California

SHRIMP FISHERY MAKES STEADY GROWTH: After five years of slow but steady growth, the commercial shrimp fishery of California looks as though it's here to stay.

Almost daily deliveries are made to processors at Crescent City and Bodega Bay. The only shrimp beds in use at present are located off these widely-separated ports because facilities for processing are limited.

The catch in 1952, the first year commercial permits were issued, totaled 206,000 pounds and gradually climbed to 1,150,000 pounds in 1956. As ocean industries go, this one still is a baby, for there were only eight boats, employing 25 fishermen, active in 1956. Another 350 persons on shore derived incomes from processing the product, most of it going into vacuum-packed cans or frozen food packages.

Actually the shrimp in question is a small prawn, but is termed "ocean shrimp" to distinguish it from the smaller "bay shrimp" of San Francisco Bay. The latter is a true shrimp. The prawn being harvested off Crescent City and Bodega Bay is known scientifically as Pandalus jordani and in other circles is also called pink shrimp or cocktail shrimp. The ocean shrimp usually taken for the market is 3-4 inches long, with less than half of this being edible. (Outdoor California, February 1957, a monthly periodical of the California Department of Fish and Game.)

Going back to how it all started, small quantities of these shrimp, mixed with the catches of bottom fish taken by the trawl fleet, had been noted for years. Then, in 1950, 1951, and 1953 Department of Fish and Game marine biologists working from the research vessel N. B. Scofield charted beds of shrimp along the coast from Santa Monica to the Oregon border.

Annual catch quotas were established for each area, based on how large the beds were and how many shrimp they contained. No more beds have since been found by the industry.

Note: Also see Commercial Fisheries Review, September 1956, p. 1.

Cans--Shipments for Fishery Products, 1956

Total shipments of metal cans during 1956 amounted to 112,532 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 110,188 tons in 1955. During December fish canning was largely confined to the West Coast packs of tuna, sardines, and mackerel. The total pack of all fish and shellfish in 1956 was about 10 percent above the 1955 pack. The December pack of California sardines was much lower than for the same month in 1955.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23,0 base boxes of steel equal one short ton of steel.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-FEBRUARY 1957: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 2.2 million pounds of fresh and frozen fishery products were purchased in January and 1,678,000 pounds during February by the Military Subsistence Market Centers. Beginning with January 1, 1957, a change was instituted in reporting the amount purchased. Instead of reporting deliveries as in the past, the Military Subsistence Supply Agency is reporting what was ordered. Therefore, this year's purchases are not directly comparable with previous years.

Table 1 - Fresh and Frozen Fishery Products Purchases by Military Subsistence Market Centers, January and February 1957 with Comparisons

QUANTITY						VALUE					
January		February		Jan.-Feb.		January		February		Jan.-Feb.	
1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956
(1,000 Pounds)						($1,000)					
2,212	1,086	1,678	1,659	3,890	2,745	1,169	746	808	850	1,977	1,596

Assuming that purchases for the first two months of this year as compared with the same months in 1956 are roughly comparable, purchases were higher by about 42 percent for the first two months of 1957.

Canned Fishery Products: Salmon and tuna were the principal canned fishery products purchased for use of the Armed Forces during January and February 1957.

Table 2 - Canned Fishery Products Purchases by Military Subsistence Market Centers, January-February 1957

Month	QUANTITY			
	Tuna	Salmon	Sardines	Total
	(1,000 Pounds)			
January	-	992	1	993
February	268	-	10	277

In addition to the purchases made under contract, the Armed Forces generally make some local purchases which are not included in the data given. Therefore, actual purchases are higher than indicated, but it is not possible to obtain the local purchases made by military installations throughout the country.

Films

FISH AND WILDLIFE SERVICE FISHERY FILM RECEIVES CERTIFICATE FOR EDINBURGH FESTIVAL SHOWING: The Department of the Interior received certificates from the British Government for having three motion pictures (one of which was a fishery film) selected for showing during the 1956 International Festival of Music and Drama at Edinburgh, Scotland. The films were produced by two Department agencies in cooperation with private industry sponsors.

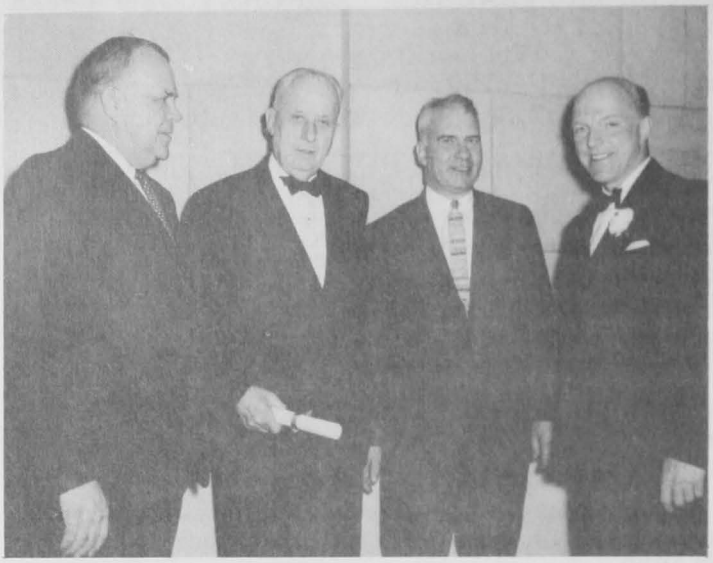
Among all motion pictures submitted by United States Government agencies during 1956, only the five were chosen for showing at the Edinburgh Festival.

The Department of the Interior was represented at the festival by one film supervised by the Fish and Wildlife Service and two produced under the supervision of the Bureau of Mines. All three half-hour films, in 16 mm. color and sound, were financed by private industry sponsors.

The three Department of the Interior films and their private industry sponsors are:

Outboard Fisherman, U. S. A. was financed by the Outboard Marine Corporation, formerly known as the Outboard, Marine and Manufacturing Company, and was produced by MPO Productions, Inc., under the supervision of the Fish and Wildlife Service. The film shows how the small independent commercial fishermen, using outboard motors, contribute to the national economy. Scenes from 10 areas in the United States and Alaska depict the catching of 10 different species of fish and shellfish, using various colorful fishing techniques.

The Petrified River--The Story of Uranium was sponsored by the Union Carbide and Carbon Corporation in cooperation with the Bureau of Mines. Produced by MPO Productions, Inc., it tells the story of the greatest metal hunt in the history of America when thousands combed the Colorado Plateau for the source material for atomic energy. The film depicts the geology of the plateau area, the search for and the drilling, mining, and milling of uranium ore. Emphasis is placed on peacetime uses of uranium in atomic energy for electric power, and the use of radioisotopes in medicine, agriculture and biologic research.



Present at the award of the Edinburgh Film Festival Certificate for the fishery film "Outboard Fisherman, U. S. A." were (left to right): Arnie J. Suomela, Commissioner, U. S. Fish and Wildlife Service; Ross Leffler, Assistant Secretary of the Interior for Fish and Wildlife; Howard Larsen, representing the Outboard Marine Corp; and the British Ambassador to the United States.

Arizona and Its Natural Resources is the other Bureau of Mines film, this one financed by the Phelps-Dodge Corporation and produced by Frederick K. Rockett Company. It depicts the natural resources of Arizona and their development and utilization for the benefit of the State's people. This motion picture shows how the great natural resources of the Southwestern United States lay untouched and unused for centuries while aborigines, early Indians, Spanish conquistadors, and Mexican colonists overlooked their value. It remained for modern man, with ingenuity and imagination, to develop these resources and to produce a rich economy in a progressive State.

Fisheries Loan Fund

LOAN APPLICATIONS TOTAL $6.3 MILLION: Applications for fishery loans as of March 18 totaled $6,335,000 or nearly two-thirds of the $10 million made available for this purpose by the U. S. Fish and Wildlife Act of 1956, Assistant Secretary of the Interior Ross L. Leffler stated on March 29, 1957. Loans amounting to $1,854,940 already have been approved.

Of the 163 applications accepted for processing, 66 are from New England for a total of $2,207,000, 64 from Pacific Coast States for $3,218,000, and the balance from other sections of the country and from Hawaii and Alaska.

There have been 61 applications approved since the program began last October. Of these, 25 totaling $861,789 were to fishermen in New England; 16 totaling $572,631 to fishermen in the Pacific Coast States; 5 totaling $323,050 to those in the South Atlantic and Gulf States; 4 totaling $29,220 to fresh-water fishermen; and 11 totaling $68,250 to Alaska fishermen. Twelve loan applications for $161,500 have been declined during the same period.

The following loans not reported earlier have been approved for New England: Estrela Corporation, Gloucester, Mass., $57,677 for refinancing and operating expenses; Roland B. Stimpson, Pleasant Point, Me., $2,000 to replace vessel and gear; Schooner Corporation, Boston, Mass., $58,700, refinancing and repairs; Mrs. Tripolina Bramante, Gloucester, Mass., $56,800, for refinancing; Dimar, Incorporated,

Gloucester, Mass., $21,506, refinancing; United Fisheries Vessels, Gloucester, Mass., $31,400 refinancing and operating expenses; and Philip Bodoni, $41,099 for refinancing.

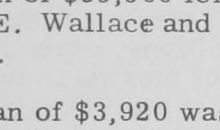
On the Pacific Coast, the following loans were approved: California--Donald Hobbs, San Diego, $126,837 for refinancing and repairs; Edward P. Silva, San Diego, $56,000 for refinancing. Washington--Curtis Kirkendall, $3,000 to repair vessel and replace gear; Lawrence P. Ollsen, $17,200 for vessel and gear replacement; and Angus and Stella McKay, $10,000 for refinancing and installation; Karl Kaldestad, $10,000 for vessel improvements; Jacobson Brothers, $22,250, for basic research; and John McDermott, $3,221 for refinancing and repairs. All of these are residents of Seattle, Wash. Frank O. Renlie, of Bellingham, received approval of a loan of $5,500 for refinancing.

The Dixie Fisheries of Yorktown, Va., had a loan for $8,500 for rebuilding a vessel and replacing gear approved; and the Whorton Crab Factory of New Bern, N. C., received approval for a loan of $35,500 for vessel replacement and gear. A loan of $20,250 was approved for E. Wallace and A. Neuman, Empire, La., for refinancing and replacement of gear.

In the Great Lakes area, a loan of $3,920 was approved for Ernest King, Sr., Naubinway, Mich., for refinancing; the Drayton Fish Company, $8,000 for gear replacement; and the B & L Fish Company, Port Huron, Mich., $11,800 for refinancing and repairs.

The Alaska loans were: William A. Grenier, Sr., Petersburg, $7,500 for refinancing and repairs; Alfred J. Steear, Ketchikan, $20,100 to rebuild and repair a vessel; Fred E. Brandes, Jr., Ketchikan, $14,850 for refinancing and engine replacement; Adron F. Ward, Ketchikan, $5,000 for vessel improvement and repairs.

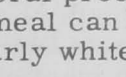
NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, MARCH 1957, P. 19.



Fish Flour--A Weapon Against Protein Malnutrition

Because fish meal can be processed in such a way as to remove the "fishy" taste and odor, it can become an important weapon against protein malnutrition in the vast underdeveloped areas of the world, Dr. James M. Hundley, nutrition adviser to the United Nations' International Children's Emergency Fund, declared in February 1957. Hundley reported that several processes have been developed by which either fresh fish or dehydrated fish meal can be defatted, deodorized, and finished as an almost tasteless, odorless, nearly white flour.

Speaking before the Conference on Protein Nutrition in New York, under the joint sponsorship of the New York Academy of Sciences and E. I. duPont de Nemours & Co., Hundley said that such flour contains 70 to 80 percent protein and relatively small amounts are needed to supplement bread and other cereal products. Estimates are that only about one-fourth cent a day would be required to supplement a child's diet effectively with fish flour.



Florida

RED TIDE RESEARCH IN GULF OF MEXICO: The research vessel Gerda of the Marine Laboratory of the University of Miami returned to Miami early in January after a 1,000-mile trip in connection with Red Tide research in the Gulf of Mexico. It was the sixth such trip made during the past 18 months.

Operations started off Key West, Fla., and a zigzag course was followed up the west coast of Florida north to John's Pass off St. Petersburg. Measurements of currents were taken electronically, water and biological samples also were taken. The water samples were analyzed for nitrite, nitrate, phosphorus, and salinity, along with biological content. Water temperatures were recorded from surface to bottom.

Water samples were analyzed to determine their potential in supporting any type of biological activity. This is necessary to ascertain the density of biological life that may be supported by the amount of chemicals in the water. To date it has been found by scientists of the Marine Laboratory that the waters of the Gulf of Mexico are capable of supporting the Red Tide organisms at any time.

However, while this is true, and the Red Tide organisms are always present in the water, it is not until these organisms increase to large numbers that a so-called Red Tide is formed, killing fish and other marine life.

It has been ascertained that the outflow of the principal rivers on Florida's west coast may, under certain conditions, cause harmful Red Tides. These waters mixing with each other in the Gulf of Mexico in relation to amounts, timing, weather, and current speeds create an optimal condition in which Red Tides flourish. Scientists at the Marine Laboratory base their predictions on this hypothesis.

Through the use of this method, which was formulated by an assistant professor at the Marine Laboratory, the Red Tide outlook for the year from October 1955 to September 1956 was successfully predicted, even though the scientist looks upon the method as a tentative one subject to improvement as the research work continues.

The prediction from October 1956 to September 1957 indicates there will be small likelihood of any major Red Tide outbreak.

Maine

GOVERNOR PROCLAIMS APRIL 11 AS SARDINE DAY: Complimenting the Maine sardine canners on their efforts to "improve and enlarge an industry which gives employment to thousands of our citizens," Governor Edmund S. Muskie proclaimed April 11 as Maine Sardine Day.

He said that the opening of the industry's modern research and quality control laboratory in Bangor on that date prompted him to "give this deserved recognition of cooperative action by the canners to meet changing conditions in the food business." Simultaneously he signed into law legislation to strengthen State sardine inspection and quality control.

For the past six years the industry has operated a 25-cents-a-case State tax-financed development program under the direction of the Maine Sardine Council.

In signing the proclamation on April 6, the Governor suggested to the people of Maine that they serve "this good seafood product on Maine Sardine Day to also show their appreciation of the vital role the industry has played in Maine's economy for seventy-five years."

Maine Sardines

INCLUDED IN NATIONAL SCOUT JAMBOREE MENU: Maine sardines have een selected as one of the major sandwich fillers for serving to the more than 0,000 young men who will attend the National Boy Scout, amboree to be held at Valley Forge, Pa., in July 1957. he Executive Secretary of the Maine Sardine Council aid that the selection had been made by National Scout eadquarters after exhaustive tests and that his organi- ation was cooperating to the fullest extent.

Sardine sandwiches made from oil and mustard packs will be served to the ,300 troops of 40 scouts each as a quick-lunch item, both upon arrival and depar- ure and this will require about 500 cases (100-cans each) of canned Maine sardines.

The Jamboree menu will be used as a model for camping trips and outings by he several hundred Scout organizations in the country for the next two years. This s the first time that canned sardines have been included in a Jamboree menu.

Market Outlook for Fishery Products

APRIL-JUNE 1957: Fresh fish of practically every variety will be available in uantity during the April-June quarter as production climbs to peak levels for many ections of the industry, according to the Commercial Fisheries Outlook, April- une 1957 published by the United States Fish and Wildlife Service.

Oyster production will cease during the quarter, and the northern Atlantic lob- ter catch will be at a seasonal low. Production of other shellfish, shrimp, sea callops, hard and soft crabs, and soft and surf clams, will increase. However, ungeness crab production on the Pacific Coast will hit a peak early in the quarter nd then decline as the effort switches to other fisheries.

Salmon trolling in the Canada-Pacific Coast area is being delayed until April 15, y agreement. The halibut season opening date this year is May 1.

The New England landings will follow the general big season pattern. Haddock nd ocean perch, followed by flounders, sole, and cod will dominate.

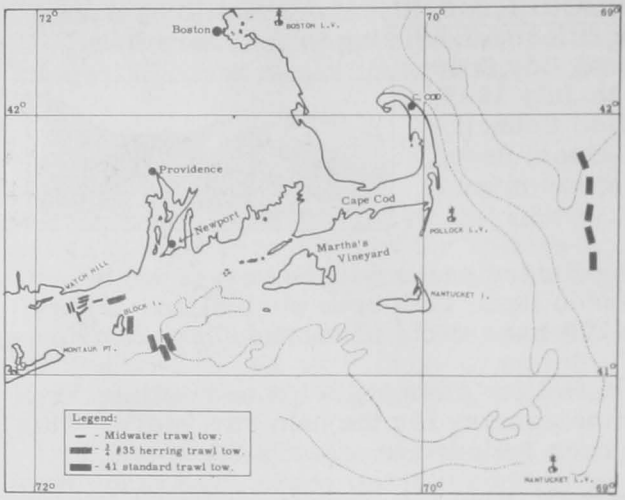
Domestic landings of fresh-water fish will also reach a seasonal peak. Receipts t Chicago should approximate 15 million pounds for the quarter.

The pack of canned sardines in Maine will be lower if the usual pattern of light- r packs in odd-numbered years repeats. Last year the pack was good but it was ot as high as in some previous years. The Pacific mackerel pack is usually low uring this second quarter. In the tuna fishery, its usual pattern calls for increased ndings and pack. Salmon canning will not get under way until the end of the quar- r with the new supplies reaching the market in the fall.

North Atlantic Fisheries Exploration and Gear Research

MIDWATER TRAWL GEAR TESTS IN BLOCK ISLAND SOUND AREA (M/V Del- ware Cruise 57-2): In the Block Island Sound area midwater trawl gear tests were nducted by the Service's exploratory fishing vessel Delaware, February 12-22.

Light concentrations of fish were located with the aid of echo-sounding equipment and experimental tows were made on these concentrations with a standard Canadian nylon midwater trawl (approximately 35-foot square-mouth opening, 5" mesh taper to $1\frac{3}{4}$" mesh). Only a small number of alewifes (Pomolebus pseudoharengus) and two whiting (Marluccius bilinearis) were taken during the experimental tows. From all measurable indications the gear was fishing properly. Handling the midwater trawl and spreader doors attached to five-fathom pendant lines presented no special problem in setting and hauling back.



M/V Delaware Cruise 57-2 (Feb. 12-22, 1957).

An air-pressure depth meter was tested during midwater trials and this device allowed positioning of the net at any desired depth.

Eight tows were made with No. 35 small-mesh Canadian herring otter trawl (headrope 36 feet, footrope 51 feet, 2" mesh). Over 6,200 pounds of herring (Clupea harengus) and alewifes were brine-frozen for use as tuna long-line bait during the next cruise. Small numbers of shad (Alosa sapidissima) were also taken in the bottom trawl. Five tows with the standard No. 41 otter trawl (headrope 79 feet, footrope 110 feet, $4\frac{1}{2}$" mesh) with a full set of rollers in the South Channel area yielded 700 pounds of haddock (Melanogrammus aeglefinus) and 1,300 pounds of pollock (Pollachius virens) for technological tests.

The Delaware was scheduled to depart from East Boston on March 12 for a five-week exploratory cruise in the offshore Atlantic. This is the first of several cruises planned in that area. The vast areas of the NW. central Atlantic were to be fished with commercial-style long-line gear to explore the potential of its subsurface fishery resources. The major objective of the exploration was to obtain additional information on the distribution of stocks of the several species of tuna and tunalike fishes and the winter habits of the schooling bluefin tuna (Thunnus thynnus) common to New England waters during the summer months.

Pacific Coast Fishing Ports

BAY CITY, ORE.: Bay City is a small fishing community located on Tillemook Bay in northern Oregon. This article, which is one in a series of photographic reports on the fishing centers of the United States and its territories, shows the activities in Bay City in September 1956.

Fig. 1 - Fish- and oyster-processing plants at Bay City.

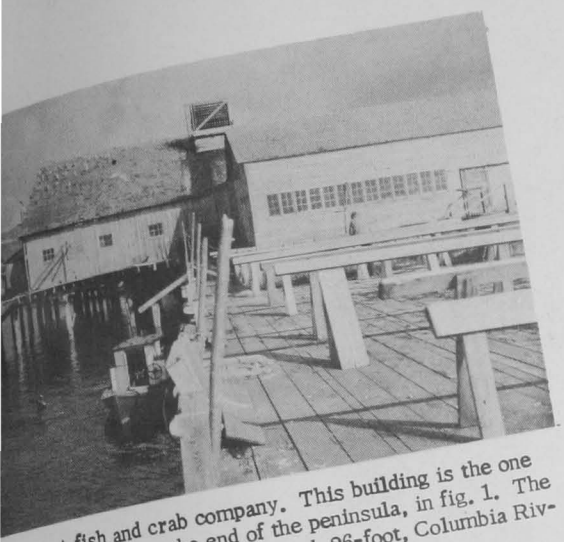


Fig. 2 - A fish and crab company. This building is the one seen on the left, on the end of the peninsula, in fig. 1. The boat shown here is a double-ended, 26-foot, Columbia River-type gill net boat.

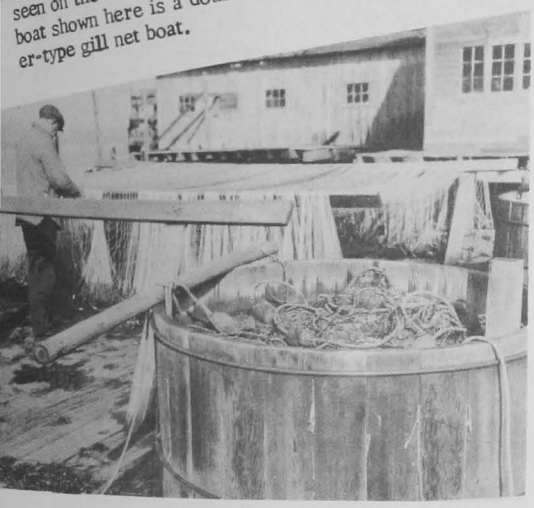


Fig. 4 - Net in a solution of bluestone (copper sulfate). Ten pounds of bluestone are used per net per week. The nets are left in the solution for 2 to 3 hours and then are placed on the racks to dry.

Fig. 5 - End of the dock of the fish and crab company shown in fig. 2. The principal products of this company are chinook, silver, and chum salmon and fresh crab and crab meat.

Fig. 3 - Fisherman repairing gill net used to catch chinook and silver salmon in the waters of Tillamook Bay near Bay City. The net is made of $6\frac{3}{4}$-inch-mesh netting and is 140 fathoms long and 30 meshes deep. Sets are made 3 hours before low water. Depending upon the season, this fisherman also fishes on the Columbia River and in Bristol Bay, Alaska. He thus is able to work as a fisherman substantially the year around.

Fig. 6 - View taken from end of peninsula on opposite side of that shown in fig. 1. The building on the left houses another fish company which sells principally fresh salmon. The center building in the right foreground is that of the Oregon Fish Commission. The end building on the right is a landing dock for the fish and crab company shown in fig. 2.

Fig. 7 - Mending a gill net

Fig. 8 - Preparing set-net stakes for stationary gill nets. These stakes must be peeled and sanded. Otherwise the nets will catch on the bark and tear in the swells. The stakes are about 35 feet long and are made from hemlock poles obtained at Sand Lake, which is 18 miles from Bay City. The building shown here is the end building on the right in fig. 6.

Fig. 9 - Set-net stakes for stationary gill net. The stationary gill nets catch chum salmon principally.

Fig. 10 - Field laboratory of the Oregon Fish Commission. Some years ago, this building, which is the center one in in the right foreground of fig. 6, was used in a fresh-crab operation.

Fig. 11 - An oyster company. The products are fresh oysters and oyster stew. This building is the one shown on the extreme right in fig. 1.

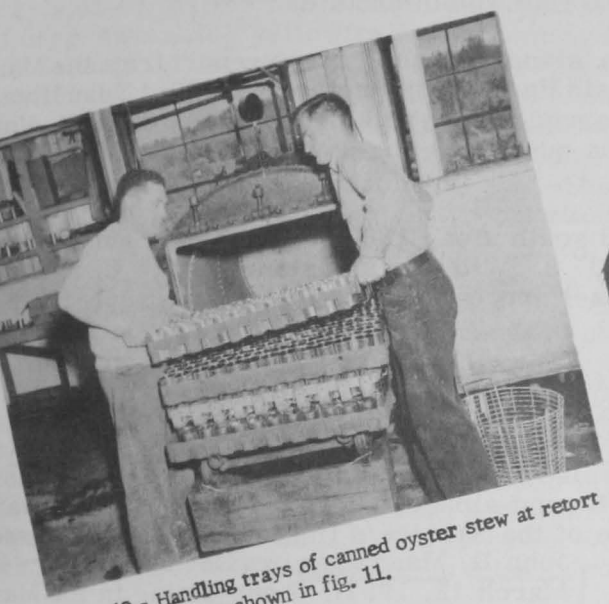


Fig. 12 - Handling trays of canned oyster stew at retort inside company shown in fig. 11.

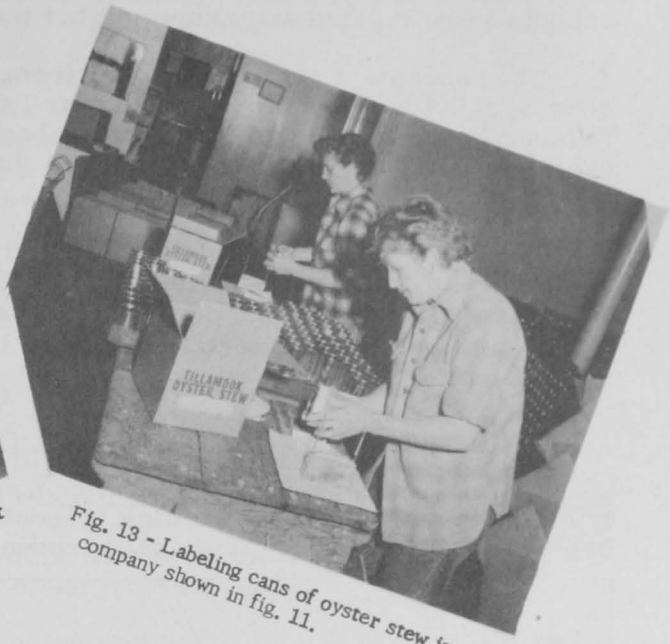


Fig. 13 - Labeling cans of oyster stew inside company shown in fig. 11.

Note: The author gratefully acknowledges the aid of Fred C. Cleaver, Supervisory Fishery Research Biologist, U. S. Fish and Wildlife Service (formerly Assistant State Fisheries Director, Oregon Fish Commission).

--BY F. BRUCE SANFORD, CHEMIST
FISHERY TECHNOLOGICAL LABORATORY,
BRANCH OF COMMERCIAL FISHERIES,
U. S. FISH AND WILDLIFE SERVICE, SEATTLE, WASH.

Pacific Oceanic Fishery Investigations

SUMMER TUNA FISHERY AND BAIT POTENTIALITIES OF MARQUESAS AND TUAMOTU ISLANDS: The summer tuna fishery and bait potentialities of the Marquesas and Tuamotu islands were being investigated early in 1957 by all three of the Service's Pacific Oceanic Fishery Investigations research vessels. In this "task force" approach to fishery biology, the Hugh M. Smith was studying the oceanic circulation of the area; the John R. Manning was sampling the deep-swimming tunas by long-line fishing; while the Charles H. Gilbert was live-bait fishing and assessing the available natural bait supplies in those islands of French Oceania.

John R. Manning, using 60 11-hook baskets a day, as of the end of February had fished a total of 33 days and reported a catch of 322 yellowfin, 35 skipjack, 48 big-eyed, 24 albacore tuna, 165 shark, and 56 miscellaneous fish such as marlin, swordfish, etc. Of the total yellowfin caught, 210 were taken at stations near the Marquesas, with the best day's catch yielding 54 yellowfin, 2 albacore, 16 shark, and 3 miscellaneous fish.

The Charles H. Gilbert, which arrived in the Marquesas on January 24, reported sighting a total of 263 surface schools: 30 yellowfin, 128 skipjack, and 105 unidentified. Using principally the local Marquesan sardines as bait, 104 of the schools were chummed and of those fished, a total of 2,829 skipjack and 81 yellowfin were caught. A total of 769 of the skipjack were tagged with the new POFI dart tag and released. In the Marquesas area, 718 skipjack were taken from one school, 311 from another. In the Tuamotus, one of the schools yielded 506 skipjack and another

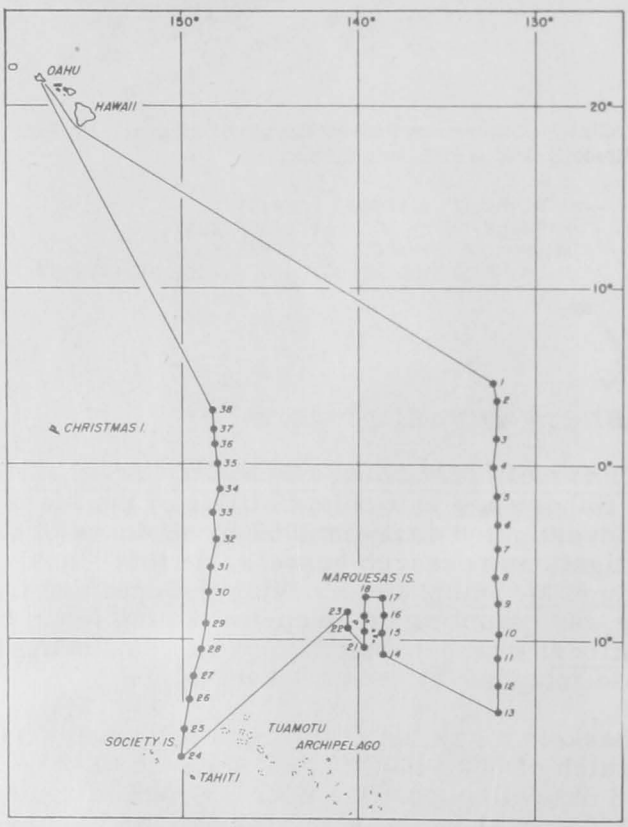
455. The schools, in general, were wild and fast moving. On some days, several schools were sighted and chummed but the fish would not bite.

The concentrations of bait varied from island to island. In one report from the Marquesas, 6,000 buckets were sighted near Taio Hae and, in another, 1,500 at Nuku Hiva. In other bays, varying amounts were observed, some with negligible quantities. However, particularly when compared with the quantities observed during the Marquesas winter, bait supplies were abundant.

The Hugh M. Smith, which proceeded south along 130° W. longitude, suffered a breakdown of the main drive shaft near 13° S. With the assistance of the U. S. Coast Guard, repairs were effected and the vessel proceeded with the oceanographic survey.

* * * * *

DEEP-SWIMMING YELLOWFIN TUNA SAMPLED BY LONG-LINING IN MARQUESAS AREA (M/V John R. Manning Cruise 34): Sampling the abundance and distribution of large deep-swimming yellowfin and albacore tuna by long-lining in the eastern Pacific was the principal purpose of the Service's fisheries research vessel John R. Manning's cruise 34 (January 4-March 12, 1957). Long-lining in the Marquesas and Society islands area (a potential fishing ground for the United States tuna fleet) yielded 23 tons of yellowfin tuna in 38 fishing days. Smaller quantities of albacore, big-eyed, and skipjack, tuna were also caught. Simultaneously with the John R. Manning, two other Honolulu-based Service vessels studied the live-bait and surface tuna resources and the oceanic environment of the region.



John R. Manning Cruise 34 (Jan.-Mar. 1957).

John R. Manning fished one series of long-line stations southward across the equator to a position southeast of the Marquesas Island group, another series among the islands, and after refueling at Tahiti, a third line of stations was fished northward across the equator on the longitude of 148° W. Although the abundance of deep-swimming yellowfin tuna was generally low on the two longitudinal sections some excellent long-line fishing was experienced in the Marquesas, particularly in the southwestern part of the archipelago. Yellowfin tuna catch rates there were as high as 8 fish per 100 hooks per day, and the tuna were large, averaging 139 pounds each.

Fishing 60 baskets of longline (660 hooks) at 38 stations produced a catch of 355 yellowfin tuna (approximately 23 tons), 51 big-eyed, 24 albacore, 36 skipjack, 44 spearfish, 6 wahoo, 5 barracuda, and 333 shark. Results on both longitudinal sections across the equatorial zone indicated low levels of yellowfin abundance. On 132° W., between 4°30' N. and 14° S., only 4 out of 13 stations had yellowfin catch rates of more than 1 fish per 100 hooks.

Only the station at 3°30' S. produced even moderately good fishing, with 4 yellowfin per 100 hooks. For the 15 stations on the 148° W. section, between 16°30' S.

nd 3° N., the best catch rate was 1.5 yellowfin at station 35, on the equator, and nly 1 other station had a catch rate of over 1. A considerably greater abundance deep-swimming yellowfin was shown by the 10 stations fished among the Marquesas Islands. There the catch rate averaged 3.45 fish per 100 hooks, only 2 stations roduced less than 1 yellowfin per 100 hooks, and 2 stations, 20 and 33, south of uku Hiva Island had the excellent catch rates of 7.58 and 8.18, respectively. Yelwfin weight averaged 134 pounds each, on 132° W., 139 pounds in the Marquesas area, and 131 pounds on 148° W. Shark damage to yellowfin varied greatly om one station to another, but amounted to about 21 percent for the whole ruise.

Albacore were not taken north of 11° S. on 132° W. nor north of 7°25' S. on 48° W., and 4 was the greatest number taken at any station. They ranged from 35 50 each, averaging 40 pounds. The fact that most of the albacore were caught on ne deepest parts of the set indicates that the long line may not have been fishing eep enough to sample this species adequately.

Trolling for 779 line-hours between stations and along the long-line sets produced a total catch of 7 skipjack, 2 yellowfin, 2 big-eyed, 12 dolphin, 2 wahoo, and sea snake snagged on a jig. The wheel watch routinely recorded surface tuna chools, bird flocks, and other marine life observed while underway.

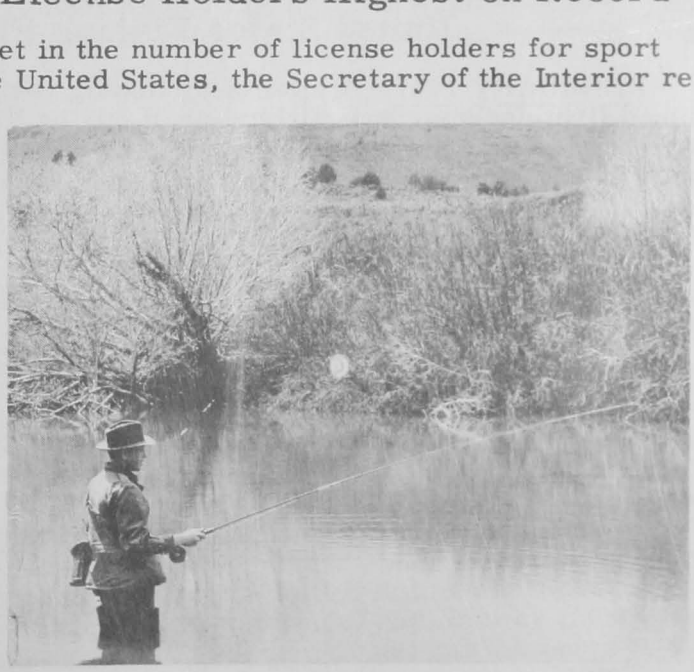
Biological data on food and reproductive condition were recorded for all fish aken, and frequent measurements of surface and subsurface water temperatures rovided information on the environment in which the tuna were found. Fifteen xtra-large yellowfin tuna were filleted and frozen for use in processing experiaents designed to improve the commercial acceptability of the big tuna which form large part of long-line catches.

Sport Fishing and Hunting License Holders Highest on Record

Once again a record has been set in the number of license holders for sport shing and wild-game hunting in the United States, the Secretary of the Interior reported on February 10. California replaced Minnesota as top-anking State in fishing licenses it Michigan, the only State to ecord more than a million hunting license sales, retained its ad in hunting.

U. S. Fish and Wildlife Service compilations show that during the fiscal year ending June 30, 956, there were 33,163,831 hunting and fishing license holders in is country, an increase of 117,470 er the previous record set in e fiscal year ending June 30, 955.

An increase of 270,296 hunting license holders is responsible r the new record. Fishing li-



FISHERMAN IN LARGE SPRING NEAR PAGE DAM.

State Fishing Licenses Issued in the United States, July 1, 1955 to June 30, 1956

State	Paid Fishing License Holders			Total Cost[1/] to Anglers for All Licenses, Permits Stamps, etc.
	Resident	Non-Resident	Total	
Alabama	435,596	24,649	460,245	$ 730,444
Arizona	97,943	62,878	160,821	420,119
Arkansas	274,912	135,346	410,258	766,447
California	1,303,256	15,934	1,319,190	3,902,898
Colorado	237,524	107,728	345,252	242,002
Connecticut	99,808	3,757	103,565	367,928
Delaware	6,835	885	7,720	16,400
Florida	275,802	178,728	454,530	936,134
Georgia	337,620	7,754	345,374	461,266
Idaho	140,712	52,360	193,072	606,269
Illinois	720,842	18,959	739,801	864,210
Indiana	805,277	38,835	844,112	927,464
Iowa	364,807	16,235	381,042	546,240
Kansas	217,202	5,850	223,052	456,299
Kentucky	335,435	77,793	413,228	878,299
Louisiana	187,466	33,369	220,835	295,955
Maine	129,075	72,046	201,121	744,706
Maryland	107,837	23,051	130,888	238,406
Massachusetts	202,506	4,793	207,299	601,968
Michigan	876,670	273,992	1,150,662	4,770,121
Minnesota	935,802	296,845	1,232,647	2,353,972
Mississippi	131,631	34,160	165,791	378,798
Missouri	509,483	55,606	565,089	1,432,738
Montana	192,353	43,097	235,450	839,828
Nebraska	205,770	9,860	215,630	352,701
Nevada	28,195	23,556	51,751	182,038
New Hampshire	74,001	44,996	118,997	396,699
New Jersey	143,136	10,081	153,217	605,859
New Mexico	65,878	31,583	97,461	366,603
New York	677,353	42,427	719,780	1,628,456
North Carolina	332,648	32,461	365,109	663,439
North Dakota	72,438	1,918	74,356	78,602
Ohio	838,898	41,177	880,075	1,766,917
Oklahoma	364,968	71,804	436,772	948,542
Oregon	300,929	29,488	330,417	1,212,920
Pennsylvania	692,516	27,199	719,715	1,839,567
Rhode Island	17,925	542	18,467	42,942
South Carolina	250,962	13,948	264,910	452,351
South Dakota	98,659	41,972	140,631	275,774
Tennessee	562,062	166,367	728,429	860,936
Texas	467,551	9,893	477,444	736,276
Utah	117,110	8,800	125,910	379,842
Vermont	72,466	34,287	106,753	249,838
Virginia	359,521	13,031	372,552	573,843
Washington	389,275	21,497	410,772	1,496,482
West Virginia	183,791	8,841	192,632	382,091
Wisconsin	680,590	331,245	1,011,835	2,270,264
Wyoming	116,840	60,484	177,324	607,781
TOTALS	16,039,876	2,662,107	18,701,983	$42,149,674

1/ This is the gross cost to the fishermen for various types and categories of licenses issued by the respective states for the privilege of fishing and/or possessing fishes.

censes decreased by 152,826. In spite of the drop in fishing and the gain in hunting licenses, fishing is still the more popular sport. A total of 18,701,983 licenses were sold for angling compared with 14,461,848 for hunting. Conversely, the hunters paid the greater amount for their licenses, tags, permits, and stamps--$46,638,220 compared with $42,149,674 for fishing licenses, permits, and stamps. During the year previous, the total cost to hunters for all licenses was $42,790,687 and to fishermen $39,501,838.

There were 14,088,608 resident-hunting license holders and 373,240 nonresident; those holding resident fishing licenses total 16,039,876 and the nonresidents total 2,662,107.

Under the Federal aid formulas for the distribution of Pittman-Robertson funds for the restoration of game and the Dingell-Johnson funds for the restoration of fish, the number of license holders (not the amount paid for licenses) is one factor considered.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, APRIL 1956, P. 24.

United States Fishing Fleet[1/] Additions

FEBRUARY 1957: A total of 31 fishing vessels of 5 net tons and over were issued first documents as fishing craft during February 1957, according to the U. S. Bureau of Customs. This was 5 vessels more than the number reported for the same month last year.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft, by Areas, February 1957 with Comparisons

Area	February		Jan.-Feb.		Total
	1957	1956	1957	1956	1956
	(Number)				
New England	2	3	3	4	15
Middle Atlantic	3	3	5	5	26
Chesapeake	9	3	17	8	138
South Atlantic	3	6	11	10	119
Gulf	9	7	10	10	100
Pacific	3	2	5	3	76
Great Lakes	-	-	-	-	6
Alaska	2	1	6	2	40
Hawaii	-	1	-	1	1
Total	31	26	57	43	521

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

Table 2 - Vessels Issued First Documents as Fishing Craft, by Tonnage, February 1957

Net Tons	Number
5 to 9	12
10 to 19	6
20 to 29	3
30 to 39	6
40 to 49	1
50 to 59	1
180 to 189	1
360 to 369	1
Total	31

The Chesapeake and Gulf areas led with 9 newly-documented vessels each, followed by the Middle Atlantic, the South Atlantic, and the Pacific areas with 3 each. New England and Alaska had 2 newly documented vessels each.

1/ Includes both commercial and sport fishing craft.

A total of 57 fishing vessels was documented for the first time during the first o months of 1957--an increase of 14 craft, or 33 percent, compared with the cor- sponding period last year. During the two-month period of 1957, the Chesapeake d all other areas with 17 newly-documented vessels, followed by the South Atlantic ith 11, and by the Gulf with 10.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, DECEMBER 1956: United States imports of edible fresh, frozen, and processed fish and shellfish in December 1956 were 6 percent less in quantity, but up 5.5 percent in value as compared with the pre- ious month. Compared with December 1955, the imports for December 1956 were most the same in quantity, but 1.2 per- nt more in value. December 1956 im- orts averaged 30.9 cents a pound as ompared with 30.5 cents a pound for the ame month in 1955. A comparison of ie December 1956 imports of leading dible fishery products with those for ecember 1955 shows that the drop in roundfish fillets, frozen, and canned almon, canned crab meat and lobster neat, and canned tuna was more than ffset by increases in fillets other than roundfish, canned sardines, frozen piny lobsters, and frozen tuna.

United States Foreign Trade in Edible Fishery Products, December 1956 With Comparisons

Item	Quantity			Value		
	Dec.		Year	Dec.		Year
	1956	1955	1955	1956	1955	1955
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish and shellfish: Fresh, frozen & processed 1/	56.4	56.4	769.5	17.4	17.2	206.4
Exports:						
Fish & shellfish: Processed 1/ only (excluding fresh & frozen)	7.9	9.9	88.3	1.6	2.0	21.6

1/ Includes pastes, sauces, clam chowder and juice, and other specialties.

Exports of processed edible fish and hellfish in December 1956 declined a- out 13 percent in quantity as compared with the previous month and were 20 per- ent below December 1955. The December 1956 value of these exports was 43 per- ent lower than the previous month, and down about 20 percent from the same month year earlier.

Because of the very poor sardine season on the Pacific Coast this past season, anned sardine exports in December 1956 were only one-fourth of those for the ame month in 1955, which accounts for part of the decline in the exports of fish nd shellfish.

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GROUNDFISH FILLET IMPORTS LOWER IN FEBRUARY 1957: Imports of roundfish (including ocean perch) fillets and blocks during February 1957 totaled 0 million pounds as compared with 11.0 million pounds imported during the same onth of 1956--a decrease of 36 percent. The decrease was primarily due to re- uced imports from Canada, and no imports from Iceland.

Total groundfish and ocean perch fillet imports into the United States during e first two months of 1957 amounted to 26.0 million pounds as compared with 5.5 million pounds during the same period of 1956. Canada with 18.6 million ounds led all other countries exporting fillets to the United States during the first o months of 1956, followed by Iceland (5.1 million pounds) and Norway (1.9 million ounds). These three countries accounted for 98 percent of the total imports for e first two months of 1957.

TE: SEE CHART 7 IN THIS ISSUE.

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IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY 1957: Imports: GROUNDFISH: Fillets imported during January 1957 totaled 11.7 million pounds, a decline of 5 percent from the same month a year ago. Cod and haddock fillets declined by 17 percent, while ocean perch fillets increased by 63 percent.

Blocks and slabs imported in January totaled 6.6 million pounds, an increase of 133 percent from the same month of 1956.

FROZEN TUNA: Imports of 12.5 million pounds in January were 11 percent more than January 1956. Albacore imports declined 61 percent, but other frozen tuna showed a gain of 63 percent.

CANNED TUNA: January imports of almost 2 million pounds were down 16 percent from a year ago.

CANNED BONITO: Imports of 1.6 million pounds were only slightly below a year ago.

CANNED SALMON: Imports of 4.5 million pounds during January were almost double those in the same month of 1956. Imports were all from Japan.

CANNED SARDINES: A total of 1.8 million pounds were imported during January, a gain of 7 percent from a year ago.

SWORDFISH: January imports of 1.4 million pounds declined by 14 percent from a year ago.

SHRIMP: Total imports in January were 5.7 million pounds--a decline of 35 percent from a year earlier due to smaller receipts from Mexico.

LOBSTERS AND LOBSTER TAILS: Fresh and frozen lobster and lobster tail imports this January of 4.8 million pounds were 51 percent above those for January 1956.

CANNED CRABMEAT: Imports during January amounted to 305,000 pounds, a decline of 29 percent from same month of 1956.

FISH MEAL: Imports of 4,219 tons were 62 percent less than during January 1956.

Exports: CANNED SARDINES: Exports of 2.6 million pounds of canned sardines during January 1957 were 69 percent less than in same month of a year ago.

CANNED MACKEREL AND JACK MACKEREL: Exports of 2 million pounds represented large gains over a year ago as a result of large shipments to the Philippines.

FISH OIL: January exports totaled 16.6 million pounds, up 28 percent from those of the same month a year earlier.

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IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA PROVISO: The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1957 at the $12\frac{1}{2}$-percent rate of duty is limited to 44,528,533 pounds. Any imports in excess of that quantity will be dutiable at 25 percent ad valorem.

Imports under the quota from January 1-March 2, 1957, amounted to 3,726,080 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 40,802,453 pounds of the quota which may be imported during the balance of 1957 at the 12½-percent rate of duty.

* * * * *

UNITED STATES FISH OIL EXPORTS DECLINE IN 1956; Fish oil exports from the United States in 1956 totaled 70,402 short tons, slightly less than the record 71,336 tons exported in 1955.

United States Fish Oil Exports by Country of Destination, Average 1935-39, Annual 1952-56

Country of Destination	1956[1/]	1955[1/]	1954	1953	1952	Average 1935-39
	(Short Tons)					
NORTH AMERICA:						
Canada	1,603	11,251	7,511	2,108	488	458
Cuba	85	83	126	87	100	155
Mexico	66	81	118	114	122	45
Other	28	1	-	1	3	71
Total	1,782	11,416	7,755	2,310	713	729
SOUTH AMERICA	62	56	148	63	38	96
EUROPE:						
Belgium-Luxembourg	750	1,098	-	764	8	8
Denmark	866	-	-	-	-	-
France	13	9	-	7	149	19
Western Germany	32,490	10,503	10,481	36,155	6,232	126
Italy	60	106	85	28	220	15
Netherlands	24,075	39,642	43,692	8,913	11,967	15
Norway	6,251	6,758	1,102	1,606	-	10
Sweden	2,646	-	-	-	-	7
Switzerland	367	646	5,797	3,115	3,140	15
United Kingdom	920	881	1,376	299	-	77
Other	-	23	27	23	43	8
Total	68,438	59,666	62,560	50,910	21,759	300
ASIA:						
Philippines, Republic of	4	-	233	860	546	66
Other	5	55	51	37	20	24
Total	9	55	284	897	566	90
AFRICA	25	68	70	53	3	19
Grand Total	3/ 70,402	2/ 71,336	70,817	54,233	23,079	1,234

1/ Preliminary.
2/ Includes 75 tons whose destination is not indicated.
3/ Includes 86 tons whose destination is not indicated.

Western Europe again was the major market, taking 97 percent of the total or almost 9,000 tons more than in the previous year. West Germany and the Netherlands continued to be the principal buyers of United States fish oil. Exports to West Germany in 1956 were almost 3 times the 1955 tonnage, while exports to the Netherlands declined about 40 percent from the previous year. Exports to Canada dropped to less than 2,000 tons as compared with over 11,000 in 1955.

Wholesale Prices, February 1957

Most of the major United States fisheries active during February experienced a normal month with weather conditions, on the average, much improved over the previous month.

In February 1957, the over-all edible fish and shellfish (fresh, frozen, and canned) wholesale price index (115.3 percent of the 1947-49 average) dropped 5.3 percent below that for January, but was slightly higher (1.4 percent) than that for February 1956. Except for a substantial drop in the prices for fresh drawn haddock and fresh haddock fillets at Boston in February, changes in the wholesale prices for the other individual items in the index were slight.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, February 1957 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			Feb. 1957	Jan. 1957	Feb. 1957	Jan. 1957	Dec. 1956	Feb. 1956
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					115.3	121.8	116.1	113.7
Fresh & Frozen Fishery Products:					124.9	136.2	126.6	121.7
Drawn, Dressed, or Whole Finfish:					113.0	134.1	118.6	114.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.06	.14	60.7	143.6	92.7	86.9
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.34	.35	105.2	108.3	108.3	97.5
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.64	.64	142.7	143.8	143.8	134.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.69	.59	171.1	146.3	151.2	181.0
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.75	.70	151.7	141.5	143.6	131.4
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.70	.57	143.4	116.8	145.4	150.6
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.65	.60	152.4	140.7	84.4	129.0
Processed, Fresh (Fish & Shellfish):					132.6	140.3	134.7	127.6
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.26	.46	88.5	158.2	103.8	110.6
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.83	.82	130.4	128.8	129.6	121.7
Oysters, shucked, standards	Norfolk	gal.	5.875	6.12	145.4	151.6	148.5	139.2
Processed, Frozen (Fish & Shellfish):					124.4	122.7	118.2	116.5
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	103.4	103.4	103.4	102.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.31	.30	97.3	87.9	87.9	92.6
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.29	.28	114.8	114.8	110.8	114.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.85	.84	131.2	130.0	126.0	119.6
Canned Fishery Products:					101.5	101.5	101.2	102.4
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.65	22.65	120.0	120.0	120.0	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.20	11.20	80.8	80.8	80.8	85.1
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	9.00	9.00	105.0	105.0	105.0	83.2
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	cs.	7.95	7.95	84.6	84.6	81.9	89.9

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

A sharp drop (down 57.7 percent) in prices for fresh large drawn haddock from January to February was responsible for the 15.7 percent decline in the index for the drawn, dressed, or whole finfish subgroup. As a rule, heavy landings of groundfish (chiefly haddock) from the Northwest Atlantic fishing banks at Boston on any one day will cause prices to drop precipitously if the supply exceeds the immediate fresh and frozen trade needs. Pacific halibut wholesale prices at New York also showed signs of weakness in February. The four fresh-water items in the subgroup were priced higher in February. Supplies of Great Lakes whitefish, lake trout, and yellow pike were quite light in February, and as a result prices rose. When com-

pared with February 1956, the drawn, dressed, or whole finfish subgroup index for this February was down only by about one percent in spite of substantially lower haddock prices. Higher wholesale prices for the other subgroup items this February as compared with February 1956 just about compensated for the lower drawn haddock prices.

The fresh processed fish and shellfish subgroup index in February 1957 was lower by 5.5 percent when compared with the previous month, but was higher by 3.9 percent as compared with the same month in 1956. Lower fresh haddock fillet prices (down 44.1 percent) this February and shucked oyster prices (down 4.1 percent) from January were only partially offset by slightly higher prices for fresh shrimp (up 1.2 percent). On the other hand, lower fresh haddock fillet prices in February 1957 were more than offset by higher shrimp (up 7.1 percent) and oyster (up 4.5 percent) prices when compared with February 1956.

Changes between January and February 1957 in the frozen processed fish and shellfish subgroup prices were slight--the index for the subgroup went up only 1.4 percent from January to February but rose 6.8 percent when compared with February 1956. Frozen haddock fillets went up about 3.3 percent and frozen shrimp prices went up 1.0 percent from January to February. All the items in this subgroup were priced higher in February 1957 than for the same month in 1956, except for frozen ocean perch fillet prices which remained unchanged. Frozen shrimp prices at Chicago increased 9.7 percent from February 1956 to February 1957.

The canned fishery products subgroup index in February 1957 was unchanged from the previous month and lower by less than one percent as compared with February 1956. The market for canned fish was steady with stocks of California sardines and salmon quite light at the packers' level. Maine sardine supplies were light to moderate and canned tuna plentiful.

PREDICTING COLOR OF CANNED SALMON

A practical test to predict the color of canned salmon is reported. Sample slices of fresh salmon flesh are dipped into glycerine at 435° F. (224° C.) and the resulting color change is similar to that produced on canning the product. This technique is expected to be of value in the sorting of salmon on a color basis prior to canning, an operation which at the present time is not always successful because color of the fresh meat in certain species does not have consistent relation to the color of the canned product.

Experiments on the elimination of curd in canned salmon have shown that although dipping of the fish in phosphoric acid gave the best appearing product, the tartaric acid-treated product was better in flavor.

--Annual Report of the Pacific Fisheries Experimental Station, Fisheries Research Board of Canada.