the United States and Canada for the development, protection, and conservation of the fisheries of the Great Lakes, signed at Washington, April 2, 1946; the proposed international treaty, with Canada, to control the fisheries of the Great Lakes, with explanatory memorandum; a table showing the changes in United States rates of duty on fresh or frozen fresh-water fish and eels, and a table giving the imports of fresh-water fish, 1942-48, inclusive.

Field Book of Marine Fishes of the Atlantic Coast from Labrador to Texas, by Charles M. Breder, Jr., 332 p., revised, printed, illus. with 8 plates and 403 line drawings. G. P. Putnam's Sons, New York, N. Y., 1948. A comprehensive guide to marine fishes from Labrador to the Gulf of Mexico. The general habits, range, and most prominent features of each species (within the offshore limit set at 25 fathoms and on the shoreward side as far as brackish water reaches) are fully described. This is a revision of a book issued in 1929, but the book is substantially the same as the previous edition. However, various minor modifications have been made throughout the book.

First Annual Report of the Pacific Marine Fisheries Commission (To the Congress of the United States and to the Governors and Legislators of Washington, Oregon, and California) 29 p., printed. Pacific Marine Fisheries Commission, Portland, Oregon. This report contains the establishment, aims, progress, activities, and financial obligations of the Commission. Besides a list of the membership of the Commission and the Advisory Committee, it reports on the various meetings of the Commission giving a short resume of the discussions, gives the resolutions passed during 1948, and presents the financial statements for the year.

"Fisheries," chapter, Department of Mines and Natural Resources--Manitoba--Annual Report for the Period Ending March 31, 1948, Winnipeg, Manitoba, Canada. This chapter is a complete report on the Manitoba fisheries for the fiscal year 1947-48. In addition to a discussion of the commercial fisheries, it contains numerous tables showing the total production and value of all species of fish produced, number of fishermen employed, and equipment used for Manitoba and individually for the Lakes Winnipeg, Winnipegosis, Manitoba, and northern Manitoba lakes; summer and winter production and value of fish taken from Manitoba waters; and summary showing data for the past 17 years. In addition, a list of lakes in which commercial fishing is carried on in northern Manitoba is included, as well as data on fish culture, whitefish surveys, and sport fishing.

Foreign Commerce and Navigation of the United States, 1945, Volume I--United States Import and Export Statistics, 678 p., printed. Bureau of the Census, U. S. Department of Commerce, Washington, D. C., 1948, \$3.75. (For sale by the Superintendent of Documents, Washington 25, D. C.). Contains official statistical data on the foreign trade of the United States for 1945. Includes data on fresh, frozen, canned, salted, cured, and other miscellaneous fishery products and by-products. The book also contains a table showing specified products of American fisheries received at ports of the United States.

Fourteenth Biennial Report 1947-1948, 238 p., printed. Department of Conservation, Lansing, Mich. This report is a summary of the activities and progress of the Department for 1947 and 1948, including a report on the Fish Division. Included is a review of the commercial fisheries of Michigan waters of the Great Lakes mainly for 1946 and 1947. The statistical tables give data by lakes and gear; by lakes and species; by months, species, and lakes; and species by lakes. The tables are preceded by a discussion of the various Great Lakes fish. In addition, the publication contains an article on the sea lamprey investigations which has been excerpted and paraphrased from: "Report of the Great Lakes Sea Lamprey Committee," by John Van Oosten of the Fish and Wildlife Service.

The Frozen Food Cook Book, by Jean I. Simpson and Demetria M. Taylor, 507 p., printed, indexed. Simon and Schuster, New York, N. Y., 1948, \$2.95. Written with the technical assistance and cooperation of the Frozen Food Foundation, the book is a complete guide to the preparation, cooking, and preservation of frozen foods, together with hundreds of recipes, charts, lists, and menus. Practically all quick-frozen types of food are considered including fish and shellfish. The chapter on quick-frozen fish and shellfish includes instructions on the preparation, and recipes and menus for all varieties of main dishes, soups, salads, chowders, and cocktails. A chapter on home freezing includes information on fish and shellfish. The book is divided into five sections. Section one deals with the advantages of frozen foods; section two, cooking with frozen foods; section three, frozen foods for special occasions; section four, zero storage cabinets and home freezers; and section five, home freezing.

A Gloucester Cook Book, 18 p., printed, free. Gloucester Fisheries Association, Gloucester, Mass. This booklet contains fish recipes collected from the women of Gloucester. It gives a few facts concerning Gloucester fish and fish in general; and platter, casserole, tureen, salad bowl, and canape fish recipes. It concludes with a few recipes to serve 50 persons.

The Life Story of the Fish (His Morals and Manners), by Brian Curtis, 284 p., illustrated with line drawings and plates, printed. Harcourt, Brace and Company, New York, N. Y., 1949, \$3.75. This book is a new and revised edition of one published 10 years ago. Much new material has been added to this particular edition which has been re-written and contains reference reading lists for those who wish to consult source material and an index. It is an attempt to set forth some of the outstanding facts known about fish which might be of interest to the general reader, angler, and aquarist. Discusses the characteristics of fish in general--their body covering, framework, the senses and nervous system, the air-bladder, internal workings, reproduction and growth, habits and adaptations--and deals individually with trout, salmon, and other game fish.

(Maine) 15th Biennial Report (For period July 1, 1946 to June 30, 1948, plus additional information to December 30, 1948), 48 p., printed. Department of Sea and Shore Fisheries, Augusta, Maine. In addition to statistics on landings at Maine ports, by counties, for 1947, this report includes a discussion of the activities of the Division of Marketing and Development and the Division of Conservation and Propagation. The former Division's report includes its efforts to promote Maine's fishing industry, establishment of new industries, and advertising and publicity for the industry. The latter Division's report includes a discussion of the fishery research program and boat, seed lobsters, lobster rearing, clam flat pollution, clam cleansing plant, eastern Maine rearing station, groundfish, Schoodic lobster pound, herring studies, tuna fishing, sea moss, cormorant and gull control, shad restoration, oysters, economic and scientific research by the University of Maine, Atlantic salmon, exchange of lobsters for Dungeness crabs with the State of Washington, and seals. The U. S. Fish and Wildlife Service has cooperated with Maine on lobster rearing, shad propagation, bird control, clam pollution surveys, Atlantic salmon restoration, shellfish research and development, statistics and other activities. In addition, included are the following articles: "Progress in Fisheries Research," by C.C. Taylor and F. T. Baird; and "Shellfish Program," by Dana Wallace.

Markets for Airborne Seafoods, by S. A. Larsen, W. Reitz, and K. K. Burgun, Wayne University Studies in Air Transport No. 5, 120 p., printed, \$2.00. Wayne University Press, Detroit, Mich., 1948. This book is a report on the study under the Air Cargo Research conducted by the School of Business Administration, Wayne University, under express authority of the Detroit Board of Education and sponsored by five corporations. This study seeks to point the way to a larger market for seafoods and to blueprint a plan for the achievement of this objective. The study should be of special interest to fish producers and distributors, transportation agencies, packaging concerns, home economists, and government officials--all of whom have a part to play in bringing about an improvement in the quality, and thereby strengthening the demand and increasing the consumption of fresh fish. (See the synopsis of this report which appears on page 26 of this issue.)

"Pacific Fisheries," by Dr. J. L. Kask, an address, 10 p., processed. Food and Agriculture Organization of the United Nations, Washington, D. C. The author, chief biologist of the Fisheries Division of FAO, presented this address at a Symposium on Economic and Power Resources of the Pacific Area, Division of Social Sciences, Seventh Pacific Science Congress, held in Auckland and Christchurch, New Zealand, February 2-22, 1949. The purpose of the address is to point out that the Pacific Ocean can contribute much more toward helping to feed that part of the world's people who live on its shores than is now being harvested from, and that there are some indications that both the people and their governments are becoming increasingly aware of this fact. "About 95 percent of all fish caught in the Pacific are taken north of the equator," according to the author, "but even in this heavily fished hemisphere there are extensive shallow water areas that are not fully exploited as in the Bering and Okhotsk seas and there are many good edible species

that are not fully utilized." Also, the high seas and ocean depths may possibly contain resources ready for harvesting that are unknown today. The address stresses that investigation and wise regulation must go hand in hand with development and exploitation.

Planning a Frozen Food Business, by Lyle L. Davis and P. D. Rodgers, Bulletin 419, 18 p., illus., printed, Virginia Agricultural Experiment Station, Blacksburg, Virginia, October 1948. This booklet gives general information concerning the construction of locker plants and commercial freezing plants. Although fishery products are not mentioned specifically, the basic elements discussed in this publication for planning a locker plant and commercial freezing plant would also apply to a plant designed for storing fish. Included are examples on how two more or less typical designs may be utilized.

Problems of the Fishing Industry (Hearings before the Subcommittee on the Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, Eighty-First Congress, First Session, February 15-16, 1949), 226 p., printed. Available only from the House's Committee on Merchant Marine and Fisheries until exhausted. This report is a transcript of the hearings on the problems of the fishing industry before the House's Committee on Merchant Marine and Fisheries. It contains statements of the various members of the fishery industries made before the Committee and material presented by the Fish and Wildlife Service.

Provincial (British Columbia) Department of Fisheries Report (with appendices for the year ended December 31, 1947), 111 p., printed. Provincial Department of Fisheries, Province of British Columbia, Victoria, B. C., 1948. This report gives the species and value of fish caught in British Columbia as well as the amount of capital, equipment, and employees in the fisheries. The canned pack of salmon, pilchard, herring, and shellfish is also included as well as data on mild-cured and dry-salt salmon, dry-salt and pickled herring, halibut, and fish oil and meal production, and net fishing in non-tidal waters. There are several appendices which include the following: "Contributions to the Life-History of the Sockeye Salmon," by W. A. Clemens; "Results of the West Coast of Vancouver Island Herring Investigation, 1947-48," by A. L. Tester; "Records of Clam Production," by Ferris Neave; "Report on Investigation of the International Pacific Salmon Fisheries Commission for 1947," by B. M. Brennan; and "Salmon-Spawning Report, British Columbia, 1947," by A. J. Whitmore. The report concludes with a number of statistical tables on the British Columbia fisheries.

School Lunch Recipes Using Fish, PA-66, 8 p., processed, free. Bureau of Human Nutrition and Home Economics and Production and Marketing Administration, U. S. Department of Agriculture, Washington, D. C., December 1948. This publication developed in cooperation with the Fish and Wildlife Service contains recipes developed especially for the school lunch program. They conform to the protein-rich food requirement for Type-A meals set up by the Production and Marketing Administration. Recipes are arranged so that they can be cut apart and added to the card file, "School Lunch Recipes for 100." The introduction discusses the nutritive value of fish, frozen fish fillets, canned fish, precautions with fish mixtures, and garnishes for fish.

A Selected List of State Publications on the Natural Resources of Maryland, by W. H. Bayliff, 15 p., printed. Maryland Board of Natural Resources, Annapolis, Md., January 1949. This list contains only those publications issued by State agencies and considered most instructive to the general reader. Includes publications on the State's commercial fisheries.



Processing -- Miscellaneous Service Division

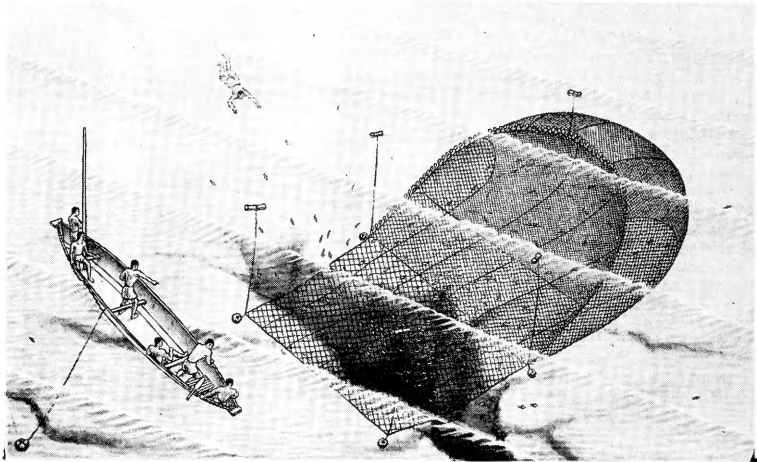
Illustrator -- Gustaf T. Sundstrom

Compositors -- Jean Zalesky and Norma D. Loeffel

AQUATIC RESOURCES OF THE RYUKYU AREA

Fishery Leaflet 333, "Aquatic Resources of the Ryukyu Area," recently issued by the Service, deals with the fish and fisheries resources of the Ryukyu Islands and vicinity and describes the fishing methods used by the natives. It is a reproduction of SCAP's Natural Resources Section Report No. 117, issued in December 1948. The Ryukyu Islands, a part of a larger island chain extending from Formosa into Japanese waters, are composed of some 60 named islands with 25 having areas of four or more square miles.

This 54-page publication contains sections on the geographic and oceanographic features which influence fisheries, data on aquatic production, an appendix list of the economically important food fishes of the islands, and concludes with several tables giving number of vessels, production by species, etc.



Before World War II, the Ryukyans had devised many ingenious methods for catching fish. These are described in the report, along with methods of using them and the kinds of fish caught.

Copies of this Fishery Leaflet can be obtained free upon request from the U. S. Fish and Wildlife Service, Washington 25, D. C.

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DEPARTMENT OF THE INTERIOR
FISH AND WILD LIFE SERVICE
WASHINGTON 25, D. C.
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