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A review of developments and news of the fishery industries
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BONE DETECTION IN FISH BY X-RAY EXAMINATION

Part 2 - Fluoroscopic Examination of Frozen Fried Fish Sticks

By J. J. Powell*

ABSTRACT

WITH THE USE OF A MEDICAL DIAGNOSTIC X-RAY FLUOROSCOPE, 98.5 PERCENT OF THE BONES CONTAINED IN SEVERAL THOUSAND FROZEN FRIED FISH STICKS WERE DETECTED DURING A TEST OF THE METHOD. USE OF THE FLUOROSCOPE FOR THE PURPOSE OF BONE DETECTION DID NOT REQUIRE COOKING AND DESTRUCTION OF THE FISH STICKS, WHICH WOULD BE NECESSARY IN MANUAL-VISUAL INSPECTION. THIS FLUOROSCOPIC X-RAY METHOD IS SUITABLE FOR ROUTINE QUALITY-CONTROL IN COMMERCIAL PLANTS AND FOR USE IN DETECTING BONES IN THE GRADING OF FROZEN FRIED FISH STICKS.

INTRODUCTION

A quick and accurate method for the detection of bones in fishery products has been sought since the U. S. Fish and Wildlife Service, with the cooperation of the fishing industry, developed the voluntary United States Standards for Grades of Frozen Fried Fish Sticks (Federal Register, July 21, 1956^{1/}). Frascatore and Holston (1955) employed photographic X-ray examination for the detection of bones in fish blocks and fillets. Although that method proved to be accurate, it was time-consuming and expensive. Fluoroscopic X-ray examination for bone detection in fishery products was suggested as being a quicker and a more practical means of solving this problem.

This paper reports the preliminary experiments employing the suggested fluoroscopic X-ray technique. The immediate purpose of this test is to develop a routine quality-control measure in commercial plants and for grading procedures in the application of the voluntary United States Standards for fishery products. The ultimate purpose, however, is to acquire information that will aid in the development of a routine continuous method of bone detection in fishery products as they are being processed commercially.

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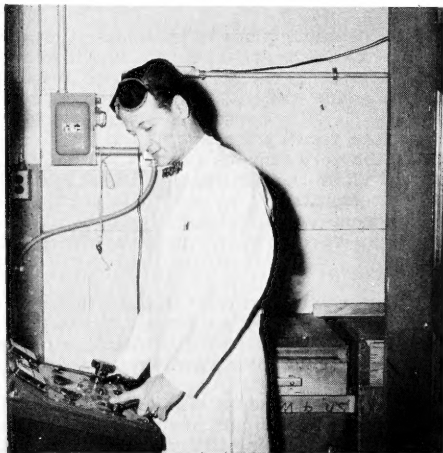


FIG. 1 - DETERMINING THE "BONE-CONTENT" OF FISH STICKS, BLOCKS, OR FILLETS BY USE OF X-RAY FLUOROSCOPY. THE OPERATOR IS ADJUSTING THE X-RAY CONTROL PANEL.

The fluoroscopic equipment available for these studies at the Bureau of Commercial Fisheries Technological Laboratory at East Boston was not designed for industrial use but rather for routine medical diagnostic examinations. It has an operating range of 2.5 to 15.0 milliamperes and 30 to 85 kilovolts.

The image produced on the fluoroscopic screen (Dupont-Patterson CB-2) is influenced by various factors. The sharpness of the image, for example, is dependent on the size of the focal point (that point where the cathode rays strike the anode to produce X-rays). If this point is large or if the tungsten anode overheats, expanding the metal, the image may be distorted, causing it to be diffuse and vague.

Other difficulties are caused by the inability of the operator to see the bones on the fluoroscopic screen. The light emitted by the fluoroscope is dim, and as a result, the operator is quickly susceptible to eye fatigue.

OBJECTIVES

The objectives of the present study were as follows:

1. To determine the optimum conditions for use and operation of available X-ray fluoroscopic equipment.
2. To determine the reliability of the fluoroscopic method when applied to the detection of bones in frozen fried fish sticks.

EXPERIMENTAL

The first problem was to determine the optimum energy levels at which to view the test samples. Approximately 50 pounds of fresh haddock and scrod haddock fillets (each fillet contained at least one bone) were viewed on the fluoroscopic screen with the current ranging from 2.5 to 9.5 milliamperes and the potential ranging from 40 to 85 kilovolts. The clearest and sharpest image on the screen was obtained at a setting of 8 to 9 milliamperes and 70 to 75 kilovolts.

The continuous use of such high-energy levels for over 3 minutes would be detrimental to the X-ray tube, causing it to overheat. To solve this problem, the instrument was operated for 2 minutes and then turned off for an equal period. When this procedure was followed, the image produced on the screen was sharp and clear.

Before viewing the samples in the dark room, the operator must accustom his eyes to the very dim light emitted by the fluoroscope. This is accomplished by donning red plastic adaptation goggles at least 20 minutes before entering the darkroom. If this precautionary measure was not taken or was done improperly (that is, if the goggles were worn in sunlight or under bright artificial light), small bones in the fish sticks were apt to be missed. The goggles are removed before viewing the screen.

After viewing samples in the dim light of the X-ray room for approximately 30 minutes, the operator's eyes became tired. Therefore, any viewing beyond this length of time decreased the reliability of the observation. Accordingly, the 30-minute time limit for viewing was never exceeded.

To test the effectiveness of the method 3,301 frozen fried fish sticks were obtained from several commercial plants. The fish sticks were removed from the package prior to being fluoroscoped. The fish sticks that were shown to contain bones by this method were designated positive; those not showing the presence of bones were designated negative. The fish sticks were then placed on a cookie pan (the positive fish sticks were indicated) and cooked in an oven at 400° F. for 15 min-

utes. The cooked fish sticks were removed from the oven and allowed to cool. They were then crushed and shredded by hand to feel for bones to check the accuracy of the fluoroscopic examination.

Table 1 - Reliability of X-ray Fluoroscope in Detection of Bones in Frozen Fried Fish Sticks

Number of Fish Sticks ^{1/} Examined	Number of Bones Detected by Manual-Visual Inspection	Number of Bones Detected by Fluoroscopic Inspection	Number of Bones Missed in Fluoroscopic Inspection	Accuracy by Fluoroscopic Inspection ^{2/}
3,301	130	128	2	Percent 98.5
^{1/} ALL STICKS WERE FIRST EXAMINED BY A FLUOROSCOPE THEN COOKED AND EXAMINED BY MANUAL-VISUAL INSPECTION.				
^{2/} PERCENTAGE OF ACCURACY CALCULATED AS FOLLOWS:				
$100 - \frac{\left[\left(\frac{\text{NUMBER OF BONES DETECTED BY MANUAL-VISUAL INSPECTION}}{\text{NUMBER OF BONES DETECTED BY FLUOROSCOPIC INSPECTION}} \right) - \left(\frac{\text{NUMBER OF BONES DETECTED BY FLUOROSCOPIC INSPECTION}}{\text{NUMBER OF BONES DETECTED BY MANUAL-VISUAL INSPECTION}} \right) \right] \times 100}{\text{NUMBER OF BONES DETECTED BY MANUAL-VISUAL INSPECTION}} = \text{PERCENT ACCURACY}$				

The results of this study (table 1) indicated that the X-ray fluoroscope, when operated under the conditions stated, will detect 98.5 percent of the bones present in frozen fried fish sticks.

CONCLUSION AND RECOMMENDATION

An accuracy of 98.5 percent in the detection of bones in frozen fried fish sticks was obtained using a diagnostic-type fluoroscopic X-ray unit.

The detection of bones in frozen fried fish sticks by fluoroscopic X-ray examination can be applied to routine quality-control. This method can also be used by the Federal Inspection Service for grading frozen fried fish sticks. Whether this method can be applied to continuous plant inspection has yet to be determined. Further tests should be conducted to determine the feasibility of detecting bones in frozen fishery products on a continuous inspection basis using industrial-type fluoroscopic X-ray units.

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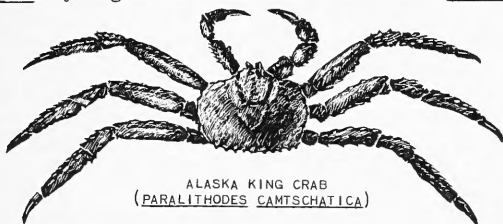
NOTE: ACKNOWLEDGMENT IS MADE TO THE GENERAL ELECTRIC X-RAY DIVISION AND TO KELEKET X-RAY CO., BOTH OF BOSTON, MASS., FOR THE LOAN OF EQUIPMENT USED IN THESE EXPERIMENTS. WE WISH TO THANK R. H. FLETCHER AND J. A. DIENER OF THE RESPECTIVE COMPANIES FOR THEIR TECHNICAL AID AND ADVICE.



MEAT CONTENT OF PAVLOF BAY KING CRABS

By Henry M. Sakuda*

Previous statements on the meat content of king crabs (*Paralithodes camtschatica*) by Wigutoff and Carlson (1950) and in Fishery Market News (May 1942 supplement) are based on production figures and do not include the size of crabs from which the yields were obtained.



ALASKA KING CRAB
(*PARALITHODES CAMTSCHATICA*)

crab to the entire meat yield was desired. With such a relationship established, it would only be necessary to extract and weigh meat from this body part to estimate the total available meat of the whole crab. The merus (thigh) section of the right third leg was selected for this purpose.

SOURCES OF DATA

On March 23, 1957, the M/V Deep Sea commenced king crab factoryship operations in the Pavlof Bay area on the Alaska Peninsula. The commercial processing equipment aboard the vessel was used in this study. Although the meat extracting was done with more care than in commercial operations, the parts of the crabs used were the same, i.e., claws, legs, and shoulders.

SAMPLING PROCEDURE

Specimens were selected to include all the commercial sizes present. In an effort to keep the method of weighing constant, weights were taken immediately upon removal of crabs from the live tanks and subsequently upon removal from the cooling tanks after cooking. Both weighing procedures required approximately 30 seconds and did not exceed 45 seconds. To standardize weight variations due to water loss, crabs were kept on their backs at all times. The specimens were cooked with the commercially-butchered crab sections in wire baskets at about 200° F. for 25 minutes. The cooked crabs were cooled in tanks containing running sea water. Prior to meat extraction, the carapace and gills were removed and the body broken in half and rinsed.

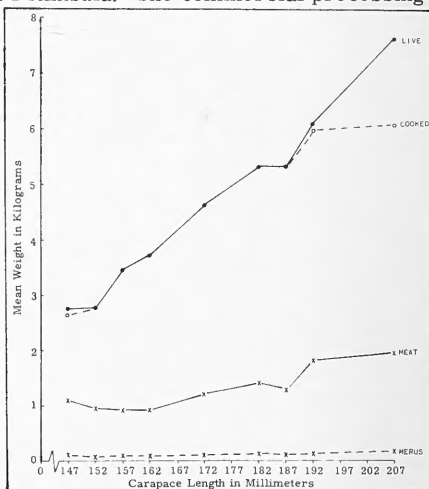


FIG. 1 - MEAN WEIGHTS OF 20 KING CRABS BY CARAPACE LENGTH.

The leg meat was extracted by a pressurized jet of water forced into the outer extremity of the propus. After the initial force of water had removed most of the

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meat, bits of meat were often found adhering to the tendons. These were recovered by breaking the shell at each joint. The extracted meat was washed by sprinkling water.

The meat from the right third merus and the total meat from each specimen were weighed.

RESULTS

Twenty specimens were collected between April 20 and April 26, 1957. The data concerning these crabs, arranged in order of increasing carapace length, are given in table 1.

Figure 1 is a graphic presentation of table 1 in 5-mm.-carapace length intervals.

From the data of table 1, the mean meat weight is 27.48 percent of the live weight. The merus meat averages 2.23 percent of the live weight, 2.33 percent of the cooked weight, and 8.11 percent of the total meat weight. Figure 2 graphically presents these percentages.

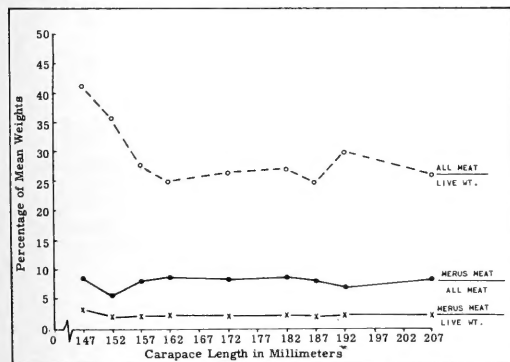


FIG. 2 - PERCENTAGE OF MEAN WEIGHTS OF 20 KING CRABS BY CARAPACE LENGTH.

Specimen No.	Carapace Length (Millimeter)	Live Weight (Kilogram)	Cooked Weight (Kilogram)	Total Meat Weight (Kilogram)	Merus (Thigh) Meat Weight (Kilogram)
1	145	2.7499	2.6649	1.1340	.097
2	150	2.8066	2.8208	1.3041	.057
3	154	2.7783	2.7783	.6804	.055
4	155	3.2744	3.1469	.8080	.056
5	159	3.5153	3.3737	1.0773	.085
6	159	3.5862	3.4587	.9639	.085
7	163	3.7988	3.7564	.9639	.079
8	164	3.6429	3.4729	.8930	.083
9	170	4.2241	4.1675	.8080	.067
10	172	4.7202	4.6494	1.2900	.111
11	172	4.8478	4.6778	1.3608	.114
12	172	4.7344	4.7628	1.4033	.117
13	180	5.6700	5.4857	1.4742	.138
14	181	4.6068	4.5502	1.3466	.112
15	182	5.4573	5.3015	1.4175	.125
16	184	5.5281	5.2589	1.4600	.120
17	185	5.3439	4.3620	1.2190	.108
18	186	5.2872	5.1739	1.4033	.102
19	191	6.1093	5.9677	1.8285	.136
20	205	7.6260	6.0669	1.9845	.166
Mean	171.45	4.5154	4.3198	1.2410	.101

NOTE: 1 KILOGRAM EQUALS 2.2046 POUNDS.

There was a 4-percent decrease in the mean live weight of the specimens after cooking.

Although the results are based on a short term study and may not be applicable in all cases, the constant percentage of merus meat weight to live weight gives indications that the merus may be used as a suitable standard for meat-content estimates.

SUMMARY

1. There was a slight decrease in weights after the specimens were cooked.

2. The live and total meat weights did not increase proportionately.

3. A higher percentage of meat yield was recovered from the smaller specimens.

4. The percentage of merus meat weight to all meat weight remained fairly constant throughout the sizes.

5. Indications of a very constant percentage between the merus meat weight and the live weight enables the use of the merus meat as a suitable standard for future meat-content estimates.

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COLD WINTRY DAYS ARE CHOWDER DAYS

The aroma of savory clam chowder cooking on the stove is a pleasant experience, especially on a cold wintry day. Clam chowder is an economical hearty dish that is as full of good nourishment as it is of good flavorful eating.



There are two basic clam chowders, the New England and the Manhattan. Ingredients common to both are clams, potatoes, a bit of onion, and clam liquor and water. (For those who desire it, salt pork or bacon may be added.) The New England chowder is made with the addition of milk, whereas, the Manhattan chowder is made with the addition of tomatoes. Additions of other ingredients are regional.

The home economists of the United States Fish and Wildlife Service are suggesting that you serve "Clam and Corn Chowder," a variation of New England chowder using canned corn which is plentiful now.

CLAM AND CORN CHOWDER

1 PINT CLAMS	1 TEASPOON SALT
1 CUP CHOPPED SALT PORK OR BACON	DASH PEPPER
1 CUP CHOPPED ONION	1 CAN (8 OUNCES) WHOLE-KERNEL CORN
1 CUP CLAM LIQUOR AND WATER	2 CUPS MILK
1 CUP DICED POTATOES	1 TABLESPOON BUTTER OR OTHER FAT
1 TEASPOON CELERY SALT	$\frac{1}{3}$ CUP CRACKER CRUMBS

Drain clams and save liquor. Chop. Fry bacon until crisp; drain on absorbent paper. Cook onion in bacon fat until tender. Add liquor, potatoes, seasonings, and clams. Cook about 15 minutes or until potatoes are tender. Add corn, milk, and butter; heat. Stir in cracker crumbs. Garnish with bacon sprinkled over the top. Serves 6.



RESEARCH

IN SERVICE LABORATORIES



BRINE-FROZEN HADDOCK TESTS BY INDUSTRY

The stimulation of industry interest in freezing New England groundfish at sea and also to acquaint members of the local fishing industry with methods of handling and processing fish frozen at sea were the objectives of a project recently initiated by the East Boston Fishery Technological Laboratory of the U. S. Bureau of Commercial Fisheries.



INTERESTED INDUSTRY MEMBERS OBSERVE TECHNIQUES DEVELOPED TO UNLOAD FISH FROZEN AT SEA FROM THE HOLDS OF THE BUREAU OF COMMERCIAL FISHERIES' EXPLORATORY VESSEL DELAWARE.

About 54,000 pounds of haddock brine-frozen aboard the Service's experimental trawler Delaware were landed at Boston in July and distributed among 23 fish dealers and processors who previously indicated their willingness to participate in testing these fish.

The brine-frozen fish will be kept in storage at 0° F. and sampled by industry members at intervals during frozen storage.

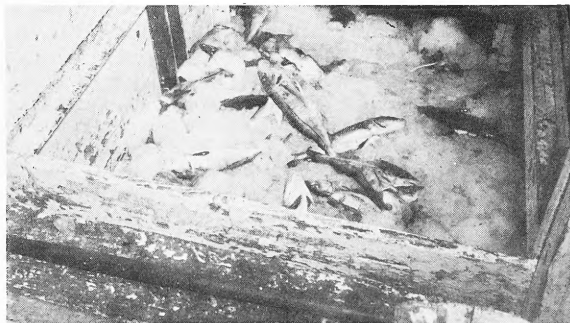
These participants will thaw and fillet the fish, refreeze the fillets, and test-market them in the manner customarily employed in the groundfish industry. The fish will be examined by industry members and laboratory personnel during the various stages of the experiment and the information collected will be used to improve and further develop techniques for processing, marketing, and distributing brine-frozen fish.



NEW VESSEL FISH-ICING TECHNIQUES PROVE VALUE TO NEW ENGLAND FISHERIES

A new fish-icing plan aboard vessels is proving its worth to the New England groundfish industry by getting fresher fish on the consumer's dining table, the United States Fish and Wildlife Service reported September 27, 1957.

The impetus behind the increasing usage of new fish-icing techniques is a series of full-scale, commercial demonstrations aboard fishing vessels at sea.



ICED HADDOCK IN THE HOLD OF A NORTH ATLANTIC TRAWLER

The work is being done by the Massachusetts Division of Marine Fisheries and is sponsored by the Service's Bureau of Commercial Fisheries with funds supplied through the Saltonstall-Kennedy Act of 1954 for improvement of the domestic fishing industry. Boston-based vessels are used in the demonstration. Full loads of fish iced according to techniques developed by the Bureau of Commercial Fisheries are compared with loads iced under conventional methods.

The new method relegates to "Davy Jones" many of the practices which have been followed for years. In some instances it has been difficult for boat owners to initiate changes, but the pressure of economics is beginning to outweigh the force of tradition. These new icing practices are a long step toward answering public demand for a uniformly better product.

Bureau of Commercial Fisheries' research has shown that the process of getting full-flavored fish to the family table begins at the time the fish are taken out of the water--and that mistakes made in that first hour cannot be rectified later.

The new technique is simple. Fish are eviscerated and each fish is thoroughly washed immediately after being caught; each individual fish is surrounded by sufficient ice to chill it rapidly and keep it chilled. Much of the secret of the success in handling fish by the new method is in the way the fish are stored and iced. After the Bureau of Commercial Fisheries developed the technique, it entered into a contract with the Massachusetts division of Marine Fisheries to demonstrate proper handling and icing techniques under commercial fishing conditions.

Through the cooperation of the industry, a man trained in the Bureau's new method goes aboard fishing vessels and demonstrates the handling and icing of the fish. In port, under the supervision of State inspectors, the results of the improved method can be compared with results from conventional means. The entire load of fish from one such demonstration cruise was recently adjudged "the best fish seen in this port for a long time."

The Bureau of Commercial Fisheries also has a contract with the National Fisheries Institute for the development of "Rules and Guidelines" for proper procedures in handling fish aboard vessels and in processing plants.



PLAN FOR DEVELOPMENT OF FEDERAL SPECIFICATIONS FOR FISHERY PRODUCTS

The Bureau of Commercial Fisheries has set the following goal for development of Federal fishery products specifications during the year ending June 30, 1958.

Shrimp, Frozen, Raw; Breaded--prepare new specification; Fish, Fresh (Chilled) and Frozen--revise present specification; Tuna Fish: Canned--revise present specification; Clams, Raw, Shucked; Fresh (Chilled) and Frozen--amend present specification; and Lobsters, Live, Chilled and Frozen--prepare new specification.

This is a coordinate research and development program between the Bureau's Fishery Technological Laboratory, at East Boston, Mass., and The Quartermaster Food and Container Institute for The Armed Forces, Chicago, Ill. The Bureau's responsibility involves (1) evaluation of the specific product needs of the various Federal agencies, (2) evaluation of commercial products, (3) conduct of research in developing the specification requirements, and (4) preparation of the specification and coordination with industry and other Federal agencies.



SCALLOP MEATS FROZEN IN GLUCOSE-SALT SOLUTION ABOARD VESSEL

A possible new development in the scallop industry, the immersion-freezing of scallop meats in a solution of glucose and salt aboard a scallop dragger, is under investigation by the Fishery Technological Laboratory of the Bureau of Commercial Fisheries at East Boston, Mass.

The Bureau's Exploratory fishing trawler Delaware arrived in New Bedford, Mass., in August with 500 pounds of scallop meats frozen at sea in a glucose (20 percent)--salt (20 percent) solution at a temperature of 0° F. The scallop meats separated easily after freezing and were then packed in 5-pound cartons and stored at 5° F. in the vessel's refrigerated hold.



THE BUREAU OF COMMERCIAL FISHERIES' EXPLORATORY VESSEL DELAWARE APPROACHING DOCK AT CONCLUSION OF FREEZING-SCALLOPS AT-SEA VOYAGE.

The frozen scallop meats were unloaded from the vessel at New Bedford and put into a local cold-storage plant. Industry members and personnel from the Laboratory will evaluate the frozen scallops at periodic intervals during frozen storage. Information obtained may well provide a basis for the adoption of freezing scallops at sea by the local fishing industry.



STRUCTURE AND FUNCTION OF THE KIDNEY IN THE OYSTER^{1/}

The major anatomical relationships, with the glaring exception of the excretory system, have been elucidated in the oyster *Crassostrea virginica*. To correct this



OYSTER

deficiency, the structure and function of the kidney (organ of Bojanus) and associated structures were determined. The structure was examined (1) grossly by injection of vital dye and observation of its distribution and (2) microscopically by sectioning preserved oysters. Two bladders are present, one on each side of the animal, with a tubular portion in between. On each side a funnel-shaped duct runs from the floor of the pericardium to the bladder and opens near the origin of the urinary pore. The latter opens to the exterior immediately posterior to the genital pore. Both openings are covered by a common flap. Injection of dye revealed that the tubules of the kidney are bathed in blood from the adductor muscle that is supplied directly by the heart. The blood then leaves the tubules for the gills.

When oysters were maintained in extremely diluted sea water, the blood remained more concentrated than the environment. The situation was reversed when the oysters were placed in extremely concentrated sea water. Measurements of the chloride concentrations of the blood and fluids from the pericardial cavity and bladder revealed that only in the most dilute medium is there a possibility that the kidney serves as an osmoregulatory organ. The wall of the ventricle appears to be the primary organ of salt filtration. In the lowest salinity tested the pericardial fluid was less concentrated than the blood, indicative of water elimination to keep the oysters more concentrated than their environment; whereas at higher concentrations the pericardial fluid was more concentrated than the blood, indicative of salt elimination to keep the oysters less concentrated than their environment. The kidney tubules, however, do seem to be involved directly in elimination of nitrogenous waste products.

^{1/}THIS INVESTIGATION WAS CONDUCTED UNDER A CONTRACT BETWEEN TULANE UNIVERSITY AND THE U. S. BUREAU OF COMMERCIAL FISHERIES WITH FUNDS PROVIDED BY THE SALTONSTALL KENNEDY ACT OF 1954.

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TRENDS AND DEVELOPMENTS

Biologists Seek Answers to Many Fishery Research Problems

Even with the experience gained over unnumbered centuries in the age-old enterprise of fishing, man's best efforts to supply this nutritious protein food for modern markets are still based largely upon hope and guesswork and that's not an efficient or economical way to operate a business, the Interior Commissioner of Fish and Wildlife Service stated September 4.

To remedy the situation, research biologists of the United States Fish and Wildlife Service are seeking ways to take the guesswork out of fishing so that precious time and money are not lost seeking "the fish that isn't there."

Painstakingly--and that's the way research operates--the fishery biologists are seeking the secrets of the sea which bear upon where fish can be found, what makes them abundant and how they can be most efficiently harvested. More than 200 species of fish which are currently used for human food are involved in these studies which stretch from inland streams to mid-ocean.

From the layman's point of view, the Commissioner explains, the problem can be considered in two parts:

(1) Developing methods by which you can predict when and where you can find large numbers of the fish you want to harvest by understanding what is responsible for variations in the supply.

(2) Knowing the exact effects of various kinds of harvest.

The former will make it possible for the commercial fisherman to know exactly where to go to conduct the finny harvest and the latter the right way to conduct that harvest to maintain bountiful supplies. That will cut down his overhead, put more money in his pocket, and at the same time permit savings in the housewife's budget.

Many interesting things are involved in these studies, such as--

The ocean currents, water temperatures, chemical content of the water, etc., and their effect on food supplies for and the distribution of its various fish populations.

What influences favorable spawning conditions and causes good survival years; what stimulates growth rates; the causes for abundance of food; how the effects of disease and predation (natural enemies) are reduced.

How do heredity and the particular water in which the fishes live affect their growth.

Why and how to manage differently the species which live a long time and those which grow rapidly and have a short life span.

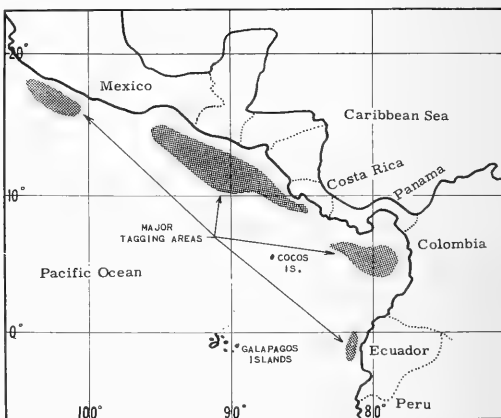
Answers to these questions must be found to take the guesswork out of fishing. So the fishery biologist has a long road ahead of him. New answers bring new questions. New days bring new problems. But the goal--that of determining the proper management measures, stream improvement, fish passage devices, pollution abatement, and other things which will lead to continuing high annual fish production--gets closer as each new bit of scientific data is added to what is already known.



California

YELLOWFIN AND SKIPJACK TUNA TAGGED BETWEEN SOUTHERN MEXICO AND ECUADOR (M/V Cape Falcon Cruise 57-C-3): A total of 490 yellowfin and 588 skipjack tuna were tagged and released during a tagging cruise (May 4-July 30, 1957) by the California Fish and Game Department biologists aboard the commercial tuna clipper Cape Falcon. Tagging was done with red and white type G or spaghetti tags to test recovery rate between the two colors. Collections of marine life from baiting and fishing areas were also collected during the cruise.

Tuna were tagged and released in the following areas; Southern Mexico: yellowfin, 9 white tags; Gulf of Tehuantepec: yellowfin, 13 white and 20 red tags; Central America: yellowfin, 57 white and 71 red tags; skipjack, 90 white and 85 red tags; Panama: yellowfin, 163 white and 154 red tags; skipjack, 90 white and 100 red tags; Northern Ecuador: skipjack, 10 white and 10 red tags; Gulf of Guayaquil: yellowfin, 2 white and 1 red tags; skipjack, 100 white and 101 red tags; Malpelo Island: skipjack, 2 white tags.



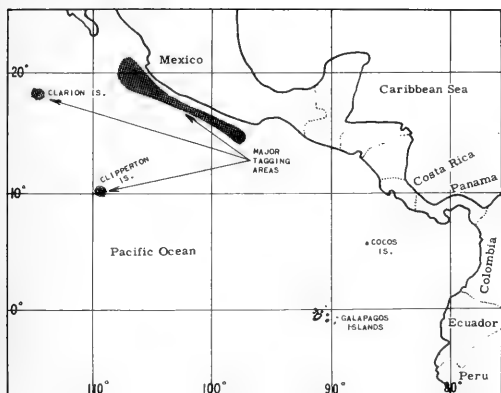
M/V CAPE FALCON CRUISE 57-C-3 (MAY 4 TO JULY 30, 1957).

Weather conditions and water surface condition temperatures were recorded daily during the trip. The surface temperatures in the fishing areas ranged between 77° and 87.4° F.

* * * * *

YELLOWFIN TUNA TAGGED OFF COAST OF MEXICO (M/V Southern Pacific Cruise 57-C-4): A total of 624 yellowfin tuna were tagged by biologists of the California Department of Fish and Game during a fishing trip (May 13-July 11, 1957) of the California tuna clipper Southern Pacific. The yellowfin tuna tagging program was planned to test the effect of tag color on future recovery by alternating red, white, and blue tags by groups of ten. In addition collections were made of marine life at baiting and fishing stations.

Yellowfin tuna were tagged and released from the following areas: Northern Mexico (130 red, 125 white, and 35 blue tags), Southern Mexico (127 red, 116 white,



M/V SOUTHERN PACIFIC CRUISE 57-C-4 (MAY 13-JULY 11, 1957).

A yellowfin tagged on March 8, 1957, 40 miles south of Acajutla, El Salvador, was recovered by a member of the tagging team on June 17--65 miles west by north of Acapulco, Mexico.



Clams

STUDIES ON SALINITY TOLERANCE OF EARLY STAGES OF HARD CLAMS: A resume of the observations on the salinity tolerance of the eggs, larvae, and set of East Coast hard clams (*Venus mercenaria*) has been prepared by biologists of the U. S. Bureau of Commercial Fisheries' Marine Biological Laboratory at Milford, Conn., and released as part of that Laboratory's Bulletin No. 3 (August 22, 1957). Much of the information can be applied by biologists and members of the industry, who are planning, or are now engaged in, the use of small salt-water ponds for the culture of commercial hard clams.

Eggs: The optimum salinity for development of eggs of the hard clam was 26.0-27.0 parts per thousand (p.p.t.). The

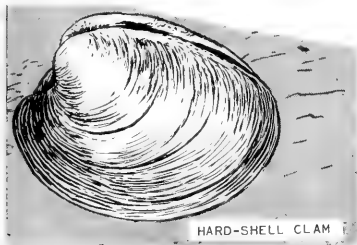
upper limit was 35.0 p.p.t., but less than one percent of the eggs developed at this salinity. Even at 32.5 p.p.t. only 30 to 50 percent of the eggs developed normally. The lower limit was 20.0 p.p.t. and 16 to 20 percent of the eggs developed normally at this salinity. At 22.5 p.p.t. approximately 80 percent of the eggs developed into normal straight-hinge larvae.

Larvae: A salinity of 26.0-27.0 p.p.t., or higher, was also optimum for growth of clam larvae, with 20.0 p.p.t. the lower limit for practical culture work. Some larvae did reach metamorphosis at 17.5 p.p.t. but were so weakened and sluggish that they died during or immediately after setting.

Set: Small (1.8-3.6 millimeter or average of about 1/10-inch) juvenile clams survived for a month or more in salinities as low as 15.0 p.p.t., and larger juveniles (5.0-21.5 millimeter or about 1/5-4/5 of an inch) survived in salinities as low as 12.5 p.p.t. None of the juvenile clams survived at 10.0 p.p.t. or lower. We have not yet determined what effect lowered salinities may have on the growth of young clams.

Most of the above data was obtained using, as parents, hard clams from Long Island Sound that had developed gonads at a salinity of approximately 27.0 p.p.t. Additional experiments will be conducted using, as parents, clams kept at lower salinities for several weeks before spawning, and also clams from different areas.

As additional information becomes available, we may find that the recommendations based on the present experiments will need to be revised for clams from other areas and for clams that develop gonads at salinities lower than that of Long Island Sound.



HARD-SHELL CLAM



and 59 blue tags), Clipperton Island (10 red and 14 white tags), and Clarion Island (6 red and 2 blue tags).

Length-frequency samples were taken from three separate schools off the coast of Mexico. Marine-life specimens were collected from night light stations, bait-net hauls, and tuna stomachs. Weather conditions and water surface temperatures in the areas fished ranged from 75° F. to 87° F.

The yellowfin tagged were exceptionally large, ranging in size from 41-101 centimeters (16.1-39.8 inches), with the majority between 80-95 centimeters (31.5-37.4 inches).

Cans--Shipments for Fishery Products, January-July 1957



Total shipments of metal cans during January-July 1957 amounted to 73,968 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 65,105 tons in January-July 1956.

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-AUGUST 1957: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Depart-

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, August 1957 with Comparisons							
QUANTITY				VALUE			
August		Jan.-Aug.		August		Jan.-Aug.	
1957	1956	1957	1956	1957	1956	1957	1956
..... (1,000 Lbs.) (\$1,000)			
2,117	2,860	17,105	18,275	1,198	1,403	8,834	9,108

ment of Defense, 2.1 million pounds (value \$1.2 million) of fresh and frozen fishery products were purchased in August by the Military Subsistence Market Centers. This was lower than the purchases in July by 28.6 percent and 26.0 percent less than the purchases in the same month a year earlier. The value of the purchases this August was lower by 19.6 percent as compared with the previous month and lower by 14.6 percent from August a year earlier.

For the first eight months of 1957 purchases totaled 17.1 million pounds, valued at \$8.8 million--a decrease of 6.4 percent in quantity and 3.0 percent in value as compared with the same period of 1956.

Prices paid for fresh and frozen fishery products by the Department of Defense in August averaged 56.6 cents a pound, 6.3 cents more than the 50.9 cents paid in July, and 7.5 cents higher than the 49.1 cents paid during August 1956.

Canned Fishery Products: Tuna was the principal canned fishery product purchased for the use of the Armed Forces during August.

NOTE: SOME LOCAL PURCHASES ARE NOT INCLUDED. ACTUAL TOTAL PURCHASES ARE HIGHER THAN INDICATED SINCE IT IS NOT POSSIBLE TO OBTAIN LOCAL PURCHASES.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, August 1957 with Comparisons		
Species	QUANTITY	
	August 1957	Jan.-Aug. 1957
	... (1,000 Lbs.) ...	
Tuna	26	1,476
Salmon	8	1,009
Sardine	2	108

* * * * *

INSPECTION CHARGE ON FISH PURCHASES PROPOSED: The fishing industry might be asked to pay the inspection costs on fresh and frozen fish purchased for the use of the Armed Forces by the Department of Defense Military Subsistence Market Centers.

At a conference in Washington attended by Defense Department officials and fishing industry representatives, it was brought out that an order has actually been written which would provide for the suppliers to pay the cost of inspection for all Department of Defense purchases of fresh and frozen fish and shellfish throughout the country.

The conference was attended by the Chief of the Office of Procurement and Inspection, Office of the Quartermaster General, four representatives from the Quartermaster Corps, a representative of the Massachusetts Fisheries Association, and two representatives from the National Fisheries Institute.

The order is being held up pending further study and a report which is being prepared by one of the industry representatives.

It has long been the practice for Army personnel to inspect fish when it is being processed, even though all of the fish inspected may not be purchased by them. There seems to be no equitable method by which inspection charges could be assessed on only that portion of fish purchased by the Defense Department. If charges were levied on all the fish inspected, the industry would find it impossible to pass inspection costs on to other customers.

* * * * *

FROZEN RAW BREADED SHRIMP INTERIM PURCHASE DESCRIPTION: An "Interim Quartermaster Corps Purchase Description for Shrimp, Frozen, Raw; Breaded" has been issued to temporarily serve the Military Subsistence Market Centers during the period in which certain comments on the proposed Federal Specification PP-S-315 ("Shrimp, Frozen, Raw; Breaded") can be resolved. A copy of the purchase description can be obtained from the Market Centers or from the Quartermaster Food and Container Institute for the Armed Forces, 1819 West Pershing Road, Chicago 9, Ill. The purchase description was prepared with the cooperation of technologists of the U. S. Bureau of Commercial Fisheries.

The purchase description is a modified version of the proposed Federal Specification PP-S-315 for the product. Revisions were made in the tolerance requirements for such items as black spot, sand veins, sizes, loose crumbs, coating breaks, and bacteria count.

Information obtained by the Armed Forces on procurement of the item using the purchase description will be used by the Bureau of Commercial Fisheries technological laboratories in developing the final version of the Federal specification. Other items affecting promulgation of the Federal specification involve application of the proposed standards for grades for frozen breaded shrimp and development of a method for determining the coating content of the frozen breaded shrimp.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, FEBRUARY 1957, P. 11.



Fur Seals

PRIIBLOF ISLANDS FUR-SEAL SKIN PRODUCTION, 1957: The annual sealing operations conducted by the U. S. Bureau of Commercial Fisheries on the Pribilof Islands in Alaska ended August 20, 1957, and netted 93,618 fur-seal skins.

The harvest last year amounted to 122,826 skins. From 1940 to 1956 the average annual yield was close to 65,000 skins.

The fur-seal industry of the Pribilof Islands has been operated by the United States Government since 1910. In 1911 an International Convention between the United States, Great Britain, Japan, and Russia to prohibit pelagic sealing--the killing of fur-seals at sea in the North Pacific--became effective.

This convention, which provided for the first time a sound basis for the management of the Alaska fur seals, remained in force for 30 years until terminated by Japan in October 1941. From 1942 the herd has been protected by a provisional agreement between Canada and the United States which reserved to Canada 20 percent of the skins taken each summer on the Pribilof Islands.



SEAL PUPS IN TYPICAL CONCENTRATION OF LATE SUMMER ON POLOVINA ROOKERY, ALASKA.

On February 9, 1957, a new interim North Pacific Fur-Seal Convention was concluded by Canada, Japan, the Union of Soviet Socialist Republics, and the United States, similar in form to the 1911 convention. The new convention provides that Canada and Japan each shall receive 15 percent of the seal skins taken commercially by the United States and by the U. S. S. R. On behalf of the United States, this convention was ratified by the Senate on August 8, 1957. Japan and Canada have already taken the required legislative action and Russia is expected to exchange ratifications soon.

Approximately 80 percent of the world's fur seals go to the Pribilof Islands each summer to breed. During the winter these seals range southward as far as southern California.



Great Lakes Fish Landings Increased in 1956

The 1956 United States Great Lakes commercial catch of fishery products, exclusive of Lake St. Clair and the International Lakes, amounted to over 79 million pounds, according to preliminary data released by eight states bordering on the Great Lakes. This represents an increase of nearly 4 million pounds as compared with the 1955 catch of over 75 million pounds. Outstanding gains were made in the 1956 yellow perch and lake smelt catches which increased more than 4 and 2 million pounds, respectively, from the 1955 harvest. Small gains were made in yellow pike and sheepshead catches. Catches of all other species were lower than the previous year.

Seven principal species accounted for 84 percent of the 1956 United States Great Lakes catch. These were (in million pounds): lake herring (16.3), chubs (11.3), yellow perch (10.8), lake smelt (7.8), yellow pike (17.1), blue pike (6.9), carp (6.5).

The 1956 Lake Michigan yellow perch catch of 3.4 million pounds was only slightly less than in 1955. The 1956 Lake Erie catch of this species (7.1 million pounds) was greater by 4.6 million pounds as compared with the 2.4 million pounds landed the previous year. The yellow perch run from Lake Erie during the fall season was exceptionally heavy. Ohio's 1956 Lake Erie landings of this species during the four-month period August-November totaled 4.6 million pounds--a monthly average of 1.2 million pounds as compared with a monthly average of only 0.2 million pounds during the same period in 1955.

The 1956 United States Great Lakes whitefish and lake trout catches again declined from the previous year. Whitefish catches of 1.5 million pounds dropped 360,000 pounds below the previous year's catch, with Lake Michigan's catch only 57,000 pounds as against 375,000 pounds in 1955. The 1956 lake trout catch in Lake Superior amounted to 1.8 million pounds--300,000 pounds lower than in 1955, and one million pounds below the 1952 catch of 2.8 million pounds.

Lake Michigan was the leading producer in 1956 with a catch of 31 million pounds, followed by Lake Erie (30.7 million pounds), Lake Superior (13.6 million pounds), Lake Huron (3.6 million pounds), and Lake Ontario (0.2 million pounds).



Great Lakes Fishery Investigations

OTTER-TRAWL AND GILL-NET FISHING IN LAKE ERIE CONTINUED: M/V "Cisco" Cruise 5 (July 23-August 6, 1957): Gill-net and otter-trawl fishing in the area of Lake Erie west of Lorain, Ohio, on the south and Point Pelee on the north were continued by the Great Lakes Fishery Investigations research vessel Cisco during cruise 5.

Gill nets (1-, 1½-, 2-, 2½-, 3-, and 4-inch mesh) were set with their float lines 6 to 9 feet beneath the surface in 6½ fathoms east of Kelly's Island, in 3 fathoms near



the west shore of Pelee Island, and in 3 fathoms near the east shore of Pelee Island. Eleven walleyes represented the largest single catch of this species taken to date. Other species taken were: blue pike,

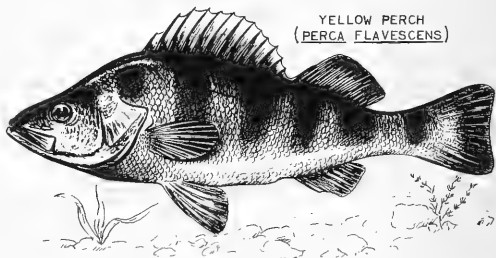
gizzard shad, yellow perch, white bass, rock bass, and channel catfish.

An oblique net set in the same area indicated that yellow perch were numerous 20 to 30 feet below the surface and sheepshead near the bottom. The gill nets set on the west side of Pelee Island took mostly sheepshead (37), with just a few walleyes, white bass, yellow perch, and one smallmouth bass. The net set on the east side of the Island, on the other hand, made a very large catch (354) of large yellow perch. There were 128 of this species in 100 feet of 2½-inch mesh, and 110 averaging 10.3 inches in 300 feet of 3-inch mesh. Other fish were 123 sheepshead and several walleyes, white bass, gizzard shad, and rock bass.

Trawling was conducted northwest of Pelee Island, at two places between this island and Point Pelee, northwest of Lorain, Ohio, and at 5 locations in the vicinity of the islands on the American side of the lake. Yellow perch and sheepshead made up the bulk of practically all hauls. Very few sheepshead, however, were caught south of Middle Sister Island, the westernmost area worked. Yellow perch and emerald shiners predominated in this area (a school of fish, almost certainly emerald

shiners, up to 30 feet thick was recorded on the fathogram here). Another unusual catch was made near shore just west of Lorain, where over 1,600 spottail shiners (36 pounds) were taken in one 15-minute tow of a relatively small trawl.

Some of the sheepshead caught this cruise appeared to have just completed spawning, but none were actually still in spawning condition. Other species taken in the trawls were walleye, blue pike (5), white bass, gizzard shad, channel catfish, carp, goldfish, white sucker, burbot (3), black crappie (1), stone cat (1), log-perch (2), trout-perch, alewife, silver chub, and smelt. Smelt in their second year of growth were much less abundant than previously, and older ones were very rare. Most of the smelt which were in the west end of the lake have presumably moved farther east to cooler water. Smelt fry, however, were fairly common in most areas trawled. Fry of white bass, walleye, sheepshead, yellow perch, and alewife were also obtained in the trawls, but except for perch and sheepshead fry caught in Sandusky Bay, none of these species were taken in abundance. Tiny fry, probably Cyprinids, were caught in large-mesh plankton nets. They seemed to concentrate near the surface even during daytime. Smelt fry were also taken in the plankton nets, but were near the bottom.



Two of the Cisco's biological staff, using SCUBA equipment, examined a trawl in operation underwater. Poor visibility hampered observations, but it was determined that the trawl, which had a 39-foot headline and a 51-foot footline, was opening well and spread a maximum of 12 feet vertically from headline to footline.

Water temperatures were very warm in the western end of Lake Erie, averaging about 25° C. (77° F.) at the surface. The extremes were 23.2° C. (73.8° F.) and 27.8° C. (82.0° F.). Generally, in all but the shallowest water, temperatures were somewhat warmer at the surface than at the bottom, probably due to the calm weather which prevailed most of the cruise.

M/V "Cisco" Cruise 6 (August 12-26, 1957): During cruise 6 the Cisco operated mainly in the eastern basin of Lake Erie. Some trawling was done in Ohio waters of the central basin.

Experimental gill nets (2½-inch mesh) were set obliquely from top to bottom in 13 fathoms off Erie, Penn., and in 26 fathoms off Long Point, Ontario; a bull net (2½-inch mesh, 120 meshes deep, 300 feet long) was set with its float line 8 fathoms below the surface in 17 fathoms of water off Long Point; and experimental gangs with several mesh sizes were set on the bottom in 33 fathoms off Long Point and 1 fathom below the surface in 13 fathoms off Erie. All gill net catches except that of the bull net were light. The bull net took 218 smelt (mostly yearlings), 27 yellow perch, and one lake herring. The bottom net off Long Point caught 25 smelt, while the oblique net there caught 11 smelt and 6 perch. The midwater net off Erie contained only 2 smelt and 3 perch, but the catch in the oblique net was somewhat heavier: 91 smelt, mostly in the bottom half, 4 perch, and 1 sheepshead at midlevels, 2 blue pike in top half, and 1 lake herring and 1 burbot near the bottom.

Trawling operations were conducted in 4 areas off Erie; 2 areas off Long Point; off Dunkirk, N. Y.; and off Ashtabula, Fairport, and Cleveland, Ohio. Trawling was done in most of these areas during Cruises 2 and 4. Smelt, especially those in their second year, continue to be the dominant species in the east end of the lake. On six occasions more than 1,000 yearling smelt were caught in a 15-minute tow, with the

largest catch over 4,000. These one-year-olds appear to be fairly uniform in size over the entire eastern basin, averaging about 4.6 inches. Those taken off Cleveland, however, averaged about 5.0 inches. They were usually abundant near the bottom or just under the thermocline, at least during daylight hours. Trout-perch were also taken in especially large numbers. The largest catch in a 15-minute tow was 1,235. They were taken at depths as great as 15 fathoms. The only other species taken in numbers were yellow perch, sheepshead, and alewife fry. The latter species was taken only once in 9.5 fathoms off Dunkirk, and sheepshead were numerous in only one tow, in 9 fathoms off Cleveland. Perch were not abundant anywhere at depths greater than 10 fathoms. Other species caught in trawls included burbot, slimy muddler, carp (1), white sucker, spottail shiner, logperch, johnny darter, sand darter, and smallmouth bass fry (1). The latter 3 species were taken in only one tow, at 8 fathoms off Erie on a sand bottom.

Except for an area east and south of Long Point, most of the water in the eastern portion of the lake deeper than 9 fathoms is thermally stratified. Off Long Point, the hypolimnion is approximately as thick as in other places, but the drop in temperature with depth in the discontinuity layer is appreciably slower. This situation may be related to the strong currents common around Long Point. Surface temperatures varied little over the eastern end of Lake Erie, ranging mostly between 21° and 23° C. Extremes were 20.8° C. (69.4° F.) and 24.6° C. (76.3° F.)

During a night plankton study off Long Point several *Mysis relicta* were caught, the first of the season. They were taken in a half-meter large-mesh plankton net, and were found at 23 and 37 meters depth in water 62 meters deep.

M/V "Cisco" Cruise 7 (September 3-15, 1957): The Cisco operated in the extreme western end of Lake Erie, west of Lorain, Ohio, on the south and Point Pelee, Ontario, on the north during cruise 7. As compared to Cruise 5, this cruise was characterized by definitely larger catches of walleyes or yellow pike, sheepshead, yellow perch, channel catfish, and gizzard shad.

The bottom trawl was used off Lorain, just east of the Detroit River light, in Sandusky Bay, and in 6 areas in the Islands region. In addition, a midwater trawl was towed at night east of South Bass Island and off Sandusky, Ohio. Especially large numbers of yearling yellow perch were caught in some of the hauls. Over 1,500 perch were in the largest catch made during a 15-minute tow. These yellow perch averaged just under 6 inches in length in all areas fished except off Lorain, where they averaged slightly over 6 inches, and off the Detroit River light and in Sandusky Bay where they averaged about 5.3 inches. The appreciably smaller size of the perch in the latter two areas suggests that growth conditions for perch are not as good in the shallow inshore waters as in the open lake. Young-of-the-year perch, sheepshead, and white bass were taken regularly, occasionally in large numbers, at nearly all stations for the first time this year. It is believed that they had just recently moved out from the inshore waters and bays. They have shown a definite decrease in abundance in Sandusky Bay. Other species caught in the trawls include smelt (a few yearlings and fry), sturgeon (1-31 inches long, near the Detroit River light), white sucker, smallmouth bass (2), burbot (1), black crappie (1), white crappie (Sandusky Bay only), blue pike (1), brown bullhead, stonecat, silver chub, emerald shiner, spottail shiner, carp, goldfish (Sandusky Bay only), alewife (taken in large numbers only once, south of Middle Sister Island, where 1,188 fry were caught), log-perch, johnny darter, and trout-perch.

A few fry of white bass, gizzard shad, and alewife were taken in the midwater trawl near the surface just before dark. But adults of white bass, yellow perch, walleye, and channel catfish, as well as small alewives and gizzard shad were caught near the surface after dark.

Experimental nylon gill nets were set obliquely from top to bottom in 7 fathoms southeast of Kelly's Island and in 7 fathoms east of Pelee Island. The net off Kelly's Island had mostly perch and sheepshead in the bottom half and walleyes in the top half with a few channel catfish, gizzard shad, and white bass scattered throughout. Off Pelee Island the catch was mostly perch in the bottom half and walleye in the top half. Also off Kelly's Island a nylon gill net (300 feet each of 2-, 3-, and 4-inch mesh) was buoyed so that its float line was 4 feet beneath the surface. In this net were 41 channel catfish, 31 white bass, 26 gizzard shad, 18 walleyes, and one black crappie.

The water in western Lake Erie was homothermous in all areas visited during Cruise 7. Surface water temperatures were 1° to 5° C. cooler than during Cruise 5. The extremes were 19.6° C. (67.3° F.) and 23.2° C. (73.8° F.), but the temperatures ranged mostly between 21° and 22° C.

NOTE: SCIENTIFIC NAMES FOR SPECIES MENTIONED: WALLEYES (*STIZOSTEDION VITREUM VITREUM*), BLUE PIKE (*STIZOSTEDION VITREUM GLAUCUM*), GIZZARD SHAD (*Dorosoma cepedianum*), YELLOW PERCH (*PERCA FLAVESCENS*), WHITE BASS (*LEPIBEMA CHRYSOPS*), ROCK BASS (*AMBOLOPLITES AUPESTRIS*), CHANNEL CATFISH (*ICTALURUS LACUSTRIS*), SHEEPSHEAD (*APLODINOTUS GRUNNIENS*), SMALLMOUTH BASS (*MICROPTERUS DOLOMIEUI*), EMERALD SHINERS (*NOTROPIS ATERINOIDES*), CARP (*CYPRINUS CARPIO*), GOLDFISH (*CARASSIUS AURATUS*), WHITE SUCKER (*CATOSTOMUS COMMERSONI*), BURBOT (*LOTA LOTA*), BLACK CRAPPIE (*POMOXIS NIGRO-MACULATUS*), STONE CAT (*NOTURUS FLAVUS*), LOG-PERCH (*PERCINA CAPRODES*), TROUT-PERCH (*PERCOPSIS OMISCOMAYCUS*), ALEWIFE (*POMOLOBUS PSEUDOHARENGUS*), SILVER CHUB (*HYBOSPSIS STORERIANUS*), SMELT (*OSMERUS MORDAX*), BROWN BULLHEAD (*ICTALURUS NEBULOSUS*), LAKE HERRING (*LEUCICHTHYS ARTEDI*), SLIMY MUDDLER (*COTTUS COGNATUS*), SPOTTAIL SHINER (*NOTROPIS HUDSONIUS*), JOHNNY DARTER (*ETHEOSTOMA NIGRUM*), SAND DARTER (*AMMOCRYPTA PALLUCIDA*), WHITE BASS (*ROCCUS CHRYSOPS*), STURGEON (*ACIPENSER FULVESCENS*), AND WHITE CRAPPIE (*POMOXIS ANNULARIS*).

* * * * *

SEA LAMPREY CONTROL BY NEW CHEMICAL POSSIBLE: Emphasis on the control of the sea lamprey is being placed on chemical research, according to the Chief of the Great Lakes Fishery Investigations of the U. S. Bureau of Commercial Fisheries. Research on the chemical approach to lamprey control has been carried through a painstaking laboratory screening program and intensified testing in simulated stream environment in outdoor raceways under controlled conditions. This research disclosed a chemical compound which gives hope of success providing unforeseen problems are not encountered in actual stream experiments.

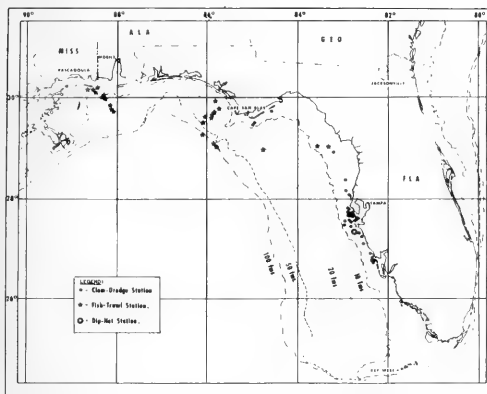
The chemical "Dowlap" was supplied by a Michigan chemical firm. Research demonstrated that the compound is lethal to lampreys in larval and adult stages at concentrations harmless to other desirable stream life. Dowlap is one of several compounds submitted by this firm, which has actively assisted in this research program.



Gulf Exploratory Fishing Program

EXPLORATORY FISHING FOR HARD CLAMS AND FINFISH IN THE NORTH-EASTERN GULF OF MEXICO (M/V Silver Bay Cruise 3): Light catches of hard clams (*Venus mercenaria*) and some fair catches of finfish were taken by the Bureau of Fisheries chartered exploratory fishing vessel Silver Bay during a 16-day cruise that ended on August 30, 1957. Sixty-two stations were occupied inside the 100-fathom curve along the coasts of Florida, Alabama, and Mississippi.

Thirty-eight drags with a modified 14-tooth clam dredge were made in the 3- to 5-fathom depth range between Cape St. George and Gasparilla Island. Hard clams were taken in all drags between Sand Key and Gasparilla Island off Fla., with the best fishing (300 clams, approximately 1 bushel per 30-minute tow) confined to the areas off Pass-a-grille and Venice, Fla. The catch was made up of 70 percent 2-



M/V SILVER BAY (CRUISE 3, AUGUST 14-29).

herring, bluefish, and round herring. Four tows made in 18-20 fathoms south of Petit Bois Island produced large croakers, spot, butterflyfish, and porgy, at the rate of about 2,000 pounds per hour tow.

inch clams (littlenecks), with the remaining 30 percent ranging from 3 to 4 inches (cherrystones and chowders). Yield was approximately one gallon of clam meats per bushel. Preliminary examination indicates that these hard clams are comparable in quality to the east coast hard clam in taste, texture, and size, but considerable trouble was experienced in keeping the clams alive aboard the vessel.

During the latter part of the cruise, an attempt was made to sample the numerous surface and subsurface schools of sardinelike fish that were encountered between Horn Island and Tampa Bay. Twenty-four tows with a 54-foot otter-trawl (with liner) yielded primarily anchovies, chub mackerel, thread



New Cold Curtain for Refrigerated Trucks

How do you keep a refrigerated truck from warming up during summer deliveries?

A new plastic curtain which, installed inside the rear-door opening, helps keep temperatures down, has been developed by transportation specialists of the Marketing Research division, Agricultural Marketing Service, U. S. Department of Agriculture. Trucks equipped with the new curtain average several degrees colder inside and do a better job of controlling frozen product temperatures.

This is not the first door curtain that has been tried out. For many years, truck owners and operators have experimented with various types of curtains. The problem has been to keep the frost from melting off the "cold plates" of the trucks and causing soggy packages and ruined labels.

The trouble largely results from the necessary opening and closing of the rear door during loading and unloading in hot weather. Even when drivers are careful to close the door immediately after removing each order, they often have the door open as much as 2 hours out of an 8-hour delivery day.

To maintain high quality in frozen foods, the truck temperature should be kept at zero degrees or lower. Fluctuations in air temperature also mean higher refrigeration costs.

Most of the previously tried canvas curtains have not been satisfactory on at least three counts: They did not permit entry of light inside the truck. They became wet and annoying to the driver during deliveries. And the wet canvas froze stiff during the night chilling process, making it hard for the driver to handle the curtain the next day.

Following a preliminary study of the problem in the summer of 1955, a number of experimental curtains were tested. Researchers sought the right combination of materials and design that would offer the least interference with the driver, yet be durable enough to withstand the stresses and strains of daily use.

These early tests led to the "window" type, 2-panel curtain made of 0.0075-inch thick clear polyester film, framed on all edges with 16-ounce neoprene-coated nylon to prevent tearing and lend stability.

Each panel is suspended at the top of the doorway with three double-eye harness snaps which provide a strong yet flexible support that allows the curtain to open and close easily. To prevent billowing and flapping as the truck door is opened and



closed, researchers put two pounds of lead shot in the bottom hem of each panel.

The new curtain was tested in actual commercial operation by private companies in Washington, D. C., and Baltimore, Md. Most of the drivers said they liked it, and cooperating truck owners are enthusiastic.

They see four major advantages in the new curtain:

1. It is of definite help in maintaining lower product and air temperatures in refrigerated local delivery trucks during summer months.

2. It allows better lighting inside the truck with the door open than when using an artificial light with the rear door partially closed.

3. It is relatively inexpensive and durable, and installation is easy. It is readily removed during the winter months.

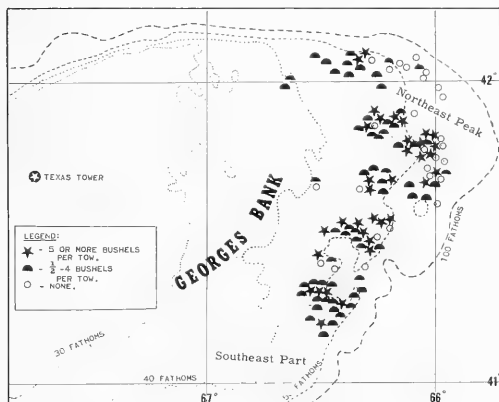
4. Elimination of dripping inside trucks more than offsets the minor inconvenience of the curtain.

So far, the curtain has been tried out only on frozen food and meat trucks. But it may also be of benefit when used on refrigerated trucks that deliver other perishable items. (Reprinted from the July 1957 issue of *Agricultural Marketing*.)



North Atlantic Fisheries Exploration and Gear Research

SCALLOP GROUNDS SURVEYED, FREEZING TESTS MADE, AND ENGLISH-TYPE DREDGE TESTED (M/V Delaware Cruise 57-7): Comparative fishing tests between a new English-type scallop dredge and the standard 11-foot New Bedford-type scallop dredge revealed that the conventional gear outfished the English model 4 to 1. The tests were conducted on the northeastern part of Georges Bank by the



DELAWARE CRUISE 57-7, AUGUST 7-22, 1957.

Bureau of Commercial Fisheries exploratory fishing vessel *Delaware* during an August 7-22 cruise. In addition, the vessel's survey of grounds near the known scallop (*Pecten grandis*) fishing areas revealed that scallop populations were limited to 54 fathoms or less.

The majority of 124 forty-minute tows produced from 1.5 to 8 bushels of commercial-size sea scallops, and catch locations and concentrations are indicated on the chart. The best single catch (14 bushels of medium-size scallops) was made at the loran bearing stations, 1H3-2346 and 1H2-1113. Bottom temperatures ranged from 43.9 F. to 47 F., with best catches generally noted in areas having water temperatures of 45 F. to 47 F.

The English-type scallop dredge features a wire rope towing bridle, depression plates, and a toothed rake. Efforts to improve operation of the English-type dredge, through minor adjustments in the spacing of the rake teeth and the use of various lengths of towing bridles, were unsuccessful in increasing the scallop catches. Indications are that this gear may perform more efficiently on softer bottom than generally prevails on Georges Bank.

Technological tests in freezing scallop meats at sea were conducted and approximately 600 pounds of scallop meats frozen on board were landed at New Bedford, Mass. Immersion freezing in glucose-salt solution in a portable deck freezer and dry frozen storage below decks were employed aboard the *Delaware*. The staff of the Bureau's East Boston Technological Laboratory expects to conduct further experiments on frozen scallop meats in cooperation with scallop industry members.

Weather conditions were generally favorable for the cruise. Several bluefin tuna were hand-lined, and large numbers of swordfish were sighted in the north-eastern sector of Georges Bank.

The Delaware was due to depart on September 6 for the third tuna long-lining cruise of the 1957 season to explore the offshore areas of the Western North Atlantic for subsurface tuna resources.

Long-line tuna gear will be used in a wide survey in an offshore area from east of Georges Bank to south of Cape Hatteras out to the center of the Gulf Stream track. It is hoped that this cruise (57-8) will supply additional information on the seasonal habits and possible commercial concentrations of bluefin and other tunas in the oceanic area of the Atlantic.

Oceanographic and biological information as it pertains to the general distribution of the tunas in the offshore area will be collected in cooperation with the Woods Hole Oceanographic Institution.



North Atlantic Fishery Investigations

SEA BOTTOM AND BOTTOM FAUNA SAMPLES COLLECTED (M/V Albatross III Cruise 101): A total of 540 substrate samples of sea bottom and 200 sea bottom fauna collections were made by the Bureau of Commercial Fisheries research vessel Albatross III during an August 21-30 cruise. The samples will be analyzed for particle size and amount of organic matter, as well as types of animal and plant life found on the sea floor.

The bottom samples were taken at $2\frac{1}{2}$ -mile intervals along a 1,100-mile track extending from Great South Channel off Cape Cod, across Georges Bank, Eastern Channel between Georges and Browns Banks and Browns Bank. Only a few samples were taken in Eastern Channel and in the Southwestern part of Browns Bank.

Sampling devices used during the cruise were (1) the Smith spring-loaded bottom sampler, and (2) the Scoopfish underway bottom sampler.

In cooperation with the Woods Hole Oceanographic Institution, a temperature-recording buoy was anchored on the southeast part of Georges Bank (latitude $40^{\circ}39' N$. and longitude $66^{\circ}32' W$.).

* * * * *

VERTICAL DISTRIBUTION OF POST-LARVAL AND AGE COMPOSITION OF OCEAN PERCH STUDIED (M/V Albatross III Cruise 102): Large numbers of post-larval ocean perch were collected at several stations occupied in the western and central parts of the Gulf of Maine by the Bureau of Commercial Fisheries research vessel Albatross III during a September 5-11, 1957, cruise. It was noted that the young-of-the-year ocean perch have settled down into deeper water during the past month. Samples of young ocean perch indicated a growth of about $\frac{1}{2}$ centimeter in about one month.

During the cruise a total of 81 otter-trawl tows were made at 11 stations in the western Gulf of Maine. Sixty-one tows were made with the Isaacs-Kidd midwater trawl at a series of depths to study the vertical distribution of this year's crop of young ocean perch. Twenty tows were made with a fine-mesh otter trawl to sample the age composition of ocean perch smaller than those taken by the commercial fisheries, or fish from one to nine years in age.

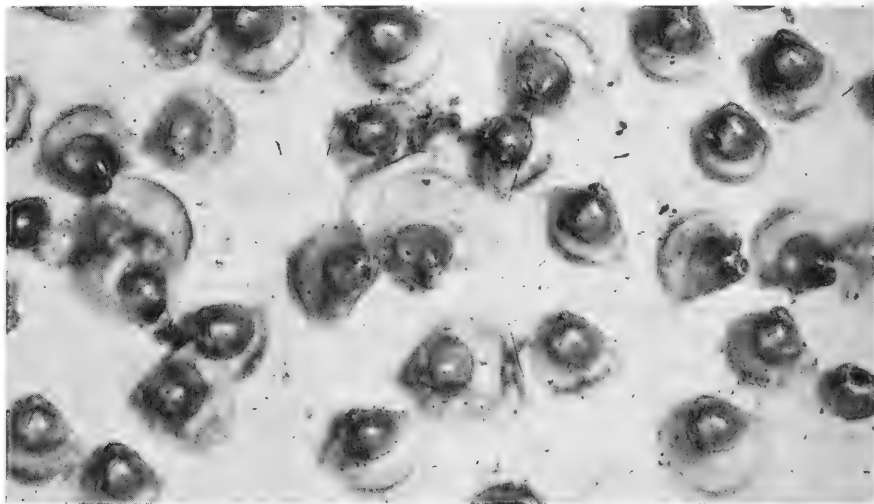
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WHITING TAGGED BY SERVICE VESSEL (T-79 Cruise 16): Biologists of the Bureau of Commercial Fisheries Woods Hole Laboratory tagged 183 whiting during a September 16-20, 1957, cruise. The whiting were taken in 26 drags by otter-trawl two miles west of Race Point, Mass., on Stellwagen Bank just north of Race Point, and in Cape Cod Bay.



Oysters

OPTIMUM AND MINIMUM SALINITY TOLERANCE THROUGH THE SETTING STAGE: A resume of the observations on the salinity tolerance of the eggs, larvae, and set of East Coast and Gulf oysters (*Crassostrea virginica*) has been prepared (Bulletin No. 3, August 22, 1957) by the biologists of the U. S. Bureau of Commer-



OYSTER LARVAE, HIGHLY MAGNIFIED.

cial Fisheries' Marine Biological Laboratory at Milford, Conn. Much of the information included in the resume can be applied by biologists and members of the industry, who are contemplating, or are now actually engaged in, the use of small salt-water ponds for the culture of commercial oysters.

Most of the data were obtained by using, as parents, oysters from Long Island Sound that had developed gonads at a salinity of approximately 27.0 parts per thousand (p.p.t.). Additional experiments are planned using, as parents, oysters kept at lower salinities for several weeks before spawning, and also oysters from different areas. It may be found after additional studies that the recommendations based on the present experiments will have to be revised for oysters from other areas and for oysters that develop gonads at salinities lower than those prevailing in Long Island Sound.

Eggs: The optimum salinity for development of the fertilized eggs of oysters that had developed gonads at 26.0-27.0 p.p.t., was 22.5 p.p.t. The percentage of eggs

that developed to the straight-hinge stage dropped off at lower salinities until at 15.0 p.p.t. only 50 to 60 percent developed normally. At 12.5 p.p.t. almost none of the eggs developed into straight-hinge larvae. Therefore, in pond culture every effort should be made to keep the salinity as near to 22.5 p.p.t. as possible over the spawning beds until after the major spawning has occurred. In any case it should not go below 17.5 p.p.t.

In recent experiments Maryland oysters that had developed gonads in their native habitat (salinity 8.74 p.p.t. at the time of collection) were spawned at salinities of 7.5, 10.0, and 15.0 p.p.t. Under these conditions some oyster eggs developed into normal larvae at 10.0 p.p.t., and at 7.5 p.p.t. larvae only slightly smaller than normal were produced. How well these larvae grow and whether they are of any value in obtaining a set has not yet been determined.

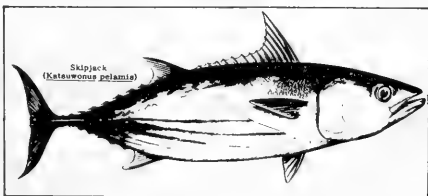
Larvae: When oysters that had developed gonads at a salinity of 26.0-27.0 p.p.t. were used as parents, the optimum salinity for growth of the larvae after they had reached the straight-hinge stage was 17.5 p.p.t. Good growth was obtained at a salinity of 15.0 p.p.t., but at 12.5 p.p.t. the rate of growth of larvae was appreciably slower, although they did grow to setting size, and set. At 10.0 p.p.t. the larvae grew very slowly and it is doubtful that any would reach setting stage at this salinity. The older the larvae were, however, the better they withstood a salinity of 10.0 p.p.t. Larvae that were reared almost to setting stage at our normal salinity continued to grow and set when placed in a salinity of 10.0 p.p.t. Every effort should be made, however, to keep the salinity as near to 17.5 p.p.t. as possible, as long as there are larvae in the water, and it should not be allowed to drop below 12.5 p.p.t.

Set: The optimum salinity for growth of recently set oyster spat was also 17.5 p.p.t. or higher. The growth rate of spat was markedly reduced at all salinities below 12.5 p.p.t. Although some growth occurred at a salinity of 5.0 p.p.t., mortality was high. At 2.5 p.p.t. recently-set oyster spat died within two weeks. It is recommended, therefore, that the salinity be kept above 12.5 p.p.t. even for growth of spat.



Pacific Oceanic Fishery Investigations

DIRECT UNDERWATER OBSERVATION OF TUNA BEHAVIOR: Direct observation of tuna from beneath the sea surface is a project recently started by Pacific Oceanic Fishery Investigations. It has been recognized that development of more efficient methods to remove tuna from the sea must in part await a better understanding of tuna behavior. In order to get directly at this problem, POFI designed an observation "bucket" which is suspended from its research vessel Charles H. Gilbert about 8 feet below the surface of the sea near the stern of the vessel. An investigator climbs into the bucket, using an underwater breathing device, and sits in safety, if not comfort, while tuna are being chummed to the vessel. The present apparatus permits the investigator to remain underwater in the observation post at speeds up to about 6 knots. The whole project is still in the early stages of developing methods and techniques, but it appears to hold great promise. Underwater vision is good. In clear offshore water the observer can see for about 180 feet on a vertical and horizontal plane.



Numerous tuna schools were observed during preliminary trials with the apparatus, and incidental to developing techniques it has been possible to make com-

parative observations on the behavior of tuna tagged by POFI dart tags and the type-G tags developed in California. It was found that almost invariably tuna tagged with the dart tag return to the school and, in most instances, recommence feeding on the chum thrown from the vessel. In contrast to this, skipjack tagged with "spaghetti" tags usually appear somewhat distressed and have not been seen to rejoin the parent school. Very likely this is related to the additional handling required and to the somewhat more severe wound caused by the spaghetti tag. Observations have dispelled one of the oldest myths in the Hawaiian tuna fishery, namely, that the local anchovy are successful tuna bait because when thrown in the water they return to the stern of the vessel, drawing the skipjack within fishing range. Quite the contrary, the Hawaiian anchovy, or "nehu," leave the vessel with all possible haste. This behavior pattern is followed when there are no skipjack in view and when there are skipjack actively feeding on them.

It appears that the scientists are now in possession of a tool which will describe in real terms what tuna are doing under the sea surface, thus freeing the biologist from inefficient and tiresome statistical approaches to such problems as the best tuna bait, the best way to use tuna bait, and the reaction of tuna to artificial stimuli. It is likely that a program based on this type of observation will be of eventual assistance in solving the tuna fisherman's problem of getting fish out of the sea more efficiently.

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"SKIPJACK CONCOURSE" STUDIED OFF HAWAIIAN ISLANDS: An intensive study of a "skipjack concourse" off Lanai, in the Hawaiian Islands was begun in July 1957 by the Service's Pacific Oceanic Fisheries Investigations (POFI) research vessels. A "skipjack concourse" is a fixed spot where skipjack tuna regularly occur. They have long been recognized in various places in the Pacific, particularly by native fishermen, but this is the first time one has been subjected to scientific scrutiny. The basic purpose behind the study was to discover why skipjack regularly occur there and to apply this knowledge to the more important puzzle of open ocean skipjack distribution.

First it was necessary to delimit a concourse and ascertain its reliability with respect to skipjack occurrence. The Lanai concourse, first defined by a series of blind chumming stations, has been very faithful indeed. It was visited about 15 times during July, and skipjack were taken during each visit. The second obvious question involved the skipjack: were they a resident population, or were they transients attracted to the area because of its special virtues?

The answer to the latter question is already partly at hand through the use of the all-plastic dart tag developed at POFI. During the first intensive survey of the concourse, 1,600 tags were put out on skipjack ranging from 2 to 20 pounds in weight. After the close of this program, approximately 8 percent of all skipjack taken in the concourse by POFI and commercial fishermen bore a POFI tag. At the same time a few skipjack tagged elsewhere in the Hawaiian Islands were taken in the concourse. After tagging ceased, returns in the concourse fell off, but skipjack tagged there began to appear elsewhere in the Hawaiian Islands area. Thus it appears that skipjack in the concourse are not residents; rather, they are transients attracted temporarily to the area.

Why the skipjack are attracted isn't so easy to answer. The long process of developing and verifying hypotheses and applying them to the high seas situation was begun with an intensive survey of the environment in the concourse.

The results obtained from the new dart tag are especially gratifying. About 12 percent of the first 1,600 released off Lanai have been recovered. Some were retaken immediately after release, indicating that the fish are not unduly disturbed by

being tagged. Others taken a few days after tagging showed evidence of prompt healing, with formation of scar tissue around the dart head and the external wound. Finally, wounds on fish out 2 or 3 months are invariably healed in a manner suggesting that the tag will remain on the fish indefinitely.

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AREA OF PERSISTENTLY OCCURRING SKIPJACK TUNA FOUND IN HAWAIIAN WATERS (M/V Charles H. Gilbert Cruise 34): An area of persistently occurring skipjack tuna was found off Cape Kaea, Lanai, during a June 21-August 21, 1957, cruise of the research vessel Charles H. Gilbert of the Bureau's Pacific Oceanic Fishery Investigations. To determine the distribution of skipjack in this area and the consistency of their appearance, a chumming pattern was developed and carried out during the cruise. At each station made in the vicinity of Cape Kaea bait fish

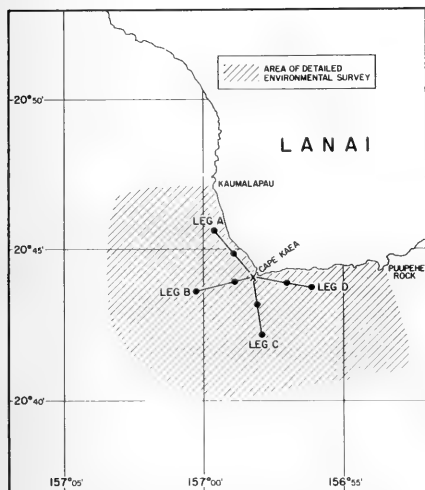


FIG. 1 - MONTHLY ENVIRONMENTAL SURVEY, JUNE, JULY 8, AND AUGUST 1957, CHARLES H. GILBERT, CRUISE 34.

signs of fish. Skipjack were always raised at station X (see figure 2), usually after only a few minutes of chumming. Chumming at adjacent stations provided results which varied from no fish being raised along the south coast (leg D) and the offshore waters (legs B and C), to fish being raised irregularly along the west coast (leg A).

Physical, chemical, and biological data were collected from the area around Cape Kaea to determine why fish occur in one locality and not in an adjacent one. In addition, a preliminary study was initiated on a temperature discontinuity which occurred east of Cape Kaea. This discontinuity was almost always present in the area and had a change in temperature of 1° to 1.5° F. in about a quarter-of-a-mile. Gross examination of the plankton hauls showed more plankton in the discontinuity area than to either side of it. A total of 2,416 skipjack were tagged with plastic tags (2,294 with dart tags and 122 with spaghetti-type tags) in the waters off Cape Kaea and to date there have been 212 recoveries.

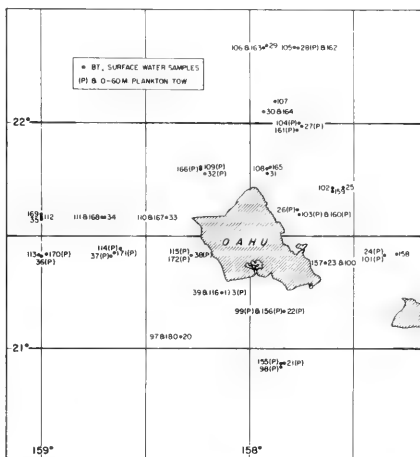


FIG. 2 - CHUMMING PATTERN OFF CAPE KAEA, LANAI, CHARLES H. GILBERT, CRUISE 34.

Direct underwater observations of bait-fish behavior and skipjack fishing were made from a subsurface platform attached to the hull of the vessel by observers using a self-contained underwater breathing apparatus (SCUBA). The behavior of a variety of bait fish, among them the anchovy (*Stolephorus purpureus*), the Hawaiian silverside (*Pranesus insularum*) and tilapia (*Tilapia mossambica*) was carefully noted under both active fishing and nonfishing conditions. Under ideal weather conditions the maximum visibility was estimated to be 180 feet (based on Secchi-disc measurement). During one fishing operation the underwater observer estimated 1,000 skipjack and little tuna around the vessel.

The "Sea Scanar" was used to track a number of skipjack schools, one yellow-fin school, and several aggregations of porpoises. In most cases the schools were slow moving and thus sonic contact up to several hours was possible. During the cruise a better understanding of the limitations of the instrument was also gained.

An oceanographic station at 21°10.3' N. latitude, 158°18.8' W. longitude was occupied initially on June 21, 1957, as part of the International Geophysical Year (IGY) program. The station was reoccupied on July 21, and August 20, 1957.

The monthly 20-station environmental monitoring survey in waters adjacent to Oahu was successfully carried out during June, July, and August (fig. 1). Activities during each survey included standard 1-meter oblique plankton hauls, bathythermograph casts, and preservation of water samples for salinity and inorganic phosphate analyses.

Weather observations were made and transmitted whenever time permitted at 0000, 0600, 1200, and 1800 GCT. Fishing and scouting broadcasts were made to the local fishing fleet whenever possible. Two or three trolling lines were fished on long runs and the wheel watch routinely recorded surface tuna schools, bird flocks, and other marine life observed on these runs.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, SEPTEMBER 1957, P. 46.

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SURVEY OF ALBACORE TUNA RESOURCES IN NORTH PACIFIC BETWEEN UNITED STATES AND HAWAII: An intensive reconnaissance of actual and potential albacore tuna fishing grounds between Hawaii and the United States Pacific Coast by two U. S. Bureau of Commercial Fisheries research vessels and seven chartered commercial fishing boats was completed August 20, 1957, with the return of the M/V John R. Manning to its Honolulu base. The Director of the Pacific Oceanic Fishery Investigations (POFI) states the nine-vessel task force was the largest fleet ever marshalled for a simultaneous attack on the mysteries surrounding the movements of the albacore tuna into the summer fishing grounds of the eastern Pacific. The Northeastern Pacific Albacore Survey (NEPAS), took in a broad area extending north and east of Hawaii to the United States mainland, with intensive coverage of a 350-mile strip along the coast from the Columbia River to southern California. Albacore were found to be widely distributed within the survey area east of 145° W. longitude, with offshore concentrations 700-800 miles west of San Francisco and 500 miles off Eureka, Calif., and with inshore concentrations 100 miles off Pt. Arena and Cape Mendocino, Calif., 300 miles off Pt. Arguello, Calif., and 200 miles off Cape Blanco, Ore.

The fisheries agencies of California, Oregon, and Washington, operating through the Albacore Steering Committee of the Pacific Marine Fisheries Commission, co-operated in the program through assistance in planning the operation and by providing observers for some of the charted vessels.

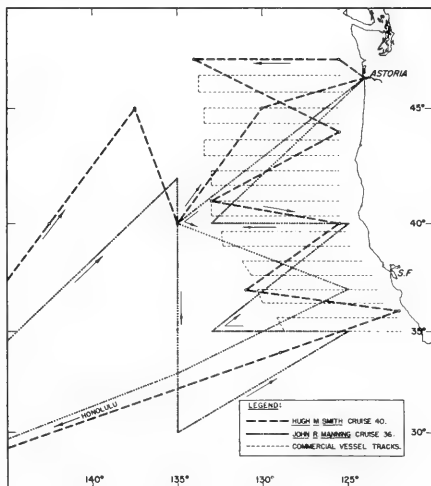
The survey was carried out in two steps, the first being a preliminary reconnaissance by the research vessels John R. Manning and Hugh M. Smith between Ha-

waii and the United States coast. The John R. Manning, which sailed from Honolulu June 11, trolled and fished with gill nets for albacore in a zigzag pattern along the coast, while the Hugh M. Smith, sailing on July 1, followed up with a series of oceanographic stations in the same area to gather information on the temperature and other characteristics of the waters through which the albacore were migrating into the fishing grounds. Observations of albacore schools during this period were reported by radio from the Bureau's vessels for the information of commercial fishermen. This stage of the survey was completed July 16.

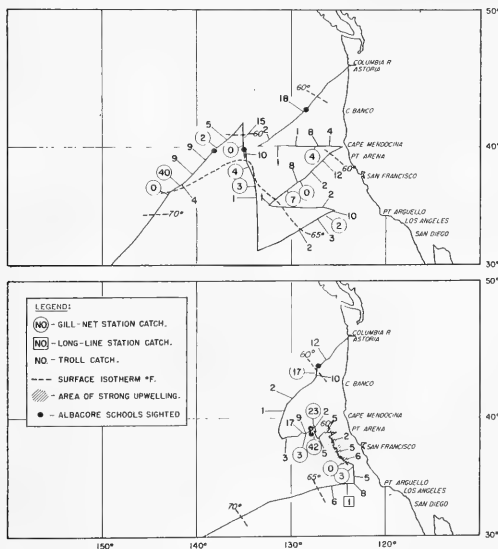
The second phase of the survey, carried out between July 22 and August 7, was a coordinated movement of the two research vessels and the seven commercial albacore boats from the coast out 350 miles and back, each vessel being assigned one of a number of parallel tracks evenly spaced down the coast. During this time the Hugh M. Smith acted as command ship for the force, directing the movements of the cooperating boats and receiving and collating their radio reports. This stage of the survey revealed that several of the inshore aggregations of albacore schools that were spotted earlier in the preliminary reconnaissance had become more concentrated and were beginning to offer fishing conditions suitable for commercial operation, particularly off Pt. Arena and Cape Mendocino. The survey fleet captured altogether 1,004 albacore tuna, of which 458 were tagged and released in the hope that recaptures during the main fishing season would provide further information on their movements in the United States coastal fishing grounds.

The survey has added to the fishery biologists' knowledge of the broader migratory movements of the albacore, knowledge which they must have in order to understand the make-up of the albacore population in the North Pacific and to estimate the production that can be expected from that population. A byproduct of the scientific expedition has been the assistance given to the fishermen in probing the offshore albacore resources with the possibility of increasing the catch.

The albacore, which brings the highest price per ton of any tuna species and is the only one that can legally be labelled "white-meat tuna," supports major summer fisheries off Japan and off the United States west coast. In the past few years several recaptures by Japanese fishermen of albacore tagged and released off the United States coast, some 4,000 miles away, and the recent recapture on the United States west coast of an albacore tagged by a Bureau vessel working north of Hawaii have shown that some, at least, of the North Pacific albacore make oceanwide migrations, and the resource may turn out to be a truly international one, exploited by both the United States and Japan. At present, however, the great expanse of water between the Japanese and the United States albacore fishing grounds is, both scientifically and commercially, largely unexplored territory, and the ways of the albacore in this area are almost as little understood as their spawning and early life history. The results of Operation NEPAS, added to the information gathered on other North Pacific cruises of POFI research vessels, will contribute importantly to the clarification of the pattern of albacore distribution and migration.



SERVICE VESSEL TAKES PART IN NORTHEAST PACIFIC ALBACORE SURVEY (M/V John R. Manning Cruise 36): As part of a large-scale survey of albacore tuna resources between the Hawaiian Islands and the United States Pacific coast, the Pacific Oceanic Fishery Investigations research vessel John R. Manning concentrated on gill-net and long-line fishing for albacore. The cruise was conducted between June 11 and August 20, 1957.



M/V JOHN R. MANNING CRUISE 36 (JUNE 11-AUG. 20, 1957).

line station. Arrived at Honolulu August 20, 1957.

The results of the first section (June 11-July 16) indicated that albacore were widely distributed over the area surveyed (see chart) as a reconnaissance to NEPAS, but that certain areas perhaps showed promising buildups or concentrations of albacore. Two offshore concentrations were located 800 and 500 miles west of San Francisco while inshore concentrations seemed evident 100 miles off Pt. Arena and Cape Mendocino, Calif., 300 miles off Pt. Arguello, Calif., and 200 miles off Cape Blanco, Ore. The first offshore concentration was not accompanied by a relative abundance of plankton and was located in an area where albacore are usually scarce later in the season. In contrast, the other concentrations were accompanied by a relative abundance of plankton and, with the exception of the fish 500 miles off San Francisco, were generally in areas where albacore are found consistently throughout the season.

Several commercial vessels responded to the John R. Manning's radioed catch reports and commercial fishing for albacore developed off Cape Blanco and Pt. Arena.

The second section of the cruise (July 22-August 20) was occupied primarily in checking concentrations uncovered during the first section and good catches made by the chartered NEPAS vessels. The results suggested that the concentrations around Cape Blanco and Pt. Arena noted by the John R. Manning had continued to build up. In addition the albacore appeared to have shifted in toward the coast.

Special attention was given to the edge of the band of upwelling shown in the chart. Several transects were made of this band and extra plankton, bathythermograph (BT), and photometer stations were undertaken. Gill-net sets were made in blue water west of the upwelling, within the upwelled water and to the east in the coastal water. Although the upwelled lower-temperature water was obviously very productive of plankton few albacore were taken there and albacore were more abundant in the blue water.

The vessel proceeded to 42° N. latitude, 135° W. longitude and fished 3 gill-net stations. Moved south roughly along 135° W., fishing 3 gill-net stations. Carried out 2 north-east tracks and 2 west tracks alternately; fished 4 gill-net stations. Arrived Astoria, Ore., July 16, refueled and departed July 22. Proceeded southwest to 41° N. latitude, 131° W. longitude and fished 1 gill-net station. Moved south making drops of scientific equipment to three chartered vessels employed in the Northeast Pacific Albacore Survey (NEPAS). Proceeded east along latitude 39° N. to longitude 125° W. Set 3 gill-net stations, one a 24-hour set. Continued southeast paralleling the coast crossing into and out of the band of upwelled water. Fished 2 gill-net stations. Continued south to 34° 30' N. latitude and then southwest toward Honolulu fishing 1 long-

A 24-hour gill-net station was undertaken after 42 fish were captured in a set off Pt. Arena. The four subsequent 6-hour sets captured 23 albacore, 6 were captured during the 3 p.m. to 9 p.m. July 21, 1957, set and 17 on the following set between 9 p.m. to 3 a.m. Although it is believed that no albacore were taken during daylight hours, small schools each consisting of about 6 fish (jumpers) each were sighted during daylight hours 25 feet from the vessel just after setting the station that took 42 fish and 50 feet from the boat just before starting the 24-hour station.

The five baskets of long-line gear which were attached to the gill nets during each set throughout the cruise produced no albacore. Toward the end of the cruise the gill-net winch failed and a special 5-basket long-line station was substituted for the usual gill-net set. Each basket had 3 buoys (one in the center) and all hooks were baited with small herring. The set was made on troll-caught fish and lasted from 1:45 p.m. to 6 p.m. One albacore was taken on one of the shallow hooks.

Small herring was obtained at Astoria to use as dead chum during trolling. Some success was obtained since two albacore taken on troll lines contained this chum in their stomachs.

A total of 377 albacore were taken by the John R. Manning, 150 in gill nets, 226 on troll lines, and 1 on long line. A total of 105 fish were tagged and released. Total catch weight for the cruise was estimated at $2\frac{1}{4}$ tons.

Stomachs of 196 were examined during the cruise. An additional 43 stomachs, believed to contain food, were preserved as a representative sample.

Gross dissections of the pineal region of big-eyed and albacore tuna were made and photographs taken. Fifty-seven patches of skin above the pineal region were preserved, 46 in formalin and 11 in Bouin's solution. Approximately 50 percent were taken from gill-net fish. Nine albacore were injected with Bouin's solution in the pineal region and frozen. Another 6 were frozen without injection.

Fourteen albacore were placed in the bait-well holding tank of the John R. Manning. The longest survival period was 14 hours and some died within minutes.

Few sauries were seen during the cruise and only two trials with the small on-deck holding tank were carried out. Each was composed of about 2 dozen fish, which survived only 3 or 4 hours.

Various hydrographic and biological data were collected.

Standard wheel watches were kept for birds and fish schools along with a daily census of surface life. Life was particularly abundant in areas of upwelling. Nine schools of fish were sighted during the cruise; 6 of these were albacore. Four were fished and albacore were taken; the other 2 were sighted while the John R. Manning was drifting.

* * * * *

ANOTHER SERVICE VESSEL PARTICIPATED IN NORTHEAST PACIFIC ALBACORE SURVEY (M/V Hugh M. Smith Cruise 40): As her part of the concentrated large-scale survey of the northeast Pacific albacore tuna resources, the POFI research vessel Hugh M. Smith was primarily engaged in the collection of oceanographic data. She was also the command vessel of a fleet of a number of chartered trollers and the Service's research vessel John R. Manning.

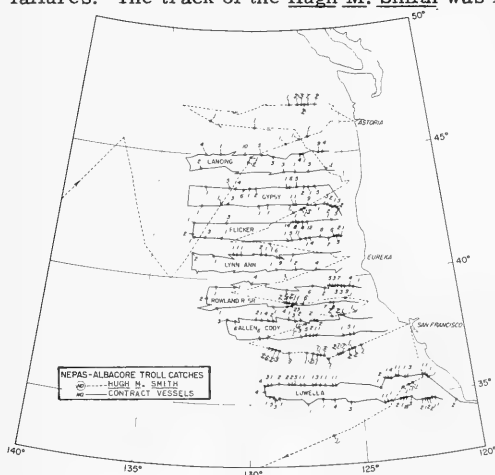
The itinerary of the cruise was as follows: July 1, departed Pearl Harbor; July 2-8, ran a line of oceanographic stations between Oahu (Hawaii) and $38^{\circ}35'$ N. latitude and $143^{\circ}28'$ W. longitude; July 9-18, made a trolling and oceanographic survey of the area between $40^{\circ}-46^{\circ}$ N. latitude and $142^{\circ}30'$ W. longitude and the United States Pacific coast; July 22-August 14 and August 26-28, acted as coordinating vessel for fleet operations and conducted a trolling and oceanographic survey of the area covered by the fleet; August 29-September 5, ran a line of oceanographic stations between $33^{\circ}36'$ N. latitude, $126^{\circ}30'$ W. longitude and Oahu. The periods July 18-21 and August 15-26 were spent in port.

July 22 to August 1 Hugh M. Smith acted as coordinating vessel of the NEPAS survey which was a study of the distribution and abundance of albacore in

the 350-mile zone off the west coast of the United States between 35° - 47° N. latitude by nine contract vessels and the two participating vessels of the U. S. Bureau of Commercial Fisheries.

Seven of the nine contract vessels completed their assigned survey tracks and the other two were forced to withdraw because of storm damage and mechanical failures. The track of the Hugh M. Smith was readjusted to partially cover the

areas missed by these vessels. For the tracks of the Hugh M. Smith and the contract vessels and the positions of their troll catches see chart.



HUGH M. SMITH CRUISE 40 (NORTHEASTERN PACIFIC ALBACORE SURVEY).

While the Hugh M. Smith was in waters having a surface temperature less than 66° F., that is on the run from $38^{\circ}35'$ N. latitude, $143^{\circ}28'$ W. longitude, to Astoria, while operating in the NEPAS survey area, and from Oakland to $33^{\circ}36'$ N. latitude, $126^{\circ}30'$ W. longitude, 5-6 lines were trolled during daylight hours at speeds of 6-6.5 knots. Over the remainder of the track two lines were trolled at 8-9 knots. While trolling at reduced speed, 112 albacore and 1 yellowfin were taken; at standard speed only 1 wahoo and 1 dolphin were caught. Seventy-one of the albacore and the yellowfin were tagged with either California-type "G" tags or POFI dart tags.

On the run from Hawaii to $38^{\circ}35'$ N. latitude, $143^{\circ}28'$ W. longitude, and from $33^{\circ}36'$ N. latitude, $126^{\circ}30'$ W. longitude and Hawaii, two 1,200-meter, 13-bottle oceanographic casts were made each day (total 28). Over the remainder of the track only one cast was made each day (total 42). Salinity samples from each bottle were returned to the laboratory and dissolved oxygen determinations were made aboard ship. Additional samples from the stations in the albacore waters were frozen for inorganic phosphate determinations.

Two bathythermograph casts were made at each oceanographic station; one before and one after the Nansen bottle casts. In waters having a surface temperature of 66° F. or less they were taken at not less than 15-mile intervals, whenever abrupt surface temperature changes occurred, and after albacore had been taken. Over the remainder of the track two BT's were taken between each oceanographic station. Surface salinity samples were taken at each off-station BT and while in albacore waters samples were frozen for inorganic phosphate analysis.

While in the NEPAS area Secchi disc and water color observations were made at approximately local noon each day and after a number of the albacore schools had

been worked. Over the rest of the track they were made after the 8 a.m. oceanographic station.

Fifteen-minute surface plankton tows with a 1-meter net were made at approximately local noon each day and after a number of albacore schools had been worked. At night 30-minute tows were made except in the NEPAS survey area. Here they were reduced to 15 minutes because of the large samples obtained and even then it was frequently not practical to preserve more than part of the sample. For example, a 20-25 liter sample was taken in the 15-minute tow at 37° 09' N. latitude, 128° 34' W. longitude and only two liters were preserved.

Pairs of 15-minute surface tows bracketing the 58°-60° F. isotherms were also made on all two legs. On one they were omitted because of rough weather, on the other they were omitted because of the dense schools of Velella.

Whenever the vessel hove-to at night an estimate of the number and size of the saury under the ship's lights were made every two hours.

* * * * *

MARQUESAN SARDINE INTRODUCTION IN HAWAIIAN WATERS SHOWS SIGNS OF SUCCESS: The capture of six large Marquesan sardines in Hawaiian waters on September 9 by two fishermen while fishing for moi near Barbers Point aroused the interest of the Service's Pacific Oceanic Fishery Investigations (POFI) and the Territorial Division of Fish and Game. The captures are the first concrete evidence that the newly-introduced species is surviving in Hawaiian waters.

The desirability of the species as skipjack (aku) bait was first established in the spring of 1954, when a Service research vessel Charles H. Gilbert surveyed the tuna baits of the Marquesas, Tuamotu, and Society islands. The sardine was found to be abundant in the Marquesas Islands, lying about 2,000 miles south and east of Hawaii. There, they generally occurred along sheltered sandy beaches.

After consultations initiated by the Territorial Division of Fish and Game, it was decided that on the basis of available evidence the sardine might do well in Hawaiian waters and would not be likely to compete with the valuable local nehu, the backbone of the Hawaiian tuna bait supply.



THE SERVICE'S RESEARCH VESSEL CHARLES H. GILBERT.

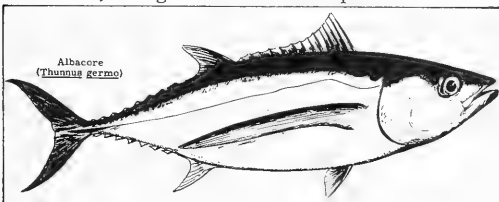
If the sardine was successful here, it might go a long way toward relieving the perennial short supply of tuna bait. Additional benefits might also accrue, for the sardine feeds on microscopic animals and therefore would serve as a means of converting microscopic food into something useful to valuable reef fishes such as the ulua. Accordingly, in late 1955 POFI instituted a program of introduction.

The first introduction was in January 1955, when about 8,000 were released off Barbers Point. Since then about 14,000 additional specimens have been released. Prior to the latest recovery there have been six reports of recapture of sardines in Hawaii. All of these were within a few days of planting, however, and most likely stemmed from the most recent releases.

By contrast, the September 9 recaptures were 6 months after the latest release (March 22). The specimens were about twice as heavy as the largest size planted, indicating that they grow well here. Even more significant, the females were approaching spawning, suggesting that conditions here are favorable to reproduction. Whether they will spawn and eventually contribute to the economy of Hawaii remains to be seen. Present indications are favorable.

* * * * *

SPAWNING ALBACORE TUNA SOUGHT OFF AMERICAN SAMOA: Persistent efforts of fishery scientists to seek out the spawning habits of the albacore tuna recently took POFI research biologist all the way to American Samoa in search of expectant females. According to the director of the Honolulu Research Laboratory of the Bureau of Commercial Fisheries, the albacore is one of the widest ranging of the tunas, being taken in the temperate waters of both the North and South Pacific



as well as in the tropical areas between, but where it spawns and where its young develop is still a mystery to science. Comparatively small, as tunas go, the albacore is highly prized by canners because of the white color of its cooked meat. There are thriving fisheries for the surface-swimming schools of smaller albacore off the

United States west coast and in the western Pacific off Japan, and production of the larger deep-swimming fish by Japanese long-line fishermen in tropical waters of the South Pacific has been increasing rapidly in recent years. Because of the great commercial value of the species, United States and foreign fishery scientists are intensively attacking the problems of its reproduction and early life history, but so far with little success. Albacore with ripe eggs are not taken in the major commercial fisheries, and attempts by Bureau research vessels to collect identifiable larvae in various areas of the central Pacific have met with no success.

The Bureau biologist's visit to American Samoa, from August 6 to 23, has extended the search for the albacore spawning grounds to a new area. A fleet of Japanese fishing boats is regularly delivering to the United States-operated cannery on the island of Tutuila considerable quantities of albacore, most of it caught south of Samoa in the vicinity of the Tonga Islands. These are all large deep-swimming fish taken on long lines, which are thought most likely to form the actively-reproducing part of the albacore population. Through the cooperation of cannery manager, arrangements were successfully made to have samples of albacore ovaries collected regularly, frozen, and forwarded to the Honolulu Laboratory for study. Two members of the cannery staff will collect specimens from seven fish out of each load delivered and will record the length and weight of the fish. It is estimated that the total number of fish sampled will be about 2,000 a year.

The biologist reported that the albacore examined by him during his stay in Samoa showed some indications of recent spawning activity, a sign that there is hope that actively-spawning fish may turn up at some season of the year in the Samoan landings. He also reported that he encountered a gratifying understanding of his mission and willingness to assist in its accomplishment on the part of industry and Government people in the South Pacific territory.



Recording Prepared to Aid Fish Consumption

A recording containing public service announcements designed to increase the consumption of fish and shellfish and raise nutritional standards in the United States has been prepared by the U. S. Bureau of Commercial Fisheries. It was mailed to approximately 4,000 radio stations throughout the country, according to a September 9 news release.

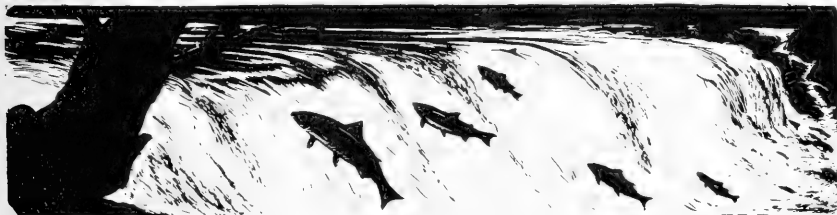
Using as its central theme, "nutritional values of fish and shellfish," the 12-inch, 33 $\frac{1}{3}$ r.p.m. recording contains 13 announcements ranging in time from 10 to 60 seconds. These deal with such subjects as the different varieties of shellfish, various forms in which fish can be purchased, "fish is good for weight watchers," the annual catch of edible fish, the ease of preparing and serving fish, various kinds of canned fish, and "every day is fish day."

Since September 18 to 28 was designated by the United States fishing industry as "National Fish Parade," a program in which the Federal Government participated, the Bureau of Commercial Fisheries requested the cooperation of radio stations throughout the country in making as much use as possible of the recording, particularly during that period, to encourage the greater use of all fishery products. This joint annual industry-Government sales promotion program was aimed at moving the summer's heavy production of fresh and frozen fish products into normal trade channels.



Salmon

KING SALMON RUN IN COLUMBIA RIVER INCREASING: A continued increase in the size of the Columbia River summer king or chinook salmon run was reflected in figures released by the Oregon Fish Commission on September 19, 1957.



The total estimated summer run this year was 197,000 fish--the largest estimated summer king salmon run entering the Columbia River since 1939, according to the chief of Columbia River Investigations for the Oregon Fish Commission. The summer run passes Bonneville Dam during June and July, and has shown a general increase since 1945, when an estimated 53,000 summer king salmon entered the Columbia River.

According to the best available estimate, combined Oregon-Washington commercial catches of king salmon during June and July this year will exceed 1,100,000 pounds. This catch is the second best since 1944, exceeded only by the 1956 summer king salmon catch of 1,600,000 pounds. This year's catch represented about 31 percent of the total run that entered the river.

"Another significant factor in this year's increased king escapement was the almost total absence of a commercial fishery above Bonneville Dam," states the

biologist. The main Columbia River above Bonneville Dam was permanently closed to commercial fishing this year by the Oregon Fish Commission and the Washington Department of Fisheries as the result of completion of The Dalles Dam. Only a very limited fishery took place immediately below The Dalles Dam by Indians using dip nets.

The blueback (sockeye) salmon run into the Columbia this year did not come up to expectations, but a preliminary reported catch of 255,000 pounds compares favorably with blueback catches in recent years. An estimated 156,000 blueback entered the river this year. Of this total, an escapement of 83,000 fish was counted over Bonneville Dam.



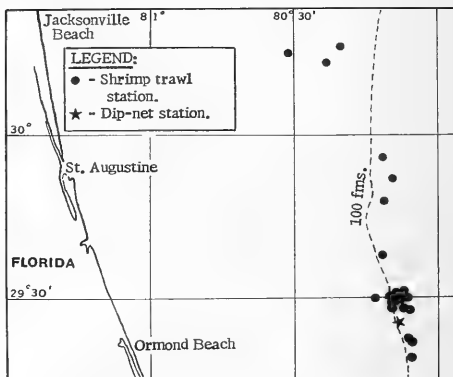
South Atlantic Exploratory Fishery Program

DEEP-WATER SHRIMP EXPLORATIONS OFF NORTHERN FLORIDA (M/V Combat Cruise 12): Catches averaging 90-100 pounds heads-on shrimp per hour tow were caught off the northern coast of Florida by the Bureau of Commercial Fisheries chartered exploratory fishing vessel *Combat* during the month of August 1957. Twenty drags were made in depths of 150-230 fathoms, all but one of which yielded royal-red shrimp (*Hymenopeneus robustus*). The catches per drag ranged between one and 460 pounds. The best single catch of 460 pounds was made in a three-hour tow using a 65-foot flat trawl with 5½-foot bracket doors.



THE SERVICE EXPLORATORY FISHING VESSEL, M/V COMBAT.

The best concentrations of royal-red shrimp were found in 190-210 fathoms east northeast of Daytona Beach. The 11 drags made in this area yielded about 3,000 pounds of heads-on shrimp or about 1,669 pounds heads-off weight. The sizes of the shrimp caught in this area were 84 percent 21-25 count (heads off) and 16 percent 35 count and smaller.



M/V COMBAT CRUISE 12 (AUG. 13-20, 1957).

Seven drags made in 20-125 fathoms caught only a few rock shrimp (*Sicyonia brevirostris*) in the 20-25 fathom part of the range.



Standards

PACIFIC TROLL SALMON QUALITY IMPROVEMENT GUIDELINES AND STANDARD PROCEDURES: Quality improvement guidelines and standard procedures for handling fresh Pacific troll salmon were issued in July 1957 for day trollers, ice boats, and dealers. Designed to be posted on vessels and in processing plants, these quality guidelines and procedures are for use on a voluntary basis.

FIG. 1 - THIS POSTER IS GOLDENROD AND GIVES FRESH FISH QUALITY IMPROVEMENT GUIDELINES AND STANDARD PROCEDURES FOR USE BY WEST COAST TROLL SALMON DEALERS.

They were developed by the Technology Division of the National Fisheries Institute (N.F.I.) under the terms of its contract with the Bureau of Commercial Fisheries of the United States Fish and Wildlife Service, through discussions with groups which are interested in the problem of product quality improvement in the fishery industries. The contract is financed by funds provided by the Saltonstall-Kennedy Act of 1954.

This is the second in the series projected for each important phase of the fishing industry. The first set was issued early this year for the New England trawler fishery.

This is the initial application of this type of quality guidelines on the Pacific Coast. As developed and adopted, the guidelines for handling Pacific troll salmon consist in reality of three sets: one set designed for day trollers; the second for use by ice boats, and the third set for primary wholesalers.

To Be Posted in All Phases of Business

GUIDELINES AND STANDARD PROCEDURES FOR QUALITY IMPROVEMENT

for use on a voluntary basis by the
PACIFIC TROLL SALMON DEALERS

Prepared by members of the industry: the National Fisheries Institute Technology Division and the U. S. Bureau of Commercial Fisheries

Removal of Fish from Boats

1. The dock area, hoisting box, grading tables, carts, dock buggies and aids must all be in a clean and sanitary condition before receiving fish.
2. Overloading handling and storage containers must be avoided at all times.
3. Fish must be handled carefully and moved under cover and out of the weather rapidly.
4. Fish that have been loaded awaiting handling must be inspected periodically and reloaded as necessary.

Plant Procedure

1. Plenty of ice must be available at all times for uninterrupted operation.
2. Contents of each spill box must be handled individually on grading table to buggie or cart. Extreme care must be employed in transferring from grading table to buggie or cart.
3. Each fish must be examined at the handling table to make sure it is completely clean and free of all gills.
4. Fish in temporary storage must be belly lead and placed in ice bed not less than 3 inches thick. Each layer must be covered by not less than 2 inches of ice.
5. Overpacking must be avoided. Protect bottom layers from crushing. Fish must be top lead completely and covered with clean tarpaulin or other suitable cover.
6. Containers used for shipment of fresh fish must be clean and new.
7. Pack all fish belly up, fill each belly with ice, and fill box to the level of cover.

Shipping

1. Trucks or trailer cars must be precooled and refrigerated at all times.
2. All conveyances must have floor racks.
3. Boxes must be flat at all times. Never stand on end or side.
4. Except on short hauls, the boxes must be covered with enough ice to provide proper protection against possible breakdown or any other unforeseen delay.

Sanitation

1. Carts, boxes and conveyances of all kinds must be washed thoroughly, immediately after they become empty of fish.
2. Plant and equipment must be subject to constant washing down when plant is in operation.
3. Responsibility for plant cleanliness must be assigned specifically to a person or persons.
4. Clothing of all personnel must be kept in a clean condition consistent with the requirements demanded in handling fish.
5. Soap or synthetic detergents and hypochlorite or other sanitizing agents must be used generously and regularly. Only clean water must be used for washing and rinsing.
6. Rodents, vermin, flies, etc. must be controlled. Hiring of exterminators (individuals or firms) might be necessary.

Note: These standard procedures are based in part on the "Operation Guidelines" developed by Canada and East Coast salmon dealers, California, September, 1956.

BB-144 July 1957

To Be Posted on Sea and Ashore

GUIDELINES AND STANDARD PROCEDURES FOR QUALITY IMPROVEMENT

for use on a voluntary basis by the

PACIFIC SALMON TROLLERS
DAY BOATS

Prepared by members of the industry: the National Fisheries Institute Technology Division and the U. S. Bureau of Commercial Fisheries

Handling of Catch

1. Bring fish to boat side alive.
2. Shun fish to avoid deck thrashing and bruising - gaff fish in head only.
3. Gut, bleed, gill, and wash fish thoroughly.
4. Place clean wet socks in carrying area.
5. Place salmon head to head on the wet socks to avoid scaling and bruising.
6. Cover fish immediately with clean socks and wet them down constantly. Cover checker or bin with insulated wooden cover.

Unloading Catch

1. Uncover and work one checker or bin at a time.
2. Handle fish carefully.
3. Do not overload landing box or basket.
4. Encourage careful handling by dock-handlers and graders.
5. Land mutilated or inferior fish separately.

Sanitation

1. Wash socks immediately in clean water and thoroughly dry them before re-use. Replace old and worn socks.
2. Wash and scrub checker boards and boxes.
3. Wash and scrub entire deck area immediately after the discharge of each trip.
4. Clean all working tools and gear thoroughly and put in proper places.
5. Pump and clean bilge thoroughly.
6. Use soap or synthetic detergents and hypochlorite or other sanitizing agents liberally in clean-up. Use only clean water for washing and rinsing.

Try ice on the next trip! It will assure landing of better quality fish. Ice is cheaper than fish.

Note: These standard procedures are based in part on the "Operation Guidelines" developed by salmon dealers of Canada and East Coast, California, July 1956.

VC-144 July 1957

To Be Posted on Sea and Ashore

GUIDELINES AND STANDARD PROCEDURES FOR QUALITY IMPROVEMENT

for use on a voluntary basis by the

PACIFIC SALMON TROLLERS
ICE BOATS

Prepared by members of the industry: the National Fisheries Institute Technology Division and the U. S. Bureau of Commercial Fisheries

Handling of Catch

1. Bring fish to boat side alive.
2. Shun fish to avoid deck thrashing and bruising.
3. Gaff fish in the head only.
4. Gut, bleed and gill fish immediately.
5. Wash fish thoroughly and put down out of the weather as quickly as possible.

icing

1. Prepare smooth ice bed at least 6 inches deep. Allow no rough ice edges.
2. Place fish belly up in pen, leaving 6 inches for ice between fish, pen boards, and hull, and 3 inches for ice around each fish.
3. Fill belly cavity of each fish with fine ice.
4. Cover each layer of fish with at least 4 inches of ice and sprinkle with salt.
5. Check top ice layer periodically and re-ice when needed.
6. Remember: - Ice is cheaper than fish. Use plenty of it.

Unloading Catch

1. Uncover and work one bin of fish at a time.
2. Handle fish carefully.
3. Do not overload landing box or basket.
4. Encourage careful handling by dock handlers and graders.
5. Land mutilated or inferior fish separately.

Sanitation

1. Wash the hold completely after the discharge of each trip.
2. "Sweeter" hold by using approved spraying product or sprinkling with plenty of salt. Leave hatch covers open.
3. Wash and scrub pen boards as soon as they come out of hold. Discard worn pen boards immediately.
4. Wash gunny sacks immediately in clean water and dry them thoroughly before re-use.
5. Be sure adequate supply of tools and equipment are in a sanitary condition and in their proper place.
6. Check bilge constantly and keep level down.
7. Use soap or synthetic detergents and hypochlorite or other sanitizing agents liberally in clean-up. Use only clean water for washing and rinsing.

Note: These standard procedures are based in part on the "Operation Guidelines" developed by salmon dealers of East Coast and Canada, California, July 1956.

VC-144 July 1957

FIG. 2 - THESE POSTERS ARE COLORED ORANGE AND GIVE QUALITY IMPROVEMENT GUIDELINES AND STANDARD PROCEDURES FOR USE BY SALMON DAY TROLLERS AND ICE BOATS.

As an important part of its contract, the N.F.I. Technology Division is preparing for distribution as supplementary information simplified versions of the extensive technical literature which has been developed by the U. S. Fish and Wildlife Service and other agencies in the fisheries research field. The expansion of the program will proceed as rapidly as is consistent with a thorough job at each stage. Appropriate rules will be developed for each of the other levels in the distribution chain. The basic guidelines will then be adapted to conform to the many varieties of fish found in our markets. Each set of guidelines will be prepared on a different colored background so that it may be easily identified as pertaining to a specific variety of fish, geographical area, or stage in the distribution chain.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, FEB. 1957, P. 30.



United States Fishing Fleet^{1/} Additions

JUNE 1957: A total of 77 vessels of 5 net tons and over were issued first documents as fishing craft during June 1957--12 less than in June 1956. The Pacific

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

Area	June		Jan.-June		Total
	1957	1956	1957	1956	1956
	(Number)				
New England	2	1	12	9	15
Middle Atlantic	1	2	15	15	26
Chesapeake	12	14	51	43	138
South Atlantic	19	25	55	49	119
Gulf	18	17	65	55	100
Pacific	19	25	65	48	76
Great Lakes	1	-	4	2	6
Alaska	5	5	27	27	40
Hawaii	-	-	-	1	1
Total	77	89	294	249	521

NOTE: VESSELS ASSIGNED TO THE VARIOUS SECTIONS ON THE BASIS OF THEIR HOME PORTS.

^{1/} INCLUDES BOTH COMMERCIAL FISHING AND SPORT FISHING CRAFT.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Tonnage, June 1957

Net Tons	Number
5 to 9	35
10 to 19	13
20 to 29	8
30 to 39	16
40 to 49	2
50 to 59	1
100 to 109	1
330 to 339	1
Total	77

Coast and South Atlantic areas led with 19 each, followed by the Gulf area with 18, the Chesapeake area with 12, and the Alaska area with 5.



United States Catch Declines Sharply in First Half of 1957

The United States and Alaska catch of fish and shellfish at mid-year was running considerably below a year ago. Fisheries which yielded slightly over 2 billion pounds of fish and shellfish in the early months of 1957 yielded 2.4 billion pounds during the same period in 1956.

Menhaden catches used almost entirely in the manufacture of fish meal and oil, showed the greatest decline. Catches during the first seven months of 1957 totaled 814 million pounds--328 million pounds less than in the same period during 1956.

Tuna and bonito catches on the Pacific Coast declined 31 million pounds; the Alaska salmon catch was off about 27

million pounds; receipts of ocean perch declined 17 million pounds.

Only three items showed marked increases in landings in the first six months of 1957 as compared with the same period last year--the herring catch in Maine (used largely for canning) was up 22 million pounds; herring catches in Alaska (used almost exclusively in the manufacture of meal and oil) were up 16 million pounds; and whiting landings in New England increased nearly 24 million pounds.

In 1956 United States and Alaskan fishermen landed a record catch of 5.2 billion pounds. It is evident that the 1957 catch will fall considerably short of this total.

United States Catch of Fishery Products, Various Periods, 1957 and 1956 1/				
Item	Period	1957	1956	Tot, 12 Mos. 1956
(1,000 Lbs.)				
Maine	6 mos.	102,851	83,513	277,822
Massachusetts:				
Boston	7 mos.	83,857	91,271	147,402
Gloucester	7 "	124,550	141,904	252,038
New Bedford	7 "	54,535	50,357	87,965
Provincetown	7 "	13,488	11,466	21,151
Total		276,430	294,998	508,556
Rhode Island 2/	6 mos.	63,354	63,657	129,406
New York 2/	6 "	22,881	19,976	38,268
New Jersey 2/	6 "	26,866	25,873	46,097
North Carolina 2/	6 "	30,532	27,579	49,009
Georgia	6 "	6,242	5,359	16,711
Florida 2/	5 "	55,146	56,282	142,493
Alabama	6 "	4,962	4,198	12,320
Mississippi 2/	5 "	5,989	5,649	22,573
Texas 2/	5 "	16,313	14,743	61,993
Ohio (Mar.-June)	4 "	16,258	15,567	24,928
Oregon	5 "	17,921	19,359	59,256
California;				
Certain	6 mos.	214,938	247,764	602,218
species 3/	4 "	34,724	28,335	156,116
Other				
Total California		249,662	276,099	758,334
Rhode Island, Middle Atlantic, Chesapeake, South Atlantic, and Gulf States, menhaden	7 mos.	799,252	1,096,657	2,010,393
Louisiana, shrimp (heads-on)	4 mos.	3,294	4,348	50,541
Washington, halibut 4/	7 mos.	11,399	9,176	16,604
Alaska:				
Halibut 4/	7 mos.	17,330	16,296	24,864
Herring	7 "	107,792	91,412	103,000
Salmon To Aug. 10		179,000	206,213	264,000
Total of all above items		2,013,474	2,336,954	4,617,168
Other		5/	5/	582,832
Grand Total		2,013,474	2,336,954	5,200,900

United States Catch of Certain Species, Various Periods, 1957 and 1956 1/				
Item	Period	1957	1956	Tot, 12 Mos. 1956
(1,000 Lbs.)				
Anchovies, Calif.	6 mos.	35,850	32,484	54,282
Cod:				
Maine	6 mos.	1,370	1,544	2,361
Boston	7 "	12,378	12,079	17,518
Gloucester	7 "	1,032	909	1,361
Total cod		14,780	14,532	21,240
Haddock:				
Maine	6 mos.	2,210	2,477	4,340
Boston	7 "	59,488	67,220	106,662
Gloucester	7 "	4,980	6,293	8,774
Total haddock		66,678	75,990	119,776
Halibut: 2/				
Washington	7 mos.	11,399	9,176	16,604
Alaska	7 "	17,330	16,296	24,864
Total halibut		28,729	25,472	41,468
Herring:				
Maine	6 mos.	47,100	24,881	140,472
Alaska	7 "	107,792	91,412	103,000
Mackerel, Calif.:				
Jack	6 mos.	35,772	35,206	76,784
Pacific	6 "	8,410	8,592	45,766
Menhaden	7 mos.	814,066	1,142,110	2,076,588
Ocean perch:				
Maine	6 mos.	27,920	32,580	64,967
Boston	7 "	2,351	1,659	2,839
Gloucester	7 "	35,250	48,304	83,303
Total ocean perch		65,521	82,543	151,109
Salmon, Alaska To Aug. 10		179,000	206,213	264,000
Scallops, sea,				
New Bedford	7 mos.	9,163	8,108	14,243
Shrimp (heads-on)	4 mos.	32,581	31,616	183,862
Squid, Calif.	6 mos.	2,348	7,692	15,790
Tuna & bonito, Calif.	6 mos.	132,558	163,790	409,596
Whiting:				
Maine	6 mos.	7,610	4,559	14,835
Boston	7 "	866	119	413
Gloucester	7 "	46,135	25,787	46,432
Total whiting		54,611	30,465	61,680
Total of all above items		1,634,959	1,981,106	3,779,656
Others 3/ not listed		378,515	355,848	1,420,344
Grand Total		2,013,474	2,336,954	5,200,000

1/ Preliminary.
2/ Excluding menhaden.
3/ Includes catch of the following: anchovies, jack and Pacific
mackerel, tuna and bonito, and squid.
4/ Dressed tuna.
5/ Not included.
Note: Round or "as caught" weight unless otherwise indi-
cated.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JULY 1957: United States imports of edible fresh, frozen, and processed fish and shellfish in July 1957 were higher by 52.8

United States Foreign Trade in Edible Fishery Products, July 1957 with Comparisons						
	Quantity			Value		
	July		Year	July		Year
	1957	1956	1956	1957	1956	1956
	.(Millions of Lbs.)			.(Millions of \$)		
Imports:						
Fish & shellfish; Fresh, frozen & processed 1/	88.9	71.1	786.6	25.7	21.9	231.6
Exports:						
Fish & shellfish; Fresh, frozen & processed 1/	3.9	5.9	82.8	1.0	1.3	19.2
1/ Includes pastes, sauces, clam chowder and juice, and other specialties.						

percent in quantity and 35.3 percent in value as compared with the previous month. Compared with July 1956, the imports for this July were up 25.1 percent in quantity and 17.4 percent in value. Imports in July this year were much higher for fish fillets and blocks, canned sardines and salmon, and swordfish as compared with the previous month. This July compared with the same month in 1956 showed that there were substantial gains in the imports of fillets and blocks, canned sardines, dressed salmon, and raw albacore tuna. These increases more than offset declines in the imports of shrimp, canned salmon, and raw tuna other than albacore.

Imports for July 1957 averaged 28.9 cents a pound as compared with 30.8 cents a pound for the same month of 1956.

Exports of processed edible fish and shellfish in July 1957 were lower by 44.2 percent in quantity and 23.1 percent in value as compared with the previous month. Compared with July 1956, exports this July were down 34.1 percent in quantity and 23.1 percent in value.

* * * * *

FISHERY PRODUCTS IMPORTS AND EXPORTS, 1956: The value of United States foreign trade in fishery products in 1956 amounted to \$320.7 million. This establishes an all-time high in the value of United States trade in these commodities. The value of this trade was 8 percent above that of 1955 and 22 percent greater than in 1952. The former high year was 1955 when the value amounted to \$257.9 million.

Of the total foreign trade in fishery products in 1956, \$281.2 million represented the value of products imported for consumption and approximately \$39.5 million the value of exports. These and other related data can be found in Imports & Exports of Fishery Products, 1952-1956 Annual Summaries (C.F.S. No. 1595) recently released by the U. S. Bureau of Commercial Fisheries.



Imports of all types of aquatic items during 1956 accounted for 88 percent of the total while exports made up the remaining 12 percent of the value of the United States foreign trade in fishery products. Imports during 1956 were 9 percent above those of the previous year, while exports were 1 percent less.

During 1956, imports for consumption amounted to nearly 787.9 million pounds of edible fishery products valued at almost \$233.2 million, while nonedible products were valued at about \$48.0 million. Among the more important items received in this country during 1956 were frozen groundfish fillets and steaks (including blocks and slabs) and tuna.

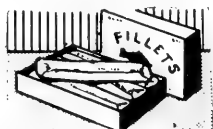
Exports of edible fishery products totaled 101.9 million pounds valued at \$22.9 million dollars, while nonedible products were valued at \$16.6 million. Exports of

both canned salmon and sardines declined sharply in 1956. Canned salmon shipments of 5.2 million pounds were less than half as large as those of 1955. Canned sardines exports of 39.7 million pounds were down 15 percent.

These and other related data can be found in Imports & Exports of Fishery Products, 1952-1956 (C. F. S. No. 1595).

* * * * *

GROUNDFISH FILLET IMPORTS, AUGUST 1957: During August 1957, imports of groundfish (including ocean perch) fillets and blocks amounted to 15.4 million pounds. Compared with the same month of last year, this represented an increase of 4.2 million pounds (38 percent). The increase this August over the same month in 1956 was primarily due to a 3.9-million-pound increase in imports from Canada.



Icelandic exports to the United States showed a gain of 130,000 pounds. Imports from Norway, the United Kingdom, and the Netherlands, compared with August 1956, registered a net increase of 431,000 pounds. Combined imports from Denmark and West Germany showed a net loss of 117,000 pounds. There were no imports of groundfish fillets from Miquelon and St. Pierre during August 1957 although 68,000 pounds were reported during the same month of last year.

Imports of groundfish and ocean perch fillets and blocks into the United States during the first eight months of 1957 totaled 97.4 million pounds--an increase of 3.5 million pounds (4 percent) as compared with the corresponding period of 1956. Canada led all other countries exporting fillets to this country with 73.0 million pounds. Iceland followed with 16.4 million pounds. The remaining 8.0 million pounds was shipped by Norway, Denmark, West Germany, the Netherlands, and United Kingdom, Greenland, France, and Miquelon and St. Pierre.

NOTE: SEE CHART 7 IN THIS ISSUE.

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IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA PROVISIO: 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-August 31, 1957, amounted to 27,259,296 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 17,269,237 pounds of the quota which may be imported during the balance of 1957 at the $12\frac{1}{2}$ -percent rate of duty.



Virginia

EELGRASS BEDS HAVEN FOR OYSTER DRILLS: The private life and habits of the oyster drill or screwborer (known to oystermen as "Public Enemy No. 1") have been studied daily by the Virginia Fisheries Laboratory this summer. Three of the Laboratory biologists report tremendous numbers of drills in eelgrass beds this year. The density of these pests is equivalent to 500 million per square mile in some places. Most of these drills were hatched in the summer of 1956.

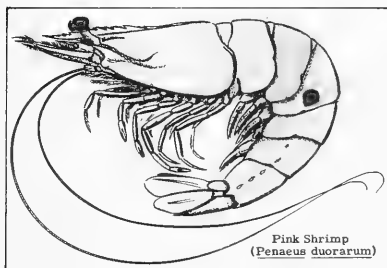
One of the biologists states, "Eelgrass beds, the green underwater pastures of our coastal waters, seem to have all the features that drills need--surfaces for egg

attachment, food for young, and protection for all. One important problem now is to determine if these drills migrate from eelgrass beds to adjacent oyster grounds" (September 6, 1957, news release from Virginia Fisheries Laboratory).



Washington

NEW FISHERY FOR SMALL SHRIMP: The catch of small pink shrimp landed at Westport, Wash., exceeded one million pounds in 1956. This shrimp fishery was established as the result of exploratory fishing surveys by the U. S. Fish and Wildlife vessel John N. Cobb in 1955 and 1956. Up to the present time, the market for the shrimp has been limited to the Pacific Coast. A Westport firm is processing the shrimp and a Seattle broker is handling the distribution.



The shrimp are caught on grounds 4-28 miles off the Washington coast in about 60-85 fathoms.

Total landings through June 30, 1957, the Washington State Department of Fisheries reports, were 982,685 pounds, of which 448,905 pounds were landed in June alone. Individual fishing boats have been averaging about 11,000

pounds a day, but one vessel, Shirley Lee, brought in 64,000 pounds in one three-day trip in June.

Commercial processing became practical when the packers installed a Gulf Coast shrimp peeler. Green shrimp are put through the peeler for automatic peeling and removal of the sand vein.

These shrimp are then canned about 130 shrimp to a 4½-ounce can. After heading, the shrimp are only about three-fourths of an inch long.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, JUNE 1956, P. 31; NOV. 1955, P. 35.



Whaling

PACIFIC COAST WHALING INDUSTRY REVIVED: There has been a re-birth of the whaling industry on the United States Pacific Coast with reactivation of a whaling station in 1956 at Point San Pablo in San Francisco Bay. The operating company is primarily a producer of whale meat which is sold under a brand name. At the present time the ground whale meat is packed in 50-pound paper sacks and then frozen. The ground whale meat (which looks like hamburger) is fed under pressure out of a three-inch pipe, which is controlled by a valve, directly into the sacks which are on a scale, thereby insuring the proper weight. At the present time, all of the whale meat product is being used by mink farms, but expansion into the pet food market is being considered. According to a company spokesman, they are having no marketing difficulties, but would like to have a more diversified operation.

The Point San Pablo plant is situated next door to a reduction plant where all of the whale that is not used for meat is processed into meal and oil. This reduction plant, which uses a dry rendering process, is believed to be the only such plant

of this type in the United States and the yield is reported to be better than in the more common reduction processes. The meal product produced is guaranteed to contain 68.5 percent protein, but will actually rate between 70-75 percent. The whaling company has been in operation for two years, but prior to the present reactivation of whaling activities, whale meat was imported from Canada for two years.

The whales are captured by a fleet of three catcher-boats, manned by a crew of five men each. They hunt daily, weather permitting, during the seasons which are: May 1 to October 31 on finback and humpback whales, and April 1 to November 30 on sperm whales. Their primary interest in sperm whales is the baleen or whalebone because the meat in the sperm whale is too oily for good quality edible meat.

The whaling grounds are offshore of the Farrallon Islands, sometimes over a hundred miles at sea. The vessels are in constant communication with the plant so that production can be controlled to the plant capacity which is three whales daily. The vessels hunt and harpoon the whales, pump air into the carcass to keep the dead whale afloat, the flukes are secured to the boat by a chain, and the dead whales are towed to the plant.

The catcher vessels are under a five-year contract to the company and receive payment for the whales based on their length. Crews are made up of a harpooner, engineer, cook, deckhand, and captain. They have an arrangement with the vessel owners for a percentage of the gross proceeds, based upon their individual job.

The humpback whales, which are their primary catch, average 43 feet in length and provide approximately 6-8 tons of whale meat and about 1,800 gallons of oil. The finback whales are slightly larger and produce 12-15 tons of meat. Only the loins are used for meat. There is some meat in the shoulder which could be utilized.

The 1957 catch to about the middle of July consisted of 80 humpback and 10 finback whales, and plans call for the processing of about 300 whales this season, weather and availability permitting. In 1956, 140 humpback and 64 fin whales were caught. Company spokesmen believe that a catch of 400 whales yearly would not deplete the population. The company spokesmen state that they are concerned with exploiting the whale population only to the extent that a sustained yield is possible.

As a source of edible meat during an emergency, this source at the present rate of production has a seasonal potential of 8 million pounds of meat and about 750,000 gallons of whale oil. Present facilities are not adequate to meet the standards for human consumption, due primarily to difficulties in maintaining quality after the whales are harpooned.



CUTTING MEAT FROM THE SHOULDERS AND RIBS OF A WHALE.



Wholesale Prices, September 1957



GENERAL VIEW OF THE OLDER OF THE TWO MARKET SHEDS AFTER SELLING ACTIVITY IS ABOUT OVER IN FULTON FISH MARKET, NEW YORK CITY.

Wholesale price trends for fishery products were mixed during September, with some sharp increases in the fresh drawn, dressed, and whole finfish varieties and decreases in fresh and frozen shrimp and Maine sardines. The net result was an increase in the September 1957 over-all edible fish and shellfish (fresh, frozen, and canned) wholesale price index (120.0 of the 1947-49 average) of 3.4 percent as compared with the previous month and an increase of 5.0 percent over the same month in 1956.

From August to September prices increased (24.4 percent) rather sharply for all the items in the drawn, dressed, or whole finfish subgroup except for yellow pike prices at New York which dropped 3.8 percent. Increases of 37.5 percent for Pacific Coast halibut and 26.0 percent in king salmon prices were the result of a firmer market for halibut and salmon because supplies began to taper off. Increases in whitefish and lake trout prices were due to the excellent demand for these varieties during the Jewish holidays. The market for fresh large offshore drawn haddock at Boston was firm due to a healthy inventory situation for frozen haddock fillets and the usual drop in landings in the late summer and fall months. The September 1957 index for this subgroup was 6.0 percent above that for the same month in 1956, due primarily to higher prices for fresh salmon and all the freshwater species. But both halibut and fresh large drawn haddock prices this September were down 2.2 percent as compared with September a year ago.

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

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ¹ / (\$)		Indexes (1947-49=100)			
			Sept. 1957	Aug. 1957	Sept. 1957	Aug. 1957	July 1957	Sept. 1956
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					120.0	116.0	119.9	114.3
Fresh & Frozen Fishery Products:					134.3	127.0	133.3	125.8
Drawn, Dressed, or Whole Finfish:					140.5	112.9	122.5	132.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.10	.08	97.9	80.6	95.3	100.1
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.44	.32	136.1	99.0	114.5	139.2
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.75	.60	168.5	133.7	140.5	151.7
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.73	.61	179.7	161.2	130.2	151.2
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.97	.80	195.1	161.8	111.2	149.6
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.67	.61	137.3	125.0	125.0	117.8
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.63	.65	146.6	152.4	164.1	117.3
Processed, Fresh (Fish & Shellfish):					131.6	134.0	141.7	126.3
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.34	.31	115.7	103.8	100.4	97.0
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.77	.85	120.9	133.5	150.1	113.0
Oysters, shucked, standards	Norfolk	gal.	6.00	5.75	148.5	142.3	142.3	148.5
Processed, Frozen (Fish & Shellfish):					116.9	131.3	129.0	102.9
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	100.8	102.1	102.1	103.4
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.30	.29	92.6	91.0	83.2	86.3
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	108.8	108.8	108.8	110.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.79	.97	121.9	148.9	149.3	99.2
Canned Fishery Products:					99.6	100.3	100.8	98.0
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	76.4
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	87.5
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans cs.	New York	cs.	6.59	17.045	70.1	175.0	79.3	81.9

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.

²/ Revised.

Fresh processed fish and shellfish prices in September this year were down 1.8 percent from August. Increases of 14.6 percent for fresh small haddock fillets and 4.4 percent for shucked oysters were more than offset by a seasonal decline of 9.4 percent in fresh shrimp prices. Comparing this September with the same month in 1956, the index for the subgroup increased 4.2 percent due to higher haddock fillet and fresh shrimp prices. Oysters were priced the same as in September 1956.

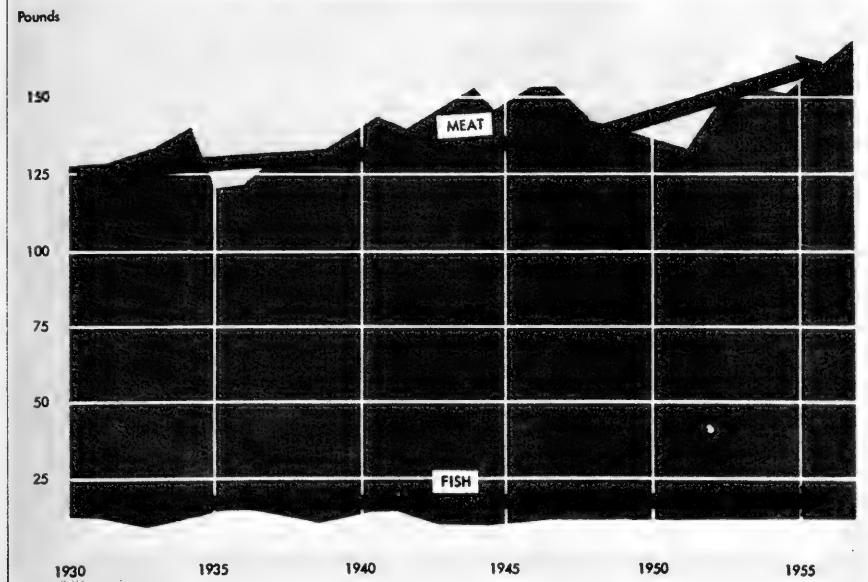
Wholesale prices for frozen processed fish and shellfish declined 11.0 percent from August to September 1957 because of a rather sharp seasonal drop in frozen brown shrimp prices at Chicago. Changes in frozen fillet prices were slight--flounder and haddock fillets prices were lower by only $\frac{1}{2}$ to 1 cent a pound. The September 1957 index for this subgroup was 13.6 percent higher than in the same month in 1956, due principally to higher frozen shrimp

prices (up 22.9 percent) and higher frozen haddock fillet prices (up 7.3 percent). Both flounder and ocean perch fillet prices were down about 2 percent from September a year ago.

Canned fishery products prices in September this year were about unchanged from the previous month except for a further decline (6.5 percent) in the price at New York for canned Maine sardines. The canned salmon market continued firm due to a short pack both this year and last; canned tuna and California sardine prices were unchanged from August to September. Comparisons between this September with September a year ago show a firmer market for canned tuna, an unsettled market for canned California sardines (production was light for the first month of the open season in Southern California), a firm market for canned salmon, and a pronounced weakness in the market for Maine sardines.



UNITED STATES PER CAPITA CONSUMPTION

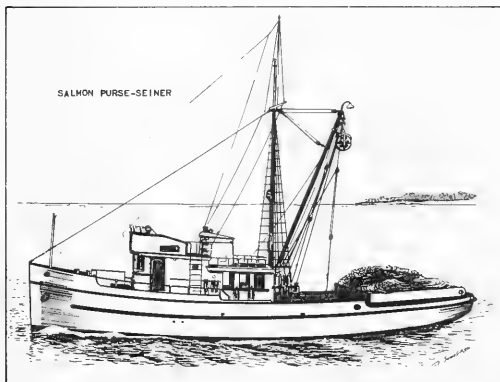




International

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

REVIEW OF 1957 FRASER RIVER SOCKEYE SALMON RUN: The 1957 Fraser River sockeye salmon run represents a drastic departure in timing from that of the previous cycle in 1953, according to an August 19, 1957, news release for the International Pacific Salmon Commission. It was much later and spread over a much



longer period of time. This characteristic change was anticipated because of a different moon phase, but to a lesser degree than actually occurred. The regulatory tendency in such a situation is to underestimate the size of the run from week to week.

The size of fish was expected to be small on the 1957 cycle but the fish were smaller than expected—averaged 5.64 pounds for the Canadian gill-net catch and 5.86 pounds for United States gill-net catch. The difference in weight is due to the 5.5-inch minimum mesh restriction for United States gill nets. The current purse-seine

average weight based on total numbers and total pounds landed for both Canada and the United States is 4.6 pounds. This average weight is being held down by a catch of over 20 percent 3-year-old males averaging 3 pounds or less. More 3-year-old males are appearing to date than in 1953 preceding the 1954 Adams River run.

The failure of the Canadian fishing fleet in Juan de Fuca Strait to take its expected share of the run, the rise in the efficiency in the United States fishery, the estimated drop of 20 percent in the run, the drastic change in the timing and nature of the run, combined with the required long weekend closed seasons when no check was possible on the nature of the day-to-day migration, made regulatory control for adequate racial escapement and division almost impossible. To obtain adequate escapement a drastic reduction in the Fraser gill-net fishery was an unfortunate necessity as a last resort, but drastic reductions in fishing time in the United States fishery was also required in an attempt to control equal allocation of the catch between the two countries and provide proper escapement.

The escapement is now considered excellent and equal or better than the brood year although only the Early Stuart run has reached the spawning grounds. A preliminary estimate of the Early Stuart escapement indicates 210,000 spawners compared with 155,000 in the brood year of 1953. This run passed up the Fraser River, however, during the strike in early July. This number of spawners is below the maximum number of 250,000 sockeye believed capable of spawning in these streams.

In spite of severe regulation on the Fraser River, the catch in this area is 45 percent of the Canadian total and the gill-net catch for all Canadian Convention waters is 60 percent with the purse-seine and trap catch making up the remaining 40 percent.

The catch through August 18, 1957 was 1,405,141 fish for United States fishermen and 1,090,000 fish for Canadian fishermen. When the fish taken by United States fishermen during the early July strike in the Fraser River are eliminated, the present deficit in the Canadian catch is 165,000 fish. Every effort will be made consistent with proper management to eliminate this deficit now that adequate escapement has been obtained, but it is doubtful because of the rapid rise in the pink salmon run if the usual accuracy in dividing the catch can now be obtained. Later data, through September 4, shows the catch by United States fishermen at 1,674,028 fish and by Canadian fishermen at 1,318,077 fish.

Although the 1957 Fraser River sockeye run is somewhat below the run of the brood year and the fish show evidence of very adverse ocean conditions during their marine existence, the Fraser run of sockeye is far better than the runs of four-year-old sockeye in the other sockeye-producing areas of the Pacific Coast region. For the first time since 1953 the number and condition of three-year-old fish is very favorable, indicating a possible improvement in the adverse ocean conditions affecting the Fraser sockeye runs of the last three years.

INTERNATIONAL WHALING COMMISSION

INTERNATIONAL WHALING CONVENTION RATIFIED BY DENMARK: The protocol amending the International Whaling Convention of 1946, done in Washington on November 19, 1956, was ratified by Denmark on July 26, 1957, the U. S. Department of State announced in an August news release.

UNITED NATIONS

"LAW OF THE SEA" CONFERENCE AT GENEVA: An international diplomatic conference on the law of the sea will open in Geneva on February 24, 1958, under the auspices of the United Nations.

The conference will meet for a period of nine weeks and will examine most aspects of the "law of the sea" and draw up appropriate international instruments on the subject. It is being convened in accordance with a resolution adopted by the eleventh session of the General Assembly, which left the choice of the site of the conference (Geneva or Rome) to the Secretary-General to decide in consultation with the United Nations member states.

Among the problems to be considered by the conference will be the breadth of the territorial sea, the right of "innocent passage," the nationality of ships and whether there should be a special United Nations registration entitling a vessel to fly the United Nations flag and receive United Nations protection, penal jurisdiction in maritime collisions, slave trade, pollution of the sea and piracy, including piratical acts by aircraft if these are directed against ships on the high seas.

These problems will be examined on the basis of draft articles adopted by the U. N. International Law Commission at its 1956 session, including revised sets of articles on fisheries and the conservation of the "living resources of the sea," and on the "continental shelf" and the right to explore and exploit its natural resources. A study will be made also of the question of free access of landlocked countries to the sea.

All member countries of the United Nations and of the specialized agencies are invited to participate in the conference at the European Headquarters of the United

Nations in Geneva and to include among their representatives experts competent in the field to be considered. In addition, 15 intergovernmental bodies, mostly concerned with fishing and other maritime questions, have been invited to send observers.

Meanwhile, a group of 10 experts appointed to advise the Secretary-General on preparations for the conference will hold a second series of meetings with the United Nations Secretariat in New York, October 7-18, 1957. The group first met in New York last February.

Following the meeting of experts, it is expected that the provisional agenda and provisional rules of procedure for the Geneva conference, probably accompanied by other recommendations, will be sent to participating members.



Australia

NEW FISH CANNERY PLANS TO CAN TUNA: A new fish cannery located in Melbourne, Australia, began operations in January 1957, and since that time has operated at a capacity rate of 25,000 pounds of raw fish a day (8 hours). The Managing Director of the new cannery was formerly the manager of two fish canneries located at Eden and Narooma, New South Wales. Full-scale production of canned tuna will commence with next season's run on the coast of New South Wales.

The canned fish production since the opening in January has consisted of trout (believed to be *Arripis trutta*) and the fish cutlets (barracuda) packed in 4-, 8-, and 16-oz. cans. The canned products have been distributed in all Australian

states except Tasmania. Fish supplies are obtained from all the fishing ports in the state of Victoria from Portland to Mallacoota. Due to improvements in the harbor at Portland, the Managing Director of the new cannery predicts that this port will be a major fishing port for trout and tuna.

The cannery has a freezer-storage capacity of 100,000 pounds. It is designed to meet overhead costs with a minimum of 20,000 pounds of raw fish a week. Prices to the fishermen for trout have averaged about 5.6 U. S. cents a pound laid down in the cannery's truck at the port of landing (Australian Fisheries Newsletter of the Commonwealth Director of Fisheries, July 1957).

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FISHERMEN WANT RESTRICTIONS ON TUNA IMPORTS CONTINUED: Anxiety on the part of Australian tuna fishermen regarding the possible effects of any increase in imports of Japanese canned tuna was expressed at a meeting at Eden on June 4, 1957, of the Southern Regional Association of Fishermen's Co-operatives.

The secretary of the Association reported that the meeting asked the manager of the Eden fish cannery if the cannery would pay 6d. a pound (about US\$112 a short ton) for tuna

next season. The cannery, it was reported, was at present not in a position to increase its price to the fishermen, and was worried by possible relaxation of import restrictions.

The meeting unanimously decided to ask the New South Wales Government to approach the Commonwealth to have the present import restrictions continued in view of the large investment by the fishermen and the cannery to establish a tuna industry in Australia. (Australian Fisheries Newsletter of July 1957.)

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SARDINE RESOURCES SURVEY PROGRESS REPORT: In accordance with original plans, the survey of pilchard resources in Australian waters off New South Wales was discontinued for the season at the end of May 1957 and will be resumed in December.

The survey, financed from the Fisheries Development Trust Account, is being carried out by the Commonwealth Fisheries Office (Dept. of Primary Industry) with the chartered fishing vessel Eden Star.

Bad weather was experienced in the early stages of the survey in February, and over-all, from north of Broken Bay to Port Stephens, the incidence of pilchards was not high. However, they were abundant between Sydney and Jervis Bay, and particularly between Kiama and Jervis Bay, and catches of up to two tons were made with the purse seine. A similar quantity was also taken in Broken Bay.

Analysis of some of the catches showed an oil content of 5-7 percent. This corresponds with the oil content of South African pilchards between August-October 1955 and would be equivalent to a factory output of about 6-10.3 gallons per ton of fish.

Good fish traces were frequently obtained by the echosounder, but the species could not always be identified.

The second phase of the survey (December-March) will cover most of the period (November-March) which a research of a few years ago suggested as the most probable time of the year for taking fat pilchards in New South Wales. (Fisheries Newsletter from Australia, July 1957.)



Brazil

FISHING VESSELS FROM JAPAN ENTER FISHERIES: A Japanese fishery company is bringing to Brazil six fishing boats to operate off Santos and supply the Sao Paulo market. Five of these boats are trawlers with a capacity of 60 to 100 tons, and one is a purse-seine vessel with a capacity for 200 tons. The Japanese company is controlled by Japanese interests and has been incorporated in Brazil under Brazilian law. Under a special waiver from the Federal Government, it may operate its boats with a Japanese crew for two years. At the end of this period, the crew must all be nationalized, states an August 13 United States consular dispatch from Sao Paulo.

The fish trade in Sao Paulo is operated through cooperatives, which include not only fishing, but also the distribution of the catch. The Japanese firm will operate through the newly-formed cooperative Industria de Pesca Atlantica, which is expected to absorb the Cooperativa Nipo Brasileira that has already been operating for some time. It is reported that the other two cooperatives, Cooperativa das Pescadores de Santos and Cooperativa de Sindicato des Armadores de Pesca, are concerned over the entry of the Japanese firm into the field with modern equipment and are looking into the possibility of acquiring some modern craft of their own to meet this competition.

The present consumption of fish in the Sao Paulo market is reported at 40 metric tons a day. It is estimated that with an abundant supply of fish at reasonable prices consumption could be expanded to 200 tons a day. Long-range plans of the state government include the construction of refrigeration and storage facilities in the City of Sao Paulo and distribution facilities to other nearby municipalities, but it is not expected that these plans will move forward very rapidly.

Brazilian law requires that the captain and crew of fishing vessels be citizens. The Federal Government, however, has been waiving this requirement in specific cases for periods of from 2 to 4 years in order to encourage the utilization of modern craft and develop an abundant supply of fish at reasonable prices. Each case is examined on its individual merits. Besides modern craft, the other main requirement is that the operation be carried on by a company organized under the laws of Brazil and that the manager of the company be a Brazilian citizen.



Canada

INSPECTION SYSTEM FOR BRITISH COLUMBIA FISHERY PLANTS: A fish processing plant inspection system in British Columbia similar to that already in its initial stages in the Atlantic coast provinces of Canada has been established, points out the July 1957 Trade News of the Canadian Department of Fisheries.

This year all Canadian fishery plants will be inspected regularly by qualified officers from the Department of Fisheries. A very exacting standard has been drawn up and approved by the industry in regard to sanitary requirements in plant facilities and in processing equipment. Detailed specifications covering every phase of operations in fish freezing and packing are laid down.

In British Columbia, the inspection system will go into effect in 1957 on a voluntary basis. Experiences gathered this season will be carefully examined, and if necessary, modified to meet practical requirements. Eventually a final form of standards for plant layout, equipment, and processing techniques will be written into special regulations under the Meat and Canned Foods Act.

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NEW SCALLOP GROUNDS FOUND ON STE. PIERRE BANK: New possibilities for Canadian scallop draggers off the Atlantic coast have been opened up by the discovery of two previously unknown scallop beds. The new beds are on the southern part of Ste. Pierre Bank east of Cape Breton and south of the islands of Ste. Pierre and Miquelon. They were located in July by scientists of the Fisheries Research Board of Canada, who have been directing exploratory fishing on a vessel chartered by the Industrial Development Service of the Federal Department of Fisheries.

The beds are described as small but promising, and are in from 24 to 26 fathoms of water. The larger of the two is about 12 square miles in extent, the smaller about 70 square miles. Commercially-profitable catches of good-size scallops, with large, firm meats, have been made. Although the new beds are smaller than those found by Research Board scientists on the northern part of Ste. Pierre Bank in 1954, the concentration of scallops is as high as has been found anywhere, holding promise of good fishing immediately (Fisheries Council of Canada Bulletin, August 19, 1957).



Cuba

CONCESSION FOR NEW FISHING TERMINAL GRANTED: The project of the Cuban National Fisheries Institute (Instituto Nacional de la Pesca) to build a fishing terminal in Habana came closer to reality with the issuance of a presidential decree (No. 2091) granting a 50-year concession to the Economic and Social Development Bank (Banco de Desarrollo Economico y Social) to begin such construction at a cost not to exceed US\$3,500,000. The technical direction for the actual construction of the terminal will be provided by the Ministry of Public Works, an August 8, 1957, dispatch from the United States Embassy in Havana reports.

The proposed terminal will be used as a receiving and distribution center of the important Habana fisheries and should greatly assist the industry in all its phases including outfitting the fishing fleet, improved handling of the catch, and provide canning and refrigeration facilities.

Location of the terminal will be in the municipality of Regla in the Ensenada de Marimelena portion of Habana Harbor. Facilities of the new project are expected to include the following: docks and piers for tying up small fishing boats, warehouse facilities for storing fresh fish and shellfish, a packing plant, a freezing plant, an ice factory, a processing plant to handle byproducts and fish derivatives, shops to outfit fishing vessels, adjacent sales outlets, a laboratory, a kitchen, a sales-room, offices, and a conference room.

Construction work will include laying of concrete or wooden pilings, dredging, filling, paving, and improving of streets and parking zones plus the building of railroad sidings and approach roads.

The Economic and Social Development Bank is charged with all the financial activities in connection with the new terminal and will fix and collect fees to be charged the fishing terminal users for all the various services that are to be provided. The bank can also sublet the concession, subject to the prior approval of the President of Cuba, but the new concessionnaire would have to assume responsibility under bond to realize all the works and projects without the necessity of the State or the original concessionnaire having to assume financial responsibility.

The Economic and Social Development Bank may issue bonds backed up by the expected income to be created by this project at the rate of interest and for the length of time required, but the maximum amount of bonds issued cannot exceed \$3,500,000 nor can the rate of interest exceed 5½ percent. Principal and interest

payments and service charges on the indebtedness must be charged to income arising from the concession. The above bonds will not constitute a debt against the State.

The concession is granted for a term of 50 years and with all the tax exemptions conceded by Law-Decree 1550 of August 4, 1954 (this is the decree law authorizing the construction of the Habana Harbor tunnel).

NOTE: SEE ALSO COMMERCIAL FISHERIES REVIEW, NOVEMBER 1955, P. 50.

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CUBAN-JAPANESE FISHING CONTRACT TO INCLUDE PROCESSING OF TUNA AND OTHER FISHERY PRODUCTS: In June Cuban press reports pointed out that the Cuban National Fisheries Institute (Instituto Nacional de la Pesca) had signed a contract with the Cuban representative of a large Japanese fishing company for the use of a 590-ton Japanese vessel (*Sumiyosha Maru*) to train Cuban crews in the latest fishing methods, especially for tuna. The contract is expected to be extended to include a shore processing plant for fish "hams" and "sausages," according to a notice in the Cuban Official Gazette of July 25, 1957, that the Cuban representative of the Japanese firm has filed an application to establish this new industry. The products are to be packed in "plastic bags, cans, and cardboard boxes." Operations were scheduled to begin August 1, 1957.

The Cuban firm bases its claim to be a new industry on the assumption that it is creating new products--fish "sausages" and "hams." The United States patent rights covering this product have been issued in favor of a Boston, Mass., firm, and exclusive Cuban rights were acquired by the Cuban firm through the Boston company's legal representative abroad.

The Cuban company plans to begin operations with 46 workers and expand to a maximum of 92 persons. It has listed as required equipment and machinery various refrigerating devices, mixers, grinders, sausage stuffers, etc., most of which equipment has already been acquired by this firm from the United States. Raw material requests are listed as various quantities of fish, seafood, and crustaceans, salts, chemicals, starches, powdered milk, and condiments. Likewise this listing includes large quantities of packing crates, boxes, and cartons of various sizes, and labels. Under the listings, tuna and other species of fish, which will presumably be caught in Cuban and Gulf of Mexico waters, are listed under "imported products."

A source of the National Fisheries Institute reported that it is anticipated that the Cuban firm will have little difficulty in acquiring new industry status, which will grant the new concern exemptions from custom duties, consular fees, and other customs taxes collected on machinery, equipment, construction, and other materials imported into Cuba.

A press report on August 10, 1957, indicated that the *Sumiyosha Maru* will sail under the Japanese flag together with an identifying pennant of the National Fisheries Institute. This article also stated that a decree has been applied for to consider the vessel as if it were under the Cuban flag and so entitled to avail itself of advantages provided in current legislation as a nonprofit operation, insofar as fiscal matters and payment of duty was concerned. The reliability of this newspaper account, however, is questionable, according to a National Fisheries Institute source.

The same source indicated that the *Sumiyosha Maru* had finally passed through the Panama Canal after some delay due to technicalities involving its registration, and arrived in Havana on September 16. In the meantime the vessel is continuing to carry on its commercial fishing activities, an August 30, 1957, despatch from the United States Embassy reports

The profits obtained from the new industry will be used as follows: 66 percent to be distributed as dividends among the Company's stockholders and 34 percent will be actually invested as capitalization; "the process to be followed in said reinvestment or capitalization being to acquire vessels, equipment, new machinery, real property, etc."

The application indicates that: all of the raw materials needed annually have to be imported from abroad. In part, the raw materials needed are: 5,000 tons of tuna, swordfish, bonito, albacore, snapper, grouper, merluza, and pilchard; 2,000 tons of other seafoods and crustaceans such as lobsters, crawfish, shrimps, octopus, squid, and crab; about 280 tons of lard, salt, spices, preservatives, and other ingredients for making a sausage-type product.

The estimated composition of each product is as follows: (1) Fish sausage: fish or shellfish 86 percent, hydrogenous fats 10 percent, starches 2 percent, spices 1 percent, powdered milk 0.5 percent, chemical products 0.5 percent; (2) Fish ham: fish or shellfish 98.5 percent, spices 1.0 percent, chemical products 0.5 percent.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1957 P. ; AUGUST 1957 P. 51.



Indonesia

AGAR-AGAR PLANT BEGINS OPERATIONS: During the month of July 1957 construction was completed of and production of agar-agar was begun in an Indonesian Government-owned factory. This factory operated by the Bank Industri Negara, is situated on 7½ acres just outside of the Surabaya city limits, an August 27 despatch from the United States Consul in Surabaya points out. Two hundred workers are employed in the production of agar-agar blocks, about 8,000 10-gram blocks a day or 80 kilograms (about 176 pounds). The factory is clean and apparently well operated, a distinct improvement over the 20 small plants producing the same item in Surabaya. The seaweed is gathered by the company's 3 sailing vessels off the coast of the island of Sumbawa in the Lesser Sundas. The Manager stated that production can be doubled if necessary and that he would like to export his product to the United States when quality problems are solved.



Japan

FISHERY PRODUCTS EXPORTS TO UNITED STATES, JANUARY-

APRIL 1957: Exports of fish and fish preparations to the United States in March 1957 totaled 10,303 metric tons (valued at US\$52 million) and 7,266 tons in April (valued at US\$4.6 million). Fish and fish preparations exports to the United States January-April 1957 totaled 32,486 tons, valued at US\$17.8 million. (U. S. Embassy in Tokyo dispatch dated July 19, 1957.)

Japanese Exports of Fish and Fish Preparations to the United States, January-April 1957		
Item	Quantity	Value
	Metric Tons	US\$
		1,000
Tuna, frozen	16,366	1,000
Tuna, canned	4,366	4,818
Crab meat, canned	877	2,163
Other canned fish	3,894	3,388
Unclassified	7,032	3,367
Total	32,486	17,771

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KING CRAB MEAT PACK BY NORTH PACIFIC FACTORYSHIP, APRIL-JULY

1957: The Japanese king crab factoryship fleets operating in the Okhotsk and the Bering Seas packed 364,000 standard cases (48-6½ oz. cans) from April-July 1957. The pack by factoryship operations through August 31, 1956, amounted to 377,000 cases and the total pack (including king crab and kegani crab) from all sources for 1956 totaled 798,350 cases.

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TUNA FISHING FLEET EXPANSION LIMITED: The Japanese "Special Exceptional Measures Law," in effect from July 1953 to July 1955, was designed to modernize the tuna fishing fleet and to encourage the building of larger vessels capable of engaging in the distant-water tuna fisheries, and to lessen the concentration of fishing activities in coastal waters. Under the provisions of this law, the tuna fleet increased considerably, both in terms of the number of vessels and the individual size of the vessels. The gross tonnage increased about 67 percent--from 108,319 at the end of 1952 to 176,243 gross tons by December 31, 1955. At the end of 1955, there were 1,825 vessels registered for the tuna fishery as compared with 1,590 at the end of 1952.

Following the repeal of the 1953 Law in 1955, new and revised regulations went into effect which prohibited the licensing of new tuna vessels, but permitted the replacement of old vessels under more restrictive conditions. The purpose of the revised regulations is to restrain unnecessary and undesirable expansion of the tuna fishing fleet. The present fleet is considered adequate to catch the maximum catch consistent with current market conditions, particularly in the United States where it is felt that the saturation point has been reached.

Details of the present regulations, and differences from the Special Exceptional Measures Law, are as follows:

A. Granting of new licenses for tuna fishing will be suspended after July 10, 1955. (Under the previous Law, switches of vessels from other fishing fleets were permitted.)

B. High seas tuna vessels (100 gross tons and over).

1. A 100- to 240-gross-ton vessel registered as of December 1, 1952, may be replaced with a vessel less than 240 gross tons.
2. A vessel over 240 gross tons may be replaced with a vessel with equal tonnage.

3. A vessel between 95 and 100 gross tons which had been increased to over 100 tons during the period the Law was in effect may be replaced with a vessel under 180 gross tons. Also, a 70- to 95-gross-ton vessel which had been increased to over 100 tons during the period the Law was in effect may be replaced with a vessel under 160 tons.

4. A vessel over 240 gross tons may be built if vessels totaling an equal tonnage are decommissioned.

C. Medium-size tuna vessels (between 20 and 100 gross tons).

1. A vessel between 70 and 100 gross tons (as of July 9, 1955) may be replaced with a vessel under 100 gross tons. (Under the previous Law, a 70- to 95-gross-ton vessel could be increased to 135 tons in the early part of the program and, during the latter part, could be increased to 160 tons. Also, a 95- to 100-ton vessel could be increased to 150 tons during the early part and later to 180 tons).

2. A vessel between 20 and 70 gross tons may be replaced with a vessel under 70 gross tons. (Under the previous Law, such vessels could be replaced with vessels under 100 gross tons). However, if the new vessel is to be over 70 gross tons (and under 100), a vessel with tonnage equal to the difference between the new vessel weight and 70 gross tons must be decommissioned, as well as a vessel between 20 and 70 gross tons. (Under the previous Law, when a medium-size vessel had been decommissioned, it could be replaced with a new vessel with an additional tonnage of 50 to 60 tons).

The effect of the above complicated regulations is essentially as follows: In the case of high seas tuna vessels (over 100 gross tons), new vessels under 240 gross tons may be built upon decommissioning of vessels of lesser tonnage and vessels over 240 gross tons may be built only upon decommissioning of an equal amount of tonnage. In the case of medium-size tuna vessels (under 100 gross tons), new vessels can be built under 100 gross tons upon decommissioning of lesser tonnages.

The number and tonnage of tuna vessels built since April 1952 and the size of the tuna fleet at the end of each year are shown in table 1.

Government assistance to tuna builders and owners has been limited since July 1953 to the extension of long-term loans with comparatively low interest rates. These loans are made available through local banks and through the Agriculture

Table 1 - Japanese Tuna Vessel Construction Since April 1952 and Size of Tuna Fleet at the End of Each Year From 1952 Through 1956

Fiscal Year	At Each Year From High 1955						Total Tuna Fleet at End Calendar Year	
	Total		Construction		Steel			
			No.	Gross Tonnage	No.	Gross Tonnage	No.	Gross Tonnage
1957 (April-June)	32	6,384	26	2,574	6	3,710	n.a.	n.a.
1956	140	27,033	106	9,729	34	17,304	1,772	197,760
1955	190	29,083	147	15,477	43	13,606	1,825	176,243
1954	218	36,506	170	18,013	48	18,493	1,801	154,133
1953	120	18,413	88	7,741	32	10,672	1,672	124,132
1952	64	7,464	51	3,814	13	3,650	1,590	108,319

NOTE: JAPANESE FISCAL YEAR RUNS FROM APRIL 1 THROUGH MARCH 31. FISCAL YEAR 1956 ENDED ON MARCH 31, 1957.

and Forestry Central Finance Corporation after review and approval by the Agriculture, Forestry, and Fisheries Finance Public Corporation. These loans are available for up to 60 percent of the construction cost at an interest rate of 7.5 percent per annum and are repayable in seven years for individuals, or in six years for associations, after deferred payments of two years.

In addition, the Government reinsures 90 percent of the amount covered under vessel insurance. A vessel owner can claim the full amount insured in case of sinking, total loss, unrepairable damage, or seizure for over 30 days.

The Tuna Fishery Research Council, which was tentatively formed in 1956 to advise the Government on future policy to follow in order to stabilize the tuna industry, recommended at the end of 1956 that construction should not be increased over the present level. Specifically, the Council recommended that: (1) It is not advisable to grant new licenses at the present time; (2) New vessel construction should not be approved unless the owners decommission an adequate tonnage of existing tuna vessels; and (3) Mothership-type tuna operations should be kept at the current level in order to control tuna resources and the tuna market situation. Since the Government's present policy appears to be based on these recommendations, the Japanese Fisheries Agency does not believe that there will be a rapid expansion of the tuna fleet in the future and that new construction will be limited to vessels due for replacement (U. S. Embassy in Tokyo dispatch dated August 21, 1957).

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U. S. S. R. CLAIM TO VLADIVOSTOK BAY REFUTED:
The Japanese Government has rejected the "historical" claims of the Soviet Union to Peter the Great Bay (Vladivostok Bay). The Japanese position was set forth in a "note verbale" handed to the Soviet Foreign Ministry August 6 by the Japanese Ambassador in Moscow, states the August 25, 1957, Japan Report issued by the Japanese Embassy in Washington.

Following receipt of a Japanese protest made July 26, 1957, against a Soviet declaration designating Peter the Great Bay as Soviet internal waters, the Soviet Government had attempted to justify its action by claiming that the Bay historically belonged to the Soviet Union.

The "note verbale" pointed out that:

1. The Soviet Government had never before claimed that the Bay historically belonged to it. The only reason the Soviet Government had given for seeking the withdrawal of Japanese fishing vessels from Peter the Great Bay in May, this year, was that there was danger from explosion of mines which remained on the sea-bed. It had not mentioned anything about the Bay being a historical possession of the U. S. S. R.

2. According to the protocol of the Fishery Convention between Japan and the U. S. S. R., concluded in 1928,

Peter the Great Bay was mentioned as one of the bays in which fishing should be prohibited, but the area fixed in the convention was smaller than the area decided upon recently. Moreover the convention recognized that open sea was included in that area.

3. Over a long period before the war Japanese trawlers carried on operations freely in the Bay without bringing any protests from the Soviet Government.

4. Although the two countries through an exchange of letters on March 30, 1944, agreed to stop Japanese vessels from fishing in the Bay, it was stated explicitly that this was a provisional wartime measure.

For the above reasons, the note reiterated, Peter the Great Bay did not possess internationally acknowledged long-term practices which are the qualifications necessary for a bay to be recognized as a historical bay from the standpoint of International Law.

The Soviet Foreign Minister, who received the note, stated that he would relay the contents of the "note verbale" to his Government and, as on the former occasions, declared that Peter the Great Bay is a historical bay of the Soviet Union.

JAPANESE GOVERNMENT



Republic of Korea

LANDINGS AND PROCESSING OF MARINE PRODUCTS: South Korea's marine fisheries and pond culture in 1956 yielded 363,322 metric tons, the highest since the beginning of the new nation in 1946. This total exceeded that for 1955 by 40.2 percent and was 68.1 percent higher than the year of lowest landings in 1950.

During 1955 South Korea processed 39,154 tons of marine products, a decline of 25.4 percent from the previous year and only 1.2 percent above 1950, which was the lowest production year in the 1947-55 period.

Employment in all phases of the fisheries (catching, pond culture, and processing) in 1955 totaled 209,585 households, an increase of 32.7 percent over the 157,907 households recorded in 1946. Of the 1955 total, 55,999 households operated full time, 96,746 households operated part time, and the balance of the total--56,842--

Table 1 - Republic of Korea Marine Landings, 1946-55

Year	Fish	Shellfish	Marine Plants	Other	Total
(Metric Tons)					
1956	258,066	9,673	24,516	71,067	363,322
1955	190,424	6,799	20,019	41,992	259,234
1954	188,941	10,455	17,253	32,887	249,536
1953	185,185	8,433	17,516	46,902	258,036
1952	208,123	9,557	13,199	46,739	277,618
1951	187,456	9,211	19,320	48,650	264,637
1950	169,251	5,324	20,313	21,303	216,191
1949	234,367	8,330	9,110	48,342	300,149
1948	225,555	6,422	6,605	46,566	285,148
1947	264,281	5,336	7,683	24,652	301,952
1946	250,990	9,528	14,764	23,441	298,723

Table 2 - Republic of Korea Processed Marine Products, 1947-1955

Year	Dried Fish	Salted Fish	Canned Fish	Other ^{1/}	Total
(Metric Tons)					
1955	14,306	13,600	285	10,963	39,154
1954	13,385	16,843	5,062	17,167	52,457
1953	19,477	25,082	223	13,271	58,053
1952	12,240	22,905	12	10,382	45,539
1951	17,825	19,638	2,090	5,587	45,140
1950	14,727	11,500	228	12,239	38,694
1949	28,737	20,707	290	37,965	87,699
1948	17,717	10,447	720	16,448	45,332
1947	22,856	25,418	108	5,319	53,701

^{1/} INCLUDES PICKLED FISH, PROCESSED SEaweeds, REFRIGERATED FISH, AND INEDIBLE PRODUCTS.

consisted of employees. (Annual Economics Review, 1957, published by the Bank of Korea.)



Libya

SPONGE INDUSTRY: The sponge industry, once one of Libya's most important sources of income, appeared to be heading for another disappointing season. By tradition, sponge fishing was a Greek activity and their annual registration of fishing boats ranged between 100 to 150 ships. This year only 16 vessels applied for licenses. The Libyan efforts to develop their own sponge-fishing industry have been marked by failures from 1952 on and this year the efforts were given up entirely, points out a United States Embassy dispatch of August 13 from Tripoli.

TUNA: The tuna fishing season, which began in mid-May, found ten fishing and canning factories in operation in Tripolitania, including the first all-Libyan-owned factory at Zuara. Three of these factories suffered severe damage in mid-June when a sudden and violent gale demolished their great nets. This setback may affect an otherwise successful season as the tuna schools were large and the catch averaged 10 to 20 percent higher than normal.



Norway

ALGINATE JELLY-COATED FROZEN MACKEREL FILLETS SOLD IN UNITED STATES: Norwegian mackerel filets, frozen in an alginate jelly (derived from seaweed), are finding acceptance in the United States, points out News of Norway of August 22, 1957. A large restaurant chain in New York City has been including this product on its menus since October 1956. According to the exclusive United States sales agents in New York City, retail-packaged frozen mackerel filets, coated with alginate jelly, are now being sold in many supermarkets of a large food chain. The filets are also available in institutional packs.

Developed (it is patented in most countries) by a Norwegian firm, the process has been passed by the U. S. Food and Drug Administration. The method is used only by the Norges Makrell-lag sales organization, a cooperative venture that has the backing of some 4,000 Norwegian fishermen.

Fish coated and frozen in alginate jelly, a substance made from seaweed, are virtually sealed from air, thus retarding rancidity and oxidation. Tests are reported to prove that alginate jelly-processed mackerel filets keep in excellent condition for a year or longer, retaining the fine flavor of fresh mackerel.

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FISHERMEN REQUEST GOVERNMENT GUARANTEES FOR PRICES AND MARKETING: A joint meeting of the Boards of the County Fishermen's Associations and Norges Rafisklag (Fishermen's Marketing Cooperative) approved the latter's proposal for a more direct control of the marketing of the catch from the large seasonal fisheries, according to a press account. Claiming that fishermen as a group had not received a proportionate share of the general rise in the standard of living,

the joint meeting also requested the government to guarantee the price as well as the marketing of fish.

The fishermen promised that they would cooperate in the realization of plans which the government in consultation with the fishermen might deem necessary to achieve public control of fish processing and fish exports. A deputation of five men was named to present the request to the government. An answer was expected prior to September 1, the United States Embassy in Oslo reported.



Panama

SHRIMP INDUSTRY EXPANDING: Panama's shrimp industry now represents a capital investment of US\$6.2 million with an additional \$2 million new capital scheduled to be invested in new boats and freezing plants. Shrimp boats presently fishing Panama waters number 152 with a net tonnage of 2,500, as compared with 13 boats of 71 net tons operating in 1951.

Shrimp exports in 1956 totaled 6,166,478 pounds with a declared value of \$4,360,131. Shipments in the first five months of 1957 have amounted to 3,881,437 pounds, 59 percent above January-May 1956. On the basis of value, 1957 exceeds 1956 shipments by 87 percent.

The "pink" shrimp run was unusually good and the local industry was better prepared this year to handle it.



Portugal

CANNED FISH EXPORTS, JANUARY-JUNE 1957: For the first six months of 1957, canned fish exports amounted to 18,943 tons, valued at US\$12.0 million. Sardines in olive oil exported during the first six months of 1957 amounted to 12,457 tons, valued at US\$7.8 million (*Conservas de Peixe*, August 1957).

Product	January-June 1957	
	Metric Tons	US\$
Sardines in olive oil.	12,457	7,795
Sardinelike fish in olive oil. .	2,655	2,169
Sardines & sardinelike fish. .		
in brine.	1,027	257
Tuna & tunalike in olive oil. .	750	650
Tuna & tunalike in brine. . . .	142	93
Mackerel in olive oil.	1,378	826
Other fish.	534	252
Total.	18,943	12,042

During January-June 1957 the leading buyers of canned fish were: Germany, 2,362 tons (valued at US\$1,498,000), Italy, 2,278 tons (US\$1,439,000), France, 2,027 tons (US\$1,253,000), Great Britain, 1,744 tons (US\$1,097,000), and the United States, 1,729 tons (US\$1,555,000). These countries purchased 53.5 percent of the quantity and 56.7 percent of the

value of all Portuguese exports of canned fish.

Exports of sardines in olive oil for the first six months of 1957 to the United States amounted to 553 tons (valued at US\$468,000), and 971 tons of anchovies (valued at US\$970,000).

* * * * *

FISHERIES TRENDS, JUNE 1957: **Sardine Fishing:** During June the Portuguese fishing fleet landed 6,934 metric tons of sardines (valued at US\$926,086 ex-vessel, or \$134 a ton). In June 1956, a total of 1,552 tons of sardines were landed with an ex-vessel value of US\$329,000.

Sardines purchased by the canneries during June amounted to 3,595 tons (valued at US\$555,826 ex-vessel or \$155 a ton), or 51.8 percent of the total landings. Only 10 tons were salted, and the balance of 3,329 tons, or 48.1 percent of the total, was purchased for the fresh fish market.

Other Fishing: The June 1957 landings of fish other than sardines consisted of 4,026 tons of anchovy, 14,393 tons of chinchard, 812 tons of mackerel, 20 tons of bonito, and 14 tons of tuna. (*Conservas de Peixe*, August 1957.)



Switzerland

MARKET FOR JAPANESE CANNED TUNA: Switzerland's imports from Japan in 1956 of tuna, crab meat, and related fishery products in containers of 3 kilograms (6.6 pounds) or less amounted to 1,777 metric tons, valued at 4,569,500 Swiss francs (US\$1,051,000). A more detailed breakdown is not available, but the imports in the basket category indicated are largely canned tuna. Japan was the third most important supplier of the products included in the basket category after Spain and Portugal. But it is believed that Japan was the leading supplier of canned tuna.

Currently (about August 1957) light meat tuna is quoted at \$6.25-6.30 (presumably c. i. f. Antwerp) per case. Wholesale prices have also declined.

Types of and Prices for Japanese Canned Tuna Sold in Switzerland in 1956		
Type	Price, c. i. f. Antwerp	Wholesale Price in Switzerland
Light meat (487-oz. cans/case)	US\$ 6.95	US\$ 8.16
White meat " " " "	8.20	9.50
Brand name " " " "	8.70	10.27

Japanese canned tuna is widely available in Swiss retail markets at prices as low as 20 U. S. cents a 7-oz. can.



Union of South Africa

GOOD SEASON FOR SALDANHA BAY WHALING STATION: Because of the increase in the world price for whale oil, whaling operations at the Saldanha station have been resumed. Since the beginning of the season on April 15, until July 5, a total of 420 whales were caught. The Saldanha whaling season ends on October 15.

The type of whales caught include the hump, sperm, sei, fin, bryde, and blue varieties.

There are four 500-gross-ton oil-burning Antarctic catchers operating from Saldanha. This is usually their overhaul period, but with the increase in whale oil prices these catchers have been operating in their off-season from Saldanha.

* * * * *

MAASBANKER-PILCHARD CATCHES GOOD: The fantastic ten days of fishing at the end of May enabled the fishermen of the Union of South Africa's west coast to establish a new record month's total of 41,697 metric tons of maasbanker (jack mackerel). Including 8,743 tons of pilchards, the May catch of 50,440 tons was second only to that of the 1954 season for that month. Of the 220 boats in the maasbanker-pilchard fishery, two-thirds have echo-sounders.

The west coast catch to the end of May was 73,348 tons of pilchards and 53,219 tons of maasbanker--a total of 126,567 tons, only 8,000 tons below the catch for the entire season last year. The total season maasbanker-pilchard catch was 134,847 tons in 1956, 221,309 tons in 1955, 227,564 tons in 1954, and 300,560 tons in 1952.

After a four-day interruption caused by bad weather at the end of May, huge catches were again brought in until mid-June when the shoals went too deep to be caught. Catches declined in the second half of the month.

The June total was expected to equal or even exceed that of May and bring the half-year's catch to nearly 175,000 tons.

Reports from the west coast early in July indicated that large pilchard shoals were expected to follow the late rush of maasbanker. In previous years, the largest maasbanker catches were made early in the season during January to April. This year, the maasbanker catch in the four-month period was only 11,522 tons.

With the rush in May and June, a good following pilchard run was expected to bring further excellent catches to the industry in July to October.

The maasbanker rush in May resulted in outstanding production of fish meal and oil and canned fish. The maasbanker were large and of very good quality; the fish body oil and the 9,500 tons of meal produced were of consistently high standard. But the large-size maasbanker did cause some difficulty in the canneries.

The six factories at Walvis Bay in South-West Africa are also reported to be enjoying an excellent season. The season started a month later this year, in March instead of February.

By the end of June, the pilchard catch had gone beyond 100,000 tons and it was considered likely that the 250,000-ton quota would be reached well before the end of the year. (The South African Shipping News and Fishing Industry Review of July 1957.)



U. S. S. R.

U. S. TAGGED SALMON CAUGHT: More than 15 salmon carrying tags from the United States University of Washington's Institute of Fisheries Research have been caught in Russian territory, the Soviet Tass News Agency announced in August 1957.

The report came from Petropalvlosk, on Kamchatka Peninsula, and it indicated that the fish were netted in the Anadavr River and Korfa Bay.



United Kingdom

CANNED CRAB MEAT IMPORTS FROM U.S.S.R. INCREASED: Arrangements for the import of an additional amount (£374,550 or US\$1 million c.i.f.) of canned crab meat from the U.S.S.R. was announced by the British Board of Trade in Notice No. 832 of August 21, 1957. Licenses for this additional quota will be issued to traders who imported canned crab meat from the U.S.S.R. during the year ended June 30, 1957, and will be in proportion to their imports during that period. The licenses issued will be valid until March 31, 1958, points out an August 21 United States Embassy dispatch from London.

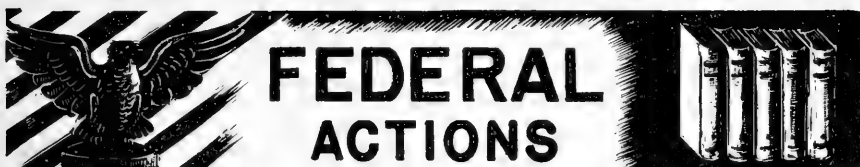


Venezuela

FISH CONSUMPTION: Fish consumption in Venezuela amounts to 10 2 kilograms (about 22.5 pounds) annually, according to a Venezuelan authority. It isn't indicated whether consumption is computed on (1) live fresh or round weight, (2) dressed weight, or (3) edible weight. However, from the figures it would seem that the computation is based on dressed weight.

On the basis of this estimate, Venezuela ranks high among all nations in fish consumption, an August 28, 1957, dispatch from the United States Embassy in Caracas states.





Committee for Reciprocity Information

VIEWS SOUGHT ON RENEGOTIATION OF CERTAIN TARIFF CONCESSIONS:

The United States Committee for Reciprocity Information requested submission of views in connection with United States participation in tariff negotiations arising from the desire of Austria, Canada, Ceylon, Greece, and the Union of South Africa to modify or withdraw certain tariff concessions made under the General Agreement on Tariffs and Trade (GATT). No fishery products were included in the list of concessions which the countries indicated a desire to withdraw or modify.

The countries listed are among those which have expressed a desire to avail themselves of the opportunity, on January 1, 1958, to modify or withdraw concessions in their schedules to the General Agreement. In these negotiations new concessions may be granted by the country proposing the modification or withdrawal. Another possible result may be withdrawal or upward adjustment, by the countries adversely affected, of concessions of a value substantially equivalent to the concession modified or withdrawn.

The Committee for Reciprocity Information invited the submission of views regarding concessions which the United States might seek from the respective countries as compensation, as well as views concerning possible upward adjustment in United States rates of duty on commodities which are now the subject of concessions in the General Agreement.

Views were to be submitted to the Committee for Reciprocity Information by October 7, 1957.

□ □ □ □ □

Department of Health, Education, and Welfare

FISHERY VOCATIONAL EDUCATION FUNDS ALLOTTED TO STATES AND TERRITORIES:

The following allotments of Federal funds have been made to the various states and territories for vocational education in the fishery industry and distributive occupations under Section 2 of Public Law 1027, 84th Congress, 2nd Session. The original Act, authorized an annual appropriation of \$375,000, but only \$228,000 was appropriated for this program. The fisheries vocational training program is under the direction of the Office of Education, U. S. Department of Health, Education and Welfare. The State Vocational Director of the individual states will be responsible for developing the programs felt to be most beneficial to the commercial fishing industry. Each state and territory will contribute an equal amount to match the Federal funds.

Congress did not provide funds for Section 1 of the fishery education bill (Payne bill) which called for Federal grants to the colleges for fishery educational facilities.

The following are the allotments of federal funds to States and territories: Alabama \$1,618, Arkansas \$593, California \$37,301, Connecticut \$707, Delaware \$5,586, Florida \$11,286, Georgia \$3,648, Illinois \$1,368, Iowa \$1,505, Louisiana \$15,116, Maine \$14,455, Maryland \$9,257, Massachusetts \$20,292, Michigan \$1,801, Minnesota \$821, Mississippi \$4,378, New Jersey \$10,214, New York \$7,957, North Carolina \$6,384, Ohio \$1,437, Oregon \$4,195, Pennsylvania \$1,482, Rhode Island \$2,485, South Carolina \$1,618, Tennessee \$730, Texas \$10,009, Virginia \$13,087, Washington

\$13,612, Alaska \$20,429, Hawaii \$1,642, Puerto Rico \$1,528.

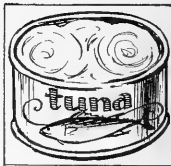
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FOOD AND DRUG ADMINISTRATION

EFFECTIVE DATE CONFIRMED ON CANNED TUNA ORDER FOR IDENTITY AND FILL-OF-CONTAINER:

An order confirming the effective date for the standard of fill-of-container for canned tuna and postponing the putting into effect of parts of the definition and standard of identity for canned tuna was published in the Federal Register

of August 29, 1957, by the U. S. Food and Drug Administration. The order stated that regulations establishing a definition and standard of identity for canned tuna as published in the Federal Register of February 13, 1957, shall go into effect February 13, 1958, except for certain provisions which have been stayed pending further hearings. The order as it appeared in the Federal Register follows:



TITLE 21—FOOD AND DRUGS

Chapter I—Food and Drug Administration, Department of Health, Education, and Welfare

Subchapter B—Food and Food Products

PART 37—FISH; DEFINITIONS AND STANDARDS OF IDENTITY; STANDARDS OF FILL OF CONTAINER

ORDER CONFIRMING EFFECTIVE DATE FOR STANDARD OF FILL OF CONTAINER FOR CANNED TUNA AND STAYING EFFECTIVENESS OF PARTS OF DEFINITION AND STANDARD OF IDENTITY FOR CANNED TUNA

In the matter of adopting a definition and standard of identity and a standard of fill of container for canned tuna:

An order ruling on proposals to adopt a definition and standard of identity (§ 37.1) and a standard of fill of container (§ 37.3) for canned tuna was published in the FEDERAL REGISTER of February 13, 1957 (22 F. R. 892). Pursuant to the provisions of the Federal Food, Drug, and Cosmetic Act (sec. 701 (e), 52 Stat. 1055, 70 Stat. 919; 21 U. S. C. 371 (e)) the order notified persons who would be adversely affected that they could file written objections to the order showing how they would be adversely affected, specifying with particularity the provisions of the order deemed objectionable, stating grounds for the objections, and requesting a public hearing on the objections. A number of written communications were submitted in response to the notice. Communications meeting the provisions of section 701 (e) of the act objected to the requirement in the identity standard that the words "in water" be included in the name of the food when water is used as the packing medium. Other communications meeting the provisions of section 701 (e) of the act objected to the requirement in the identity standard calling for label declaration of tuna darker than Munsell value 5.3 as "dark tuna." It will be necessary to hold a public hearing on whether the words

"in water" are to be included in the name of the food when water is used as the packing medium and what label declaration shall be used to designate tuna darker than Munsell value 5.3.

Some communications were received which failed to comply with section 701 (e) of the act and accordingly they do not have the effect of objections within the meaning of that section—that is, they do not require staying the effectiveness of any provisions of standards promulgated by the order and they do not raise issues for a hearing. A number of persons filed objections requesting that various species of fish be included in the class known as tuna. Evaluation of these objections shows that all the species mentioned in the objections (except for a request to include bonito) are already included in the standard as tuna, under different names. Since the fish referred to are already included, those filing objections have shown no adverse effect, and a hearing upon such objections would serve no useful purpose. The person requesting that bonito be classed as tuna did not request a public hearing, nor did he show reasonable grounds for classifying bonito as tuna. For these reasons, the objections concerning the species of fish classified as tuna will not operate to stay the effectiveness of that portion of the order and no hearing will be held concerning what fish will be classified as tuna.

No communications were filed objecting to provisions of the fill of container standard for canned tuna (§ 37.3), published in the FEDERAL REGISTER February 13, 1957 (22 F. R. 892), and the order promulgating those regulations became effective August 13, 1957.

The order published in the FEDERAL REGISTER of February 13, 1957, announced that the effective date for the definition and standard of identity for canned tuna (§ 37.1) would be one year after publication in the FEDERAL REGISTER, and that the effective date for the standard of fill of container for canned tuna (§ 37.3) would be 90 days after publication in the

FEDERAL REGISTER. An order which was published May 2, 1957 (22 F. R. 3106), extended the effective date for the standard of fill of container for canned tuna to August 13, 1957.

Now, therefore, pursuant to the authority vested in the Secretary of Health, Education, and Welfare by the Federal Food, Drug, and Cosmetic Act (secs. 401, 701, 52 Stat. 1046, 1055, as amended 70 Stat. 919; 21 U. S. C. 341, 371) and delegated to the Commissioner of Food and Drugs by the Secretary (22 F. R. 1045); *It is ordered, That:*

The regulations establishing a definition and standard of identity for canned tuna (§ 37.1) as published in the FEDERAL REGISTER of February 13, 1957 (22 F. R. 892), shall go into effect on February 13, 1958, except as to the provisions stayed as follows:

The provision of the definition and standard of identity for canned tuna (§ 37.1), requiring that the words "in water" are to be included in the name of the food when water is used as the packing medium and the requirement for label declaration of tuna darker than Munsell value 5.3 as "dark tuna" are stayed to the extent that they would cause to be deemed to be misbranded under section 403 (g) of the act canned tuna that in all respects except as to these labeling provisions complies with the definition and standard of identity. This stay shall continue until final action is taken, disposing of the objections after public hearing thereon.

Notice of a public hearing to receive evidence on the provisions of the identity standard which were stayed by the filing of objections will be announced by publication in the FEDERAL REGISTER.

(Sec. 701, 52 Stat. 1055 as amended; 21 U. S. C. 371, Interpret or apply sec. 401, 52 Stat. 1046; 21 U. S. C. 341)

Dated: August 23, 1957.

[SEAL]

JOHN L. HARVEY,
Deputy Commissioner
of Food and Drugs.

NOTE: SEE ALSO COMMERCIAL FISHERIES REVIEW, APRIL 1957, P. 61.

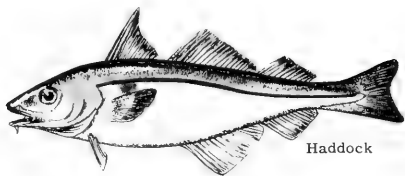


Department of the Interior

U. S. FISH AND WILDLIFE SERVICE

NORTH ATLANTIC HADDOCK AND COD FISHERIES REGULATIONS REVISED:

Revised regulations governing the taking of haddock within Subarea 5 of the Northwest Atlantic Ocean by trawl fishermen under the jurisdiction of the United States were published in the September 18 Federal Register and became



Haddock

effective on October 1. The regulations as they appeared in the Federal Register follow:

TITLE 50—WILDLIFE

Chapter I—Fish and Wildlife Service, Department of the Interior

Subchapter I—Northwest Atlantic Commercial Fisheries

Part 155—HADDOCK AND COD FISHERIES

Basis and purpose. At its Fifth Annual Meeting held in Ottawa, Canada, June 6-11, 1955, the International Commission for the Northwest Atlantic Fisheries, a body created pursuant to Article II of the International Convention for the Northwest Atlantic Fisheries signed at Washington, D. C., under date of February 8, 1949, adopted a proposal amending a proposal previously adopted by the Commission in which it had been recommended that the Contracting Governments take appropriate action to prohibit the taking of haddock in Sub-area 5 of the Convention Area with a trawl net having a mesh size of less than four and one-half inches.

Under the terms of the proposal adopted at its Fifth Annual Meeting the Commission's earlier proposal was so amended as to recommend that all Contracting Governments prohibit the taking of cod, as well as haddock, in Sub-area 5 of the Convention Area with a trawl net having a mesh size of less than four and one-half inches. In the amended proposal the restrictions on the mesh size of a net are stated in terms of a trawl net constructed of manila twine, with the provision that when trawl nets other than manila are used they shall have a selectivity equivalent to that of a four and one-half inch manila trawl net. The amended proposal also modified the Commission's previously adopted recommendation that all Contracting Governments restrict the nature and extent of the protective covering (chafing gear) which might be used to reduce and prevent damage to trawl nets used in taking haddock and cod.

At all times since the initial adoption by the International Commission for the Northwest Atlantic Fisheries at its meeting held in St. Andrews, New Brunswick, Canada, June 30-July 9, 1952, of a proposal recommending a mesh size restriction for the taking of haddock in Sub-area 5, the Commission's proposals have limited the exemptions to the restriction to persons taking haddock for the purposes of scientific investigation or to persons having in possession on board a vessel haddock in amounts less than five

thousand pounds or ten percent by weight of all fish on board such vessel, whichever is larger. At its Sixth Annual Meeting held in Halifax, Nova Scotia, Canada, June 11-15, 1956, the Commission so amended the proposal adopted at its Fifth Annual Meeting as to provide for an alternative to the "five thousand pound-ten percent" exemption per fishing trip applicable to the taking of haddock and cod in Sub-area 5. Under the alternative provided by the Commission's amended proposal all Contracting Governments may also exempt from the mesh size restriction any person who does not catch, in any period of twelve months, haddock or cod in quantities in excess of ten percent for each species of all the trawl-caught fish taken by such persons during such period of twelve months.

Acceptance of the proposal adopted at the Commission's Fifth Annual Meeting, as amended by the Commission at its Sixth Annual Meeting, was completed by the Governments of the United States and Canada on November 26, 1956. Accordingly, in accordance with the provisions of the International Convention for the Northwest Atlantic Fisheries, the proposal as adopted and amended entered into force with respect to all Contracting Governments on March 26, 1957.

In accordance with section 4 (a) of the Northwest Atlantic Fisheries Act of 1950, a proposed revision of existing regulations designed to implement the Commission's proposals, as described above, was submitted to the Advisory Committee to the United States Commissioners on the International Commission for the Northwest Atlantic Fisheries on March 5, 1957, at which time the proposed revised regulations received the approval, in principle, of the Advisory Committee.

By notice of proposed rule making published on May 30, 1957 (22 F. R. 3797), the public was invited to participate in the adoption of proposed amendments to these regulations by submitting written data, views, or arguments to the Commissioner, U. S. Fish and Wildlife Service, Washington 25, D. C., within a period of thirty days from the publication of the notice. Consideration having been given to all pertinent data received in response to the notice, the part headline is revised to read as set forth above and the regulations appearing below are adopted to replace Part 155—Haddock Provisions:

Sec.

155.1 Meaning of terms.

155.2 Registration certificates.

155.3 Restrictions on fishing gear.

155.4 Temporary suspension of registration certificates.

155.5 Certain persons and vessels exempted.

AUTHORITY: §§ 155.1 to 155.5 issued under sec. 7, 64 Stat. 1069; 16 U. S. C. 986.

§ 155.1 *Meaning of terms.* When used in this part, unless the context otherwise requires, terms shall have the meanings ascribed in this section.

(a) *Convention area.* All waters, except territorial waters, bounded by a line beginning at a point on the coast of Rhode Island in 71°40' west longitude; thence due south to 39°00' north latitude; thence due east to 42°00' west longitude; thence due north to 59°00' north latitude; thence due west to 44°00' west longitude; thence due north to the coast of Greenland; thence along the west coast of Greenland to 78°10' north latitude; thence southward to a point in 75°00' north latitude and 73°30' west longitude; thence along a rhumb line to a point in 69°00' north latitude and 59°00' west longitude; thence due south to 61°00' north latitude; thence due west to 64°30' west longitude; thence due south to the coast of Labrador; thence in a southerly direction along the coast of Labrador to the southern terminus of its boundary with Quebec; thence in a westerly direction along the coast of Quebec, and in an easterly and southerly direction along the coasts of New Brunswick, Nova Scotia, and Cape Breton Island to Cabot Strait; thence along the coasts of Cape Breton Island, Nova Scotia, New Brunswick, Maine, New Hampshire, Massachusetts, and Rhode Island to the point of beginning.

(b) *Regulatory area.* That portion of the Convention area, including all waters except territorial waters, bounded by a line beginning at the terminus of the international boundary between the United States of America and Canada in Grand Manan Channel at a point in 44°46'35.34" north latitude, 66°54'11.23" west longitude; thence due south to the parallel of 43°50' north latitude; thence due west to the Meridian of 67°40' west longitude; thence due south to the parallel of 42°20' north latitude; thence due east to a point in 66° west longitude; thence along a rhumb line in a southeasterly direction to a point in 42° north latitude; 65°40' west longitude; thence due south to the parallel of 39° north latitude; thence due west to the Meridian of 71°40' west longitude; thence due north to a point three miles off the coast of the State of Rhode Island, Massachusetts, New Hampshire, and Maine at a distance of three miles to the point of beginning.

(c) *Haddock*. Any fish of the species *Melanogrammus aeglefinus*.

(d) *Haddock fishing*. Means and includes (1) the catching, taking, or fishing for or the attempted catching, taking, or fishing for fish of the species *Melanogrammus aeglefinus*; and (2) the outfitting and departure of a vessel for or the return of a vessel from haddock fishing.

(e) *Cod*. Any fish of the species *Gadus calarias*.

(f) *Cod fishing*. Means and includes (1) the catching, taking, or fishing for or the attempted catching, taking, or fishing for fish of the species *Gadus calarias*; and (2) the outfitting and departure of a vessel for or the return of a vessel from cod fishing.

(g) *Fishing vessel*. Every kind, type, or description of watercraft subject to the jurisdiction of the United States used in or outfitted for catching or processing fish or transporting fish from fishing grounds.

(h) *Trawl net*. Any large bag net dragged in the sea by a vessel or vessels for the purpose of taking fish.

(i) *Cod end*. The bag-like extension attached to the after end of the belly of the trawl net and used to retain the catch.

§ 155.2 *Registration certificates*. (a) Unless permitted to do so by § 155.5, after October 1, 1957, no person shall engage in haddock fishing or cod fishing within the regulatory area, nor shall any person possess, transport or deliver by means of any fishing vessel haddock or cod taken within such area except under a registration certificate issued and in force in conformity with the provisions of this part.

(b) The owner or operator of a fishing vessel may obtain without charge a registration certificate by furnishing, on a form to be supplied by the Bureau of Commercial Fisheries, information specifying the names and addresses of the owner and operator of the vessel, the name, official number and home port of the vessel, and the period for which the registration certificate is desired. The form shall be submitted, in duplicate, to the Regional Director, Bureau of Commercial Fisheries, Boston, Massachusetts, who shall grant the registration certificate for the duration specified by the applicant in the form but in no event to extend beyond the end of the calendar year during which the registration certificate is issued. New registration certificates shall similarly be issued to replace expired, lost or mutilated certificates. An application for replacement of an expiring registration certificate shall be made in like manner as the original application not later than ten days prior to the expiration date of the expiring certificate.

(c) The registration certificate issued by the Bureau of Commercial Fisheries shall be carried at all times on board the vessel for which it is issued and such certificate, the vessel, its gear and equipment shall at all times be subject to inspection for the purposes of this part by officers authorized to enforce the provisions of this part.

§ 155.3 *Restrictions on fishing gear*. (a) No person shall possess at any time

on board a vessel for which a registration certificate is in force, or use or attempt to use from such vessel, a trawl net or nets, parts of nets, or netting of manila twine having a mesh size of less than four and one-half inches as defined in this section, nor a trawl net or nets, parts of nets, or netting of material other than manila twine unless it shall have a selectivity equivalent to that of a four and one-half inch manila trawl net.

(b) As used in this section, the term "mesh size of less than four and one-half inches" shall mean: (1) With respect to any part of the net except the cod end, the average size of any twenty consecutive meshes in any row located at least ten meshes from the side lacing measured when wet after use; and (2) with respect to the cod end, the average size of any row of meshes running the length of the cod end located at least ten meshes from the side lacing, measured when wet after use, or, at the option of the user, a cod end which has been approved, in accordance with paragraph (d) of this section, by an authorized employee of the Bureau of Commercial Fisheries, as having a mesh size when dry before use equivalent to not less than four and one-half inches when wet after use.

(c) All measurements of meshes when wet after use shall be made by the insertion into such meshes under pressure of not less than ten nor more than fifteen pounds of a flat wedge-shaped gauge having a taper of two inches in eight inches and a thickness of three thirty-seconds of an inch.

(d) For the purpose of approving a dry cod end before use, as contemplated by paragraph (b) of this section, the average mesh size of such cod end shall be determined by measuring the length of any single row of meshes running the length of the cod end, parallel to the long axis of the cod end and located at least ten meshes from the side lacing, when stretched under a tension of two hundred pounds, and dividing the length by the number of meshes in such row: *Provided*, That not more than ten percent of the meshes in such row shall be more than one-half inch smaller when measured between knot centers than the average of the row. A cod end so measured which is constructed of one of the twines and is of not less than the average mesh size specified in the table below for such twine may be approved for haddock fishing or cod fishing by any authorized employee of the Bureau of Commercial Fisheries by the attachment to such cod end of an appropriate seal. The omission from the table of one or more specifications of twines shall not preclude the continued use of cod ends constructed from such twines where the cod ends received approval pursuant to the provisions of this part as the same were in effect between the dates of January 1, 1954, and October 24, 1956.

Twine:	Average mesh size
4-ply 45-yard manila, double strand.	5.625 inches (5 1/2").
4-ply 50-yard manila, double strand.	5.625 inches (5 1/2").
4-ply 75-yard manila, double strand.	5.625 inches (5 1/2").
4-ply 80-yard manila, double strand.	5.500 inches (5 1/2").
120-thread cotton.....	4.250 inches (4 1/4").

No. 1000 braided nylon cargo netting, single strand (43 yd. per lb.).

No. 400-550 braided nylon parachute cord, single strand.

(e) The alteration, defacement or reuse of any seal affixed to a cod end in accordance with this section is prohibited.

(f) The repair, alteration or other modification of a cod end to which a seal has been affixed in accordance with this section shall invalidate such seal and such cod end shall not thereafter be deemed to be approved for haddock fishing or cod fishing. Nothing contained in this paragraph shall preclude the continued use at the option of the user of a cod end having an invalidated seal affixed thereto if such cod end after repair, alteration or other modification does not have a mesh size of less than four and one-half inches as defined in paragraph (b) of this section.

(g) For the purposes of this section, a cod end constructed of twine other than manila and not subject to approval and certification when measured dry before use as provided in paragraph (d) of this section shall be deemed to have a selectivity equivalent to that of a four and one-half inch manila trawl net if such cod end has a mesh size of not less than four and one-half inches when measured wet after use in the manner prescribed in paragraph (b) of this section.

(h) The use in haddock fishing or cod fishing within the regulatory area of any device or method which will obstruct the meshes of the trawl net or which otherwise will have the effect of diminishing the size of said meshes is prohibited. *Provided*, That (1) a protective covering of canvas, netting, or other material may be attached to the underside of the cod end only of the net to reduce and prevent damage and (2) a rectangular piece of netting may be attached to the upper side of the cod end only of the net to reduce and prevent damage so long as the netting attached to the upper side of the cod end conforms to the following conditions:

(i) Such netting shall not have a mesh size less than that specified in this section. For the purposes of this paragraph, the required four and one-half inch mesh size when measured wet after use shall be deemed to be the average of the measurements of twenty consecutive meshes in a series across the netting, such measurements to be made with a like gauge inserted into the meshes as specified in paragraph (c) of this section.

(ii) Such netting may be fastened to the cod end of the trawl net only along the forward and lateral edges of the netting and at no other place in the netting.

(iii) Such netting shall not exceed sixteen meshes in length counted parallel to the long axis of the cod end and the width of the netting shall be at least one and one-half times the width of the area of the cod end which is covered; such width to be measured at right angles to the long axis of the cod end.

§ 155.4 *Temporary suspension of registration certificates*. (a) The owner or operator of any fishing vessel which

is proposed to be used in haddock fishing or cod fishing beyond the limits of the regulatory area or is proposed to be used in fishing within such area for species of fish other than haddock or cod, may obtain a temporary suspension of the registration certificate issued for such vessel for the specified period during which such nonregulated fishing is to be conducted.

(b) Temporary suspension of registration certificates shall be granted upon oral or written request, specifying the period of suspension desired, by an authorized officer of the State of Maine or of the State of Massachusetts or by an authorized officer of any one of the following agencies: Bureau of Commercial Fisheries, Coast Guard, Bureau of Customs, Post Office Department. Such officer shall make appropriate endorsement on the certificate evidencing the duration of its suspension.

§ 155.5 *Certain persons and vessels exempted.* Except as otherwise provided in this section, nothing contained in §§ 155.2 to 155.4 shall apply to:

(a) Any person or vessel authorized by the Secretary of the Interior to engage in haddock fishing or cod fishing for scientific purposes.

(b) Any vessel documented as a common carrier by the Government of the United States and engaged exclusively in the carriage of freight and passengers.

(c) Any person who in the course of taking fish other than haddock or cod, takes and possesses a quantity of haddock or cod not exceeding five thousand pounds for each, or ten percent by weight for each, of all fish on board the vessel from which the fishing is conducted, whichever is the greater.

(d) Any person who does not take, in any period of twelve months, haddock or cod in quantities in excess of ten percent by weight for each of said species, of all the trawl-caught fish taken by such person in such period of twelve months. Any person desiring to avail himself of the exemption provided in this paragraph shall first obtain a certificate of exemption and shall comply with the following conditions:

(1) The owner or operator of a fishing vessel proposed to be operated under the exemption authorized in this paragraph

may obtain without charge a certificate of exemption by furnishing, on a form to be supplied by the Bureau of Commercial Fisheries, information specifying the name and address of the owner and operator of the vessel and the name, official number, and the home port of the vessel. Each such application must be accompanied by a written statement, certified by the applicant to be correct, listing by weight, species, and catch by month, the total quantities of all fish taken, by means of the vessel to be exempted, during a period of twelve months immediately preceding the date of application. The application form and the certified statement shall be submitted, in duplicate, to the Regional Director, Bureau of Commercial Fisheries, Boston, Massachusetts, who shall grant a certificate of exemption valid for a period of twelve months from the date of issue and authorizing during such period the use of the vessel for which issued in the taking of haddock or cod within the regulatory area without regard to the registration requirements and restrictions on fishing gear imposed, respectively, by §§ 155.2 and 155.3, so long as the vessel and its fishing gear are not used to take haddock or cod in quantities in excess of ten percent by weight for each species of all the trawl-caught fish taken by means of such vessel during the 12-month period covered by the certificate. Duplicate certificates of exemption shall be issued to replace lost or mutilated certificates. An application for renewal of an expiring certificate of exemption shall be made in like manner as the original application not later than 15 days prior to the expiration date of the expiring certificate, but no renewal shall be granted if it is determined by said Regional Director that the vessel for which a renewal is sought was used to take quantities of haddock or cod in excess of the allowable percentages during the 12-month period covered by the expiring certificate of exemption.

(2) The certificate of exemption issued by the Bureau of Commercial Fisheries shall be carried at all times on board the vessel for which it is issued, and such certificate, the vessel, its gear and equipment, and records pertaining to the catches of fish made by means of

such vessel shall at all times be subject to inspection for the purposes of this part by any officer authorized to enforce the provisions of this part.

(3) The owner or operator of a fishing vessel for which a certificate of exemption is in force shall furnish on a form supplied by the Bureau of Commercial Fisheries, immediately following the delivery or sale of a catch of fish made by means of such vessel, a report, certified to be correct by the owner or operator, listing separately by species and weight the total quantities of all fish so sold or delivered. Such reports shall be delivered or mailed, in duplicate, to the said Regional Director.

(4) The owner or operator of a fishing vessel for which a certificate of exemption is in force, who proposes to use such vessel in fishing primarily for haddock or cod during any period of time within the 12-month period covered by the certificate, may obtain a temporary suspension of such certificate in like manner as provided in § 155.4 and may make application to engage in fishing for haddock or cod under a registration certificate as provided in § 155.2. Any haddock or cod taken by means of a vessel for which a registration certificate is in force and by means of haddock fishing or cod fishing conducted in conformity with the restrictions on fishing gear prescribed by § 155.3 shall be excluded from the total of all trawl-caught fish taken during the applicable 12-month period when computing the ratio of haddock or cod to the trawl-caught fish taken during such period. For the purposes of computing the quantities of haddock or cod so to be excluded, the owner or operator of a fishing vessel covered by a suspended certificate of exemption and taking haddock or cod while operating under a registration certificate shall submit catch reports in like manner as provided in subparagraph (3) of this paragraph.

The foregoing revision of Part 155 shall become effective on October 1, 1957.

Issued at Washington, D. C., and dated September 6, 1957.

HATFIELD CHILSON,
Acting Secretary of the Interior.

[F. R. Doc. 57-7627; Filed, Sept. 17, 1957; 8:45 a. m.]

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, OCTOBER 1957, PP. 37-38.



Treasury Department

NEW CUSTOMS VALUATION TO APPLY TO MOST FISHERY IMPORTS:

The Treasury Department, on August 23, 1957, published in the Federal Register a preliminary list of articles which, when imported into the United States, will continue to be valued for customs purposes under the applicable provisions of the Tariff Act of 1930

rather than under the new valuation provisions of the Customs Simplification Act of 1956 (70 Stat. 943) when these become effective.

Fishery items included in the preliminary list were: sodium alginate; seaweed extract, manufactured; fishing line composed of nylon; cord floats for fish nets; aluminum trawl floats; knotless leaders, tapered, made of synthetic

monofilament; fishing spoons; and fish-ing swivels.

Pursuant to the Customs Simplifica-tion Act, within 60 days of the publica-tion of this preliminary list, interested parties may present reasons for their belief that specified additions should be made to the list. The preliminary list, with any additions thereto as may be substantiated, will be published as a final list. Thirty days following publica-tion of the final list, all articles not on the final list will be appraised under the new provisions. Articles on the final list will continue to be appraised under the old law.

Accordingly, the new valuation pro-cedure will subsequently apply to United States imports of all fishery items and fishery products not listed which are dutiable on the basis of value (ad valorem and compound duty merchandise). It should be noted that on the basis of the list published in the Federal Register by far the great majority of fishery im-ports assessed on ad valorem duty will be affected. Under the new procedure export value (the usual wholesale value in the foreign market for trade with the United States) will become the primary basis for determining the dutiable value. On the old basis, the higher of two values--the export value or foreign value (the usual wholesale value in the foreign market for home consumption)--was used in valuing shipments for duty pur-poses.

By statute, any imported article must be valued under provisions of the Tariff Act of 1930 if the dutiable value would be reduced under the new pro-cedure by 5 percent or more of the av-erage value at which such articles were actually appraised during fiscal year 1954.

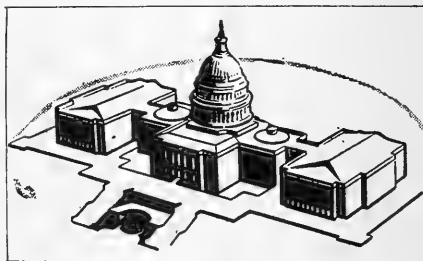
Interested parties had 60 days from August 23 in which to present reasons for their belief that the dutiable value of any imported articles not specified on the list would be reduced by 5 per-cent or more under the new appraisal procedures established by the Act. Articles proposed will be given con-sideration and if substantiated by in-vestigation will be added to the list

which will then be published as a final list. The procedures for presentation of information were published in the Feder-al Register of August 20.



Eighty-Fifth Congress (First Session)

Public bills and resolutions which directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees,



pertinent legislative actions, hearings, and other chamber actions by the House and Senate, as well as signature into law or other final disposition, are covered.

Most of the actions during the latter part of the First Session were reported in the Commercial Fisheries Review of October 1957, pp. 42-45. However, the following actions were overlooked and are being reported to complete the his-tory of those bills of direct or indirect interest to fisheries reported upon in past issues of the Review.

ALASKA FISHERIES RESOURCES CONSERVA-TION; House Report No. 1197: Facilitating the Conduct of Fishing Operations in the Territory of Alaska, to accompany H. R. 9280, 3 pp., printed, August 19, 1957, Committee on Merchant Marine and Fisheries, 85th Congress, 1st Session. Con-tains a summary of Committee actions; discusses the purpose of the bill and changes in existing law; also presents a letter from the Assistant Secretary of the Interior for Fish and Wildlife. (Also see Com-mercial Fisheries Review, October 1957, p. 42.)

ANTIDUMPING ACT OF 1921: H. R. 6006, a bill to amend certain provisions of the Antidump-ing Act of 1921, to provide for greater certainty

and speed, and efficiency in the enforcement thereof, and for other purposes; passed by the House on August 29 with amendments. Referred to the Senate Committee on Finance on August 30.

FUR-SEAL CONVENTION: Interim convention on conservation of North Pacific fur seals, signed at Washington February 9, 1957, in behalf of Canada, Japan, U.S.S.R., and U. S. (Ex. S. 85th Cong., 1st sess.) was ratified by the President on August 30, 1957.

HAWAII STATEHOOD: Senate Report No. 1164 Part I, Providing for the Admission of the State of Hawaii into the Union, to accompany S. 50, 70 pp., printed, August 29, 1957, Committee on Interior and Insular Affairs, 85th Congress, 1st Session. Contains the purpose of the bill, major provisions of the bill and how they apply to the facts in Ha-

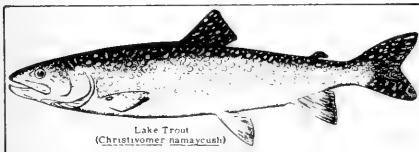
wai, historical and general background, reasons for statehood, readiness for statehood, arguments against statehood, and among other subjects a procedure for admitting the State of Hawaii into the Union. Also included are Executive Department reports on statehood for Hawaii, changes that would be necessary in the United States Code, and an appendix.

SAFETY OF LIFE AT SEA: Executive M, an amendment to the International Convention for the Safety of Life at Sea, together with a proposal for amendment originated with the Government of United Kingdom and contained in a memo dated London, May 1955. Reported August 15 to the House by the Committee on Merchant Marine and Fisheries (H. Rept. 1179). Referred to the Whole House on the State of the Union.



LAKE TROUT FISHERIES

Lake trout are so widely dispersed in their environment that dense populations or high production in any given water are unusual. In inland waters the average annual catch by sport fishing seldom exceeds 1 pound per surface acre and the farflung commercial fishery of the upper Great Lakes has produced an average of less than $\frac{1}{2}$ pound per acre per year.



land lakes has been shown to occur as a result of angling alone. Most sport fishing is by trolling at considerable depths (50 to 200 feet, depending on the character of the fishing grounds) with copper or silver spoons, spinners, or live bait.

The upper Great Lakes area was the major center for commercial production of lake trout for many years. Fish tugs were operated out of most port cities and towns lining the shores. Gill nets accounted for more than 70 percent of the production and set-hooks were next in importance; impounding nets, commercial trolling, and other methods combined yielded only about 5 percent of the total commercial catch. In the 10-year-period 1931-1940 (before the sea lamprey had decimated the stocks) the average annual production in the upper Great Lakes was 14.7 million pounds (worth more than \$7 million at present prices). Of this total, Lake Michigan produced 36 percent, Lake Huron 34 percent, and Lake Superior 30 percent. Forty-two percent of the total catch was landed in Michigan ports, 33 percent in Ontario, 19 in Wisconsin, 3 in Minnesota, 2 in Illinois, and 1 percent in Indiana.

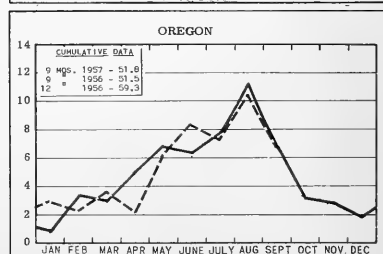
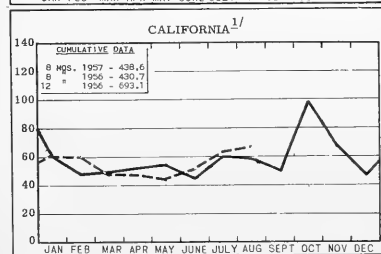
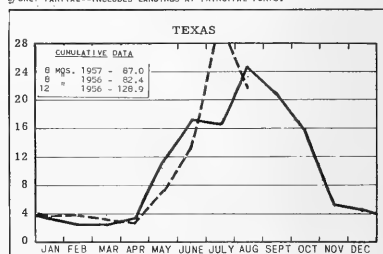
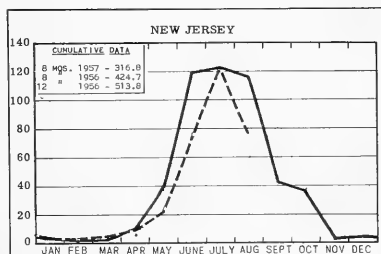
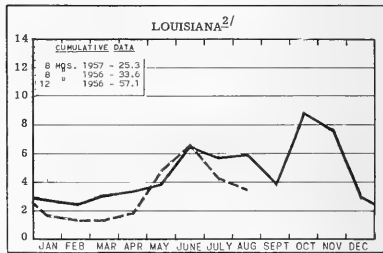
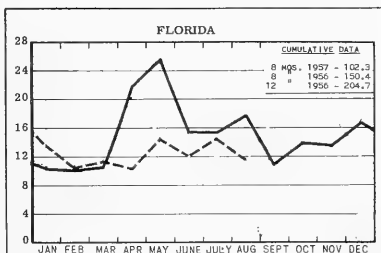
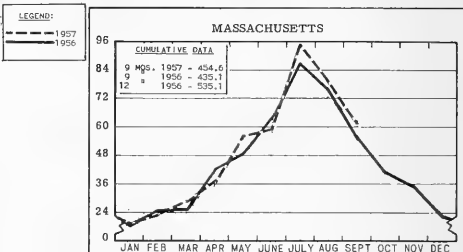
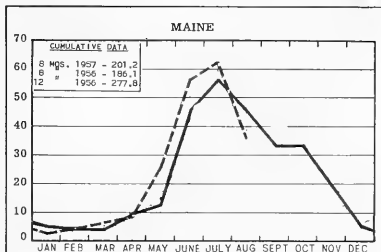
In addition to the Great Lakes, lake trout are caught commercially in Great Slave Lake, Lake Nipigon, and other large inland lakes of Canada.

--Fishery Leaflet 441, The Lake Trout
(Salvelinus namaycush), August 1957.

FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

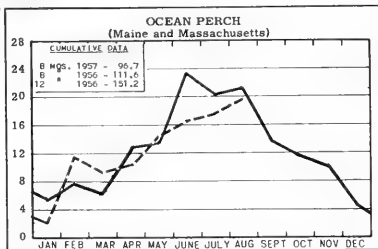
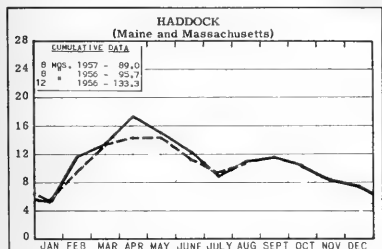


^{1/}ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

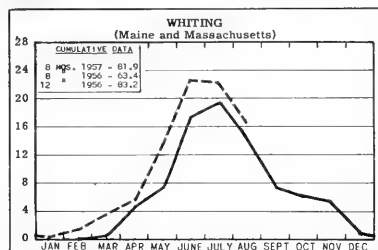
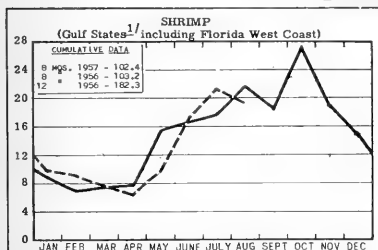
^{2/}ONLY PARTIAL--INCLUDES LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

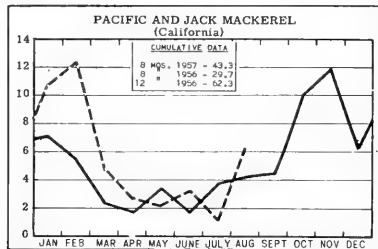
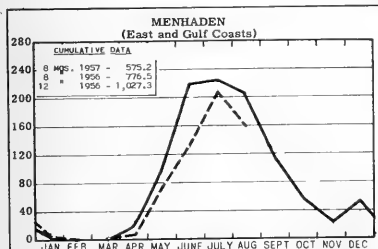


In Millions of Pounds

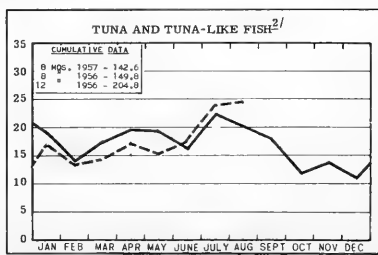
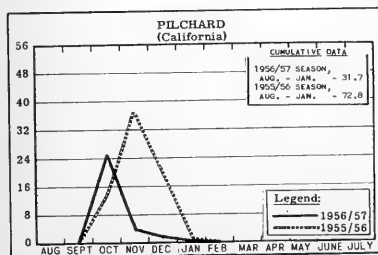


^{1/}LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



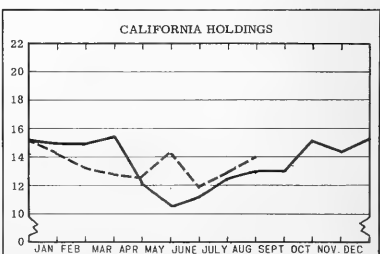
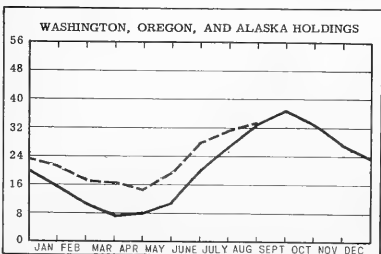
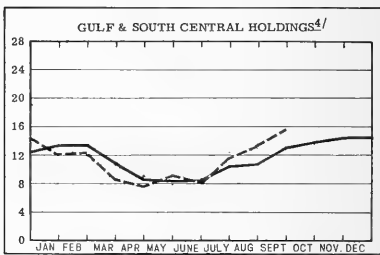
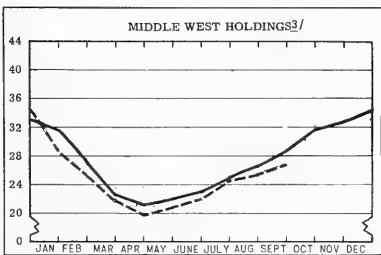
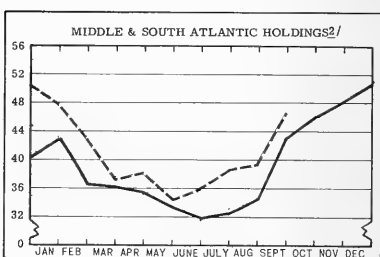
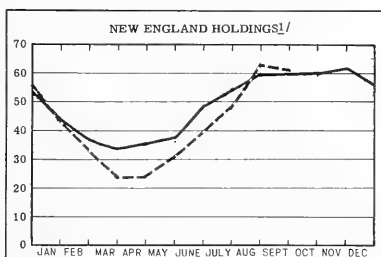
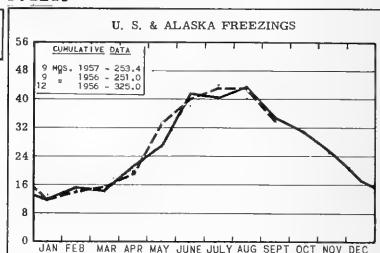
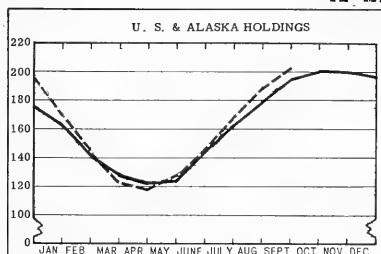
In Thousands of Tons



^{2/}RECEIPTS BY CALIFORNIA CANNERIES, INCLUDING IMPORTS.

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

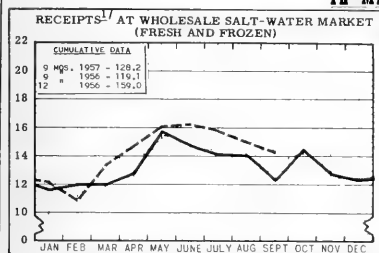
In Millions of Pounds



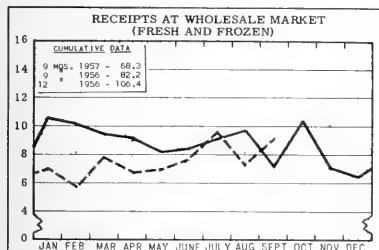
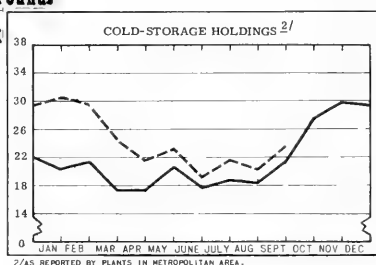
*Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

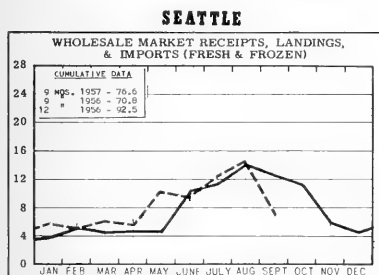
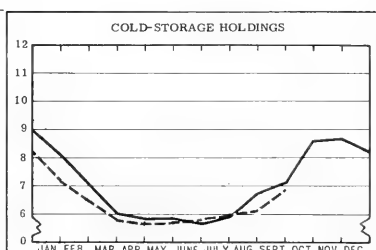
In Millions of Pounds



NEW YORK CITY



CHICAGO



BOSTON

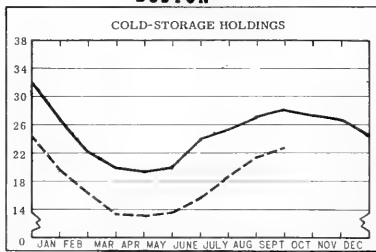


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA

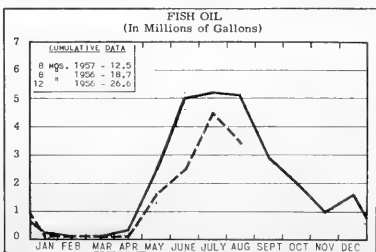
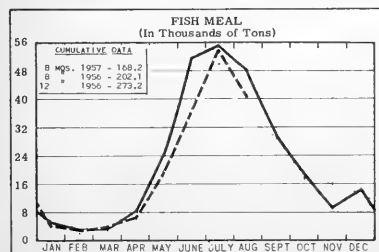
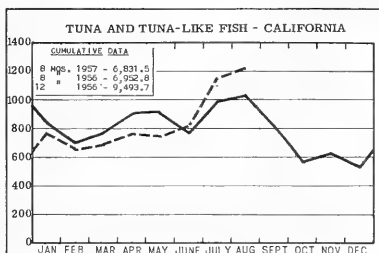
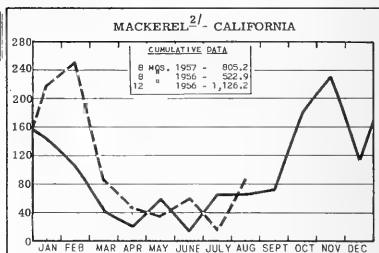


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

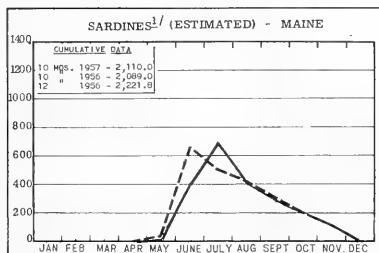
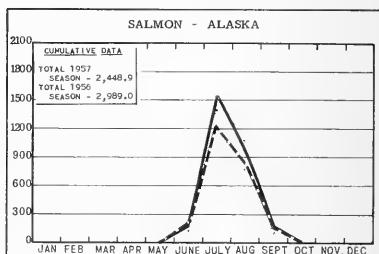
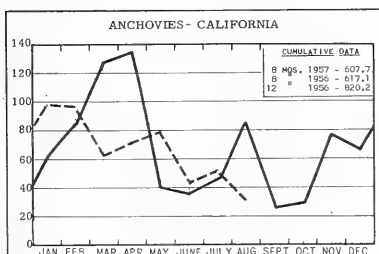
In Thousands of Standard Cases



LEGEND:
--- 1957
— 1956

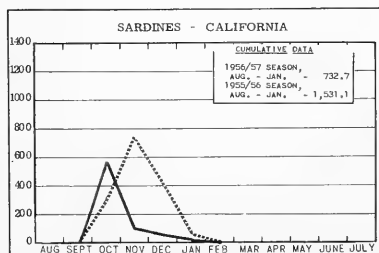


^{2/}INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.



^{1/}INCLUDING SEA HERRING.

STANDARD CASES			
Variety	No. Cans	Can Designation	Net Wgt.
SARDINES	100	$\frac{1}{2}$ drawn	3 $\frac{1}{2}$ oz.
SHRIMP	48	--	5 oz.
TUNA	48	No. $\frac{1}{2}$ tuna	6 & 7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
SALMON	48	1-pound tall	16 oz.
ANCHOVIES	48	$\frac{1}{2}$ lb.	8 oz.



Legend:
--- 1957/58
— 1956/57
..... 1955/56

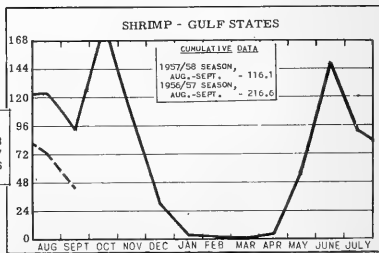
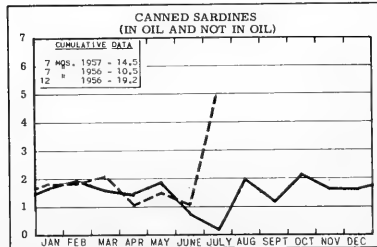
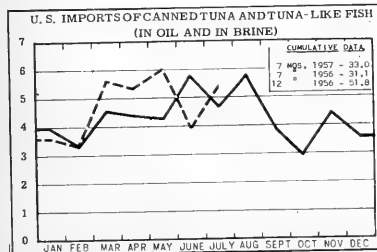
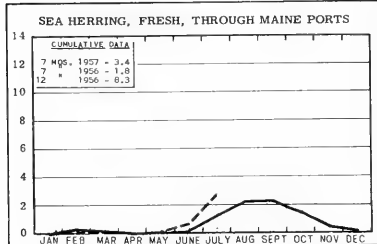
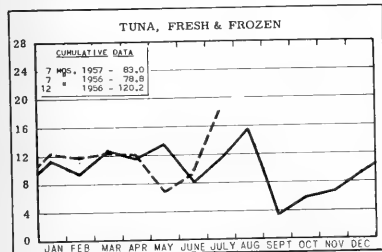
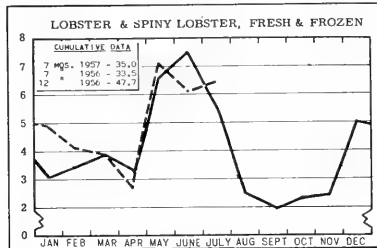
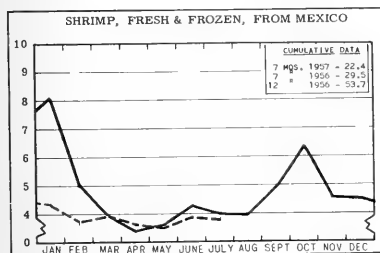
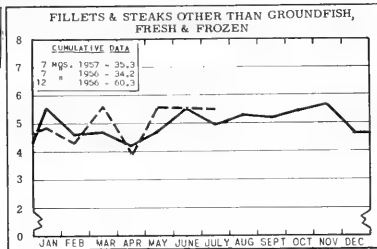
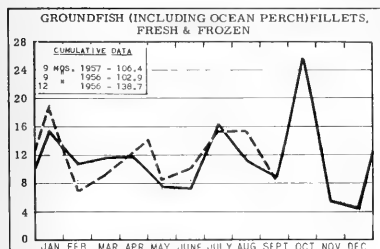


CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds





FISH AND WILDLIFE SERVICE PUBLICATIONS

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

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
- SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
- SSR - FISH, - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
- SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number | Title |
|----------|---|
| CFS-1584 | - Manufactured Fishery Products, 1955 Annual Summary, 6 pp. |
| CFS-1592 | - Florida Landings, 1956 Annual Summary, 9 pp. |
| CFS-1603 | - Florida Landings, May 1957, 5 pp. |
| CFS-1608 | - Mississippi Landings, May 1957, 2 pp. |
| CFS-1609 | - Ohio Landings, June 1957, 2 pp. |
| CFS-1610 | - South Carolina Landings, June 1957, 2 pp. |
| CFS-1615 | - Massachusetts Landings, March 1957, 3 pp. |
| CFS-1616 | - New Jersey Landings, June 1957, 3 pp. |

Wholesale Dealers in Fishery Products (Revised):

- SL-14 - South Carolina, 1957.
- SL-15 - Georgia, 1957.
- SL-16 - Florida, 1957.
- SL-17 - Alabama, 1956.

SSR-Fish. No. 206 - Neuse River Shad Investigations, 1953, by Charles H. Walburg, 17 pp., illus., June 1957. The purpose of the Neuse River shad investigation was to determine total catch, fishing effort, fishing rate, size of run, and spawning escapement for the 1953 season in order to establish a basis for scientific management of the fishery. "The total catch in the commercial fishing area," reports the author, "was 98,000 shad. The fishing rate in this area was estimated to be 65 percent, and the number of shad available to this fishery was approximately 151,000. Most male shad entered the fishery at 4 years of age, most females at 5 years of age. Less than 3 percent of the run had spawned the previous year. It was estimated that 440 shad used the Goldsboro Dam fishway during the 1953 run." In summary, the author states that "Before the Neuse River shad fishery can be scientifically managed, catch and effort data must be gathered for a series of years. Studies can then be undertaken to determine factors limiting population abundance. If these factors can be controlled, it may be possible to manage the Neuse River shad population to obtain maximum yields."

SSR-Fish. No. 215 - Chaetognaths and Pteropods as Biological Indicators in the North Pacific, by Thomas S. Hida, 17 pp., illus., June 1957.

SSR-Fish. No. 221 - Zooplankton Abundance in Hawaiian Waters, 1953-54, by Joseph E. King and Thomas S. Hida, 28 pp., illus., June 1957.

Sport Fish Restoration, 30 pp., illus., printed, September 1957. A well-illustrated booklet describing the fish-restoration program which includes fisheries research, purchase or lease of lands or waters, improvement in environment, and construction of facilities. To illustrate accomplishments of the Federal Aid in Fish Restoration Program, statistics from the first five years (fiscal years 1952 through 1956) have been used in this report. Program details are available in a separate publication known as Sport Fish Restoration (Statistical Supplement), 60 pp. This supplement is designed to supply legislators, state administrators, project workers, outdoor writers, and interested individuals with detailed project and program information.

Dep. No. 489 - An Investigation of the Chemistry of Texture Changes of Frozen Blue Crab Meat.

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Receipts of Fresh and Frozen Fishery Products at New York City's Fulton Fish Market, 1956, (Includes Statistics and Marketing Trends), by T. J. Risoli, 24 pp., processed. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) The first part of this annual summary of New York City's Fulton Market receipts of fresh and frozen salt-water fishery products discusses the marketing trends for 1956. The subjects covered are: a comparison of New York City's Fulton Market Salt-Water Section receipts of finfish and shellfish, leading finfish species, the City's fishing fleet and direct fishing vessel landings, types of transportation used, receipts by shipping areas, general marketing trends and conditions that affected fishery products, consumption of fishery products in New York City, business conditions, an estimate of the receipts by the Fresh-Water Section of Fulton Fish Market, and a number of other related subjects. This first section also includes a table showing the imports of selected fresh and frozen fishery products through the New York Customs District in 1956. The second part of this annual report consists of a series of statistical tables giving the receipts of fish and shellfish in the Salt-Water Section of New York City's Fulton Fish Market by months and method of

transportation; by species, method of transportation and state and provinces; and by states and provinces of origin.

California Fishery Products Monthly Summary, July 1957, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of raw tuna and tunalike fish, herring, mackerel, anchovies, and squid; pack of canned tuna, herring, mackerel, anchovies, and squid; market fish receipts at San Pedro, Santa Monica, San Diego, and Eureka areas; California imports; canned fish and frozen fish prices; for the month indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, August 1957, 12 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp, and frozen fillet wholesale market prices; for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, July 1957, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shellfish on the New Orleans French Market; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, August 1957, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.) Fishery production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Ocean City, and Cambridge; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

(Seattle) Monthly Summary - Fishery Products, July 1957, 7 pp. (Market News Service, U. S. Fish and Wildlife Service, 421 Bell St. Terminal, Seattle 1, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Oregon) wholesale dealers; also Northwest Pacific halibut landings; for the month indicated.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Commercial Fishing Vessels and Gear, by Gustaf T. Sundstrom, Circular 48, 50 pp., illus., printed, 40 cents. The author has illustrated in this booklet the most important types of fishing gear and vessels in use today in the United States and Alaska. Descriptions of representative types of fishing vessels are also included. General

range of length, beam, draft, net tonnage, construction, engine, refrigeration, speed, average crew, length of trip and convertibility, are indicated. The main fishing areas are shown on maps.

Early Development, Spawning, Growth, and Occurrence of the Silver Mullet (MUGIL CUREMA) along the South Atlantic Coast of the United States, by William W. Anderson, Fishery Bulletin 119 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 57), 21 pp., illus., printed, 20 cents, 1957.

Federal Aid in Fish Restoration, Regulatory Announcement 54, 17 pp., printed, 10 cents, May 1957.

"Fish-Escapeweigher," by Earl Leitrita and Robert Macklin, article, *The Progressive Fish-Culturist*, vol. 18, no. 4, October 1956, pp. 178-180, processed, single copy 25 cents (annual subscription \$1 domestic, US\$1.30 foreign). Describes a tank-truck loading device patterned after a conventional flat-belt conveyor. Important differences are the use of a rubber cleated belt, construction primarily of aluminum, and two pneumatic-tired wheels for portability around the hatchery. No fish remains on the belt more than 10 seconds, and all water escapes before the fish reach the top and drop into the tank truck. As no water is added at the time of loading the fish, displacement is used to weigh the fish. Where three men took 1.5 hours to load 2,000 pounds of fish, two men can now do the job in 15 minutes.

"The Inland Fisheries of Indonesia," by Atmo Hardjono, article, *The Progressive Fish-Culturist*, vol. 18, no. 1, January 1956, p. 29, processed, single copy 25 cents (annual subscription \$1 domestic, US\$1.30 foreign).

Past and Present Delaware River Shad Fishery and Considerations for Its Future, by James E. Sykes and Burton A. Lehman, Research Report 46, illus., printed, 20 cents, 1957. A report presenting a history of the Delaware River shad fishery, especially emphasizing its constant state of decline since the peak year of 1896. Describes efforts to restore the shad fishery to its former economic importance through surveys of the distribution and migrations of the shad, and studies of the problems of pollution and dams. The report concludes with a presentation of some of the future problems that confront the Interstate Commission on the Delaware River Basin as a result of proposed development of water resources of the Delaware River. Despite the many problems, if the objectives of the shad-rehabilitation program are accomplished as planned, according to the authors, "there is no apparent reason why the shad runs cannot be rebuilt to their former abundance."

"Population Changes and Studies Caused by the Sea Lamprey," article, *The Progressive Fish-Culturist*, vol. 18, no. 1, January 1956, p. 41, processed, single copy 25 cents (annual subscription \$1 domestic, US\$1.30 foreign).

MISCELLANEOUS PUBLICATIONS

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

BIBLIOGRAPHY:

Bibliographia Oceanographica, 1950, (Oceanographic Bibliography), Vol. XXIII, 521 pp., printed in Italian and English, \$6. Bibliographia Oceanographica presso il Consiglio Nazionale delle Ricerche, Piazzale delle Scienze, 7, Rome, Italy, 1956. This bibliography for 1950, listing a total of 2,453 articles, is the first of a new series. The use of (1) Italian and English in the text and (2) the decimal classification developed by FAO for fisheries science, makes this a bibliography of outstanding value. The bibliography contains the following major divisions: The Geophysical Environment--including, among others, the subtopics of physical oceanography, marine biology, chemical composition of marine animals, and ecology; Stocks of Marine Organisms--identification and measurement of the dimensions of individuals and stocks; Harvesting of Marine Products--fishing operations, fishing technology, and civil engineering; Effects of Environmental Changes - Damage to and Protection of the Living Resources of the Sea; Aquaculture--improvement and creation of habitat and environment, and culture of aquatic organisms; Exploitation of the Stocks - Economy of Primary Operations - Administration of Fisheries; Markets, Storehouses, transportation, and Conservation of Fresh Fish Products; Utilization of Fish Products, Ownership, Processing, Conservation; and History and Policy of Fisheries - Regional Studies, National and International Social Aspects and Economics of Fisheries. Included also are a list of the principal periodicals from which the articles of the bibliography have been derived, and an author index.

BRAZIL:

Peixes da Agua Doce (Fresh-Water Fish), by Eurico Santos, 276 pp., illus. in color, printed in Portuguese. F. Briguiet & Cia., Travessa do Ouvidor, 11, Rio de Janeiro, Brazil, 1954. A beautifully-illustrated guide to the fresh-water fish of Brazil.

CANADA:

Annual Report of the Fisheries Research Board of Canada, 1955, 182 pp., printed. Fisheries Research Board of Canada, Ottawa, Canada, 1956. Detailed reports of the various investigations of the Fisheries Research Board of Canada are presented for 1955. The work of the Board is divided into three principal branches: work in fishery biology, technology, and oceanography. During 1955 considerable effort was again expended in the field of industrial development.

Fisheries Statistics of Canada, 1955 (British Columbia), 14 pp., illus., printed in French and English, 25 Canadian cents. Department of Trade and Commerce, Dominion Bureau of Sta-

tistics, Ottawa, Canada, 1957. Contains tables giving the quantity and value of fishery products landed in British Columbia in 1952-55, by species and by fisheries districts; quantity and value of manufactured fishery products for 1954-55; capital equipment in the primary fisheries operations; and the number of fishermen engaged in the primary fisheries operations.

Fisheries Statistics of Canada, 1955 (Prince Edward Island), 22 pp., illus., printed in French and English, 25 Canadian cents. Dominion Bureau of Statistics, Industry and Merchandising Division, Fisheries Section, Ottawa, Canada, 1957. Contains tables giving the quantity and value of fishery products landed in Prince Edward Island in 1952-55, by species and by fisheries districts; quantity and value of manufactured fishery products; capital equipment in the primary fisheries operations; and the number of fishermen engaged in the primary fisheries operations.

COOK ISLANDS:

The Fisheries Industry of the Cook Islands, by H. Van Pel, 47 pp., illus., processed. South Pacific Commission, Noumea, New Caledonia, 1955.

CRAZFISHES:

The Crayfishes of New York State, by Denton W. Crocker, Bulletin 355, 97 pp., illus., printed. State Science Service, State Museum, Albany, N. Y., 1957.

DENMARK:

Fiskeribetretning for Aret 1956 (The Ministry of Fisheries' Annual Report for 1956), 144 pp., illus., printed in Danish with summary in English. Fiskeriministeriet, I Kommission Hos G. E. C. Gad, Copenhagen, Denmark. A report on the Danish fishing industry for the year 1956. Presents statistical data on the following: the number of fishermen and how many are employed permanently or occasionally; fishing vessels, gear, and nets; catch of fish and shellfish; trout produced in ponds; amount of fish used for filleting, smoking, and canning; production of fish meal and oil; exports of fresh and processed fish and shellfish; and imports of fish and shellfish.

DEPTH RECORDER:

"Underwater Telemetering," by William Dow, article, Deep-Sea Research, vol. 2, no. 2, January 1955, pp. 145-151, printed. Pergamon Press, 122 East 57th St., New York 22, N. Y. This report describes an inexpensive telemetering depth meter capable of determining depth of towed gear and other information, and of transmitting the data acoustically through the water to the surface. The device is somewhat unusual in that it uses the ocean rather than the air as the metering medium. Built into a torpedo-shaped fish for towing purposes, the instrument is self-contained and may be quickly attached to any trawl wire.

FARM PONDS:

Farm Ponds--Their Construction and Management, by H. D. Ayers, and A. deVos, Ontario Department of Agriculture Bulletin 515, 23 pp., illus., printed. Ontario Department of Agriculture,

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

Parliament Bldg., East Block, Toronto, Ontario, Canada, July 1956.

FINLAND:

Tietoja Rannikkoalueidemme Kalaliikkeista ja Kalanjalostuslaitoksista Sekä Vahittain ja Kuluttain Tapahtuvan Kalanjalon Autolinjoista Kulutusalueille Vuonna 1951 (On the Fish Business, Curing Houses and Wholesale and Retail Distribution of Fish by Road in Finland 1951), by Erkki Halme and Veikko Sjöblom, 35 pp., illus., printed in Finnish with summary in English. (Reprinted from *Fennia* 80, No. 4) Tilgmannin Kirjapaino, Helsinki, Finland, 1957.

FISHERMEN:

Conditions of Work of Fishermen, 71 pp., printed. International Labour Office, Geneva, Switzerland, 1957.

FISH FLOUR:

Algunas Observaciones Acerca de la Determinación del Contenido Lipídico en Harinas de Pescado (Some Observations of the Determination of the Lipid Content of Fish Flour), by D. Montequi and M. D. García Pineda, Boletín No. 79, June 30, 1956, 13 pp., illus., printed in Spanish. Instituto Español de Oceanografía, Ministerio de Marina, Madrid, Spain.

FISH LADDERS:

"Planning Anadromous Fish Protection for Proposed Dams," by W. R. Houston, C. H. Clay, L. Edgeworth, P. A. Karkin, E. H. Vernon, and R. G. McMynn, article, Transactions of the Twentieth North American Wildlife Conference, pp. 440-454, printed. Wildlife Management Institute, Wire Bldg., Washington 5, D. C., March 1955.

FLORIDA:

"The Fishes of Two Gulf Coastal Marsh Areas of Florida," by John D. Kilby, article, Tulane Studies in Zoology, vol. 2, no. 8, May 4, 1955, pp. 175-247, illus., printed. Tulane University, New Orleans, La.

FRANCE:

Rapport sur la Production de l'Industrie des Pêches Maritimes en 1956 (Report on the Production of the Maritime Fisheries in 1956), 45 pp., processed in French. Comité Central des Pêches Maritimes, Paris, France.

FRESH-WATER FISH:

"Commercial Netting May Help Fishing in Big Reservoirs," by Otho D. May, Jr., article, South Carolina Wildlife, vol. 4, no. 3, Summer Issue 1957, pp. 2-3, 14-15, illus., printed. South Carolina Wildlife Resources Department, 1015 Main St., Columbia, S. C. Describes a study of Lake Murray and Lake Greenwood to find some means of decreasing the large roughfish population and at the same time harming the gamefish population as little as possible. It was found that the roughfish population could be appreciably decreased through the use of a sufficient number of gill nets, particularly in the larger sizes.

FREEZING:

"Bulk-Freezing of Fish," by Eirik Heen, Olaf Karsti, and Einar Bagge-Lune, article, FAO Fisheries Bulletin, vol. X, No. 2, April-June 1957, pp. 89-98, printed, single copy 30 U. S. cents. Food and Agriculture Organization of the United Nations, Rome, Italy. (For sale by Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.) The term "bulk-freezing" refers to fish frozen aboard for subsequent distribution in the thawed state as fresh fish, fish fillets frozen in blocks for fish sticks, products for pet foods and bait, but not to fish frozen in consumer and institutional packs. This paper discusses the fish freezing activities in various countries and of the many different aspects of freezing fish in bulk; it is not intended to cover production and distribution of consumer goods. It describes commercial activities in the tuna, herring, salmon, halibut, and white fish fisheries. A section on the bulk-freezing methods describes brine freezing, air-blast freezing, and indirect contact freezing. Another section discusses the economic aspects of freezing fish at sea.

"The Freezing and Cold Storage of Raw Crayfish," by K. W. Anderson, article, Food Preservation Quarterly, vol. 16, December 1956, pp. 69-71, printed. Council for Scientific & Industrial Research, Division of Food Preservation, 314 Albert St., East Melbourne, Australia. The experiments reported in this paper were designed to assess the effect of storage for 2 to 8 weeks at 0° F. on the quality of the edible meat of raw crayfish (spiny lobster). Examination of the treated fish was largely organoleptic but data on weight losses during storage, cooking, and thawing were also obtained.

FROZEN FOODS:

Production of Frozen Prepared Foods, 1954-55, by Robert B. Reese, Marketing Research Report No. 170, 20 pp., illus., processed, 15 cents. Agricultural Marketing Service, U. S. Department of Agriculture, Washington, D. C., May 1957. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Reports on a study made to determine the current production level, relative importance of marketing outlets, and major problems of the frozen prepared foods industry. Total reported production of frozen prepared foods in 1955 exceeded one-half billion pounds, excluding all fish and shellfish items except fish sticks. Of 170 items being produced commercially, fish sticks are among the four product groups which account for about two-thirds of the total output. The data included on frozen prepared fish and shellfish production was obtained with the full cooperation of the U. S. Fish and Wildlife Service.

GENERAL:

Statistical Abstract of the United States, 1957 (78th Annual Edition), 1061 pp., printed, \$3.50 (buckram). U. S. Bureau of the Census, Washington, D. C., 1957. (For sale by Superintendent of Documents, U. S. Government Printing

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

Office, Washington 25, D. C.) This is the standard summary of statistics for the most recent year available early in 1957 on the social, political, and economic organization of the United States. It is designed to fulfill two functions: first, to serve as a convenient volume for statistical reference; and second, to serve as a guide to other statistical publications and sources. It contains, among many others, a section on fisheries which presents briefly statistics relating to quantity, value, species, and disposition of fish caught for commercial purposes, and of fishery products. The principal sources of these data on fisheries are reports published by the Fish and Wildlife Service.

"Spectral Reflectance Applied to the Study of Heme Pigments," by J. J. Naughton, M. Frodyma, and H. Zeitlin, article, *Science*, vol. 125, no. 3238, 1957, pp. 121-122, printed, single copy 25 cents. *Science*, 1515 Massachusetts Ave., Washington 5, D. C.

"A Trip on a Sampan," by J. E. King, article, *The Elepaio* (Journal of the Hawaiian Audubon Society), vol. 17, no. 1, 1956, pp. 3-4, printed. Hawaiian Audubon Society, P. O. Box 5032, Honolulu 14, Hawaii.

GREAT BRITAIN:

"Governmental Services to the Sea Fish Industry of Great Britain," article, *FAO Fisheries Bulletin*, vol. X, no. 2, April-June 1957, pp. 65-84, printed, 30 U.S. cents. Food and Agriculture Organization of the United Nations, Rome, Italy. (For sale by Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.) This article is a summary of the monograph of the same title, prepared for FAO under the auspices of the Royal Institute of Public Administration, London. It describes the main features of the structure of the British sea fish industry and the functions performed by the Government in connection with the sea fish industry. These functions fall into two groups--those entirely concerned with fisheries and which are, therefore, unrelated to any other aspect of governmental work, and those which apply in some measure to the fishing industry but have also to be performed in other contexts and for other interests. This article also presents a background to the present governmental services and a description of the services which the Government provides at each stage of the progress of the fish from the sea to its ultimate consumers. The description of the organization of statistical work and scientific research is given separately in the closing section of the article.

HERRING:

On the Fecundity of the Herring (*CLUPEA HARENGUS PALLASI V.*) Spawning Along the Western Coast of the Sächalin Island, by I. A. Piskunov, *Zoologicheskii Zhurnal*, vol. 31, no. 1, pp. 115-121. Translated by K. F. Wiborg, *Havforskningsinstituttet*, Bergen, Norway.

INDIA:

Indian Journal of Fisheries, Vol. III, No. 2, (October 1956), 207 pp., illus., printed. The Editorial

Committee, Indian Journal of Fisheries for the Ministry of Food and Agriculture, Government of India, New Delhi, India. Contains, among others, the following articles: "Rate of Growth in Spat and Yearlings of the Indian Backwater Oyster *Ostrea madrasensis* Preston," by K. Virabhadra Rao and K. Nagappan Nayar; "The Bacterial Flora, Trimethylamine and Total Volatile Nitrogen of Fish Muscle at 30° C.," by N. K. Velankar; "The Bacterial Flora, Trimethylamine and Total Volatile Nitrogen of Fish Muscle at 0° C. (in Ice)," by N. K. Velankar and P. V. Kamasastri; "Experimental Air-Shipment of Carp Fry in Plastic Bags," by M. R. Renade and H. G. Kevalramani; "A Simple Scientific Fish-Liver Oil Extractor for Production of A-Vitaminized Oil," by K. C. Saha; "Studies on Some Aspects of the Biology of the Common Anchovy, *Thrissocles mystax* (Bloch and Schneider)," by G. Venkataraman; "Annual Report of the Central Inland Fisheries Research Station, Calcutta, for the Year 1954"; and "Government of India, Central Marine Fisheries Research Station, Mandapam Camp--Annual Report of the Chief Research Officer for the Year Ending 31st March 1955."

JAPAN:

The Journal of the Shimonooseki College of Fisheries, vol. 6, no. 1, 157 pp., illus., printed. Shimonooseki College of Fisheries, Yoshimi, Shimonooseki City, Japan, November 1956. Contains, among others, the following articles: "Forms of Fish Shoal Lured by the Fish Lamp and Setting Direction of Purse Seine," by Masanori Chigusa, Akiyoshi Kataoka, and Makoto Hirose; "On Refractive Index of Crystal Guanine from Marine Fish," by Tadashi Ueda and Jogoro Matsuzawa; and "On the Body Composition and Morphological Character of Yellowfin Tuna in the Mid-Indian Ocean," by Osamu Hirano and Shoji Tagawa.

The Journal of the Shimonooseki College of Fisheries, vol. 6, no. 2, 143 pp., illus., printed. Shimonooseki College of Fisheries, Yoshimi, Shimonooseki City, Japan, March 1957. Contains, among others, the following articles: "At the Middle Indian Ocean about Result of Tuna Long-line Fishing Examination," by Akiyoshi Kataoka; and "Fish Fauna of the Japan Sea," by Hiroshi Yoshida and Takeo Ito.

MARKETING:

Analyzing Your Cost of Marketing, by Charles H. Sevin, *Management Aids for Small Manufacturers* No. 85, 4 pp., printed, available free. Small Business Administration, Washington 25, D. C., June 1957.

MENHADEN:

"Early Life History of the Gulf Menhaden, *Brevoortia patronus*, in Louisiana," by Royal D. Suttks, article, *Transactions of the Twenty-first North American Wildlife Conference*, pp. 390-407, printed. Wildlife Management Institute, Wire Bldg., Washington 5, D. C.

NORTH BORNEO:

Report on a Collection of Marine Fishes from North Borneo, by Robert F. Inger, 67 pp., illus., printed.

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(Reprinted from *Fieldiana: Zoology*, vol. 36, no. 3, pp. 341-405. Chicago Natural History Museum, Chicago, Ill., May 29, 1957.

NORWAY:

Fisheries Research in Northern Waters - Study Items and Results, by Gunnar Saetersdal, 28 pp., illus., processed. (Translation of Departmental Report No. 1 from the Deep Sea Research Institute, Fisheries Directorate, Bergen, August 1956.) Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, England.

Konkylien, no. 1 (July 1957), 30 pp., illus., printed in Norwegian with summary in English. Stord Marin Industri a-s, Bergen, Norway. Contains, among others, the following articles: "Herring Meal Quality," by Knut Breirem--discusses the characteristics of high-quality fish meal, especially Norwegian produced fish meal; "Antioxidants," by Lars Aure; and "A Visit Aboard the Havkvern"--describes the Norwegian-made motor trawler Havkvern, a factory ship unique for fishing herring and sand-eel for meal and oil production only, which has a capacity of 60 tons of raw material and can stay at sea for about 30 days without refuelling.

OCEANOGRAPHY:

"Variations in the Equatorial Countercurrent in the Central Pacific," by T. S. Austin, E. D. Stroup, and M. O. Rinkel, article, *Transactions, American Geophysical Union*, vol. 37, no. 5, 1956, pp. 558-564, printed. American Geophysical Union, 1530 P St., NW., Washington 5, D. C.

OYSTERS:

Cleansing Research on Cultured Oysters in Hiroshima Bay, 5th Report. Experiments on Artificial Purification of Oysters, No. 2, September 1953, by Dr. M. Okinaka, M. Sakai, S. Sakai, G. Chiba, M. Kaganaka, K. Kishimoto, T. Takeuchi, T. Matsuhara, Dr. H. Yoshino, and R. Inoue, 13 pp., processed. (Translated from Report on Hiroshima - Eisei-Kenkyusho No. 4, pp. 101-06, 1954.) Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, England.

Heat Death and Associated Weight Loss of the Oyster CRASSOSTREA VIRGINICA, by Milton Fingerman and Laurence D. Fairbanks, 15 pp., illus., printed. (Reprinted from *Tulane Studies in Zoology*, vol. 5, no. 4, April 1, 1957, pp. 55-68.) Department of Zoology, Tulane University, New Orleans, La.

Hygienic Studies on Cultured Oysters in Hiroshima Bay. Fourth Report: Experiments in Artificial Purification of Oysters, No. 1, by Dr. M. Okinami, M. Sakai, Y. Kurata, M. Fujita, T. Matsuhara, Dr. H. Furuno, and R. Inoue, 20 pp., processed. (Translated from Hiroshima - Eisei-Kenkyusho No. 3, pp. 40-48, 1953.) Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, England.

PHYSIOLOGY:

The Physiology of Fishes, vol. 1 - Metabolism, edited by Margaret E. Brown, 456 pp., illus.,

printed. Academic Press Inc., 125 East 23rd St., New York 10, N. Y., 1957.

PLANKTON:

Investigaciones Sobre el Plancton Marino de Cuba (Research on the Plankton of Cuba), by Jose A. Suarez Caabro, Publicacion Separada de Noverim, vol. 2, no. 6, 1957, 15 pp., illus., printed in Spanish with summaries in English and French. Universidad Catolica de Santo Tomas de Villanueva, Apartado 6, Marianao, Cuba. Discusses the background, importance, and objectives of the Cuban marine plankton investigations which were begun at the University of Villanova in January 1957. Includes outlines of the work done in Latin America, Gulf of Mexico, the Caribbean Sea, and especially in the waters that surround Cuba. The importance of these studies is considered in relation to what has already been done in other countries.

QUALITY:

Objective and Subjective Assessments of Fish Quality, by J. M. Shewan and J. Liston, *DSIR Food Investigation Memoir No. 1022*, 11 pp., illus., printed. Institut International du Froid, 177 Boulevard Malesherbes, Paris, France.

RED TIDE:

An Annotated Bibliography of Red Tides Occurring in the Marine Waters of Florida, by Robert F. Hutton, No. 2, 24 pp., illus., printed. (Reprinted from *The Quarterly Journal of the Florida Academy of Sciences*, vol. 19, nos. 2-3, June-September 1956, pp. 123-146.) Florida State Board of Conservation, Marine Laboratory, St. Petersburg, Fla.

RESEARCH VESSEL:

"A Gear Research Vessel," article, *FAO Fisheries Bulletin*, vol. X, no. 2, April-June 1957, pp. 85-88, illus., printed, single copy 30 U.S. cents. Food and Agriculture Organization of the United Nations, Rome, Italy. (For sale by Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.) In 1956, the Royal Swedish Board of Fisheries requested FAO to prepare preliminary plans for a fisheries research vessel to carry out gear research and experimental fishing. This article describes briefly a study of the design requirements for such a vessel.

SALMON:

"Further Observations on Stream Survival of King Salmon Spawn," by Harold A. Gangmark and Robert D. Broad, article, *California Fish and Game*, vol. 42, no. 1, January 1956, pp. 37-49, printed. California Department of Fish and Game, Sacramento, Calif.

"Problems of Pacific Salmon Management," by Ferris Neave and R. E. Foerster, article, *Transactions of the Twentieth North American Wildlife Conference*, pp. 426-440, printed. Wildlife Management Institute, Wire Bldg., Washington 5, D. C., March 1955.

"Scotland's Salmon Fisheries," by T. W. Beak, article, *The Atlantic Salmon Journal*, no. 4,

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

December 1955, pp. 12-14, printed. The Atlantic Salmon Association, Inc., 1559 McGregor St., Montreal 25, Canada.

"Studies on Canadian Atlantic Salmon," by P. F. Elson and C. J. Kerswill, article, Transactions of the Twentieth North American Wildlife Conference, pp. 415-426, printed. Wildlife Management Institute, Wire Bldg., Washington 5, D. C., March 1955.

SARDINES:

Biología de la Sardina de Baleares (Biology of the Baleares Sardine)--Puesta, Alevinaje y Desarrollo en su Primer Año de Vida (Spawning, Hatching, and Development in its First Year of Life), by Miguel Oliver Massuti, Boletín No. 80, 23 pp., illus., printed in Spanish. Instituto Español de Oceanografía, Ministerio de Marina, Madrid, Spain.

SEA LAMPREYS:

"Lampreys in the Lake Champlain Basin," by Francis H. Wilson, article, American Midland Naturalist, vol. 54, July-October 1955, pp. 168-172, printed. American Midland Naturalist, Notre Dame, Ind.

"The Sea Lamprey," by Vernon C. Applegate and James W. Moffett, article, Scientific American, vol. 192, no. 4, April 1955, pp. 37-41, printed. Scientific American, 415 Madison Ave., New York 17, N. Y. This article presents a brief resume of the decline of the lake trout fisheries of Lake Huron and Lake Michigan, the life history of the sea lamprey, and the methods attempted and those now being used in control of the lamprey. Complete eradication of sea lampreys from the Great Lakes above Niagara Falls is the objective of the program.

SHRIMP:

The Biology of PANDALUS MONTAGUI Leach, by M. N. Mistakidis, Fishery Investigations Series II, vol. XXI, no. 4, 52 pp. text and 8 plates photographs, printed. Her Majesty's Stationery Office, York House, Kingsway, London, W. C. 2, England, 1957. A biological report on the breeding, growth, migrations, and parasites of pink shrimp, Pandalus montagui Leach. Includes as introductory background, a general description of the shrimp fishery off the coast of England and Wales--especially the highly successful beam-trawl shrimp fishery in the Wash and Thames estuaries. Six of eight photographic plates show vessels and gear employed in beam-trawl shrimp fishing.

Propagation of the White Shrimp, PENAEUS SETIFERUS (Linn.), in Captivity, by Malcolm C. Johnson and J. R. Fielding, 17 pp., printed, 30 cents. (Reprinted from Tulane Studies in Zoology, vol. 4, no. 6, December 31, 1956, pp. 175-190.) Tulane University, New Orleans, La.

The Live Bait Shrimp Industry of the West Coast of Florida (Cedar Key to Naples), by Kenneth D. Woodburn, Bonnie Eldred, Eugene Clark, Robert F. Hutton, and Robert M. Ingle, Technical Series No. 21, 33 pp., illus., printed. Florida

State Board of Conservation Marine Laboratory, St. Petersburg, Fla., May 21, 1957. Reports on a relatively new enterprise--the multi-million dollar live bait shrimp industry. Discusses the Cedar Key to Naples area which produces over 60 percent of Florida's bait shrimp. Presents, with the aid of figures and photographs, data on the life history and biological studies of shrimp; production, transportation, and retailing of live bait shrimp; and legal and conservation aspects of the live bait shrimp industry.

"Vitamin Content of Fresh, Processed Shrimp," by A. F. Novak, E. A. Fieger, and M. E. Bailey, article, Quick Frozen Foods, vol. 18, July 1956, pp. 64-65, printed, single copy 50 cents. E. W. Williams Publications, Inc., 82 Wall St., New York 5, N. Y. Results of an investigation showed that the vitamin content of fresh, iced, and frozen shrimp varies considerably. Vitamin losses were shown to occur both in ice-stored and frozen-stored shrimp. A comparison of data shows a more rapid decline in the iced than in the frozen product. Early losses in vitamin content may occur because of insufficient refrigeration from the time the shrimp are caught until they are processed and frozen. Organoleptic studies indicated a rapid decline in the quality of shrimp stored in ice during a two-week period.

SOUTH AFRICA:

Freshwater Fishing in the Cape South Western Districts, South Africa (With Notes on the Eastern Cape), Third Edition, 18 pp., illus., printed. The Cape Piscatorial Society, 73 St. George's St., Cape Town, South Africa, February 1957.

The Sea Fishes of Southern Africa, by J. L. B. Smith, revised enlarged edition, 581 pp., illus., printed. Central News Agency, Ltd., South Africa, 1953. Hafner Publishing Company, 31 East 10th St., New York 3, N. Y.

SPAIN:

Cotos de Pesca Continental (Continental Fishery Boundaries), 14 pp., printed in Spanish. Dirección General de Montes, Caza y Pesca Fluvial, Servicio Nacional de Pesca Fluvial y Caza, Madrid, Spain, 1957. Lists the most important inland fishery regions of Spain with information on the boundaries and regulations concerning fishery zones within those regions. Only very generalized descriptions of the fishery zones are given but the addresses of the various regional offices of the National Fluvial Fishery Service, which may be consulted for details, are included.

STURGEON:

"Progress Report on White Sturgeon Studies," by Richard L. Pycha, article, California Fish and Game, vol. 42, no. 1, January 1956, pp. 23-35, printed. California Department of Fish and Game, Sacramento, Calif.

SWORDFISH:

"On the Breeding Areas of the Swordfish (Xiphias)," by A. Vedel Taning, article, Deep-Sea Research.

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

Supplement to vol. 3, Papers in Marine Biology and Oceanography, pp. 438-450, printed, 1955. Pergamon Press, 122 East 57th St., New York 22, N. Y.

THAILAND:

A General Account on the Fisheries of Thailand, 52 pp. text and 15 tables, printed. Department of Fisheries, Ministry of Agriculture, Bangkok, Thailand. This booklet presents a complete report on all phases of the fisheries industry in Thailand--an industry second in importance only to agriculture. The report is divided into the following headings: (1) Land and Water Environment; (2) Fisheries Resources; (3) Fisheries Industries--including the subtopics of fishing grounds, culture operations, and handling and utilization of catch such as canning, refrigeration, and cold storage; and (4) Fisheries Administration and Development. The tables cover fishing gear, 1947-56; fishing boats, 1942-56; annual catches, 1949-57; fresh and salted fishery products sales, 1948-57; exports and imports of fish, 1947-56; revenue from fisheries, 1949-56; market receipts and average wholesale prices at Bangkok, 1947-57; monthly market receipts at Bangkok, 1954-57; monthly auction prices at Bangkok Fish Market, 1956-57; fish fry distribution, 1947-56; balance of imports and exports of aquatic animal products, 1942-56; and number and area of fish ponds by geographical zones in 1955.

TRADE LISTS:

The Office of Economic Affairs, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., published the following mimeographed trade lists. Copies may be obtained by firms in the United States from that office or from Department of Commerce field offices at \$2 each.

Oils (Animal, Fish and Vegetable)--Importers, Dealers, and Producers--Haiti, 8 pp. (July 1957). Contains the names and addresses, the relative size of each firm, type of products dealt in or produced by each firm, and the annual production by producers. The main items imported are olive oil, soybean oil, crude vegetable oil for refining, lard and lard substitutes, and butter and butter substitutes. The United States is the chief supplier and there are no import

or exchange restrictions in Haiti. No firms are listed as importing, wholesaling, or producing either edible or inedible fish oils as such.

Oils (Animal, Fish, and Vegetable)--Importers, Dealers, and Producers--Sweden, 5 pp. (July 1957). Contains the names and addresses, the relative size of each firm, type of products dealt in or produced by the firms listed, and the value of the production for some of the producing firms. Production of animal, fish and vegetable oils in 1954 was valued at US\$20.2 million. Of this total 82 percent consisted of rapeseed and mustard oils, principally from domestic sources. In 1955, Swedish imports of animal, fish, and vegetable oils were valued at US\$3.6 million. Principal suppliers of fish oils were Japan and Denmark.

TRAWLING:

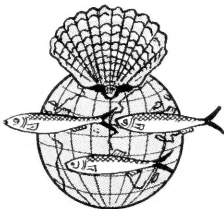
"Pair-Trawling on the Grand Banks," by Alfonso Rojo, article, Trade News, vol. 10, no. 1, July 1957, pp. 3-4, illus., printed. Department of Fisheries, Ottawa, Canada. The author states that "The art of taking fish by means of a single net towed between two ships is probably one of the world's most effective methods of fishing." This method, known as "pair-trawler fishing," was introduced by the Spanish fishing fleet in 1949 in the waters of the Grand Banks of Newfoundland. It was proved then that pair-trawling could be carried out on the Grand Banks with as much success as in the Spanish fisheries. This article describes the trawlers used in this fishery and the trawling nets and their operation which differ in many ways from the standard trawl.

VIETNAM:

Etudes sur les Techniques des Pêches du Vietnam (Study of Vietnam's Fishing Methods), by M. M. R. Serene, Nguyen-Chau, and Nguyen-Trong-Hien, Fascicule II, Contribution 13, 51 pp. illus., printed in French. Institut Oceanographique de Nha Trang, Nha Trang, Indochina, 1956.

WASHINGTON:

Report and Recommendations for 1955-1957, 8 pp., illus., printed. Interim Fisheries Committee, Washington Legislature, Olympia, Wash., 1957. Recommendations for the fisheries of Washington.



WHALES AND DOLPHINS

Of all the sights at sea, probably nothing quite equals the thrill of "Th'ar she blows!" --the plume of spray that marks a whale's sudden surfacing for a breath of fresh air.

San Diego's Point Loma each fall is crowded with adults and youngsters alike who come to view the spectacle of the gray whale herds passing close to shore en route to breeding grounds in Baja California.

Whether it's whale, dolphin, or porpoise, they all belong to the same group of mammals, warm-blooded members of the animal kingdom. They give birth to living young about every two years after a gestation period of 10-12 months.

You also can tell them from fish by their tails: fish have vertical tails and members of the whale family all have horizontal tails.

There's no sharp line of distinction between a whale and a dolphin, or porpoise. Generally, the larger ones are called whales, but the pygmy sperm whale confuses things by being no larger than some of the dolphins.

Whether to call certain members a porpoise or a dolphin is another moot question, but the beaked ones are more likely to be known as dolphins and their snubnosed brethren as porpoises.

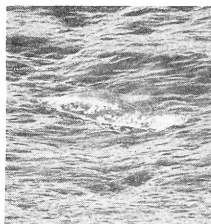


Fig. 1 - This gray whale, "taking a breather" at the surface, is blotched with pigment spots and with barnacles getting a free ride around the Pacific. Gray whales usually spout three or four times in close succession, then "sound" or submerge and stay down 8 to 11 minutes if not frightened.



Fig. 2 - Adult Dall's porpoise.

Of the 50 known kinds of whales and dolphins, 22 appear along the California coast. Most often seen in these waters is the California gray whale, which reaches a length of 45 feet. Recent counts from headlands in the San Diego area during the animal's migratory passage indicate that the gray's numbers are slowly increasing under protection, and now total about 4,000.

Several bays along the Baja California coast, among them the widely known Scammon's Lagoon, are named for early-day whaling vessels or whaling men who tracked the gray whales to their calving grounds. They were the far-ranging fleets out of New England ports. So successful were they that the gray whale was nearly wiped out before international action intervened to protect it.

Whales can be divided into two groups; those that have teeth (including dolphins) and can eat fish, and the larger species that depend on horny strainers, called baleen, or "whalebone," to filter the tiny organisms called plankton from the ocean water.

The blue or sulphur-bottom whales, the world's largest animals, are of the toothless type.

The famous but fictional Moby Dick was a sperm whale which had bitten off a whaler's leg, but the terrifying real-life exploits of the orca or killer whale put Moby Dick to shame. It's a swift and vicious terror of the sea, 20-30 feet long and more dangerous because it swims in packs or herds. It's capable of killing other whales much larger than itself.

California never was in a class with Massachusetts in its romantic heyday of the great whaling fleets, but there were commercial whaling operations established in California in the early 1800's. The first shore whaling station was set up in 1851, and that type of operation has continued off and on ever since.

A station was active at Field's Landing near Eureka from 1940 to 1951, and at present there's a station at Point San Pablo in San Francisco Bay, operating with two vessels. Its 1956 kill totaled 145 whales, processed mostly for pet food.

However, with whale oil for lamps and whalebone for corsets no longer much in demand, the industry in California provides a living for only a few. Thanks to international protective laws, the giant of the sea has made a gradual comeback throughout the world and once more appears in sizable numbers.

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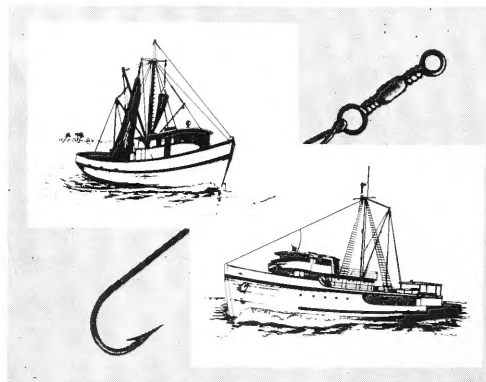
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fer; p. 36--H. R. Bullis, and p. 44--J. Pileggi.

COMMERCIAL FISHING VESSELS AND GEAR

A selection of some of the most important types of fishing gear and the vessels in use today, in the United States and Alaska, are illustrated in Commercial



Fishing Vessels and Gear (Circular 48). Descriptions of representative types of fishing craft include general range of length, beam, draft, net tonnage, construction, engine, refrigeration, speed, average crew, length of trip, and convertibility to other fisheries. Many kinds of fishing gear and fishing gear accessories are clearly illustrated. The main United States fishing areas for each type of gear described are shown on maps.

Circular 48 is available at 40 cents a copy from the Superintendent of Documents, Washington 25, D. C.

Leaflets describing in more detail some of the fishing methods illustrated in Circular 48 are listed on the inside back cover as follows:

- F. L. 64 - Construction and Operation of Lobster Gear
- F. L. 225 - Gear Used in the Sea Scallop Fishery
- F. L. 262 - Crab Pot Construction (Chesapeake Bay Type)
- F. L. 291 - Trotline Construction, Operation and Maintenance (Chesapeake Bay Type)
- F. L. 373 - Atlantic Coast Mackerel Purse Seine
- F. L. 379 - New England Sink Gill Net
- F. L. 386 - Pacific Salmon Drift Gill Netting
- F. L. 387 - Commercial Salmon Trolling

- F. L. 394 - Gulf of Mexico Shrimp Trawl Design
- F. L. 302 - Kite Rigs for Otter Trawl Gear
- F. L. 316 - Increasing the Spread of Shrimp Trawls
- F. L. 343 - Floating Trawls
- F. L. 365 - Drum Seining
- F. L. 400 - The Pond Net Fishery in Virginia
- F. L. 419 - Dungeness Crab Pots
- F. L. 422 - Construction Details of Improved Tuna Long-Line Gear
- F. L. 437 - Assembly Methods for Otter-Trawl Nets

The above leaflets may be obtained free from the U. S. Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.