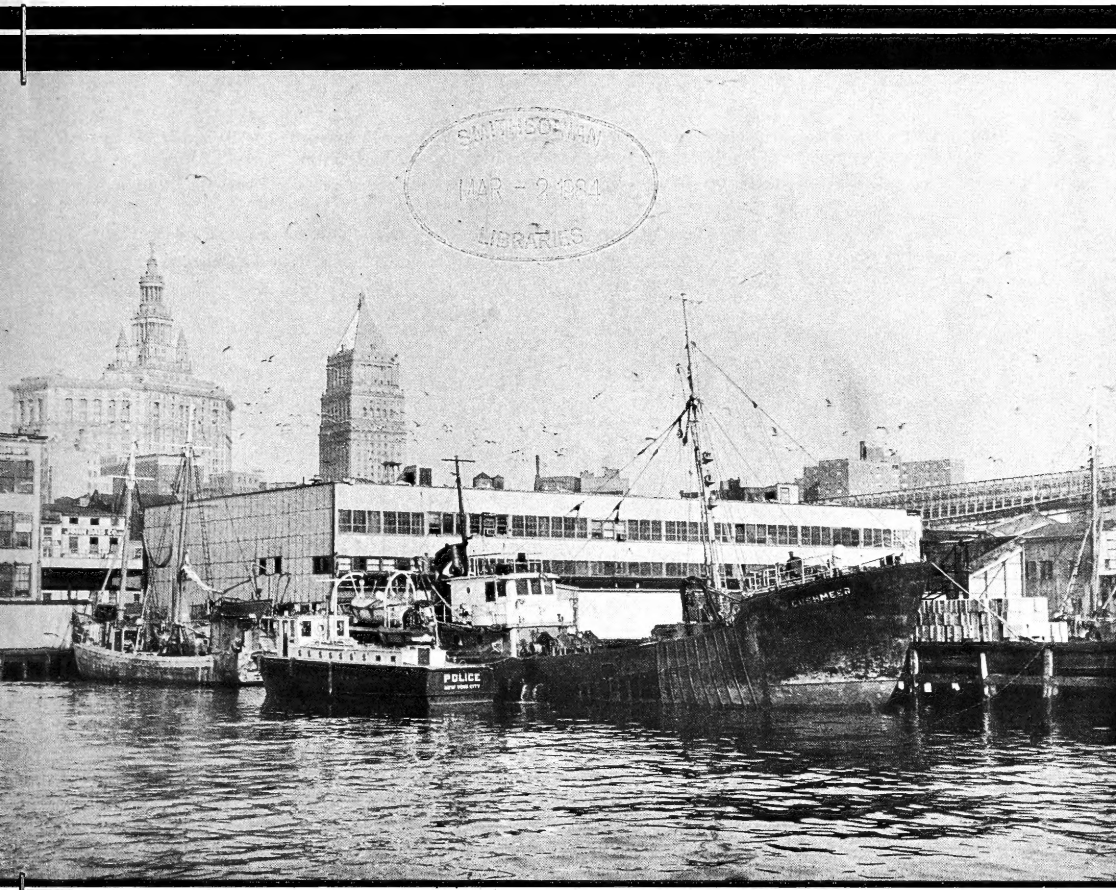
COMMERCIAL FISHERIES REVIEW



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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
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Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Chief, Branch of Market News, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.

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CONTENTS

COVER: Fish pier at Fulton Fish Market, New York City, with a medium dragger docked at the entreme left and a large otter trawler in the center of the pier. Although primarily a distribution market for fish and shellfish landed at other fishing ports, about 8 percent (almost 13 million pounds annually) of all fish and shellfish received in Fulton Fish Market is landed direct by fishing vessels. Leading varieties landed are scup (porgy), sea scallops, fluke, and butterfish.

Contents Continued Page 79.

COMMERCIAL FISHERIES REVIEW

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POTENTIAL BYPRODUCTS FROM ALASKA FISHERIES: UTILIZATION OF SALMON EGGS AND SALMON WASTE

By R. M. Kyte*

ABSTRACT

THE PRESENT LACK OF UTILIZATION OF THE VAST QUANTITIES OF ALASKA SALMON TRIMMINGS AVAILABLE AS WASTE IS CAUSED PRIMARILY BY THE REMOTE AND WIDELY-SEPARATED LOCATIONS OF THE INDIVIDUAL CANNERIES. THIS ARTICLE DISCUSSES THE PAST AND PRESENT METHODS OF USING A RELATIVELY SMALL QUANTITY OF THE TRIMMINGS AND POINTS OUT THE POTENTIAL OF THE WASTE MATERIAL IN INDUSTRIAL PRODUCTION. IT IS SUGGESTED THAT ENZYMATIC DIGESTION, IF PROVED TO BE PRACTICAL BY FURTHER RESEARCH, MAY HELP TO OVERCOME PROBLEMS INHERENT IN ESTABLISHMENT OF AN ALASKA SALMON-WASTE INDUSTRY.

INTRODUCTION

Commercial canning started in Alaska in 1878 with the production of 8,000 cases of salmon. The industry grew steadily. In 1914 it packed 4 million cases (almost 200 million pounds) of salmon, and dumped an estimated 100 million pounds of offal into the sea. In that same year, however, the first plant in Alaska to utilize cannery waste was built near Ketchikan. This plant produced salmon-offal meal and oil. Since 1914, little progress has been made toward efficient and economical utilization of the waste. During 1954, for example, 3 million cases of salmon were packed, yet an estimated 60 million pounds of offal was discarded. During the 1957 canning season, no use was made of salmon offal for reduction purposes.

In contrast to the lack of utilization of salmon offal is the complete utilization of offal in the meat-packing industry, where "the packer saves everything but the squeal." The byproduct branch of that industry, however, has developed around the larger meat-packing centers. Thus it was only when the offal could be collected in substantial quantities--with the growth of large-scale plants for packing meat--that efficient use could be made of all the potential byproducts.

With the decline in size of Alaska salmon runs in recent years, there has been some consolidation of canning operations. Nevertheless, salmon-canning plants still are scattered along a coastline that is longer than the distance from New York to Los Angeles and are hidden, in many instances, in locations remote from normal routes of travel. Furthermore, the canning season in Alaska is short, most canneries operating less than two months of the year.

For salmon-cannery offal to be economically available for the manufacture of byproducts, it must be obtainable either in large quantities, as in Ketchikan where several canneries are located, or it must contain components so valuable that they justify the high cost of collecting.

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The purpose of this paper is (1) to discuss the present use made of salmon waste from the canneries of Alaska, (2) to point out some of the potential uses of the waste and particularly of the eggs as industrial raw materials, and (3) to suggest the use of enzymes as a possible means for preparing soluble protein mixtures from salmon waste.

PRESENT USE

FISH-HATCHERY FEED: In 1956, 100,000 pounds of salmon viscera was collected from two canneries in Petersburg and frozen. The viscera were marketed principally as fish-hatchery feed in Washington and Oregon. The development of this use for cannery offal was based on the results of fish-feeding tests conducted at the Leavenworth hatchery of the Bureau of Commercial Fisheries (Burrows, Robinson, and Palmer 1951; Robinson, Palmer and Burrows 1951; and Robinson, Payne, Palmer and Burrows 1951). Data from the Leavenworth tests indicated that salmon viscera produced a growth response superior to any meat product tested. The response of the hatchery fish to salmon eggs exceeded even that obtained with the viscera. Here a unique quality of the viscera and eggs may be great enough to make their recovery economically attractive. The methods of separating, packaging, and transporting salmon viscera are discussed by Landgraf, Miyauchi, and Stansby (1951).

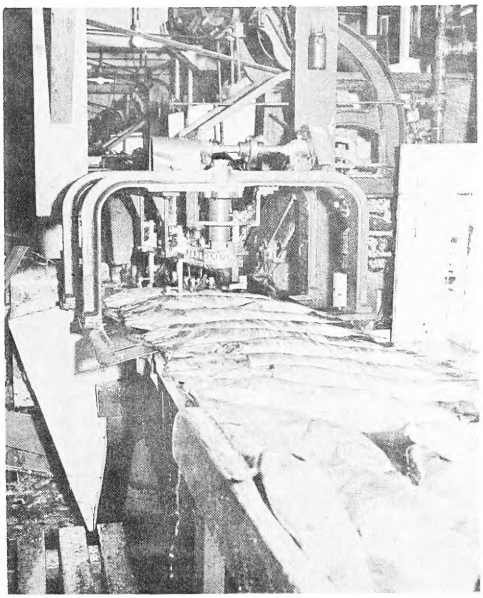

FIG. 1 - CHUM SALMON GOING THROUGH A BEHEADING MACHINE IN A SALMON CANNERY AT KETCHIKAN, ALASKA.

MINK FEED: The use of salmon offal for mink feed was investigated by Leekley, Landgraf, Bjork, and Hagevig (1952). The mink gained in weight when fed frozen salmon offal as the main portion of their diet. As the commonly-used mink feed--horsemeat--becomes less plentiful, more interest may be shown in utilizing salmon-cannery waste for this purpose.

BAIT EGGS: The first commercial use made of salmon eggs was the preparation of bait eggs for catching trout and other game fish (Jarvis 1950). The growth of sport fishing in the United States has tremendously increased the demand for salmon eggs. As the supply of eggs becomes increasingly short in Washington and Oregon, more use is being made of the large amount of Alaska salmon eggs. In 1954, several thousand pounds were processed in Southeastern Alaska for use as bait.

CAVIAR: Cobb (1931) reported that the Russians in Siberia made an excellent caviar from salmon eggs. This "red caviar," as distinguished from sturgeon or "black caviar," has found a good market in the U.S.S.R. as well as in various European countries. Jarvis (1950) describes methods for preparing caviar from salmon. In 1956, a small quantity of salmon eggs from Alaska was marketed as caviar. An additional food product has been suggested by Carlson (1955), who developed a sandwich spread from smoked salmon eggs.

POTENTIAL USES

Stansby and associates (1953a) carefully investigated the potentialities of salmon-cannery offal and salmon eggs as industrial raw materials. Many ways were suggested for recovering valuable constituents. They (1953b) discussed the possibilities, for example, of producing proteins, protein hydrolysates, and amino acids from cannery offal. The remote location of the canneries and the lack of processing facilities for the manufacture of such commodities, however, were stressed as factors that make the economical recoveries of these materials difficult. Additional work in Bureau of Commercial Fisheries laboratories has been directed towards the determination of components which might have industrial value.

Table 1 - Component Fatty Acids of Pink Salmon Egg Oil, Cottonseed Oil, and Beef Fat

Fatty Acids	Salmon-Egg Oil		Cottonseed Oil[1]	Beef Fat[1]
	Free-Oil Drop	Total Oil		
	(Percent)			
Saturated:				
C_{14}	1.8	0.6	3.0	3.0
C_{16}	8.3	9.5	20.0	29.2
C_{18}	1.9	3.9	1.0	21.0
C_{20}	-	-	1.0	0.4
Unsaturated:				
C_{14}	0.1	0.1	-	0.6
C_{16}	5.1	8.1	-	2.7
C_{18} oleic	10.5	1.7	30.0	41.1
C_{18} higher unsaturated	30.8 (4.4H)	26.1 (3.5H)	45.0 (4.0H)	1.8 (4.0H)
C_{20}	31.1 (7.3H)	27.0 (9.0H)	-	0.2
C_{22}	14.7 (11.8H)	19.0 (10.6H)	-	-
C_{24}	0.2	-	-	-
Unresolved	5.5	3.7	-	-

1/ HILDITCH 1941.
NOTE: THE NUMBERS IN PARENTHESES ARE A MEASURE OF UNSATURATION AND INDICATE THE ATOMS OF HYDROGEN REQUIRED TO SATURATE THE FATTY ACIDS COMPLETELY.

On a tonnage basis, the largest use of Alaska salmon waste has been in the production of meal and oil. At the present time, no salmon-offal reduction plants are operating in Alaska.

OIL FRACTION: Salmon eggs comprise 3 to 30 percent of the cannery offal (Magnusson and Hagevig 1950), depending on the species of salmon and its maturity.

The salmon egg is a large single cell consisting of a soft shell, a protein solution, and a droplet of oil floating on the protein solution. Sinnhuber (1943) developed a method of recovering the oil droplet from salmon eggs. Kyte (1956) determined the constituent fatty acids of this oil. This free droplet, however, represents only one-third of the total oil in the salmon egg. The other two-thirds apparently is associated closely with the protein of the egg, in that it is not liberated by the Sinnhuber method. In later unpublished work by Kyte, the fatty acids in the total oil of pink salmon eggs are determined. Data on the fatty acids in the total oil and in the oil droplet are shown in table 1 together with comparative data for cottonseed oil and beef tallow.

It will be noted from table 1 that salmon-egg oils contain about 45 percent fatty acids with molecules having 20 to 22 carbon atoms--fatty acids not normally found in significant quantities in vegetable or land-animal fats. These long-chain fatty acids in salmon-egg oil are highly unsaturated. Active research is being carried out by Bureau of Commercial Fisheries laboratories (Anonymous 1955), to take advantage of these characteristics in the preparation of new compounds of potential commercial value.[1]/

Stansby and associates (1953c) reported that approximately one-third of the total oil of salmon eggs is a phospholipid, probably lecithin. Vegetable lecithins are used industrially as wetting and emulsifying agents, moisture absorbents, and antioxidants in both food and nonfood industries. The fatty acids associated with the lecithin from salmon eggs are more highly unsaturated and have a longer carbon chain than have those found in vegetable lecithin.

1/ C_{20} AND C_{22} FATTY ACIDS REPORTED IN SEVERAL MARINE ANIMAL OILS ARE: COD LIVER, 35.0 PERCENT; HERRING, 45.0 PERCENT; MENHADEN, 32.0 PERCENT; PILCHARD, 31.7 PERCENT; SALMON, 39.7 PERCENT; SARDINE, 41.0 PERCENT; SHARK LIVER, 32.5 PERCENT; AND WHALE, 17.7 PERCENT. THUS SALMON-EGG OIL CONTAINS MORE C_{20} AND C_{22} FATTY ACIDS THAN DO MOST OTHER COMMERCIAL MARINE-ANIMAL OILS.

The properties of salmon-egg lecithin have not been investigated extensively. Stansby and associates (1953c) also found 4 to 7 percent unsaponifiable matter in the total oil from salmon eggs. About half of this unsaponifiable matter is cholesterol. Cholesterol is used in the manufacture of synthetic vitamin D and certain hormones.

PROTEIN FRACTION: The amino acid content of the protein fraction of salmon eggs was investigated by Seagran, Morey, and Dassow (1954). These workers reported the amount of each of 10 essential amino acids found in the eggs of the five Alaskan species of salmon at various stages of maturity. Table 2 gives the average

Table 2 - Amount of the Ten Essential Amino Acids in the Protein of Salmon Eggs, Soybean Meal, and Cottonseed Meal

Amino Acids	Salmon Eggs	Soybean Meal	Cottonseed Meal
	(Percentage of Protein)		
Arginine	7.2	7.3	11.3
Histidine	2.7	2.9	2.7
Isoleucine	7.2	6.0	4.0
Leucine	9.9	8.0	6.0
Lysine	8.8	6.8	3.5
Methionine	2.9	1.7	1.7
Phenylalanine	4.8	5.3	6.0
Threonine	5.9	3.9	3.0
Tryptophan	0.9	1.4	1.3
Valine	7.2	5.3	4.8

content of these amino acids in the protein of mature salmon eggs and, for comparison, the amino acid content of the protein of soybean meal and cottonseed meal. The data show that the essential amino acids are present in good amount in salmon eggs. Of particular interest are the levels of lysine, isoleucine, and methionine--the amino acids needed for supplementation of vegetable-protein concentrates in animal nutrition.

ENZYME DIGESTION

Anderson (1945) worked on the possibility of using alkali digestion to recover oil from salmon-cannery waste. A somewhat different approach was taken by Idler and Schmitt (1955), who reported enzymes effective in solubilizing a large portion of the waste from shrimp-processing plants. Kyte (1956) reported that enzyme digestion of salmon eggs was effective in solubilizing salmon-egg protein, thus aiding a gross separation of the oil from the protein.

It is proposed that enzymes acting on the entire offal from a salmon cannery may enable the cannery operator, with very little additional equipment, to prepare slurries of crude oil and protein. This mixture could be collected after the seasonal canning operations, and could be combined and processed with similar materials from other canneries in a central byproducts plant.

Although considerable field testing and an economic study would be necessary in order to evaluate enzyme digestion of fish waste, this process may enable a processor to secure adequate raw materials to make economically feasible a greater production of byproducts from Alaska salmon waste.

SUMMARY

Approximately 60 million pounds of offal from Alaska salmon canneries is being discarded annually. The remote locations of the canneries tend to discourage the collection of large amounts of waste, evidently because potential industries feel that

this situation will not permit the economical collection and manufacture of byproducts. Such use as is made of the waste at present is in the manufacture of a limited amount of fish-hatchery feed, mink feed, bait eggs, and caviar. The possibility exists, however, that valuable uses may be found for the oil and protein fractions of salmon offal.

About one-third of the oil in the salmon egg is in the form of a free-oil droplet. The other two-thirds is closely associated with protein. Salmon-egg oil contains about 45 percent fatty acids with molecules having 20 and 22 carbon atoms. These molecules are highly unsaturated. Approximately one-third of the total oil is phospholipid, probably lecithin, and approximately 4 to 7 percent of the total oil is unsaponifiable matter, half of which is cholesterol.

The essential amino acids are present in good amount in salmon eggs. Of particular interest is the content of lysine, isoleucine, and methionine, which are needed for supplementation of vegetable-protein concentrates in animal nutrition.

It is proposed that enzymes acting on salmon-cannery offal may enable a cannery operator, with little additional equipment or labor, to prepare an oil-and-protein slurry. Such a process would require additional research, but if proved practical, could offer a partial solution in encouraging more complete utilization of salmon waste.

LITERATURE CITED

ANDERSON, LYLE
1945. A PRELIMINARY REPORT ON AN ALKALI PROCESS FOR THE MANUFACTURE OF COMMERCIAL OIL FROM SALMON CANNERY TRIMMINGS, FISHERY MARKET NEWS, VOL. 7, NO. 4 (APRIL), PP. 4-7. (SEPARATE NO. 99.)

ANONYMOUS
1955. SALTONSTALL-KENNEDY ACT FISHERIES PROJECTS. COMMERCIAL FISHERIES REVIEW, VOL. 17, NO. 6 (JUNE), P. 55.

BURROWS, R. E.; ROBINSON, L. A.; AND PALMER, D. D.
1951. TESTS OF HATCHERY FOODS FOR BLUEBACK SALMON 1944-1948. U. S. FISH AND WILDLIFE SERVICE, SPECIAL SCIENTIFIC REPORT: FISHERIES NO. 59.

CARLSON, C. J.
1955. PREPARATION OF A SMOKED SALMON CAVIAR SPREAD. COMMERCIAL FISHERIES REVIEW, VOL. 17, NO. 1 (JANUARY), P. 13. (SEPARATE NO. 391.)

COBB, J. N.
1931. PACIFIC SALMON FISHERIES. U. S. BUREAU OF FISHERIES DOCUMENT 1092, P. 543.

HILDITCH, T. P.
1941. THE CHEMICAL CONSTITUTION OF NATURAL FATS. 1ST EDITION. JOHN WILEY AND SONS, INC., NEW YORK, PP. 220, 248.

IDLER, D. R. AND SCHMIDT, P. J.
1955. A SOLUBLE FERTILIZER FROM SHRIMP WASTE. FISHERIES RESEARCH BOARD OF CANADA, PROGRESS REPORTS OF THE PACIFIC STATIONS, NO. 103, P. 16.

JARVIS, N. D.
1950. CURING OF FISHERY PRODUCTS. U. S. FISH AND WILDLIFE SERVICE, RESEARCH REPORT 18, P. 180.

KYTE, R. M.
1957. ENZYMES AS AN AID IN SEPARATING OIL FROM PROTEIN IN SALMON EGGS. COMMERCIAL FISHERIES REVIEW, VOL. 19, NO. 4A (APRIL-SUPPLEMENT), PP.30-34.

LANDGRAF, JR., R. G.; MIYAUCHI, D. T.; AND STANSBY, M. E.
1951. UTILIZATION OF ALASKA SALMON CANNERY WASTE AS A SOURCE OF FEED FOR HATCHERY FISH. COMMERCIAL FISHERIES REVIEW, VOL. 13, NO. 11A (NOVEMBER-SUPPLEMENT), PP. 26-33.

LEEKLEY, J. R.; LANDGRAF, R. G.; BJORK, JEANNE E.; AND HAGEVIG, W. A.
1952. SALMON CANNERY WASTE FOR MINK FEED. FISH AND WILDLIFE SERVICE FISHERY LEAFLET 405.

MAGNUSSON, H. W. AND HAGEVIG, W. H.
1950. SALMON CANNERY TRIMMINGS, COMMERCIAL FISHERIES REVIEW, VOL. 12, NO. 9 (SEPTEMBER), P. 11. (SEPARATE NO. 258.)

ROBINSON, L. A.; PALMER, D. D.; AND BURROWS, R. E.
1951. TESTS OF HATCHERY FOODS FOR BLUEBACK SALMON 1949. U. S. FISH AND WILDLIFE SERVICE, SPECIAL SCIENTIFIC REPORT: FISHERIES NO. 60.

_____ _____; PAYNE, M. H.; PALMER, D. D.; AND BURROWS, R. E.
1951. TESTS OF HATCHERY FOODS FOR BLUEBACK SALMON 1950. U. S. FISH AND WILDLIFE SERVICE, SPECIAL SCIENTIFIC REPORT: FISHERIES NO. 63.

SEAGRAN, H. L.; MOREY, D.; AND DASSOW, J. A.
1954. AMINO ACID CONTENT OF ROE AT DIFFERENT STAGES OF MATURITY FROM THE FIVE SPECIES OF PACIFIC SALMON. JOURNAL OF NUTRITION, VOL. 53, NO. 1 (MARCH), PP. 139-150.

SINNHUBER, R. O.
1943. PRODUCTION OF SALMON EGG OIL. CIRCULAR 302, AGRICULTURAL EXPERIMENT STATION, OREGON STATE COLLEGE, CORVALLIS, OREGON, PP. 1-2.

STANSBY, M. E. AND ASSOCIATES
1953A. UTILIZATION OF ALASKAN SALMON CANNERY WASTE. U. S. FISH AND WILDLIFE SERVICE, SPECIAL SCIENTIFIC REPORT: FISHERIES NO. 109, PP. 5-33.

1953B. IBID. PP. 8-30.

1953C. IBID. P. 77.

BREADING CONTRIBUTES TO THE MICROBIAL POPULATIONS OF FROZEN BREADED FISHERY PRODUCTS

By Melvin A. Benarde*

ABSTRACT

IN ORDER TO TEST THE SUGGESTION THAT BREADINGS ARE A MAJOR SOURCE OF BACTERIAL CONTAMINATION IN FROZEN PRECOOKED FISHERY PRODUCTS, BREADINGS WERE OBTAINED FROM THREE SOURCES: THE MANUFACTURER DIRECTLY; RETAIL OUTLETS; AND OFF THE PRODUCTION LINE FROM PROCESSORS OF BREADED FROZEN FOODS.

IT WAS FOUND THAT THE BREADINGS OBTAINED DIRECTLY FROM THE MANUFACTURERS WERE UNIFORMLY LOW IN BACTERIAL NUMBERS. THOSE OBTAINED FROM THE SHELVES OF RETAIL STORES HAD SIMILARLY LOW COUNTS. THE IN-USE SAMPLES, HOWEVER, HAD SIGNIFICANTLY HIGHER TOTAL PLATE AND COLIFORM COUNTS.

APPARENTLY IT IS DURING THE HAND-PROCESSING OPERATIONS IN THE PLANT THAT BREADINGS BECOME CONTAMINATED. THE SUGGESTION THAT BREADING, PER SE, IS A MAJOR SOURCE OF BACTERIAL CONTAMINATION SEEMS UNTENABLE.

BACKGROUND

Frozen precooked fishery products and specialties have found a ready market in the United States. Apparently, these "convenience foods" fit our changing patterns of living since these new foods are replacing, in large part, similar items normally prepared and cooked at home.

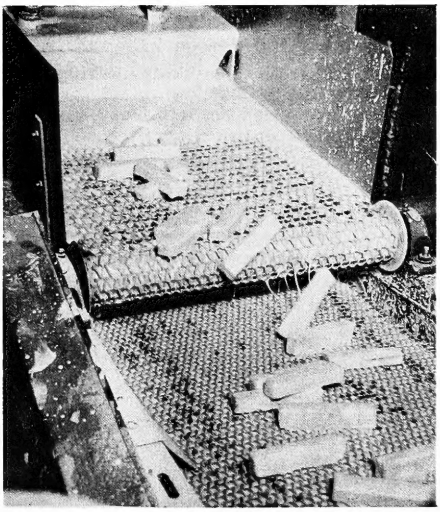

FIG. 1 - IN A PLANT THAT IS MECHANIZED, FISH STICKS ON CONVEYOR BELT GO THROUGH A BATTER PRIOR TO BREADING.

From a bacteriological viewpoint, it is highly possible that commercially-prepared fishery products may suffer from excessive handling, improper storage, and generally unsanitary conditions. Straka and Stokes (1956) have pointed out that "the dangers of excessive microbial contamination in pre-cooked frozen foods are real." Thus, a potential health hazard may be a distinct possibility.

Many of these new products can be called "made-up" dishes; that is, they consist of many ingredients added to the "name" item to enhance its over-all appeal. For example, one such ingredient used extensively in precooked products is breading material.1/

In order to achieve a crisp toast-like character as well as coating for improved color, breadings of various types are added to fishery products during processing.

It has been suggested (Larkin, Litsky, and Fuller 1956) that these breadings may be a major contributor of bacterial

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1/ THE TERM "BREADING" COMMONLY INCLUDES A VARIETY OF PREPARATIONS: BREAD OR CRACKER CRUMBS ALONE; THOSE CONTAINING A HOST OF INGREDIENTS, INCLUDING NONFAT DRY MILK SOLIDS, TOASTED CEREALS, EGGS, AND LEAVENING; AND THOSE CONTAINING SHORTENING, DEXTROSE, MONOSODIUM GLUTAMATE AND MALT EXTRACT, IN ADDITION TO THE OTHERS. DRY BATTER MIXES ALSO HAVE BEEN CALLED BREADING AS THEY CONTAIN MUCH THE SAME FORMULATION AND THEY ARE USED IN MUCH THE SAME WAY AND IN MANY INSTANCES ARE USED IN CONJUNCTION WITH BREAD OR CRACKER CRUMBS.

contamination in precooked frozen fishery products. In order to test this suggestion, breadings were obtained from three sources: directly from the manufacturer; at retail outlets; and from processors of fish and shellfish products as they were being breaded. These samples were subjected to a series of microbial examinations to discover the number and types of contaminating microflora.

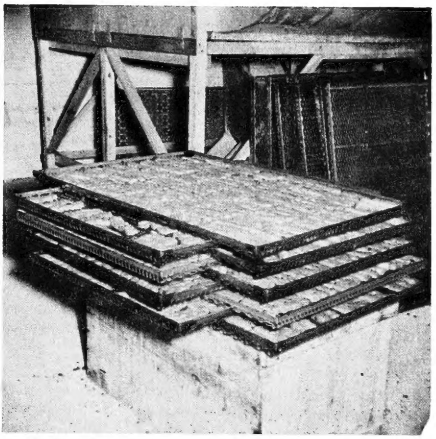


FIG. 2 - COOKED BREADED FISH STICKS READY FOR THE PACKING TABLE IN A PLANT WHERE PROCESSING IS NOT MECHANIZED.

METHOD

Fifty-gram (1.8-oz.) samples of breading were placed in a food blendor containing 450 milliliters of sterile chilled distilled water. After a 3-minute blending period, additional tenfold serial dilutions were made. Triplicate 1 and 0.1 milliliter quantities of the appropriate dilution were placed in or onto suitable media. Nutrient agar 2/ (pH 6.8) was used to determine estimated total bacterial numbers. Levine's EMB 2/, tergitol-7 2/, violet red bile 2/, and desoxycholate agars 2/, incubated at 37° C. for 24 hours were used as streak plates for coliform counts. In addition, 10, 1, and 0.1 milliliter aliquots of the original homogenate were placed in lauryl sulphate broth 2/ to determine the most probable numbers (MPN) of coliforms. Sets of 3 replicate broth tubes were employed. The tubes were allowed to incubate for 48 hours in a water bath maintained at 37° C.

Potato dextrose agar 2/ (pH 3.5) was used for determination of yeast and mold counts. These plates were read after 5 days incubation at 24° C.

Table 1 - Comparison of Total Plate Counts for the Three Groups of Breading Samples

Sample Type	Counts Per Gram		
	Manufacturers'	Retail	Commercial Processors'
Breading	2,900		
Batter Mix	4,000		
Breading	4,500		
Batter Mix	1,250		
Breading	700		
Crumbs	360		
Breading	800		
Batter Mix	1,400		
Batter Mix	1,250		
Breading	1,200		
Crumbs		300	
Breading		600	
Cracker Meal		100	
Breading		1,500	
Cracker Meal		200	
Breading		350	
Breading		300	
Crumbs			6,000
Cracker Meal			7,500
Batter Mix			10,000
Batter Mix			10,000
Cracker Meal			18,000
Batter Mix			19,000
Breading			14,000

Finally, moisture and pH determinations were performed. The air-oven method as described in Official Methods of Analysis (AOAC 8th Ed.) was used. Electrometric determinations of pH were made on slurries of the breading in distilled water.

RESULTS AND DISCUSSION

The counts obtained from 10 manufacturer's samples (representing the 4 largest producers in the country), 7 retail samples, and 7 in-use samples are listed in table 1.

The manufacturer's samples ranged from 360 bacteria per gram for a bread crumb item, to 4,500 per gram for a breading. The retail samples were likewise uniformly low; the highest was one breading containing 1,500 bacteria per gram.

2/ ALL DIFCO PRODUCTS.

The in-use samples, on the other hand, contained many more bacteria than those of either the manufacturer's or retail samples.

It may be noted that the crumb items in each of the three sets had the lowest counts. This may be due to the difference in total nutrients between the plain crumbs, and breadings and batters. Since bread crumbs are made from crumbled bread which is toasted, they contain all nutrients normally found in bread; but toasting may seal off these nutrients and make them unavailable to bacteria. On the other hand, breadings and batters consist of such ingredients as egg and milk solids, malt extract, leavening, and maybe other ingredients in such a form that they are readily available to bacteria. In addition, the moisture content of the crumb, approximately 4 percent, was significantly lower than the 9-11 percent[3] found for batter and breading. Finally, pH[4] values of 5.3-5.6 for crumbs, as against 6.1-6.5 for batters were obtained. All three factors, ingredients in a form readily available to bacteria, higher moisture content, and hydrogen-ion activity may actually serve to increase bacterial proliferation. The in-use samples were obtained from open cans, sacks, and pots as they were being applied to the fish and shellfish products in the plants. Samples 3-7 of this group were obtained from a plant where processing operations were entirely manual and in which the women continually handled the product.

Table 2 - Comparison of Mold and Yeast Counts from Breaded Material

Sample Type	Manufacturers'		Retail		Commercial Processors'	
	Mold	Yeast	Mold	Yeast	Mold	Yeast
	(Colonies Per Plate)					
Breading	1	0				
Batter Mix	2	0				
Breading	2	0				
Batter Mix	2	0				
Breading	1	0				
Crumbs	2	0				
Breading	3	0				
Batter Mix	2	0				
Batter Mix	2	0				
Breading	2	0				
Crumbs			1	0		
Breading			2	1		
Cracker Meal			1	0		
Breading			3	0		
Cracker Meal			1	0		
Breading			2	1		
Breading			1	1		
Crumbs					10	4
Cracker Meal					7	6
Batter Mix					4	3
Batter Mix					13	6
Cracker Meal					7	3
Batter Mix					6	3
Breading					9	5

Table 3 - Comparison of MPN Values and Plate Counts for Coliform Bacteria from Breading Material

Sample Type	MPN/100 gm. LTB	TERG-7	VRBA	EMB	DA
	(Colonies Per Plate)				
		Manufacturers'			
Breading	230	15	0	3	
Batter	0	0	0	1	
Breading	0	0	0	1	
Batter	920	4	0	0	
Breading	0	0	0	0	
Crumbs	0	0	0	0	
Breading	0	0	0	0	
Batter	43	13	0	3	
Bater	0	0	0	0	
Breading	0	0	0	0	
		Retail			
Crumbs	30	3	0	0	0
Breading	91	3	0	0	0
Cracker Meal	0	0	0	0	0
Breading	0	0	0	0	0
Cracker Meal	0	0	0	0	0
Breading	0	0	0	0	0
Breading	0	0	0	0	0
		In-Use			
Crumbs	30	3	0	0	0
Cracker Meal	200	12	6	2	3
Batter	2,500	20	1	6	0
Batter	150	2	0	0	0
Cracker Meal	90	1	0	0	0
Batter	90	8	0	0	0
Breading	250	10	2	6	3

In addition to higher total plate counts, the in-use samples had higher mold and yeast counts as noted in table 2.

The asporogenic pink and orange pigmented yeasts found were probably the ubiquitous Rhodotorula. The molds were predominantly Aspergillus and Penicillium. These yeasts and molds may have sanitary but little public health significance. The greater number of molds found in the in-use samples points up the normally moist condition present in the processing plant--which is favorable to growth mold.

The coliform count, on the other hand, has a greater bearing on the general sanitary as well as health aspects of food processing.

3/DETERMINED BY AIR-OVEN METHOD AS DESCRIBED IN 8TH ED. OF OFFICIAL METHODS OF THE A.O.A.C.
4/BREADING IN WATER SLURRIES DETERMINED BY ELECTROMETRIC METHOD.

Normally, coliform bacteria could have been satisfactorily determined by the most probable number (MPN) procedure alone. However, as we have been interested in obtaining a relatively rapid and economical plate test for coliform density determinations in fishery products, four selective media were employed in addition to replicate lauryl sulphate broth tubes. These four media represent an attempt to obtain a complete picture of the organisms of intestinal origin should they be present in breadings. The data obtained with all coliform media are listed in table 3.

Three manufacturers' samples had gas-positive tubes. Further testing, however, indicated their nonfecal nature. They proved to be type II intermediates. This was also the case with the two retail samples.

Sample 1 of the in-use group, contained a nonfecal contaminant but samples 2-7 proved to be fecal types.

These findings coupled with visual inspection may allow the presumption that such contamination occurs from within the plant.

It may be seen that tergitol-7 agar gave consistently better results than the others. Colonies were present on this agar consistent with the presumptive-positive lauryl sulphate tubes. However, addition of triphenyltetrazolium chloride is necessary in order to distinguish colonies from breading particles. Tergitol-7 contains the indicator brom thymol blue which is yellow below pH 6 and blue above. Both breading and colonies assume these colors according to their particular characteristics. When the tetrazole is added, the coliform colonies are an easily distinguishable dark red.

Because of the dry nature of the breading samples from the three sources they were examined for spore-forming organisms.

Five-milliliter amounts of the original 1:10 dilutions were heated for 20 minutes at 80° C. At that time pour-and-streak plates were made using nutrient agar, blood agar, and Brewers anaerobic agar. The nutrient agar plates were incubated aerobically at 36° C. for 72 hours. Blood agar plates were incubated aerobically and anaerobically (spray method) at 36° C. for 72 hours and the Brewer anaerobic agar by similar procedure.

The aerobic plates showed a range of colonies, 100-1,400 per gram, somewhat similar to the total plate counts of the manufacturer and retail samples.

Anaerobic incubation produced approximately 40 colonies per gram from batter mix. Crumbs and breading were negative. Staining revealed Gram positive rods characteristic of the genus Bacillus. Similarly with aerobic incubation, staining revealed Gram positive rods of the Bacillus type.

When one considers breading manufacture, it is not surprising that the product is low in microbial numbers. After the dough passes from an automatic mixer to stainless steel belts moving through gas-fired ovens maintained at approximately 475° F., it emerges at about 212° F., to be run through a mechanical breaker. It is then fed into bins, that are cooled by filtered air pulverized to size, and automatically bagged and sealed. This is a generalized version of the individual modifications normally practiced. The intense heat destroys the bacteria and the highly sanitary processing operations minimize reinoculation.

SUMMARY AND CONCLUSIONS

1. Samples of breadings from three sources were tested for bacterial density: from the manufacturer directly; from retail stores; and in-use samples from processing plants.

2. Breadings as received from the manufacturer do not appear to harbor large bacterial propulations.

3. Indications are that breadings contribute bacterial contamination to precooked frozen fishery products after the breadings have been contaminated by the handlers during processing.

4. The precooking process destroys, to a great extent, the bacteria which contaminate the breading during processing. The tests on the microbial populations of the retail samples show these populations to be uniformly very low.

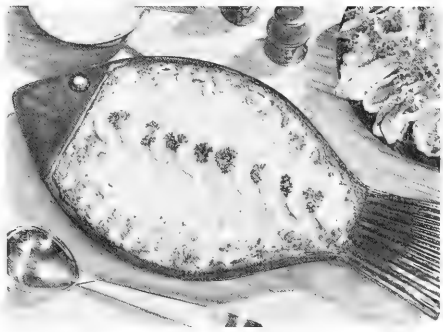
BIBLIOGRAPHY

STRAKA, R. P. AND STOKES, J. L.
1956. MICROBIOLOGICAL HAZARDS OF PRECOOKED FROZEN FOODS. QUICK FROZEN FOODS, VOL. 18, PP. 182-185.

LARKIN, E. P.; LITSKY, W.; AND FULLER, J. F.
1956. INCIDENCE OF FECAL STREPTOCOCCI AND COLIFORM BACTERIA IN FROZEN FISH PRODUCTS. AMERICAN JOURNAL OF PUBLIC HEALTH, VOL. 46, PP. 464-468.

A QUICK CASSEROLE

The busy homemaker will welcome some time-saving meals that will appeal to all members of the family. A good cold-weather meal is a casserole which contains canned Maine sardines, cheese, and cooked potatoes. It is nourishing, palatable, attractive, as well as time-saving.



The Maine sardine is a small silvery fish called the sea herring. It is found in the cool waters off the Northeastern coast of the United States, the bulk of the catch being off the coast of Maine.

Maine sardines are usually packed in vegetable oil. They are also packed in olive oil, mustard sauce, tomato sauce, and several specialty packs. They are excellent sources of proteins and some of the essential vitamins and minerals.

The home economists of the U. S. Bureau of Commercial Fisheries suggest that you serve "Maine Sardines and Potatoes au Gratin," a quick casserole for busy days.

MAINE SARDINES AND POTATOES AU GRATIN

- 2 CANS ($3\frac{1}{4}$ OUNCES EACH) MAINE SARDINES
- 2 TABLESPOONS CHOPPED ONION
- 2 TABLESPOONS BUTTER OR OTHER FAT, MELTED
- 2 TABLESPOONS FLOUR
- $1\frac{1}{2}$ TEASPOONS SALT
- $\frac{1}{4}$ DASH PEPPER
- 2 CUPS MILK
- 1 CUP GRATED CHEESE
- 2 TEASPOONS WORCESTERSHIRE SAUCE
- $1\frac{1}{4}$ QUARTS SLICED COOKED POTATOES

Drain sardines. Reserve 6 sardines for top. Cook onion in butter until tender. Blend in flour and seasonings. Add milk gradually and cook until thick, stirring constantly. Add cheese and Worcestershire sauce. Arrange half of the potatoes, the sardines, and the remaining potatoes, in layers in a well-greased 2-quart casserole. Cover with the cheese sauce. Bake in a moderate oven, 350° F., for 15 minutes. Garnish with the 6 sardines and continue baking for 15 minutes. Serves 6.

ALASKA TRIES REFRIGERATED SEA WATER TECHNIQUE

Paralleling the interest of the Southeast Alaska fishermen in refrigerated sea water systems for holding fish aboard vessels, Alaska equipment distributors are naturally keeping a watchful eye on the development. One enterprising Ketchikan merchant has gone so far as to construct a small demonstration unit. Seine-caught herring serve as samples. A stainless steel washing machine tank wrapped with copper tubing, insulation, a compressor, and a pump for circulation are the essential components of this demonstration equipment for the application of the refrigerated sea water principle for quality maintenance.

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STUDIES ON METHODS OF IMPROVING HANDLING OF SCALLOPS AT SEA

The U. S. Bureau of Commercial Fisheries, the Sea Scallop Industry, and the Massachusetts Divisions of Law Enforcement and Marine Fisheries have united in an effort to increase the "keepability" of sea scallops by the use of proper handling and icing practices aboard the vessel.

Methods of improving the handling of fish aboard the vessel are being studied by the Massachusetts Division of Marine Fisheries under contract with the Bureau of Commercial Fisheries, with funds provided by the Saltonstall-Kennedy Act of 1954. Patrick Walsh, who is presently employed under the terms of this contract, has made trips on several groundfish trawlers operating out of Boston. As a result a number of recommendations for increasing the keeping quality of fish have been made to the vessel owners of that port.

Because of the success of this project in the port of Boston, the scallop industry has requested that Walsh go aboard scallop vessels and advise that industry of the latest handling and icing techniques. He will make trips on several scallop vessels to observe the handling and storing of the fish at sea. Recommendations will then be made to vessel operators in the New Bedford area towards the objective of increasing the quality of the sea scallops landed in Massachusetts ports, thereby enabling the fisherman and vessel owner to obtain the best price for sea scallops.

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USE OF MARINE OILS FOR FATLIQUORING LEATHER

Exhaustive laboratory tests of the feasibility of using fish-body oils in the tanning of skins into leather, followed by analysis of scientific data derived from semi-commercial-scale pilot-plant tests in a tannery, have shown no significant differences between leathers prepared from processes using fish-body oils and those using fish-liver oils. As was expected, in comparison with neetsfoot oil-containing

leather, both forms utilizing fish oils evidence (1) slight yellowing with age and (2) increased firmness. No spew formation (lumpy grease deposits) occurred in any of the test leathers. Both neetsfoot oils and cod-liver oils are normally used in the preparation of leather, the latter to make a firm leather, the former for soft leather. Degree of firmness appears to be a function of saturation of the fatty acids in the oils. These results, if accepted by the tanning industry, promise to open a new domestic market for fish-body oils, such as those derived from menhaden, since fish-liver oils are presently imported from Canada.

As a side issue of these studies, a process to prevent excessive heats of reaction between sulfuric acid and the menhaden oil during the sulfation process was developed. A public service patent is being sought to cover this new and valuable tanning technique. As usual, one of the chief results of research in this case has been to dispel in the tanning industry an unfounded prejudice against use of fish-body oils. It had been claimed that excessive polymerization of the fatty acids in such oils caused excessive firmness of the leather. Comparative tests showed no significant differences in firmness between aged leathers containing imported liver oils or domestic fish-body oils. The conclusions of tannery employees, based on subjective tests, were that the tests were not conclusive but the overwhelming weight of data derived from objective, scientifically controlled tests conclusively demonstrate that, under proper conditions, fish-body oils were successfully used, on a semicommercial scale, in the production of leather.

An article, prepared for a technical journal serving the leather industry, should be published in the near future. No further large-scale work is planned on this project. A concerted effort should now be made by the fish-body oil industry to capitalize on these findings. Processors should initiate cooperative work with the tanners to ensure our domestic oils their proper place in the leather industry.

--BY VICTOR MATTEI AND WILLIAM T. RODDY
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CORRECTION

In the article "Progress on Studies in Utilization of Fish Oil Derivatives in Ore Flotation" which appeared in the January 1958 issue of the Review, the sentence beginning on line 17 of page 19 should read: The work reported above was conducted at room temperature, but a few spot tests were made on iron ore at 50° C. and higher, using 0.5 pound of oleic acid and of the relatively saturated fraction (I.V. = 116) of a menhaden oil bulk fatty acid. . ."

California

CLIPPER TUNA AUCTION SALES, AUGUST 24-DECEMBER 31, 1957: Auctioning of raw frozen tuna landed by member clipper (live-bait) vessels of the American Tuna Boat Association was initiated at San Diego, Calif., on August 24, 1957. This is the first time that raw tuna has been sold by auction in California. Prior to this time catches landed by tuna clippers and others were sold at prices generally negotiated on a seasonal basis. From the first auction on August 24 to December 31, 1957, a total of 22,723 short tons of tuna were sold at 24 auctions. The ATA fleet of 97 vessels participated in these auction sales. Five tuna cannery operators in San Diego and San Pedro each made more than one bid and purchase, and 2 additional canners purchased one trip each.

Ex-vessel prices ranged from a low of $230 a ton for yellowfin, and $190 for skipjack at the first two auctions (August 24 and 28) to a high of $280 a ton for yellowfin and $241 for skipjack tuna. Details on ex-vessel prices and sales at each auction during 1957 are shown in the table.

San Diego Raw Frozen Tuna Auction Sales, August 24-December 31, 1957

Auction Date	No. of Trips	Quantity Yellowfin & Skipjack Tuna	Range of Prices 1/ Yellowfin	Skipjack
		Tons	... ($/Ton) ...	
Aug. 24	40	6,500	230	190
" 28	12	2,000	230	190
Sept. 4	3	500	240-250	200-210
" 11	5	1,000	240-250	200-210
" 18	5	1,544	250-260	210-220
" 25	7	1,165	260-270	220-230
Oct. 2	9	1,662	265-272	225-230
" 9	1	676	270-280	230-240
" 16	4	1,050	260-275	220-241
" 23	1	170	270	230
" 28	5	1,655	260-270	220-240
Nov. 4	2	520	260-270	220-230
" 7	2	450	260-270	220-230
" 13	3	610	260-270	220-230
" 15	1	80	260-270	230
" 18	4	1,100	260-265	220-230
" 27	3	496	255-260	217-230
Dec. 2	3	452	260-270	220-230
" 5	1	220	265-270	225
" 9	6	873	255-270	220-230
" 12	3	-	2/255	2/220
" 16	3	-	2/260	2/220
" 19	2	-	2/255-270	2/215-230
Total	117	22,723	230-280	190-241

1/ INCLUDE DIFFERENTIALS PAID FOR LARGE FISH--AN AVERAGE OF $10 A TON MORE FOR YELLOWFIN TUNA LARGER THAN 12-14 POUNDS AND SKIPJACK TUNA LARGER THAN 7-8 POUNDS.
2/ NO SALES WERE MADE AT THESE PRICES BECAUSE THE BIDS WERE REJECTED BY ATA.

NOTE: SEE COMMERCIAL FISHERIES REVIEW, JANUARY 1958, P. 31.

* * * * *

ESTABLISHING SILVER SALMON RUN IN SACRAMENTO RIVER SHOWS PROMISE: The California Department of Fish and Game announced in a January 24, 1958, press release it is well pleased with the count of 6,420 silver salmon making up the Sacramento River spawning run during the fall of 1957. The experimental planting

of yearling silver salmon to establish natural runs in the Sacramento River was begun in 1956. Except for a stray fish, silver salmon were not native to the River.

The run was made up of 2,240 three-year-old fish returning from the plant of 43,025 yearlings made in the spring of 1956 and 4,180 two-year-olds (mostly precocious males known as grilse or jacks) from the plant of 53,503 yearlings made in the spring of 1957.

A total of 5,460 silvers, or 12.7 percent of the number stocked, has now returned over two seasons from the original plant made in 1956. This number includes only fish passing Fremont Weir, near Sacramento, and does not include a considerable number taken in the ocean and Delta commercial and sport fisheries.

Of 900 silvers entering Battle Creek and taken at Coleman Hatchery, 706 were grilse and 194 three-year-olds.

In Mill Creek, site of the original plants of 1956 and 1957, 1,523 silvers were counted. Of these, 759 were three-year-olds and the other 764 were two-year-old grilse. Most of the silvers spawned high in Mill Creek and will be protected on their downstream migration this spring by new screens about to be installed on two major irrigation diversions.

One more plant, under its present three-year program, will be made in Mill Creek in the spring of 1958. Silvers for the experiment are grown to yearling size at Darrah Springs Hatchery.

The Director of the Department of Fish and Game, while expressing himself as well satisfied with the project thus far, said "It is still much too early to state flatly that we have established a silver salmon run. We can not fully evaluate the results of these experiments for another year. But so far we are hopeful."

* * * * *

OYSTER CULTURE ON LEASED BEDS RULED BY COURT TO BE SIMILAR TO FARMING: In a decision made on December 24, 1957, the Superior Court of California ruled that oyster farming is "agricultural labor." A motion on the part of the State for a new trial was dismissed by the Court. As a result of this decision, the State was ordered to refund $62,249 in employment insurance payments to a California company engaged in the commercial raising of Japanese oysters on leased beds.

* * * * *

OYSTER INDUSTRY REVIVED: Not since the times of Jack London and the oyster pirates of San Francisco Bay has there been such bustling activity in the bays of California. Oysters for stews and for serving raw on the half shell are pouring from the fertile bottoms of Humboldt, Tomales, Drakes, and Morro bays.

The oyster industry had declined for some time after the turn of the century until a recent California Fish and Game Commission-sponsored revision of legislation and regulations made possible the rebirth of what has become a new young giant in the State's fisheries.

Rules and regulations governing this industry were revitalized, assuring a practical inspection and planting schedule with a maximum of efficiency and protection, along with safeguards to the anglers and hunters who also use the tidal bays.

For many years the oysters of the State have been protected from the attacks of the oyster drill.

Although oysters grow rapidly in the warm and nutrient-rich waters of California bays, conditions for producing baby oysters are not suitable and the young seed oysters must be imported.

However, the waters off Japan, Washington State, and the Atlantic Coast have the oyster drill as well as the oyster. When either the young oysters, known as spat, or large oysters are imported from these areas great care must be used to prevent the accidental introduction of drills, which is the reason for California's rigid inspection of all plantings.

So far the vigilance in California has paid off, as the drill problem does not exist to cause loss of producing oysters and bottoms.

FIG. 1 - HEAVY WIRE BASKETS LOADED WITH OYSTERS LANDED FROM THE BOATS.

Production has grown in recent years. In 1948 only 166,000 pounds (in-shell weight) of oysters were harvested. In 1956 6,000,000 pounds were dredged by the rejuvenated industry which is still growing.

FIG. 2 - SHUCKING OYSTERS AT MORRO BAY, CALIF. PLANT.

FIG. 3 - PACKING SHUCKED OYSTER MEATS INTO JARS.

Most of California's oyster harvest comes from Eureka, where 250,000 gal-

lons of shucked oyster meats is the goal, a result of an already-planted 28,000 cases of seed oysters.

Local industry in the Eureka area has felt the effect of the production development, with more than 130 people employed there at full capacity. There are more than 200 employed in the oyster industry as a whole.

Much of the increased yield is due to the foresight of two California oyster firms. These firms invested risk capital, time, and energy to prepare the seed beds, construct plant facilities, and develop the market for the harvest that would be forthcoming several years later. Following their example, other smaller firms entered the picture and the industry's production records now speak for themselves.

One of the two original firms has introduced the hydraulic dredge to California, making possible a take of as much as 2,000 bushels during a tide. Oysters are unloaded mechanically, but are opened by hand. The fresh, frozen, and canned products of California's oyster beds are sold throughout the United States.

Another good indicator of how the industry has grown: income from the production tax increased from $336 in 1955/56 to $1,335 in 1956/57 (fiscal years). Oyster bed rentals netted $722 and $1,071 for the same periods. All costs of inspection are borne by the oyster growers.

It's evident that an early California industry once again is becoming big sea food business, revitalized and all decked out in new techniques. (Abstracted from an article by William Ripley, Assistant Chief, California Marine Fisheries Division, in Outdoor California, December 1957.)

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

Total shipments of metal cans during January-November 1957 amounted to 109,534 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 106,613 tons in January-November 1956. At the end of November principal fish canning operations ended for Maine sardines and salmon. Plants were active in California canning tuna, sardines, mackerel, and anchovies. Some shrimp were canned in the Gulf area, and oyster canning was just getting under way.

Although shipments of metal cans indicate an increase in 1957, the cans were probably shipped on expectations since the actual 1957 canned fish and shellfish packs in most instances were less than in 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.

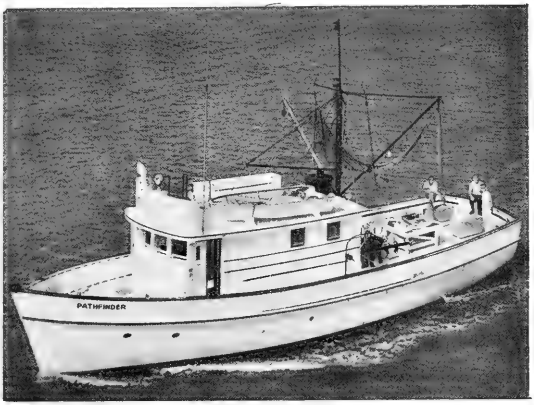
Chesapeake Bay

VIRGINIA-MARYLAND BIOLOGISTS SEEK YOUNG CROAKERS: Young croakers were being sought in Chesapeake Bay by fishery biologists from the Virginia Fisheries Laboratory at Gloucester Point, Va., and the Chesapeake Biological Laboratory, Solomons, Md., early in January 1958. Staff members from both laboratories sampled the fish that live in the Bay in winter with an experimental trawl. The

net was fished at seven-mile intervals from the Virginia Capes up the Bay into Maryland waters and was halted 15 miles above Baltimore by ice.

This cooperative study was made possible through the facilities of the M/V Pathfinder, the new research vessel of the Virginia Fisheries Laboratory. It is the second occasion on which Maryland and Virginia scientists have worked together and they plan to continue the surveys four times each year--winter, spring, summer, and fall.

"The lower part of the Bay is almost devoid of fishes at this time of year," the vessel's Captain reported. "Few fish other than sticklebacks, pipefish, silversides, and anchovies appeared in our trawl, and these were in water 50 to 60 feet deep. In summer, these fish are more abundant in the shallow waters of the Bay and rivers."



VIRGINIA'S FISHERIES RESEARCH VESSEL PATHFINDER.

In the upper part of the Bay, scientists found numbers of small croakers and striped bass. Some bass weighing up to two pounds were tagged to discover their winter wanderings.

Later in January the Pathfinder was used by the Virginia Fisheries Laboratory staff to check the York River for young croakers from its mouth to fresh waters. Information from these cruises, collected and tabulated over a period of several years, will form the basis on which fishery biologists may predict future catches.

Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY DEPARTMENT OF DEFENSE: December 1957: Purchases of fresh and frozen fishery products for the use of the Armed Forces in December 1957 amounted to 1.8 million pounds (value $903,000). They were purchased by the Military Subsistence Market Centers. In quantity that month's purchases were 28.0 percent greater than in November, but were 13.5 percent less than in December 1956. The value of the purchases in December 1957 were 31.6 percent higher than the preceding month and 17.4 percent lower than in December 1956.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers (December and 12 Months 1957 with Comparisons)

QUANTITY					VALUE				
December		Total			December		Total		
1957	1956	1957	1956	1955	1957	1956	1957	1956	1955
(1,000 Lbs.)					($1,000)				
1,756	2,031	23,452	26,610	24,989	903	1,093	12,080	13,413	10,929

Prices paid for fresh and frozen fishery products by the Department of Defense in December 1957 averaged 51.4 cents a pound, practically the same as was paid in November 1957, but 2.4 cents less than the 53.8 cents paid in December 1956.

Year 1957: For the 12 months of 1957 purchases of fresh and frozen fishery products totaled 23.5 million pounds, valued at $12.1 million--10.0 percent lower in quantity and 9.9 percent lower in value than for the 12 months of 1956.

The over-all average price paid for fresh and frozen fishery products in 1957 was 51.5 cents a pound as compared with 50.4 cents in 1956 and 43.7 cents in 1955. As compared with 1956, prices were generally higher in 1957 for all types of fillets and shrimp, for oysters about unchanged, and for sea scallops lower during the latter half of the year. Those fishery products account for a large percentage of the fresh and frozen fishery products purchased for the use of the Armed Forces.

CANNED FISHERY PRODUCTS PURCHASED BY DEPARTMENT OF DEFENSE: December 1957: Tuna was the principal canned fishery product purchased for the use of the Armed Forces during December 1957.

Year 1957: Canned fishery products purchases for the Armed Forces for the 12 months of 1957 amounted to about 6 million pounds, 5.2 percent less than the 6.4 million pounds purchased in 1956, but higher by 3.5 percent than the 5.8 million pounds purchased in 1955.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers (December and 12 Months 1957 with Comparisons)1/

Product	Quantity					Value2/
	December		Total			Dec.
	1957	1956	1957	1956	1955	1957 3/
	(1,000 Lbs.)					$1,000
Tuna	490	3/	2,711	3,334	2,906	240
Salmon	-	3/	3,111	2,798	2,785	-
Sardine	22	3/	215	236	143	7
Total	512		6,037	6,368	5,834	247

1/DATA FOR 1957 ON BASIS OF AWARDS; PRIOR YEARS BASED ON ACTUAL DELIVERIES.
2/VALUE AVAILABLE FOR DECEMBER 1957 ONLY.
3/PURCHASES BY MONTHS PRIOR TO 1957 NOT AVAILABLE.

NOTE: (1) SOME LOCAL PURCHASES ARE NOT INCLUDED. ACTUAL TOTAL PURCHASES ARE HIGHER THAN INCLUDED SINCE IT IS NOT POSSIBLE TO OBTAIN LOCAL PURCHASES.
(2) SEE COMMERCIAL FISHERIES REVIEW, MARCH 1957, P. 17.

Fish and Wildlife Service

ANNUAL REPORT LISTS ACCOMPLISHMENTS: The double task of conducting "business as usual" and undergoing a major reorganization as directed by the Congress is detailed in the report of the United States Fish and Wildlife Service, Department of the Interior, for the year ending June 1957. The report shows that the changeover from the old organization to the new had developed the following:

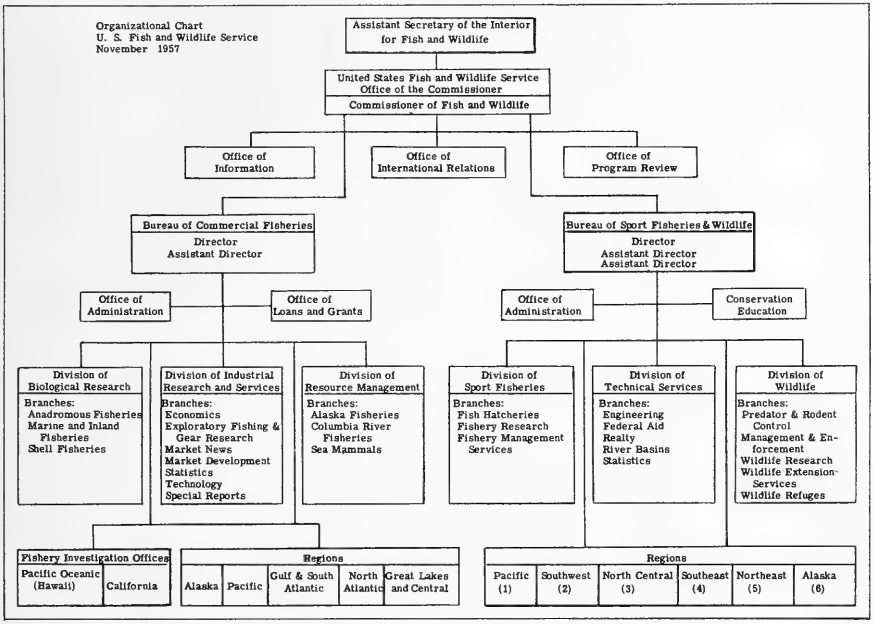
The Bureau of Commercial Fisheries with four divisions--Administration, Biological Research, Industrial Research and Services, and Resource Management, with a field organization of five regional offices and a Pacific Oceanic Fishery Investigations Office; responsible for matters relating to commercial fisheries, whales, seals, and sea lions.

The Bureau of Sport Fisheries and Wildlife with four divisions--Administration, Sport Fisheries, Wildlife, and Technical Services, with a field organization of six regional offices; responsible for matters relating primarily to migratory birds, game management, wildlife refuges, sport fisheries and sea mammals (except whales, seals, and sea-lions).

The Office of the Commissioner with coordinating responsibility; includes the following offices: Information, International Relations, and Program Review. The new Service is under the supervision of a Commissioner of Fish and Wildlife and under the general direction of an Assistant Secretary of the Interior for Fish and Wildlife.

Important developments are reported by both operating bureaus. The Bureau of Commercial Fisheries got its fishery loan program under way and by the end of the fiscal period had applications which totaled more than the $10,000,000 made available by the Congress; announced success in its several years of experimenting to find a selective poison which would kill sea lamprey larvae but not injure larvae of desirable species of fish; reported an increase in the volume and value of the Alas-

ka fishery products in 1956; showed definite proof of the value of the haddock regulations which the Northwest Atlantic Fisheries Commission established in 1953; saw its exploratory work on royal-red shrimp off the South Atlantic Coast become the basis for a commercial shrimp industry, and its exploratory fishing and gear research program become the forerunner for a commercial shrimp industry off the coast of the State of Washington; found a new market for the Alaska cocktail shrimp in Chicago and a market for the Pacific Coast's Dungeness crab in Florida; developed a market in the pet-food industry in the mid-West for the underutilized fish taken from the Great Lakes; reported contracts with 32 of the Nation's leading research centers for fundamental studies which will mean better utilization of fishery products and better customer satisfaction with those products; and reported continued progress in the field of quality standards for fishery progress; refined development projects; devoted considerable study to bird and animal pests and pesticides, on one hand trying to discover ways by which the farmer can get the protection he needs without disaster to fish and wildlife and on the other hand seeking ways to control rodents and birds which are nullifying efforts to reforest parts of the Northwest and Southeast and sections of the country; reported increased cooperation between the states and the Service in waterfowl studies and in mourning dove studies; acquired 14,194 acres of land for wildlife refuge purposes, with an additional 24,000 acres pending; worked with the Air Force on plans for a big fish and game conservation program on Air Force reservations; aided the Navy program to manage renewable resources on all lands under the control of the Navy and Marine Corps; arrested or helped arrest 4,790 persons for violation of State fish and game laws; climaxed a two-year probe by arresting 53 market hunters on the Texas waterfowl



the collection of Market News information; and developed the collection of shrimp statistics in the Gulf of Mexico.

The Bureau of Sport Fisheries and Wildlife declared that waterfowl habitat in some areas was becoming critical because of the conversion of choice marshland to rice fields and orchards and because of the destruction of coastal areas by intercoastal canals and by sulphur and oil prospecting; reported a ten percent increase in hatchery-trout production over the previous year; issued 340 reports on fish and wildlife aspects of proposed water marshes; brought in 1,035 new cases into Federal courts exclusive of Alaska and had 1,186 cases terminated with a total of $60,434 in fines and 1,615 jail days.

The report lists in some detail the various activities of the Bureau of Commercial Fisheries in such categories as exploratory fishing and gear research, technological research, economics, market development, statistics, market news reporting, fishery biological research of various kinds, and management and research on Alaska and Columbia River salmon and Alaska fur-seals.

Alaska: In 1956 products of the Alaska fishing industry, including fur-seal byproducts, totaled 226 million pounds with a wholesale value of $93 million, compared with 186 million valued at $70 million in 1955. There was an increase of nearly 30 million pounds in the salmon production over 1955, with an increase in value of more than $21 million. The scope of the research program was doubled as compared with the year before, with special emphasis on numerous salmon problems. There was also an increase in the harvest of sealskins because of the necessity of bringing the Pribilof Islands seal herd into conformity with the carrying capacity of the islands. A convention for the protection of North Pacific fur seals was concluded on February 9, 1957, with Canada, Japan, and the U. S. S. R.

Salmon Research: Northwest salmon studies--work continued on electrical methods of counting and guiding fish; the use of the electrical fish counters was extended; salmon bearing sonic tags were tracked for as much as eight hours, giving researchers data of value in fishway studies; work continued on the development of better and more economical fishways, the research being done at the fishery-engineering research facility at Bonneville Dam; comprehensive spawning and migration studies were made on the Wenatchee River basin in Washington; the ten-year fingerling migration study at Bonneville Dam ended during the year.

Coastal Fishery Research: The task of estimating the shad run on the Connecticut River continued; the technique for making this annual estimate is based upon research of former years; the estimate is used in determining the number of shad which can be taken from the river without damaging the reproductivity of the resource; studies indicated that shad in the Hudson River continue to respond to the conservation practices and their numbers are approaching original proportions; similar studies indicate that pollution in the Delaware River still prevents the rebuilding of the shad resource in that stream; the research on striped bass continued in the Albermarle Sound and Roanoke River area and in Chesapeake Bay; Atlantic salmon studies continued in the Sheepscot River area.

Shellfish Research: In cooperation with the State of Connecticut, oyster spawning beds were established for study purposes at the mouths of several streams; in cooperation with the Oyster Institute of North America, the Bureau began research on the use of salt water ponds in oyster culture; the effectiveness of oyster rafts in keeping commercial quantities of oysters away from predators came in for attention; other projects utilized radioisotopes in shellfish biological research; control methods on green crabs, predators on soft clams, and drills (predators on oysters) were investigated and success in control was achieved.

Inland Fishery Research: Conducted numerous studies on cultural and nutritional problems; further work was done regarding the vitamin needs of chinook salmon; a general study of Lake Erie fishery resources was conducted during the year; discovered two selective poisons which would destroy sea lamprey larvae without harming desirable species of fish, the discovery following several years of work including the testing of 5,000 chemicals.

Marine Fishery Research: Underwater television proved to be a practical tool for researchers studying the capture, behavior, and escapement of fish through trawl meshes; studies continued on cod, haddock, ocean perch, and halibut; ocean perch were successfully tagged for the first time and returns from the 3,385 tagged fish is already beginning to yield needed information on age, growth, migration, and mortality; migrations of shrimp over a period of several months can finally be studied because identification of test stock can be made by coloration induced by immersion in a dilute solution of riboflavin or feeding food stained with certain dyes; answers to the sudden fluctuations of Pacific sardine stocks are still being sought; numerous tuna studies were made and the Service participated in a comprehensive oceanographic survey of central and western equatorial Pacific by Japan, the United States, and France.

Foreign Activities: The halibut catch taken in conformity with management practices of the Halibut Commission was well above the five-year average; the pink salmon resource of the Fraser River was brought under the jurisdiction of the Sockeye Salmon Commission; joint research of the North Pacific salmon resource continued with the work of Japan, Canada, and the United States correlated by the International North Pacific Fisheries Commission.

Economics: Transportation rates, import problems, a shrimp survey, household preference studies, and a survey of insurance problems were among the studies completed or nearly completed during the year; new projects included research on factors which affect the prices of key fishery products, research on controlled production, and on the interaction of biological and economic forces in the fisheries.

Market Development: Presented 244 fish-cookery demonstrations, engaged in marketing promotional campaigns in cooperation with the industry; produced two industry-financed motion pictures, and issued the monthly Commercial Fisheries Abstracts.

Market News and Statistics: Continued to issue daily Fishery Market News Reports in seven important fish distribution and production centers; published numerous information news items and statistical bulletins including the monthly Commercial Fisheries Review and the annual Fishery Statistics of the United States.

Technological Research: Contracts which have been awarded to 32 of the Nation's leading research centers include improved utilization, quality and standardization and preservation by radiation studies; methods to prevent discoloration of canned tuna were developed; the use of menhaden oil in leather processing was extended.

The activities of the Bureau of Sport Fisheries and Wildlife are detailed under such categories as Federal aid to States, river basin studies, wildlife refuges, game management, inland fisheries, wildlife research and predator and rodent control.

River Basin Studies: Issued 340 reports on proposed water development projects, including 135 sponsored by the Corps of Engineers, 30 by the Bureau of Reclamation, 65 requiring Federal power license, and 102 small watershed projects; reported wildlife management agreements on 11 water-use projects; listed cooperative efforts for the preservation of anadromous fish runs in the Columbia River basin, on the Rogue River, and on several streams on the Atlantic seaboard; recommended against the proposed Wood Canyon Dam in Alaska; continued studies on the effect of the proposed Narragansett Bay hurricane barrier on the fishery resource of that region.

Inland Fisheries: Operated 92 hatcheries and distributed 24 species of trout, salmon, and warm-water fish; proceeded with hatchery construction, stream development, and fishery investigation plan for the Columbia River in cooperation with the States of Washington, Oregon, and Idaho; listed six new hatcheries and one major replacement authorized by Congress; also listed 14 other hatcheries in the course of construction or repair, as authorized by Congress; planted nearly five million catchable-size fish; listed special plantings in two States which had experienced severe fish kills; introduced a Mexican warm water rainbow trout into the Southwest; conducted nutrition and disease studies; reported that Federal pond-fish production was at a high level but could not meet the demand for pond fish induced by the ending of the drouth in many areas; emphasized the need for more trout production created by the cold water reaches in the rivers below large dams.

Fisheries Loan Fund

LOANS TO JANUARY 16 AMOUNT TO ALMOST $5.2 MILLION: Fishery loans granted up to January 16, 1958, amounted to $5,161,434, slightly more than half the $10,000,000 revolving fund provided by the Congress, the Department of the Interior reported January 28. More than $100,000 has been collected in principal and interest. This money is returned to the fund and is available for loans.

Loans have been made on 190 of the 357 applications received. They have been denied on 82 applications totaling $2,101,293. Total requests to date amount to $13,500,088. Applications are still being accepted and processed because some earlier applicants have asked for deferral of their requests.

The U. S. Bureau of Commercial Fisheries administers the fisheries loan fund. This fund was provided by Congress in the Fish and Wildlife Act of August 8, 1956. The money is available for operation, maintenance, replacement, repairs, and equipment of fishing vessels and gear and for research in the basic problems of fisheries. The first applications were received in October 1956.

Great Lakes

PROBLEMS OF CONTROLLING FRESH-WATER FISH POPULATIONS DISCUSSED: Fishery administrators, managers, and research workers from Minnesota, Wisconsin, and Michigan discussed methods of controlling lake fish populations at the January 15-16, 1958 meeting of the Tri-State Fisheries Conference at Higgins Lake, Mich.

Among the more than 100 persons participating in the conference were representatives of the U. S. Fish and Wildlife Service, the Great Lakes Fishery Commission, and the University of Michigan.

Panels representing the participating agencies reviewed the role of both toxic chemicals and predator fish in ridding lakes of unwanted fish species and overcrowding. Reduction of undesirable species and excessive fish populations is a vital part of management programs aiming at better growth of game fish species.

Fishery biologists of the U. S. Fish and Wildlife Service discussed development of a specific toxicant which kills sea lamprey larvae with little damage to other fish. Conference delegates agreed that this development pointed up the need for research aimed at discovery of additional specific toxicants to handle various fishery problems.

A chemical might be developed, for example, which would kill only certain undesirable species. Such a toxicant would be of great value in both lake and stream management. Also desirable is a chemical which would act on the young only--enabling fish workers to reduce excessive populations in a lake without harming larger, adult fish.

With hope that control of the sea lamprey is in sight, conference participants reviewed plans for hatchery production of lake trout to speed the build-up of depleted stocks. Reintroduction of lake trout in the Great Lakes would be attempted as soon as the lamprey problem is solved.

Great Lakes Fishery Investigations

SURVEY OF FISH POPULATIONS IN LAKE ERIE COMPLETED FOR 1957 (M/V Cisco Cruise 10): The survey of fish populations in Lake Erie was completed for 1957 when the final cruise (November 5-19) of the season was made by the U. S. Bureau of Commercial Fisheries research vessel Cisco in the eastern basin of Lake Erie. Fishing operations were hampered considerably by continuous stormy weather.

Bottom trawling was done in 2 areas off Erie, Pa., and one area near Long Point, Ontario. Smelt were the only fish caught in any numbers in the trawls. Practically all the smelt were yearlings; they were taken at the rate of about 1,000 per 15-minute tow off Long Point, but were not nearly so numerous off Erie. They seemed to be equally abundant at all depths trawled, from $3\frac{1}{2}$ to 10 fathoms, off Long Point. Smelt older than yearlings in these areas were not as abundant as they had been during the summer. Other species caught in the bottom trawls included alewife, whitefish, white sucker, spottail shiner, emerald shiner, burbot, trout-perch, white bass, yellow perch, johnny darter, sand darter, sheepshead, slimy muddler, and spoonhead muddler.

A British Columbia midwater trawl was tested just north of Long Point, in cooperation with the Ontario fisheries research organization. Bad weather prevented a search for fish concentrations, but the trawl seemed to spread very well and could be handled fairly efficiently using the Cisco's equipment. Only very small catches were made.

A gang of experimental nylon gill nets (graded mesh sizes $1\frac{1}{2}$- to 4-inch) was set on the bottom in 33 fathoms off Long Point, and nearby another gang ($2\frac{1}{2}$-inch mesh) was set obliquely from top to bottom in 27 fathoms (both gangs were overnight sets). The bottom net caught 62 smelt (57 were yearlings), 2 yellow perch, and 20 lake herring. The 20 lake herring represented the largest catch of this species taken this year. The males appeared ripe, but the females were not.

The oblique net contained 108 yearling smelt, scattered at all depths but most abundant near the bottom--5 adult smelt near the bottom. Three yellow perch, 3 sheepshead, 2 alewives, and 1 lake herring were caught at midlevels.

No thermal stratification remained even in the deepest portion of Lake Erie. Surface water temperatures of the open lake were generally around 10° C. (50° F.),

and were somewhat lower near shore. The maximum recorded was 11.9° C. (53.4° F.) and the minimum 3.3° C. (35.0° F.), the latter temperature recorded near the mouth of the Lynn River at Port Dover, Ontario.

NOTE: FOR THE SCIENTIFIC NAMES OF THE SPECIES MENTIONED SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1957, P. 20.

Groundfish Fillets

UNITED STATES PRODUCTION AND IMPORTS, 1939-57: Since 1954 there has been a steady decline in the United States production of groundfish fillets (cod, haddock, hake, cusk, pollock, and ocean perch) fillets and blocks. On the other hand, United States imports of groundfish fillets and blocks have climbed steadily from 47.3 million pounds in 1949 to a record 141.3 million pounds in 1957.

United States Production and Imports of Groundfish Fillets and Blocks, 1939-1957

Year	U. S. Production	U. S. Imports	Year	U. S. Production	U. S. Imports
	(1,000 Lbs.)			(1,000 Lbs.)	
1957	1/ 95,000	1/141,292	1947	115,507	35,093
1956	2/107,138	2/138,714	1946	126,730	49,260
1955	105,633	130,068	1945	126,372	43,169
1954	122,385	137,548	1944	108,754	24,546
1953	112,280	89,706	1943	87,269	16,323
1952	132,642	107,401	1942	105,420	16,674
1951	148,786	87,639	1941	122,790	9,931
1950	136,572	64,800	1940	91,438	9,740
1949	140,078	47,322	1939	99,456	9,426
1948	137,758	53,964			

1/PRELIMINARY. 2/REVISED.

NOTE: ALSO SEE P. 33 OF THIS ISSUE.

Maine Sardines

CANNED STOCKS, JANUARY 1, 1958: Distributors' stocks of Maine sardines totaled 230,000 actual cases on January 1, 1958, considerably less (117,000 cases or 34 percent) than the 347,000 cases on hand January 1, 1957. Stocks held by distributors on November 1, 1957, amounted to 298,000 cases, and on July 1, 1957, totaled 212,000 cases, according to estimates made by the U. S. Bureau of the Census.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, January 1, 1958, with Comparisons

Type	Unit	1957/58 Season		1956/57 Season				
		1/1/58	11/1/57	7/1/57	6/1/57	4/1/57	1/1/57	11/1/56
Distributors	1,000 Actual Cases	230	298	212	230	295	347	388
Canners . .	1,000 Standard Cases 1/	1,111	1,337	895	416	465	879	1,016

1/100 3¼-OZ. CANS EQUALS ONE STANDARD CASE.

Canners' stocks on January 1, 1958, of 1,111,000 cases (100 3¼-oz. cans) were 232,000 cases or 26.4 percent more than the stocks held on January 1, 1957. But there was a decrease of 226,000 cases (14 percent) between November 1, 1957, and January 1, 1958.

Maryland

OYSTER SET IN 1957 SPOTTY: Each year biologists of Maryland's Cheaspeake Biological Laboratory measure the season's oyster set by two methods. Clean shells in small chicken-wire bags are placed overboard at various points and changed about once a week. The shells are then examined under a microscope and the number of oyster spat that have attached during the period of exposure are counted. The information from this method shows when the young oysters set and also how many would attach to clean shells placed in the water at that time. After all setting has ended in the fall, samples of natural cultch and of shell plantings from bars all over the State are taken up by regular oyster gear and the number of spat per bushel counted. This second method gives the actual addition of young oysters each year on the natural rocks, and the number of young oysters per bushel of shells that have been contributed by the regular shell plantings.

The number of spat observed on fixed cultch after the end of the setting season always is much less than the number found attached to the clean shells that are changed weekly. There are a number of obvious reasons for this. Natural cultch or shells that have been on the beds throughout the season accumulate a multitude of other living creatures such as barnacles, mussels, sea squirts, networks of Bryozoa or tiny "Moss Animals," and many others. Silt or mud also may accumulate in a thick layer over many of the shells. All of these leave much less of the clean shell surface that is needed for attachment of the oyster spat. Also the rapid growth of the other living creatures attached to the shells may crowd out and kill the very young oysters which are less than the size of a fly speck when they first attach. Crowded young oysters may even smother out one another when very thickly set. Certain predators, especially young oyster drills, feed upon and destroy many of the young thin-shelled oysters.

On the test shells exposed in wire bags, the time of setting in 1957 was found to be quite variable. The first spat was found attached about June 1, 1957, near the mouth of the Manokin River. However, the first general period of setting occurred there and in Holland Straits, Hooper Straits, Honga River, Punch Island Bar, and Smith Creek commencing shortly after the middle of June and generally ending during the first week of July. A second wave of setting in these areas occurred during the first half of August, but generally was much less than the early set. In Holland Straits, Hooper Straits, and on Punch Island Creek Bar a third and heavier wave of setting occurred during September and early October. No late setting occurred in the other areas studied except near the mouth of the Patuxent River where a light set occurred in the fall.

Observations of the statewide natural set will not be completed until spring 1958. On the areas thus far examined a very light set of 2 to 16 spat per bushel was found on the head of the Bay bars. From Love Point to Poplar Island the set varied from about 24 to 102 spat per bushel, averaging near 50. On Bay bars above Cove Point along the Western Shore the set was from 0 to 10, near the mouth of the Patuxent 14 to 30, and 4 to 20 in Cedar Point Hollow. Stone Rock and Punch Island Creek Bars on the eastern side of the Bay had counts of 64 and 112, respectively. In the Choptank, sets on natural cultch varied from 0 to 30. The upper Tangier Sound area had sets ranging from 2 to 60 and the lower Sound had mostly no surviving set at all. Natural set in Holland Straits showed 180 spat per bushel. In the Potomac River the set was on most up-river bars with around 20 per bushel from St. Georges to the river mouth. The observations indicate that only the middle Bay along the eastern side has average to slightly above average sets as compared to their past records, while the other areas examined were below their average. Most of the tributaries, where setting usually is higher than in the open Bay, will be examined early in the spring of 1958.

Mollusks

PINK DISCOLORATION OF OYSTERS AND CLAMS STUDIED: The problem of red color in oysters and clams was discussed in January when the Director of the Virginia Fisheries Laboratory, Gloucester Point, met with biologists from other marine Laboratories from New Jersey to South Carolina. Although this strange coloration has been appearing infrequently in oysters for many years, it has been much more troublesome and widespread in freshly-shucked clams in Maryland. Growth of the soft clam fishery to a position of major importance in Maryland has brought this problem to the fore, a January 21 news release from the Virginia Fisheries Laboratory points out.

Scientists believe the color is due to microscopic animals that live in the water. These sometimes become so numerous that they impart a reddish or brownish tint to the water. Some of them carry brilliant crimson pigments which collect in the liver of bivalves. Clams and oysters feed on these and other small organisms, but in cold weather, oysters are less active feeders than clams. A New Jersey biologist has discovered that, through examination of the livers, one may predict whether or not freshly-shucked oysters will exhibit this red coloration.

Oysters may be shucked and packed under the most sanitary conditions and stored under ideal refrigeration, yet the objectionable color may appear after three or four days. Though harmless to man, it makes the product unacceptable to housewives.

In the past two years, outbreaks of red oysters have occurred from New Jersey to Florida. These have usually been of short duration and have occurred in fall or late spring. The Director of the Virginia Fisheries Laboratory stated that "When these tiny colored animals are abundant it is not unreasonable to suppose that oysters filtering water at rates of several gallons an hour would accumulate enough pigment to produce the red liquor we have seen."

The scientists believe these small organisms, called dinoflagellates, do not cause red oysters in winter, since oysters feed seldom, if ever, when the water temperature falls below 50° F. However, there is at least one other cause of pink oysters which has been known for a number of years. This is pink yeast, which infects oysters after they have been shucked. Pink yeast can be eliminated by processing oysters under strictly sanitary conditions.

Packers can avoid serious trouble from reddening caused by dinoflagellates by slicing a sample of fifty oysters and holding them at room temperature. If present, the red color should appear within 24 hours. Packers may learn to "read" the liver of oysters and determine in a very short time whether or not the oysters will turn red after shucking. In this way, they may avoid heavy financial losses by returning the offending load of oysters to a nearby oyster ground until the color disappears.

During periods when red coloration is expected, planters should test samples of oysters from grounds they plan to harvest. If red coloration appears, oysters from these grounds should not be harvested until later samples show they are free of the objectionable color.

North Atlantic Fisheries Investigations

YELLOWTAIL FLOUNDER SAMPLES COLLECTED (M/V T-79 Cruise 20): The fishing grounds about 25-30 miles southwest of No Mans Land Island were sampled for yellowtail flounders during a one-day cruise (January 21, 1958) of the U. S. Bu-

reau of Commercial Fisheries small research vessel T-79. In three drags with a 45-foot head rope otter trawl about 300 yellowtail flounders were caught.

Pacific Oceanic Fishery Investigations

REARING OF TILAPIA FOR LIVE BAIT SHOWS PROMISE: As a result of studies on the part of the Pacific Oceanic Fishery Investigations (POFI) staff on the rearing of tilapia in tanks, a cooperative program was started on the Island of Maui, Hawaii, late in 1957 to provide commercial quantities of this species to the live-bait fishery for skipjack. The major capital investment was provided by a commercial firm, the Territory of Hawaii provided certain services and facilities, and POFI provided supervisory personnel and operating materials. If the program is successful, it should do much to alleviate the chronic bait shortage of the Hawaiian live-bait tuna fishermen. In addition, the success of this program would be a stimulus for others to investigate the possibilities of raising tilapia as a means of easing the bait problem.

Some problems arose concerning the raising of tilapia in POFI rearing tanks late in December 1957. The adult fish showed the effects of an infection caused by an ectoparasite (Trichodina sp.), a ciliated protozoan. This infection was observed among the young tilapia early in November. The production of young tilapia decreased from an average of 200 per female per month from June to September as water temperatures began to drop in October to practically zero in December.

* * * * *

RECOVERIES OF TAGGED SKIPJACK TUNA IN 1957: During 1957 the staff of the Pacific Oceanic Fishery Investigations tagged a total of 8,150 skipjack tuna. By the end of the year 966, or 11.8 percent, tagged skipjack had been recaptured. Although few returns were received during the month of December 1957, one interesting recovery was that of a skipjack that had been tagged twice. This fish, first tagged November 20, 1957, was caught and released again on November 23 with a new tag. On December 6 the fish was caught for a third time by a commercial fisherman.

Rhode Island

EXPANSION OF PIER FACILITIES AT POINT JUDITH PROPOSED: The Governor of Rhode Island has proposed an appropriation of $400,000 to build new piers to accommodate 50 fishing vessels and other facilities at the port of Point Judith. In recent years this port has been growing as a port of landing for fish used in the manufacture of fish meal and oil. The reduction plant now operating in Point Judith plans to build a $200,000 addition and the fishermen's cooperative expects to invest an additional $40,000 in cold-storage space.

South Atlantic Exploratory Fishery Program

TRAWLING SPEEDS TRACKED BY RADAR (M/V George M. Bowers Cruise 11): Radar tracking of commercial shrimp trawlers operating on the Tortugas grounds, for the purpose of allowing accurate determination of trawling speeds, was the objective of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers during Cruise 11 (December 15-22, 1957).

The determination of trawling speed with accuracy of ±0.05 of a knot is one of the several basic requirements in studies by the Service of design and performance of shrimp trawls. Special instruments for more precise determinations of trawling speed than those used on Cruise 11 will be used in future studies. In addition, it is important to determine trawling speeds of commercial vessels from time to time to permit analysis of factors affecting the catches.. A considerable number of observations are needed so that the results may be treated statistically. This work is being greatly facilitated by the cooperation of shrimp vessel operators.

THE SERVICE EXPLORATORY FISHING VESSEL GEORGE M. BOWERS.

Radar tracks were made of the courses of three vessels (55-58 feet) over varying periods of time. On most legs of these tracks, which were plotted at 5- or 10-minute intervals, speeds were later determined to have been between 3.0 and 3.3 knots. The lowest speed observed, for one 10-minute period, was 2.5 knots; the highest, 3.6 knots. All three of these vessels were towing two (40-42 feet) flat trawls (double-trawl rig).

Data on the design, size, power, and fishing gear and catch of these vessels were also obtained. For these latter purposes, an observer was placed aboard the trawlers. Further analyses of the speed data and other information are being made.

Radar tracks of three other trawlers were also made, but the allied data on them was not obtained.

Unfavorable weather forced termination of the cruise on December 21, one day earlier than planned.

South Atlantic and Gulf Fisheries Investigations

FACTORS AFFECTING THE ABUNDANCE OF SHRIMP AND BLUE CRAB STUDIED: Shrimp in the Tortugas area is being sampled by the Marine Laboratory of the University of Miami, under a Saltonstall-Kennedy Act contract with the U. S. Bureau of Commercial Fisheries. Using a chartered vessel, the Marine Laboratory is studying the distribution of shrimp by size, depth, and sex. Results will provide basic knowledge of the distribution, migrations, and growth of pink shrimp on the Tortugas grounds of Key West, Fla. In conjunction with this study, the Bureau of Commercial Fisheries is preparing to conduct large-scale shrimp-marking experiments to determine the rates of growth and mortality and to study the population units in the fishery.

Production of shrimp for bait fell off considerably in Galveston Bay, Tex., during October-December 1957 because of cold weather. Brown shrimp (Penaeus aztecus)

disappeared from the bays, but a small amount of the white shrimp (Penaeus setiferus) remained. Whether this is an abnormal situation or not is not known, as the statistical survey of this fishery has been under way only a few months.

A field station for studying the estuarine phase of shrimp biology has been established at Clear Lake, near Galveston, Tex. Sampling stations for shrimp and associated fauna are being set up. Thermometers recording surface and bottom temperatures set up throughout the lake by the Houston Light and Power Company will provide a continuous record of temperature conditions. A plankton trap has been placed at the entrance of Clear Lake to determine when the first small shrimp enter the estuaries. This investigation of the estuarine life of shrimp will provide basic information on the facets of estuarine life which limit successful shrimp production.

The tagging program of the Bureau for blue crabs has been extended into South Carolina, where considerable commercial crab fishing is done. The crab investigation headquarters at Beaufort, N. C., is investigating causes of fluctuations in the supply of crabs, which cause considerable difficulty to the crab processing industry. Laboratory studies are designed to show the effect of varying water conditions on survival of the young crabs. The tagging program will indicate the extent of migration and the rate of capture by the fishery. These two sources of information together should eventually yield a means of prediction and possible control of fluctuations in abundance.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, SEPTEMBER-DECEMBER 1957: Oyster Research: In order to recheck and confirm observations made on seed oysters for out-of-state shipments, small samples of young oysters from the Ashepoo River as well as the Wadmalaw River were shipped to the Chesapeake Biological Laboratory and to the Virginia Fisheries Laboratory. These oysters will be watched during their life span by biologists at those Laboratories. Will seed oysters from an area of low salinity (Ashepoo River) react differently from those from a high-salinity area (Wadmalaw River) when both are transplanted to an entirely different geographical region?

Fish culturists have been successfully using specific and selective chemicals to control undesirable fish. Preliminary small-scale experiments indicate that at least one commonly-used insecticide can kill certain oyster enemies yet not destroy oysters. After a few more tests, insecticide control of some of the oyster's enemies will be tried on a large scale in one of the acre experimental ponds at Bears Bluff, Progress Report No. 34 (September-December 1957) of the Bears Bluff Laboratories points out.

In July, with funds from the Charleston Scientific and Cultural Educational Foundation, a part of one of the experimental ponds was planted with seed oysters. This planting has thrived and the oysters have now grown to a mean length of 1-7/8 inches, an increase of 3.6 times in length in the 167 days since they were planted. These seed oysters were grown on shell cultch and are somewhat crowded. Seed grown on cement-dipped egg crates, even though they are some 40 days younger, are larger. Many individuals of the more than 3,000 measured are now over two inches long.

Meanwhile the growth and mortality of individual oysters, under study since the summer of 1954, is being continued. These oysters experienced relatively low mortality for the first two years of their life. The most rapid period of growth occurred in the first year, but after the second year growth in the Wadmalaw River area, at least, was extremely slow.

Shrimp Research: Analyses of 82 experimental drags at regular stations indicate that white shrimp (Penaeus setiferus) are much more abundant during this quarter of 1957 than during the corresponding period in 1956. Generally, however, shrimp reached their peak of abundance a month later this year than last. The season's first hard freeze on December 11 and 12 apparently drove small white shrimp out of the shoal river areas into deeper, warmer waters. There was no indication that the freeze actually killed shrimp, except in the experimental ponds at Bears Bluff.

Survey records show also that the catch per unit of effort for all commercial fish taken in the experimental tows was somewhat below that of 1956. Primarily this was due to the reduced number of spot taken this year. Toward the latter part of December, small spot were beginning to appear in large numbers. Apparently spot are entering the catches three weeks to a month later this year than in 1956. Although whiting catches are almost 50 percent higher this year, summer sea trout and croaker are about equal in abundance.

Offshore exploratory fishing during this quarter was confined to two cruises. In October the Laboratory's research vessel T-19 and the U. S. Bureau of Commercial Fisheries exploratory fishing

vessel Combat fished side by side for several days in the 20- to 45-fathom zone. In addition to a normal catch of rock shrimp, spot and croaker were found in large numbers. Over 600 pounds of spot and croaker were taken in one 30-minute drag with the 40-foot experimental net. In November, fishing along the 50-fathom curve east of Charleston gave successful catches of snapper, grouper, and scup (porgy).

On each trip a specimen of the silky shark (Carcharhinus floridanus), seldom reported from South Carolina waters, was taken.

Pond Cultivation: The hard freeze of December 11 and 12 killed spot, winter sea trout, anchovies, and shrimp in the salt-water experimental ponds. The minimum air temperature of 18° F. at Bears Bluff was not as low as at the Charleston weather station, but water temperatures in the ponds dropped to 34° F. killing fish and shrimp, but not oysters.

The crop of one of the experimental ponds weighed out at 145 pounds for a $5\frac{1}{2}$-month growing period--from mid-May to November. Little or no attempt was made to manage this experiment. Predators, competitors, and associates--a natural aggregation--were all allowed to enter the pond. Shrimp (299) were dye-tagged and added to the pond during August. Some 8 percent survived. Altogether 23.3 pounds of shrimp were harvested. Since only a few were stocked, most of the shrimp must have voluntarily entered the pond and survived despite predators. If the fate of the dye-tagged shrimp is a criterion, the potential shrimp recruitment plus growth in a one-acre pond is in excess of 300 pounds. Earlier experimental work at Bears Bluff shows that this potential can be approached but requires careful management.

The two newly-constructed high-land ponds were stocked with shrimp in July and August. In one of the ponds the shrimp were fed chopped grouper steaks three times a week. In the other pond the shrimp were not fed. Neither of these ponds produced a satisfactory crop of shrimp. This may have been due to the "uncured" condition of the ponds which were bulldozed out of a hard yellow clay. It is interesting to note that the shrimp introduced into these ponds rapidly changed color and permanently took on a yellowish cast similar to the substrata. Shrimp in these ponds seemed to have a softer shell than the normal river shrimp. It has been suggested that this was due to a lack of calcium in the pond waters. However, this is difficult to concede since the waters in the pond originally were pumped from a nearby creek, and during the time of the experiment were added to by additional pumpings. Approximately 88 percent of the shrimp stocked in the pond where feeding was carried out did not survive. About 40 percent of the shrimp in the unfed pond survived. This 28 percent difference in mortality rate may not have been due to feeding because a rather catastrophic mortality occurred in the "fed" pond shortly after the pond had been circled by a low-flying crop-dusting airplane.

Saltonstall-Kennedy Act Fisheries Projects

FISHERY PROJECTS FOR 1957: According to a report by the United States Fish and Wildlife Service, activities in behalf of American commercial fisheries during fiscal year 1957 financed with funds provided by the Saltonstall-Kennedy Act of 1954 included studies on many phases of fish production and utilization with special emphasis on:

1. The restoration of the Alaska salmon fishery;

2. New England fishery problems, especially those incident to the longer voyages the fishing fleets must make in search of the product;

3. Derivatives of fish oils which may have industrial uses and might lead to the creation of new industrial products;

4. Development of standards for quality of fishery products;

5. Exploratory and research activities in behalf of the Maine sardine, California sardine, and Alaska herring industries;

6. A search for a better source of seed oysters, better protection against oyster predators, and better methods of handling oysters in the interim from the water to the customer;

7. Explorations of the tuna resources and technological studies on the quality of the canned product;

8. Exploratory and technological work on shrimp;

9. Research on both the Atlantic Ocean and Gulf of Mexico races of menhaden;

10. A program of gear development and improvement;

11. Preservation of fish by radiation;

12. A broad program on marketing which includes education, market development, and market information, and such programs as fishery statistics and economic studies which apply to both production and utilization.

The Saltonstall-Kennedy program is carried out by the Service's Bureau of Commercial Fisheries either by Bureau personnel or on contracts awarded by the Bureau.

The allocation of funds for fiscal 1957 amounted to $6,595,000, some of it on projects which would extend over a period of at least three years. Of this total allocation, $3,394,000 was directed toward fishery biological research, $2,814,000 to-

ward the exploration, development, and utilization of the resource, and $387,000 for administrative expenses.

Biological research funds were distributed as follows: coastal and offshore research $2,073,200; tuna research, $640,000; shell fisheries, $258,000; Pacific oceanic research, $227,800; and inland commercial fisheries, $195,000.

Funds for exploration, development, and utilization of the resource were apportioned as follows: fishery technological studies, $845,700; exploratory fishing and gear research $757,300; commercial fishery statistics, $250,500; economic studies; $242,000; market news activities, $101,000; education and market development, $617,500.

Alaska's fishery, which includes salmon, halibut, herring, king crab, and other species, is the Territory's most important industry. Available data indicate that its fishery products in 1956 were valued at $110,000,000 while its forest products for that year were valued at $34,000,000 and its mineral products at $25,000,000. But despite this, the full potential of its fishery is not being realized. Salmon is by far the most important species of fish caught in Alaskan waters and salmon production is far below what it was 20 years ago.

In 1955 the pack of Alaska salmon was 2,300,000 standard cases, compared with an annual output of 5 and 6 million cases in the 1920's and 1930's. Since Alaska contributes about 10 percent of the total amount of fish caught by American fishermen and about 25 percent of the canned fish produced by American processors, the restoration of the salmon resource is of importance not only to the people of Alaska but to the American consumer.

A total of $786,500 was devoted to the many problems which beset the fishery in Alaska. Most of this went into salmon research as part of the long-time project of learning just why the salmon resource has dwindled, and to develop ways and means of bringing it back. In addition to this another $90,000 was allocated to the major salmon study which is being made under the direction of the International North Pacific Fisheries Commission.

The restoration problem is not merely one of allowing an adequate total amount of escapement from the fishermen's nets or lines, for many streams have continued to decline with more than 50-percent escapement. Salmon have a remarkable homing instinct and to realize the full potential of the spawning grounds there must be adequate escapement for each of the many thousand streams.

The Alaska fishery studies include salmon migration research, effects of predators on salmon stocks, effect of logging upon salmon potentials, development of better methods of counting and recording escapement; analysis of data already accumulated. Herring studies include identification of populations and development of predicting abundance. There is also the question of whether or not herring are indispensable to the stocks of coho and king salmon.

Special research is being done on the king crab which is one of Alaska's choice contributions to the American table. The problem with shrimp, clam, bottom fish, sea scallop, and other potential fisheries in Alaska is that of development. With proper data available fishermen could utilize these resources to make the Alaska fishery more valuable and more stable.

The fact that New Englanders must travel greater distances than formerly and spend more time going to and from fishing grounds has created problems. In seeking solutions the Bureau of Commercial Fisheries has conducted explorations to locate new fishery resources, made freezership economic studies and developed freezership plans to combat time and distance difficulties, tackled the harassing problem of vessel and personal injury insurance costs which take 15 percent of the fisherman's dollar; and conducted numerous biological studies on various species of North Atlantic fish.

For North Atlantic explorations $311,000 was allocated. The work included investigations with conventional otter trawls and experimental midwater gear in an area extending from the Gulf of Maine to Georges Bank to a depth of 400 fathoms; discovery of concentrations of commercial-size scallops off Browns and Georges Banks; discovery of schools of bluefin tuna on the New England continental shelf; significant catches of albacore, bluefin, and yellowfin tuna in Gulf Stream waters from Georges Banks to near Bermuda; herring explorations and gear development programs.

To secure the biological data on North Atlantic trawl fishes--sea scallops, flounder, whiting, ocean perch--the sum of $439,000 was allotted.

Contracts were awarded for comprehensive studies of hull insurance problems and another contract was awarded for the best possible safety program which would prevent injury to the men and at the same time relieve the vessel owner of some of their insurance expense.

Sardine studies were made in widely-separated areas. In the New England area there was $77,000 allotted for exploratory work on the herring of that region; for the study of the California herring $118,700 was provided, and for biological research on the Alaska herring there was $83,900 (already included in Alaska totals).

There was considerable activity on tuna in addition to the work done in the North Atlantic. For a three-year research program in the Pacific Ocean which will be conducted by contract, $640,000 was earmarked. Another $60,000 went to contracts to study how to improve methods of freezing skipjack at sea and on improving the quality of canned tuna. In addition, $227,800 was directed to Pacific Ocean studies which include research on the location of albacore stocks north of Hawaii and additional research on albacore.

There were various studies relating to shellfish. Exploratory work was done on New England sea scallops. There were promising catches of shrimp made in several areas near the Dry Tortugas Islands. Explorations for shrimp are continuing along the continental shelf from Cape Hatteras to Cape Canaveral. Other exploration is being done in deep water in the Gulf of Mexico. Biological studies on shrimp are aimed at answering many

complex questions on spawning seasons, spawning areas, growth rates, distribution, and behavior. This type of information must be available before any valid conservation practices can be inaugurated. For the shrimp biological work there was $130,000; for the exploratory activity, $116,000.

The studies on oysters were many and varied, including such items as why the southern oysters lose liquid, what is the optimum salinity for the development of eggs in the Long Island Sound area, what are the best methods for control of predators, and how can the industry give the consumer the best possible oyster product. In addition the king crab and blue crab came in for study.

Saltonstall-Kennedy funds also aided in the continuing process of developing standards for quality fishery products. Fish stick standards have been operating for more than a year and during fiscal 1957 the first notice of proposed quality standards for frozen raw breaded shrimp was published. Considerable headway was made in the development of standards for frozen fish blocks and frozen fish portions, fried or raw; background data were collected on "green" shrimp, blue crab, and fish fillets for use in standards. There was $277,500 provided for this. Another $208,000 was provided for various studies, including complex chemical research, on new uses of fish oil and the components of fish oil.

There were numerous economic studies. A survey of public eating places showing the number which did not serve fish or shellfish pointed up a problem area to the industry. A national shrimp survey gave the shrimp industry pertinent facts on its production and distribution program. Other studies pertained to potential inland markets, household preferences in fish products, parity prices and income in the fishing industry, marketing margins, the relative position of the fishing industry in the domestic economy, and the demand and price structure.

Market development and educational activities included: development of markets for underutilized fish, test-kitchen recipes and reports, promotion of the use of fish in the school-lunch program, production and distribution of fishery educational motion pictures, promotion of fishery products through radio and television, special market studies, forecasts of fishery production and supply, and publication of various periodicals and reports.

The statistical program included national and regional compilations and publications.

The report, Research and Activities under the Saltonstall-Kennedy Act, Fiscal Year 1957, is available from the Division of Information, United States Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.

Texas

LICENSE FEE FOR DOUBLE-TRAWL RIGGED VESSELS UNCHANGED: In an opinion handed down by the Texas Attorney General's Office late in 1957, the question of whether a shrimp vessel rigged to tow two shrimp trawls is required to pay for two trawl licenses or a singele trawl license was decided. The summary of the opinion states "The Shrimp Trawl License is based on each boat operating or towing a trawl or trawls and not the number of trawls each carries."

United States and Alaska

COMMERCIAL FISHERY CATCH AND CANNED PACK DECLINED IN 1957: The total United States and Alaska commercial fishery catch was 4.8 billion pounds, or 425 million pounds below the record catch of 5.25 billion pounds in 1956. Slightly more than 300 million pounds of the decrease was in the industrial fish category and approximately 125 million pounds was in food fish. The food fish catch was 2.68 billion pounds and the industrial fish catch was 2.12 billion pounds in 1957.

According to late data compiled by the U. S. Bureau of Commercial Fisheries, the decline in the menhaden catch was responsible for most of the 1957 loss in catch. The catch of menhaden, the principal industrial fish, in 1957 was about 400 million pounds below the record catch of 1956.

The declines in the catches of the following food fish were (in millions of pounds): haddock, 19; salmon, 58; Pacific sardines, 29; tuna, 30; ocean perch, 19. These decreases were compensated partly by increases in the catch of other fish. The species with increases and their gains (in millions of pounds) were: industrial fish other than menhaden, 74; whiting, 24; Maine herring, 14; Alaska herring, 7; jack mack-

erel, 11; Pacific mackerel, 5. The big drop in salmon came in the Alaska area where the catch was down 65 million pounds below 1956. The salmon catch in the Pacific Coast States was up 7 million pounds--the Puget Sound pink salmon run, which occurs only in odd-numbered years, was responsible for this gain.

The total shrimp catch, especially in Louisiana, was lower than in the previous year.

The total canned pack of fish used for human food was 31 million pounds less than the 658 million pounds of 1956.

The pack of Alaska salmon, anchovies, Pacific sardines, and Gulf shrimp was considerably lower than in the previous year while the tuna pack was down less than 0.5 percent.

The Alaska salmon pack of 2,458,000 standard cases was close to the record low of 1955 when only 2,385,000 standard cases were canned. The 1957 decrease was the result of a decline in the runs. The 1957 salmon pack in the Pacific Coast States was 742,000 standard cases, compared with 482,000 standard cases in 1956. The odd-year pink run in Puget Sound accounts for the increase.

The total tuna pack was only slightly lower than in 1956 despite the fact that the Pacific Coast output was down 336,000 cases. An increase of 289,000 cases on the East and Gulf coasts and in the territories brought the tuna pack to 11,787,000 standard cases, close to the 1956 figure. Output of Maine sardines--2,117,000 cases--was down 5 percent while the output of California sardines--471,000 cases--dropped 38 percent.

The total Gulf shrimp pack dropped from 905,000 cases in 1956 to 552,000 cases in 1957. This big decline was due to the failure of the small shrimp (used for canning) to make its appearance in its usual habitat in the Louisiana inshore waters.

United States Fishing Fleet[1/] Additions

OCTOBER 1957: During October 1957, a total of 49 vessels of 5 net tons and over were issued first documents as fishing craft--the same number as in October 1956. The Gulf led all other areas with 15 vessels. The South Atlantic was in second place with 13 vessels, followed by the Chesapeake with 11, the Pacific 9, and Alaska 1 vessel.

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

Area	October		Jan.-Oct.		Total
	1957	1956	1957[2/]	1956	1956
	(Number)				
New England	-	1	17	14	15
Middle Atlantic	-	2	21	23	26
Chesapeake	11	22	93	109	138
South Atlantic	13	14	104	106	119
Gulf	15	6	132	89	100
Pacific	9	3	98	71	76
Great Lakes	-	-	5	2	6
Alaska	1	1	47	40	40
Hawaii	-	-	-	1	1
Puerto Rico	-	-	1	-	-
Total	49	49	518	455	521

2/REVISED.
NOTE: VESSELS HAVE BEEN ASSIGNED TO THE VARIOUS SECTIONS ON THE BASIS OF THEIR HOME PORTS.

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

Net Tons	Number
5 to 9	25
10 to 19	4
20 to 29	8
30 to 39	6
40 to 49	4
50 to 59	2
Total	49

1/INCLUDES BOTH COMMERCIAL FISHING AND SPORT FISHING CRAFT.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, NOVEMBER 1957: United States imports of edible fresh, frozen, and processed fish and shellfish in November 1957 were lower by 32.4 percent in quantity and 30.8 percent in value as compared with October 1957. Compared with November 1956, the imports for November 1957 were up 9.0 percent in quantity and 10.3 percent in value. Imports in November 1957 were much lower than in the preceding month for groundfish and other fillets, dressed and canned salmon, shrimp, tuna in brine, and raw tuna. A rather sharp increase in the imports of fillets and blocks usually follows the month after the beginning of a quarterly quota period. Imports of edible fishery products in November 1957 as compared with November 1956 were higher for shrimp, groundfish and other fillets, and frozen raw tuna.

Table 1 - United States Foreign Trade in Edible Fishery Products, November 1957 with Comparisons

Item	Quantity			Value		
	November		Year	November		Year
	1957	1956	1956	1957	1956	1956
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish:						
Fresh, frozen & processed 1/	62.5	57.3	786.5	18.2	16.5	231.6
Exports:						
Fish & shellfish:						
Processed 1/ only (excluding fresh and frozen)	4.5	9.1	82.8	1.0	2.3	19.2

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

Imports for November 1957 averaged 29.1 cents a pound as compared with 28.8 cents a pound for the same month of 1956.

Exports of processed fish and shellfish in November 1957 were higher by 7.1 percent in quantity, but were down 23.1 percent in value as compared with the previous month. Compared with November 1956, the exports for November 1957 were lower by 50.5 percent in quantity and 56.5 percent in value. The sharp decrease in both quantity and value in November 1957 as compared with November 1956 was due primarily to lack of canned California sardines for export. In November 1956 sardine exports amounted to almost 4.5 million pounds, as compared with about 1.7 million pounds in November 1957.

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United States Imports of Groundfish (Including Ocean Perch) Fillets and Blocks

Country of Origin	1/1957	1/1956
	(1,000 Lbs.)	
Canada	108,308	99,810
Iceland	22,392	27,178
Sweden	-	6
Norway	4,594	4,124
Denmark	3,151	3,010
United Kingdom	77	-
Netherlands	564	480
France	190	919
West Germany	1,240	2,036
Greenland	532	811
Miquelon & St. Pierre	244	321
Union of South Africa	-	19
Total	141,292	138,714

1/REVISED IN ACCORDANCE WITH LATEST DATA AVAILABLE. NOTE: THE QUOTA OF GROUNDFISH (INCLUDING OCEAN PERCH) FILLETS AND BLOCKS PERMITTED TO ENTER THE UNITED STATES AT 1½ CENTS PER POUND IN 1957 WAS 37,375,636 POUNDS--DIVIDED SO THAT 9,343,909 POUNDS ENTERED AT THAT RATE OF DUTY EACH QUARTER. THE 1956 QUOTA WAS 35,196,575 POUNDS. IMPORTS, DURING INDIVIDUAL QUARTERS IN EXCESS OF THE ESTABLISHED QUARTERLY QUOTA ENTER AT A DUTY OF 2.5 CENTS A POUND. (ALSO SEE COMMERCIAL FISHERIES REVIEW, MARCH 1957, P. 57.)

GROUNDFISH FILLET IMPORTS: Year 1957: Preliminary data indicate that 1957 imports of groundfish (including ocean perch) fillets and blocks into the United States reached the record total of 141.3 million pounds--an increase of 2.6 million pounds (2 percent) over 1956. Imports from Iceland and West Germany were down significantly. Canada led all other countries with 108.3 million pounds, or 77 percent of the total, followed by Iceland with 22.4 million pounds, or 16 percent.

December 1957: During December 1957, a total of 7.0 million pounds of groundfish (cod, haddock, hake, cusk, pollock, and ocean perch) fillets and blocks were imported into the United States. Compared with December 1956, this was a gain of 2.7 million pounds (62 percent)--due primarily to more imports from Iceland (up 1.8 million pounds) and Canada (up 656,000 pounds). These two countries

accounted for 93 percent of the December 1957 total. The remaining 7 percent was imported from Greenland, Denmark, France, Norway, West Germany, and the Netherlands.

NOTE: SEE CHART 7 IN THIS ISSUE.

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IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA PROVISO FOR 1957: The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1957 at the 12½ 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-December 31, 1957, amounted to 42,513,788 pounds, according to data compiled by the Bureau of the Customs. A total of 2,014,745 pounds of the quota, which could have been imported at the 12½-percent rate of duty during 1957, was not utilized.

The new quota for 1958 has not been announced yet, but from January 1-January 4, 1958, 130,353 pounds of canned tuna in brine was imported into the United States.

* * * * *

IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY-NOVEMBER 1957: Imports of most major fishery products January-November 1957 were significantly higher as compared with the first 11 months of 1956. Groundfish and ocean perch fillets and fish blocks increased 2 percent; frozen tuna, 17 percent; canned tuna in oil and brine, 10 percent; canned bonito in oil and brine, 20 percent; canned sardines in oil and not in oil, 28 percent; fresh or frozen lobster, 6 percent; and canned crabmeat, 9 percent. Canned salmon imports were 11 percent less than the January-November 1956; shrimp imports were about equal; and fish meal imports were 14 percent less.

Exports of principal fishery products during the first 11 months of 1957 were less than in the 1956 period except for canned salmon and mackerel. Canned sardine (not in oil) exports were down 65 percent; and fish oil dropped 17 percent. Exports of canned mackerel were substantially larger than in the 11 months of 1956. Canned salmon exports gained by 37 percent over the 1956 period.

Imports: GROUNDFISH: During the first 11 months of 1957, imports of groundfish and ocean perch fillets and blocks totaled 133.3 million pounds or nearly 2 percent more than in the comparable period of 1956. Blocks and slabs were up 27 percent, but ocean perch fillets were down 25 percent. Cod fillet imports were up 2 percent. About 75 percent of the fish fillets and blocks were received from Canada, an increase over the proportion imported from Canada during the first 11 months of 1956. Imports from Iceland comprised 16 percent of the total, a slight decline in their share of the fillet and block imports.

FROZEN TUNA: Imports of frozen albacore amounted to 61.5 million pounds during the first 11 months of 1957, 75 percent more than in the same 1956 period. Imports of tuna other than albacore were 68.8 million pounds, 9 percent less than in the 1956 period. Imports of tuna other than albacore from Peru were up 33 percent, but those from Japan were down 20 percent.

CANNED TUNA: Canned tuna imports totaled 39.6 million pounds through November 1957, an increase of 10 percent. About 986,000 pounds of this quantity were tuna canned in oil. Approximately 94 percent of the canned tuna was imported from Japan.

CANNED BONITO: Canned bonito imports, mostly from Peru, totaled 14.7 million pounds January-November 1957, an increase of 20 percent over the same 1956 period.

CANNED SALMON: Canned salmon imports during the first 11 months of 1957 were 23.5 million pounds, 11 percent less than in the same period in 1956. The decrease was all in the amount received from Canada.

CANNED SARDINES: Imports of canned sardines January through November 1957 of 22.5 million pounds were 28 percent more than in the comparable period in 1956.

SWORDFISH: Imports of fresh or frozen swordfish totaled 17.7 million pounds during the first 11 months of 1957, about 2 percent less than for the comparable 1956 period.

SHRIMP: Fresh and frozen shrimp imports for the first 11 months of 1957 (62.9 million pounds) showed little change from the similar period of 1956. The quantity imported from the principal supplier, Mexico, was about 13 percent less.

FRESH AND FROZEN LOBSTER: Imports of fresh and frozen lobster and spiny lobster from January-November 1957 were 45.2 million pounds, 6 percent more than in the previous year.

CANNED CRABMEAT: Imports during the first 11 months of 1957 were 5.9 million pounds, a gain of 9 percent as compared with the same period in 1956. Canned crabmeat came almost entirely from Japan.

FISH MEAL: Fish meal imports January-November 1957 of 74,929 tons were 14 percent less than in the comparable period of 1956. Imports from Canada and Norway were less, but those from Peru and Angola increased.

Exports: CANNED SARDINES: During the first 11 months of 1957, canned sardine (not in oil) exports were 65 percent less than in the 1956 period. Exports of canned sardines to the Philippine Republic totaled 4.7 million pounds during the first 11 months of 1957 as compared to 25.2 million pounds in the same period of 1956.

CANNED MACKEREL: Canned mackerel exports during the first 11 months of 1957 were 15.9 million pounds, mostly to the Philippines. The entire 1956 export was only 2.4 million pounds.

CANNED SALMON: Canned salmon exports were 6.5 million pounds during the 11 months of 1957, an increase of 37 percent over the same period in 1956. Most of the increase went to the United Kingdom, the principal country of destination.

FISH OILS: Fish oil exports January-November 1957 were 108.5 million pounds, or 17 percent less than the 1956 period. The decrease was mostly due to smaller shipments to the Netherlands and West Germany.

Vessel Safety

NEW YORK FIRM GETS CONTRACT FOR FISHING SAFETY STUDY: A $25,000 contract for the development of a vessel safety program for the New England fisheries has been awarded to Ebasco Services of New York City, it was announced January 27 by the Department of the Interior.

The study has the double purpose of providing better safety conditions for the men of the fishing fleet and for the reduction of personal injury insurance costs. It is part of a broad study of the New England fishing fleet insurance problems. The contract was awarded by the Bureau of Commercial Fisheries, United States Fish and Wildlife Service.

Hull and personal injury insurance costs constitute one of the important items of expense in the New England fisheries. A study of hull insurance problems recently has been completed.

The safety study is to be completed in a year. When the program is completed, the Bureau of Commercial Fisheries will submit it to the segments of the fishing industry concerned for their consideration and voluntary action.

Ebasco Services is a firm of engineering consultants with a division which specializes in insurance and safety studies.

Virginia

LEASED OYSTER GROUNDS MORE PRODUCTIVE: For every bushel of oysters produced on natural rocks in Virginia, five bushels are produced on leased grounds. A January 15, 1958, report by the Virginia Fisheries Laboratory at Gloucester Point indicated that less than 1 million bushels of market oysters were tonged from public rocks in 1955, while more than 4 million bushels were dredged and tonged from leased grounds.

Prior to the Civil War some planters began to move oysters from thick crowded beds into open grounds where they grew rapidly and yielded high profits. About 27,000 acres were being cultivated by 1900 and within five years the leased acreage increased rapidly to about 50,000. The period 1905 to 1945 saw a gradual increase in leased bottom up to about 70,000 acres. A phenomenal increase in rented oyster grounds began in 1945. This may have been induced in part by profits made during World War II. The Virginia Commission of Fisheries has encouraged both large and small planters to take up and cultivate suitable bottoms for oyster production. At present the State rents more than 128,000 acres to Virginia planters. By contrast, the smaller yield from public rocks comes from more than 200,000 acres of natural rocks.

The oyster industry of the State will probably depend more and more on production from cultivated grounds unless more money is appropriated for management of public rocks. The key to improvement lies in shell planting and seeding. According to oyster biologists at the Virginia Fisheries Laboratory many public rocks do not receive a consistent set of oyster spat from year to year and, therefore, cannot maintain production at a high level. While private grounds have increased on a large scale, areas producing seed oysters have not been extended proportionally. Parts of the Corrotoman and Piankatank Rivers could be developed for raising seed, and some private oystermen may produce seed on their grounds.

Shell planting by the Virginia Commission of Fisheries has more than doubled in the past ten years, but at the present rate it would take 73 years to put 200 bushels of shells on each acre of the public grounds. Even if shells were planted only on grounds which would respond well to such treatment (and many acres of public grounds cannot be made productive through shell planting), it would take several decades to plant the minimum number of shells required.

Virginia's oyster industry has remained fairly constant in recent years except for the gradual increase in production from leased grounds, the Virginia Commission of Fisheries reports. The Commission points out that the acreage of leased grounds has not increased in the past two years, for while new acreage has been leased, other loans have been abandoned due to storm damage rendering the ground unfit for continued planting of oysters.

The demand for seed oysters has continued good and the Commissioner has refused to issue permits for out-of-state shipments of seed oysters wherever there has been a demand therefor by Virginia oyster planters. This policy conforms to the statue laws of Virginia. The James River beds continue to produce about 2,000,000 bushels of seed oysters yearly.

Virginia now has 128,217 acres under lease as compared to 26,846 acres in 1900. More oyster

ground is under cultivation than in any other state. The Commission believes that the oyster industry has largely recovered from the severe damage wrought by hurricanes in the fall of 1954 and the summer of 1955.

One of the greatest wonders of the seafood industry is the continued high production of the James River seed beds. The success of spawning, setting, and survival of spat varies, but in the history of the fishery there never has been a failure. This is particularly surprising in face of the large variations in abundance that affect most of the other seafoods in Chesapeake Bay.

The most convenient source of seed outside the James River is an extensive area along the seaside of the Eastern Shore where setting is prolific. Most oystermen are aware that this seed does not survive well when it is transplanted to the Bay, but this information has been obtained by trial and error, and costly experiments undoubtedly will be tried again if the need for seed becomes urgent. Controlled experiments at the Virginia Fisheries Laboratory have confirmed the high mortality rate of seaside seed and have revealed the reasons. The heavy deaths are caused by the fungus Dermocystidium, which is prevalent in the Bay, but almost entirely absent from the James River seed beds and the seaside area. James River seed is resistant to infection, and the death rate from fungus is not unduly heavy. Seaside oysters, on the other hand, have little resistance to the fungus, and by the end of the second summer deaths have been so heavy that only a small fraction of the original oysters remain. Unless the prevalence of fungus in the Bay becomes substantially and permanently reduced, the planting of seaside seed is not recommended.

Another source of seed for Chesapeake Bay is the south Atlantic coast, where in many areas underexploited heavy sets of oysters occur regularly. One such source is the coastal waters of South Carolina. Considerable information has been obtained on the survival and growth of this seed in local waters by growing South Carolina spat to market size in trays suspended from the Laboratory pier. Growth is rapid and quite satisfactory at first, but lags behind the growth of local oysters after about two years. Survival, on the other hand, is much better in summer, for these oysters are highly resistant to infection with Dermocystidium. In winter, however, the survival rate is poor, and in cold winters the death rate may be heavy. Yields in terms of bushels of market-size oysters per original bushel of seed seem to be somewhat lower than for local seed, but South Carolina seed is probably superior to seed from the seaside of the Eastern Shore for planting in Chesapeake Bay. It is believed that under normal conditions local seed is best for local planting, but if additional supplies are needed, experiments on a commercial scale with South Carolina seed might be profitable if economic conditions and that State's export regulations are favorable.

* * * * *

REPRODUCTIVE RATE OF OYSTER DRILLS LOWER IN 1957: Reproductive activity of oyster drills slumped amazingly during the summer of 1957, according to a January 29, 1958, news release from biologists of the Virginia Fisheries Laboratory. Oyster drills or screwborers have plagued the oyster industry for years. These small snails, with file-like tongues, drill holes through the thin shells of baby oysters and devour them. So destructive are they on the Eastern Shore of Virginia that the State pays a bounty to have the pests removed from public oyster grounds; $14,856 was spent for collected drills during the year ending June 1957.

Biologists are patiently gathering information about drills. In the summer of 1957, the biologists discovered that neither of the two kinds of drills living in eelgrass beds in front of the Laboratory were laying as many eggs as they had during the previous summer. Whereas 330 young had been produced in each square yard of bottom sampled in 1956, only 41 were produced in 1957. Had the scientists reduced the breeding population by collecting so many drills? About 80,000 had been removed from the area during the past several years.

Scientists try to watch for changing conditions that may explain the results of their experiments. The biologists had just commenced work in another area down river similar to the bottom where they had been trapping oyster drills in 1956. Although the new plot, never disturbed before, had three times as many large drills on it as the first plot fished in 1956, it, too, produced only 42 baby drills per square yard last summer. Evidently some widespread calamity had befallen these oyster-eaters, drastically reducing their reproductive rate. What was the cause?

"Actually the cause is unknown," the biologist stated. "Future investigations will measure variations in spawning success from year to year and will be planned to reveal the reasons. Eventually, we hope, this knowledge will be used to control these pests, which destroy millions of bushels of oysters every year."

Wholesale Prices, January 1958

During January 1958 the edible fish and shellfish (fresh, frozen, and canned) wholesale price index (122.1 percent of the 1947-49 average) declined 4.6 percent as compared with December 1957, but was up less than one percent as compared with January 1957. Lower wholesale prices for fresh drawn haddock and haddock fillets at Boston and drawn lake trout at Chicago were responsible for the drop in the index from December 1957 to January 1958.

Wholesale prices for fresh and frozen drawn, dressed, and whole finfish from December 1957 to January 1958 dropped 10.4 percent due principally to a 26.2 percent decline in fresh drawn haddock prices at Boston and a decline of 15.4 percent in fresh lake trout prices at Chicago. Prices for frozen western halibut and king salmon increased slightly. In January 1958 the wholesale price index for this subgroup was 3.7 percent below the same month in 1957 because of lower prices for all the subgroup items, except fresh drawn haddock (up 6.1 percent) and drawn whitefish (unchanged).

Fresh processed fish and shellfish prices in January 1958 were lower by 2.7 percent as compared with the preceding month. Lower wholesale prices for fresh haddock fillets (down 16.6 percent) reflected the decline in ex-vessel prices for drawn haddock at Boston. Due to more plentiful supplies of shucked oysters this season as compared to last, wholesale prices showed signs of weakness with a decline of 2.1 percent from December 1957 to January 1958. Prices for fresh 26-30 count headless shrimp remained high and unchanged from

CHUNKS OF FRESH CANADIAN SWORDFISH ON DISPLAY AT FULTON FISH MARKET, N.Y.C.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1958 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices1/ ($)		Indexes (1947-49=100)			
			Jan. 1958	Dec. 1957	Jan. 1958	Dec. 1957	Nov. 1957	Jan. 1957
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					122.1	126.6	121.2	121.8
Fresh & Frozen Fishery Products:					137.4	144.8	136.1	136.2
Drawn, Dressed, or Whole Finfish:					129.2	144.2	130.8	134.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.15	.20	152.3	206.5	142.4	143.6
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.31	.31	96.4	96.9	96.4	108.3
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.62	.61	138.8	136.0	143.8	143.8
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.59	.59	146.3	146.3	142.5	146.3
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.64	.64	128.4	128.4	156.7	141.5
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.54	.64	110.6	131.1	151.6	116.8
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.48	.48	111.4	111.4	114.9	140.7
Processed, Fresh (Fish & Shellfish):					143.8	147.8	142.2	140.3
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.48	.58	163.3	195.7	158.2	158.2
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.89	.89	140.6	140.6	138.3	128.8
Oysters, shucked, standards	Norfolk	gal.	5.88	6.00	145.4	148.5	145.4	151.6
Processed, Frozen (Fish & Shellfish):					131.2	129.7	125.1	122.7
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	103.4	103.4	100.8	103.4
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.38	.38	117.7	117.7	103.6	94.2
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.20	.29	114.3	114.8	110.8	114.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.85	.84	131.6	128.8	130.0	130.0
Canned Fishery Products:					100.5	100.8	100.0	101.5
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.	11.35	11.50	81.8	82.9	82.9	80.8
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	9.75	9.60	113.8	112.0	100.4	105.0
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans cs.	New York	cs.	6.38	6.35	67.9	67.6	68.6	84.6

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.

December 1957. Compared with January 1957, the index for this subgroup in January 1958 was up 2.5 percent because of a 3.2-percent increase in fresh haddock fillet prices and a 9.2-percent rise in fresh shrimp prices; but oyster prices were down 4.1 percent.

Frozen processed fish and shellfish prices increased slightly (1.1 percent) from December 1957 to January 1958 due to an increase of one cent a pound for frozen 26-30 count shrimp at Chicago. Frozen fillet prices were firm and unchanged during the period. From January 1957 to January this year the frozen processed subgroup index was up 6.9 percent, principally because of an increase of about 25 percent in frozen haddock fillet prices and a slight rise of 1.1 percent in frozen shrimp prices.

The canned fishery products subgroup index in January this year was about unchanged (down 0.3 percent) from December 1957 and was down 1.0 percent from January last year. This January canned Maine sardines (up 0.4 percent) showed the first signs of recovery from the unprofitable price that marked the first sales of the 1957 pack, and further changes upward were expected due to a more healthy inventory situation. Wholesale prices for canned Maine sardines this January were still 19.7 percent below January a year ago. Canned tuna prices dropped by about 15 cents a case from December 1957 to January 1958, but were up 1.2 percent from January a year ago. Supplies of canned California sardines (one pound ovals) were about exhausted by the middle of January this year and prices rose.

SEA SCALLOP DREDGE

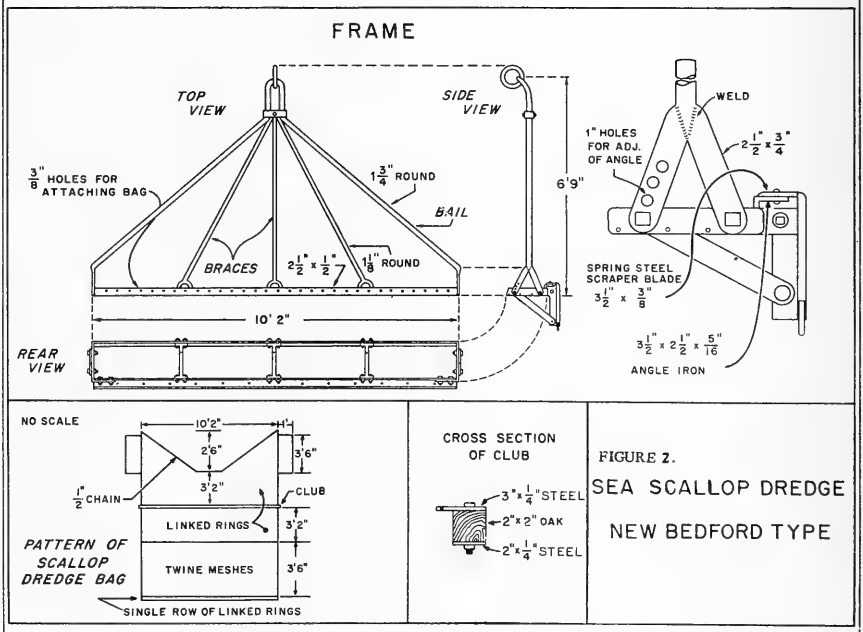

FIGURE 2.

SEA SCALLOP DREDGE

NEW BEDFORD TYPE

Details of construction of a typical offshore sea scallop dredge.

--Fishery Leaflet 442, Sea Scallop Boats and Gear, August 1957.

International

FOOD AND AGRICULTURE ORGANIZATION

FISHING GEAR EXPERTS STUDY ITALIAN TRAWL NET: Studies and experiments aimed at improving the Italian trawl net, which is widely used throughout the Mediterranean, are under way by fishing-gear experts of the Food and Agriculture Organization (FAO), Rome, Italy, in cooperation with scientists of the Sea Fisheries Research Station, Haifa, Israel.

The investigations into the design, construction, behavior under water, and efficiency of the net started on December 30, 1957, and continued throughout the greater part of January. FAO experts (Dr. J. Schärfe, fisheries gear technologist, and Norio Fujinama, naval architect, both of the Technology Branch, Fisheries Division) have gone to Haifa to carry out the investigations in cooperation with the Israeli experts.

This is the second step in the investigations of the trawl net, which were initiated by FAO and the Israelis in 1956. The first studies were carried out by FAO experts in collaboration and with the assistance of the Italian Government at Anzio, Italy, in 1956.

"We have a rather full program involving mainly the use of recording instruments for measuring dimensions and shape of the gear when fishing and the forces acting upon it. On the basis of this investigation we hope to be able to recommend improvements to the design of the net," declared Dr. Schärfe, before leaving FAO headquarters for Haifa.

"The Italian trawl net is widely used in the Mediterranean," he added. "It is of a design based on long, practical experience but, with modern methods of gear research it may be possible to introduce some changes which will add to the efficiency of this type of trawl as a fish catching instrument."

The investigations are of special interest to the member countries of the General Fisheries Council for the Mediterranean, whose fishermen all use the Italian trawl to some extent. Most of these countries are paying a good deal of attention to ways and means of developing their fisheries. An improvement in the catching effectiveness of the Italian trawl would be of immediate practical value to all of them.

The FAO naval architect, who will assist Dr. Schärfe, will also record data on the behavior of the vessel being used in the investigations. The angles of roll and pitch and other information of interest to naval architects will be recorded.

INTER-AMERICAN TROPICAL TUNA COMMISSION

TUNA SCHOOLING HABITS: Previous analysis of seiner logbook data by the Inter-American Tropical Tuna Commission has indicated that at least 80 percent, and in some years over 90 percent, of the United States Pacific catch of yellowfin and skipjack is from pure schools. A similar study of the bait-vessel logbooks has

not been possible, because the daily catches of each species are given without a breakdown as to the catch per school. However, as a continuing program, scientists of the Commission have been recording this information on all tagging cruises since early 1956.

Although the bait-vessel coverage is still small, it appears that about 65 percent of the catch is taken from pure schools. The greatest percentage of pure schools is found in the northern and southern Pacific areas, with a tendency toward greater mixing in the central regions of the fishery. This geographical variation is also evident in the schools encountered by the seine vessels, the November-December 1957 "Bimonthly Progress Report" of the Commission points out.

TAGGING OF TUNAS: The Commission's Tagging Cruise No. 16 returned to San Diego on December 11 after releasing 401 tagged yellowfin tuna and 585 tagged skipjack tuna in an area between Asunción Island and the lower tip of Baja California. Tagging Cruises No. 15 and No. 17 were reported fishing off northern Chile during December and had not returned to San Diego at the end of 1957. Four tagging cruises were made from the Commission's laboratory in northern Peru during the period, with 272 yellowfin tuna and 606 skipjack tagged on the first three trips. Results of the fourth trip were not available at the end of 1957.

Many tags were returned during the period from the Baja California area and from the area off Chimbote, Peru. Returns from the experiment with the automatic pliers have been most encouraging, especially for skipjack tagging, as may be seen from the tabulation of recoveries from comparable groups of fish tagged by the new and old methods.

The excellent return of skipjack tagged with the automatic pliers suggests a large reduction of the tagging mortality with an increase in tagging speed. Apparently no such change in tagging mortality results from the increase in tagging speed in yellowfin tuna.

Table 1 - Tagged Tuna Recoveries by Method of Tagging

Method	Yellowfin		Skipjack	
	Recovered	Tagged	Recovered	Tagged
Automatic staples ..	9	315	47	455
Hand-clamped	10	258	8	451

During November, one yellowfin tuna which was tagged in February at 15°57' N. 101°42' W. was caught at San Benedicto Island about 600 miles to the northwest. A skipjack tagged in June off Chimbote, Peru, was recovered in December 1957 off Cape Pasado, Ecuador, some 600 miles to the north. Many of the tag returns from the local grounds indicated a southward movement, to the Cape Tosco area during the fall, of fish tagged off Asuncion Island during the summer and early fall.

WHALING

SPERM WHALE CATCH IN ANTARCTIC FOR 1957/58 SEASON EXCELLENT: The world catch of Antarctic sperm whales during the 1957/58 season was excellent. The estimated 39,000 long tons of oil yielded was an increase of 5,000 long tons over the 1956/57 season, according to the International Association of Whaling Companies, Sandefjord, Norway. The total Norwegian oil production was about 15,000 long tons, almost 40 percent of the world results, and an increase of about 24 percent over 1956/57. While a few more sperm whales may be caught during the current major Antarctic whaling season, the Association does not expect significant changes in the above figures, the United States Embassy in Oslo reported on January 17, 1958.

Australia

EXPORTS OF SPINY LOBSTERS VALUED AT OVER US$5 MILLION IN 1956/57: Exports of frozen raw spiny lobster tails and cooked whole spiny lobsters by Australia in fiscal year 1956/57 (July 1, 1956-June 30, 1957) were valued at more than US$5.1 million and in value exceeded fiscal year 1955/56 exports by almost 20 percent. The quantity of spiny lobster exports also set a new record of 4,950,731 pounds. This total exceeded that for previous fiscal year by 244,790 pounds. Exports of spiny lobster tails amounted to 4,629,348 pounds or about 2 percent less than the record year of 1954/55, but the exports of whole cooked spiny lobsters set a new record of 321,383 pounds. The tremendous increase in Australia's export trade in spiny lobsters is illustrated by the steady increase in the value from about $1.0 million in 1948/49 to over $5.0 million in 1956/57.

Table 1 - Australia's Exports of Frozen Raw Tails and Cooked Whole Spiny Lobsters, 1955/56 and 1956/57

Destination	1956/57		1955/56	
	Tails	Whole	Tails	Whole
	(1,000 Lbs.)			
United States	4,457	266	4,213	216
Hawaii	165	-	176	-
Canada	-	9	8	-
Singapore	6	39	11	78
Other	1	7	3	1
Totals	4,629	321	4,411	295

Table 2 - Australia's Exports of Frozen Raw Spiny Lobster Tails by Size, 1956/57

Destination	Midget & Small	Medium	Large & Jumbo	Total Exports
	(Percent 1/)			1,000 Lbs.
Western Australia	52	28	20	3,428
South Australia	23	27	50	1,034
Tasmania	15	51	34	167
All of Australia	2/43	29	3/28	4,629

1/ Calculated on basis of 4.3 million pounds.
2/ Divided 19 percent midget and 24 percent small.
3/ Divided 17 percent large and 11 percent jumbo.

Exports of spiny lobster tails by size in 1956/57 varied considerably between the three exporting states. The exports from West Australia ran heavily to midget and small sizes (about 52 percent), from South Australia large and jumbo sizes made up 50 percent of the exports, and from Tasmania 51 percent of the exports were medium sizes. (Australian Fisheries Newsletter, October 1957.)

Table 3 - Australia's Exports of Spiny Lobsters by States, 1948/49 to 1956/57

Fiscal Year	Item	Tasmania	South Australia	West Australia	Total
		(1,000 Lbs.)			
1956/57	Tails	167	1,034	3,428	4,629
	Whole	65	184	73	322
1955/56	Tails	30	877	3,505	4,412
	Whole	22	172	101	295
1954/55	Tails	14	1,108	3,601	4,723
	Whole	2	12	103	117
1953/54	Tails	98	828	3,244	4,170
	Whole	4	-	62	66
1952/53	Tails	162	956	2,823	3,941
	Whole	77	34	19	130
1951/52	Tails	17	556	3,033	3,606
	Whole	33	-	21	54
1950/51	Tails	107	537	2,221	2,865
	Whole	-	-	71	71
1949/50	Tails	31	614	2,005	2,650
	Whole	28	3	62	93
1948/49	Tails	64	324	1,215	1,603
	Whole	73	48	61	182

In addition to increased exports, good prices were received for most consignments to the United States. The average f.o.b. price for Western Australian spiny lobster tail shipments, or about 74 percent of total Australian exports, was about US$1.07 a pound. This is a substantial increase over the 1955/56 average price of about US$0.93.

In estimating total dollar earnings, a price of US$1.07 a pound was applied to all shipments. However, as parcels of South Australian tails normally fetch higher prices, this average price may be too low. Probably final figures will show that earnings were in excess of $5.1 million.

Table 4 - Australian Landings of Spiny Lobsters (Fresh Whole Weight), 1955/56-1956/57

Year	New South Wales	Victoria	Tasmania	South Australia	Western Australia	Total
1956/57	437	652	2,096	4,300	12,019	19,504
1955/56	438	614	2,802	4,000	10,530	18,384
1954/55	510	832	3,256	4,294	10,906	19,798
1953/54	576	1,163	2,527	3,850	9,224	17,340
1952/53	543	831	2,770	3,500	8,100	15,744
1951/52	685	623	2,242	2,700	8,344	14,594

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IMPORTS FROZEN AND CANNED JAPANESE OYSTERS: Frozen Japanese oysters were scheduled to arrive in Melbourne, Australia, for the Christmas holidays. The frozen oysters were expected to be sold at about 5.6 U. S. cents a dozen in institutional packs to cafes and canners.

Canned Japanese oysters have been on the Australian market for some time. The imported canned oysters sell at retail for about 66.3-72.8 U. S. cents a 10-ounce can as compared with 95.2 U. S. centa a 10-ounce can for Australian canned oysters. Dockside prices for Japanese canned oysters a 10-ounce can are about 21.5 U. S. cents.

Due to the shortage of Australian-produced oysters, the Japanese imports are expected to find a ready market. There are differences in flavor between the native and the imported oysters, but as the Australian production is only about six oysters per capita, many consumers have never eaten a native oyster and would, therefore, not know the difference between the native and the imported oysters. (Fish Trades Review, November 1957.)

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NEW QUEENSLAND SHRIMP GROUNDS PROFITABLE: The new shrimp fishery in Queensland's Tin Can Bay has proved to be profitable. This area was discovered to be rich in shrimp by an Australian Fisheries Division survey in July 1957. An ever-growing number of shrimp trawlers are making a profit and laying the foundation for a valuable export trade. In less than two months, 70 vessels were fishing for shrimp in this area, and the value of the catch was reported to be close to US$3,584,000 ex-vessel.

The foot-long shrimp known as "king tiger prawns" are especially sought for export. The Australian Fisheries Division is searching for other profitable shrimp fishing grounds off the Queensland coast. The fishermen hope that when the supply in Tin Can Bay becomes exhausted there will be other areas to exploit. (World Fishing, December 1957.)

Canada

FISHERIES RESEARCH DURING 1957 REVIEWED: Canadian fisheries research was reviewed at the annual meeting of the Fisheries Research Board of Canada on January 6, 1958, in Ottawa.

Fresh-Water Fisheries: The effects on Canada's fresh-water fisheries of man-made changes in environment were discussed fully in Ottawa during the week-end preceding the Board meeting by speakers at the 11th annual meeting of the Canadian Committee on Freshwater Fisheries Research. All who took part stressed the need for minimizing the harmful effects on the country's rivers and lakes by foreseeing and counteracting, where possible, the alterations in natural conditions created by human agencies. These include the blockage of passage caused by the construction of dams and other obstacles, the DDT spraying of forest areas, the introduction of harmful substances by industrial effluents and other forms of pollution, the removal of gravel from certain stream beds, and the diversion of water for many industrial and agricultural purposes made necessary by the general development of the country.

In many cases foresight and prompt action have resulted in the protection of fresh-water fishery resources, but in widespread areas throughout Canada great damage has been caused in the past by the growth of forest industries, power development, mining operations, and the ever-increasing need of water by cities and towns and the manufacturing plants which have sprung up along rivers and lakes.

Salmon Studies: An intensified study of the various species of Pacific salmon, now extended to the high seas, was reported at the annual meeting of the Board.

Members of the staff of the Board's Biological Station at Nanaimo, B. C., fishing from chartered vessels, carried out Canada's part of an international program to sample salmon throughout their range in the North Pacific Ocean. The other countries taking part in the program are the United States and Japan which with Canada are signatory to the International North Pacific Fisheries Convention.

Biological characters have been found which indicate whether Pacific salmon found far from shore are of Asiatic or North American origin. These researches have shown that species of North American origin intermingle with those of Asian origin over a broad area of the central Pacific and the Bering Sea.

Shellfish: Clues to the existence of several promising new shellfish grounds on Canada's east coast have been discovered by exploratory fishing on the ocean floor by the Board's researchers for the Fisheries Department's Industrial Development Service. Stocks of scallops and shrimps have been discovered in inshore and offshore waters around Newfoundland.

In a report on the year's activities at the Board's Biological Station in St, John's, Newfoundland, it was pointed out that several new scallop beds of possible commercial value had been located in St. John's Bay, Ingornachoix Bay, Bone Bay, and Bay of Islands along Newfoundland's west coast. Similar finds were made in Fortune Bay, St. Mary's Bay, and Placentia Bay on the south coast, but results were less favorable in the southwest area.

Good shrimp catches were made within a large area in the Gulf of St. Lawrence extending about 100 miles south from Port aux Choix on Newfoundland's west coast. Fair-size stocks of shrimp were found on the southwest coast between Ramea Island and the mainland and from Burgeo to Rencontre West, and small areas in Fortune Bay and Bay D'Espoir also yielded good shrimp catches.

Deep-water exploratory fishing was referred to by the Board's Biological Station in St. Andrews, New Brunswick. Promising new scallop beds were found on the southern part of St. Pierre Bank, following up a similar discovery on the northern part of this bank in 1954. The new beds were 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 four square miles. Commercially-profitable catches of good-sized scallops with large firm meats have been made.

Refrigerated Sea Water: Continued tests of the use of refrigerated sea water for the transport and storage of fish, carried out by the Vancouver Technological Station of the Board, have proved the value of this system to commercial fishermen of the Pacific coast.

Trials made on commercial vessels suggest three possible advantages. Refrigerated sea-water installations allow fishing vessels to operate at great distances from the canneries and other processing establishments, no valuable fishing time is lost by the daily delivery of fish, and some types of fish bring more to the fishermen if delivered directly to the fresh fish market than if sold to a cannery or packer.

In a report to the annual meeting of the Research Board in Ottawa, the Vancouver station said that round sockeye and chum salmon were found to be in excellent condition after a week's fishing and still so after 13 days further storage in refrigerated sea water at the station. Halibut kept in the same manner on the fishery vessel was sold from 8 to 15 days after catching in finest condition, and samples further stored at the station for a total time of 29 days were in good edible condition. The elimination of icing showed promise of greatly increasing the effectiveness of fishing crews, and could possibly provide for a larger catch in periods of heavy fishing.

Preliminary tests have now been made on the storage of live crabs in refrigerated sea water and the results to date indicate that this system also may be adopted to advantage by commercial fishermen.

Herring Fishery: The traditional method for catching herring in British Columbia waters is by use of huge purse seines, but it is now possible for small trawlers to take part in the herring fishery.

Exhaustive tests with various kinds of midwater trawls developed at the Board's Nanaimo, B. C., Biological Station have proved the efficiency of this type of gear. Such trawls are, under limited conditions, capable of commercial use in the winter fishery for herring. The station also has developed special aluminum otter boards which may be used with the trawl either in midwater or for bottom fishing.

Nets and Netting: All kinds of nets, which are the most important unit of fishing equipment, come under close scrutiny by the Research Board. With the continuing development and improvement of synthetic materials which can be used for nets and lines, fishermen are sometimes at a loss as to how to evaluate their efficiency for the particular kind of fishing they prosecute. Thorough tests are made not only on Canadian materials, but also on materials from the United States, Japan, Germany, the United Kingdom, and Holland.

Producing Salmon: Two million pink salmon eggs are being incubated in a special ten-million-egg hatchery built by the Fisheries Research Board of Canada on Kleanza Creek in the Skeena River system of British Columbia. This large-scale incubation is part of a series of experiments to produce salmon fry with normal behavior patterns, timing, and stage of development under artificial conditions. The object is to increase the numbers of salmon returning to spawning areas after they have been to sea. The two million eggs now being incubated are considered a test run and if the experiment is a success larger numbers will be reared in the future.

The hatchery, which incorporates the most modern equipment for fish culture, is operated under the direction of the Research Board's Biological Station at Nanaimo, B. C. Other research work on salmon in British Columbia included the tagging of 10,000 fish in and near the Skeena fishing areas, the purpose being to discover the routes and timing of the various runs and improve the basis for managing the fishery.

Quality and Season of Catch: The relationship between the season of the year and the quality of fish when landed at a fishing port is under study by the Board. The Board's Technological Station at Halifax has undertaken the year-round job of sampling all the catches of a fleet of seven trawlers. The principal fish under study are cod and haddock. Many factors are taken into consideration in the examination of the catch, including the length of time since the fish were caught, air and sea temperatures, methods of washing and icing, exposure of the fish to the atmosphere, location of the catch in the vessel, and possible physiological changes in the fish prior to being caught, due to spawning and feeding habits. Results have not yet been tabulated.

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GOOD SOCKEYE SALMON RUN TO ADAMS RIVER PREDICTED FOR 1958: A run of 10 million or more sockeye salmon to the Adams River (Fraser River system) of British Columbia in 1958 is the prediction by the Director of the International Pacific Salmon Fisheries Commission. This predicted run of sockeye salmon should improve the British Columbia pack of canned red salmon after three years of poor or mediocre packs.

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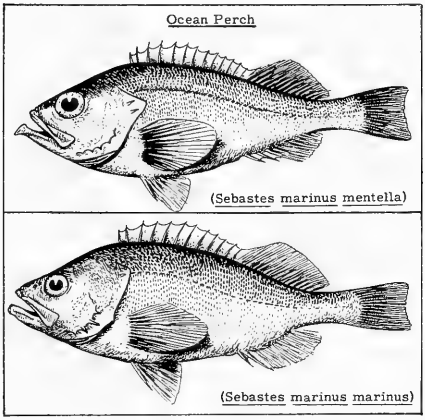
TWO SUBSPECIES OF OCEAN PERCH FOUND OFF NEWFOUNDLAND AREA: Since about the year 1940, European ocean perch or redfish scientists have been aware that there are two varieties of the commercial species Sebastes marinus in northern European waters, the Canadian Biological Station, St. John's, Newfoundland, points out in their Note No. 7. One form, which in Europe is known as the common or usual form, is found in the shallower parts of deep water and generally not below 140 to 160 fathoms. It is orange or yellowish red in color, has a relatively small eye, and the bony protrusion of the lower jaw is usually blunt and weakly developed. This form has recently been named Sebastes marinus marinus. For convenience we shall refer to fish which resemble this form as marinus-type ocean perch or redfish. The other commercial form is the deep-water ocean perch or redfish which in the European area is usually found below 160 fathoms. It has a bright red color, a relatively large eye, and, particularly in large specimens, a long and pointed bony beak projecting from the chin. Fish which resemble this form, which has recently been named Sebastes marinus mentella, will be referred to as mentella-type ocean perch or redfish.

The marinus type, which resembles the subspecies of ocean perch (Sebastes marinus marinus) common in Europe and the European catches, has not hitherto been noted in the North American area. We had doubtless seen occasional specimens, but until recently had not been willing to admit that the species Sebastes marinus found in the area might be comprised of more than one subspecies.

In 1956, however, we measured body proportions of ocean perch or redfish. In carrying out this work, not only did we look more closely at the individual details of appearance but, in addition to random samples, had opportunity to study closely especially selected samples containing many more large fish than usual. The differences between the two forms were readily evident, particularly in the larger fish. The experimental fishing and the collection of ocean perch samples mentioned in this report were carried out by research vessels of the Station, in Hermitage Bay and Connaigre Bay by the Marinus and elsewhere by the Investigator II.

While almost all the ocean perch in the general area between Labrador, Flemish Cap, Grand Bank, St. Pierre Bank, and the

Gulf of St. Lawrence were of the bright red, deep-water, large-eyed, and sharp-chinned mentella type, some marinus type, normally orange yellow or golden yellow, small-eyed, round-chinned, and found in shallower water, were usually also present. Except at Flemish Cap almost all of the marinus type were large ocean perch or redfish beyond the usual upper limit of size of the mentella type.



The first definite indications that the two forms existed in the Newfoundland area were found while examining ocean perch from Hermitage Bay on the south coast of Newfoundland in May and June of 1956. In July 1956, when fish caught at various depths north of Flemish Cap were examined, it was clear that at 150 fathoms, although relatively small numbers of ocean perch were obtained, both types were present in all sizes, and indeed the marinus-type ocean perch was the more abundant. At 200 fathoms where most of the ocean perch were mentella, a few, all large fish (17"-21" long), were of the marinus type. Below this depth, at 250 fathoms where good ocean perch catches were obtained, and at 300 fathoms, only mentella-type ocean perch were found.

Monthly samples of ocean perch (May to November 1956) from Hermitage Bay have shown that in this area, where ocean perch fishing is usually carried out at 120 to 160 fathoms, there are only a few definite marinus-type ocean perch. In a trip of about 40 sets in which 30,000 or more mentella-type ocean perch are caught, there would be only about half a dozen to a dozen marinus-type fish, these being usually very large. Even these few marinus-type ocean perch are in the shallower water and are much more likely to be present in a set at 120 fathoms than in one at 160 fathoms. In the shallower water (92 to 112 fathoms) of the neighboring Connaigre Bay, the marinus-type ocean perch are somewhat more common, and in a half-hour drag several large marinus-type fish may be caught together with the smaller and much more numerous mentella type.

Examination of fish taken at several depths (110 to 310 fathoms) from an area near the southern end of the southwest slope of the Grand Bank in June 1956, indicated that no marinus-type ocean perch were present. In the many ocean perch drags that were performed in the area all the fish were of the mentella type. South of Green Bank at a depth of about 115 fathoms some marinus-type ocean perch are present, but from this area only casual information is available.

A trip in November 1956 to an area off St. George's Bay in the southeastern Gulf of St. Lawrence revealed a situation similar to that in Hermitage Bay with only the occasional marinus-type ocean perch being present among the much more numerous and smaller mentella type. Marinus-type fish, which were mostly large specimens (15"-20" long), were present in sets at 100 and 126 fathoms and in 150 to 156 fathoms, but at 200 and at 250 fathoms, all ocean perch were of the mentella type.

A good deal more information is needed before the role of the marinus type in the ocean perch or redfish population of the Northwest Atlantic is fully understood. At the present time this role in the Newfoundland region appears to be a minor one except in the Flemish Cap area. However, the area north of the Grand Bank, where our earlier researches have shown many large ocean perch or redfish, has not yet been fully investigated with regard to the relative numbers of marinus and mentella types.

Chile

DANISH VESSELS TO FISH IN CHILE: Three Danish fishing vessels departed from Denmark the latter part of 1957. The three vessels ordered by a firm in Valparaiso, Chile, are each 53 tons, equipped with Danish 200-220 horsepower engines rated at 450 revolutions-per-minute, and designed for fishing from the stern. Each vessel will have a crew of six men, most of them Danish fishermen who have signed on for three years in Chile. All the fishing gear is of Danish manufacture, according to the December 1957 issue of World Fishing.

Denmark

FISH MEAL AND OIL FACTORY HAS RECORD YEAR IN 1957: The Cooperative Herring Oil Factory in Esbjerg, Denmark, which produces over 50 percent of Denmark's herring oil and meal, announced that 1957 was the most successful in its nine years of existence.

The factory in 1957 processed 117,000 metric tons of fish as against 96,000 tons in 1956, and its profits enabled the factory to pay out to its members a Christmas

bonus of 2.4 million kroner (US$348,000). The gross turnover in 1957 was 40 million kroner (US$5,800,000), an increase of 14.8 million kroner (US$2,143,000) over 1956.

The factory's director, who returned recently from a visit to both coasts of the United States, announced that his trip was most successful in finding customers for fish solubles ("stickwater"), the byproduct of industrial fish reduction which contains useful salts and vitamins.

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REVIEW OF FISHING INDUSTRY FOR 1957: Catches of fishery products by Danish fishermen in 1957 were estimated to be about 520,000 metric tons (1.1 billion pounds), an increase of 14 percent as compared with the 1956 landings of 456,000 tons (1.0 billion pounds). The ex-vessel value of the 1957 catch amounted to 287 million kroner (US$41.6 million), an 8-percent increase over the value for the previous year. The catch of sand eel (also known as tobis or launce, and used for reduction into meal and oil) declined for the first time in four years from 87,000 tons (165 million pounds) in 1956 to 75,000 tons (165 million pounds) in 1957.

The export market for fishery products was firm during the last quarter of 1957. Preliminary figures indicate exports of all fishery products to be about 300 million kroner (US$43 million), an increase of 15 percent over 1956. The market for food fish was firm, but the market for fish meal was weaker at the end of 1957.

The Faroe Islands fisheries in 1957 were disappointing. Due to a poor herring fishing season, there was a 15-percent decline in the exports from the Faroe Islands in 1957.

The trend towards a lower per capita fish consumption was believed to have continued through 1957. An advertising campaign was instituted to promote fish sales with the slogan "eat fish and be healthy."

The herring oil industry had a good year. A cooperative factory that accounts for about 50 percent of the Danish production processed a record 117,000 metric tons of herring in 1957. Prospects for better herring catches in 1958 were good, due to evidence of successful spawning in 1957.

During the fall of 1957 Danish officials of the Ministry of Fisheries conducted preliminary negotiations with other members of the North Sea convention preparatory to the revision of that Convention in 1958. Denmark is particularly interested in a continued dispensation on industrial fishing until May 1, 1950. (United States Embassy in Copenhagen, January 9, 1958.)

German Democratic Republic

FACTORYSHIP-TYPE FISHING VESSEL PLANNED FOR 1959: In a year or so the first large factoryship fishing vessel will be delivered to the East German fishing fleet, the Director of the East German Fishery Research Institute at Rostock-Marienehe reported in a press review during a visit to the Swedish port of Kalmar.

The trawler-type vessel will be equipped to catch, process, and freeze the catch at sea. It is planned to have the vessel make trips of about three months to the fishing grounds north of Iceland, the vicinity of Greenland, and the Grand Banks off Newfoundland (United States Consul in Goteborg, January 8, 1958).

German Federal Republic

FIRST FREE-PISTON GAS-TURBINE TRAWLER LAUNCHED: The launching in Bremerhaven, West Germany, of the Sagitta, the first fishing trawler to be fitted with a free-piston gas generator turbine engine has aroused considerable interest. The special advantages claimed for the free-piston engines are that they are flexible, easily maintained, and simple to install. They are lighter in weight in relation to power than the normal Diesel engine and occupy much less space.

The Sagitta, following recent trends in German trawler design, is built for stern trawling and is powered by an 1,800 horsepower free-piston turbine. The vessel is 180 feet long, has a beam of 31 feet, and has a depth of 23 feet. The fish hold has a capacity of 450 cubic meters (15,900 cubic feet). There is an additional 90 cubic meters (3,180 cubic feet) of refrigerated space forward of the engineroom.

A number of French tugs and naval vessels are equipped with free-piston turbines and have given, it is reported, excellent service. Interest was shown in this type engine by British trawler owners in the form of an application to the British Whitefish Authority for a contribution towards an experimental installation. It was estimated that costs would exceed £120,000 (US$336,000) if the installation proved impractical and had to be replaced. The trawling firm owner was offered £20,000 (US$56,000) towards the cost of the project, but failed to proceed with the experiment. In the sixth annual report of the Whitefish Authority it was stated that free-piston gas turbines should be tried. At the present time there are three gas-turbine trawlers under construction, one of which is for a British firm.

A British engineering firm has the license to manufacture free-piston engines in the United Kingdom and other territories. During Canada's Power Show in Toronto in October 1957, the British manufacturer exhibited a free-piston unit of 350 shaft horsepower suitable for a marine auxiliary unit coupled to an axial flow turbine driving a 200-kilowatt generator. The firm is the first to produce this size free-piston unit and has orders for 60,000 horsepower of free-piston units, states the November 1, 1957, Fishing News.

Ghana

DEVELOPMENT OF TUNA FISHING AND PROCESSING CONSIDERED: The Ghana Government is considering the development of tuna fishing and processing for internal consumption. Planning is at such an early stage that only the barest outlines of its intentions are available. In 1956 Ghana imported fish and fish preparations valued at £2,215,737 (US$6,204,064), and the Government believes this can be considerably reduced by offshore commercial fishing, and freezing or canning the catch. It is likely that the Government will want part ownership of the enterprise and an option to buy the remainder after an undetermined period. A program of training Ghanaians to fill any position in the enterprise would probably also be required. (U. S. Embassy in Accra, report of December 18, 1957.)

Hong Kong

AUCTION PRICES FOR HEADS-ON SHRIMP, JANUARY 1-14, 1958: Shrimp landed in Hong Kong are sold at auction by size groups (heads-on), according to a January 17, 1958, report from the United States Consulate in Hong Kong. Unsorted shrimp are not sold at the Hong Kong auction. Average prices per pound for heads-on shrimp sold at auction from January 1-14, 1958, were as follows: 10-15 count, 26 U. S. cents; 16-45 count, 23 cents; and over 46 count, 7.8 cents. Exporters process and reclassify shrimp before shipping.

Iceland

FISHERIES TRENDS, JANUARY-SEPTEMBER 1957: While Icelandic landings of fish (including herring) for the first nine months of 1957 were almost identical with those for the same period of 1956, the proportion of cod (the most important of the groundfish) declined in each of the past two years.

Utilization points up the steady rise in the proportion of fish frozen, and a corresponding decline in the quantity salted, as the industry became increasingly geared to supplying frozen fillets to Russia.

The catch of the various species of white fish declined (271,300 metric tons compared to 294,400 tons). While the herring catch by weight rose by a corresponding amount, the increase was entirely in the less valuable lean herring for meal and oil processing, while salt herring, which is the more profitable, dropped by 44 percent. The value of the main herring catch in 1957 was, therefore, below that of 1956. Moreover, the catches during the Southwest Coast season through the early part of the fourth quarter of 1957 were characterized as a failure, and there was even a serious question whether sufficient herring could be caught in this

secondary season to provide the bait needed for the winter cod fishing season. If not, herring would have to be imported from Norway.

Although landings were not up in 1957, there was an increase of Ikr. 20 million (US$1.2 million) in the value of fish exports during the first three quarters of 1957. This was due to the fact that carryover stocks were depleted more rapidly. On September 30, 1957, stocks of export goods (mostly fish products) were lower by Ikr. 99 million ($6.1 million) as compared to the same date in 1956.

Table 1 - Icelandic Catch of Principal Species, January-September 1955-56

Species	1957	1956	1955
	(Metric Tons)		
Cod	180,961	205,059	222,591
Haddock	15,416	12,811	9,510
Ling	2,362	2,763	3,132
Catfish	8,416	5,027	3,363
Ocean perch	47,438	48,828	47,919
Coalfish	8,931	14,009	6,487
Cusk	2,795	2,829	3,358
Herring	105,342	82,547	45,108
Other	5,009	3,066	2,024
Total	376,670	376,939	343,492

The Icelandic Minister of Finance in the course of his budget speech to the Althing spoke of the unusually large number of fishing boats taking part in the winter season, under the inducement of the more generous subsidies offered the industry in 1957, and the greater number of operational days for the average vessel. In terms of vessels engaged and days of operation, the value of the 1957 winter white fish catch was 29 percent below that of 1955 and 22 percent below the average for the 1954-1956 period. This means, of course, that Export Fund expenditures to support the industry were proportionately higher and that the foreign exchange costs for fuel and upkeep were also higher than in a normal fishing year.

The same applies to the 1957 main summer herring season, in which 233 vessels participated with an average of 47 days of operation. In the summer of 1956 a total of 187 vessels operated an average of 37 days and produced a more valuable catch than in 1957, according to the Finance Minister.

The landing of iced fish by trawlers in British and Continental ports has become both more attractive, with increases in the European price of fresh fish, and more controversial, as workers in relatively idle processing plants in Iceland demanded an even tighter control on fresh fish landings abroad.

Table 2 - Icelandic Production of Frozen Fishery Products, January-September 1955-57

Product	1957	1956	1955
	(Metric Tons)		
Cod fillets	26,450	24,950	24,400
Haddock fillets	3,200	2,650	2,450
Ling fillets	100	50	200
Catfish fillets	2,400	1,400	1,000
Ocean perch fillets	14,150	13,600	14,150
Coalfish (pollock) fillets	600	650	450
Cusk	-	-	100
Flounder and halibut, whole; frozen fillets and steaks	800	350	150
Total	47,700	43,650	42,900

Unions demanded that the per diem subsidy--already lower for trawlers landing fish abroad--be entirely removed. This suggestion was opposed, however, by the Seamen's Union and by trawler owners. One trawler was laid up by its private owner when permission was refused to deliver fish abroad. The owner claimed that deliveries abroad were bringing three times the price of local deliveries.

The combined influence of the 1956 trade agreement with Russia and the lower fish catch resulted in a further rise in the percentage of Iceland's exports going to the Soviet Bloc.

NOTE: VALUES CONVERTED AT RATE OF ONE ICELANDIC KRONER EQUALS US$0.0615.

Japan

EXPORTS OF SELECTED FISHERY PRODUCTS TO THE UNITED STATES, JULY-AUGUST 1957: During the first eight months of 1957 exports of frozen tuna to the United States were valued at US$11,070,000, an increase of 12.5 percent as compared with $9,840,000 for the similar period in 1956. Canned tuna exports January-August 1957 were valued at $8,572,000, a decline of 5.6 percent from the January-August 1956 value of $9,080,000.

Japan's Exports of Selected Fishery Products to the United States, July-August 1957

Item	Quantity				Value			
	July		August		July		August	
	1957	1956	1957	1956	1957	1956	1957	1956
	(Metric Tons)				(US$1,000)			
Tuna, frozen	7,549	7,693	6,005	2,074	2,193	2,800	1,729	599
Tuna, canned	1,909	2,574	1,046	968	1,680	2,310	896	866
Crab meat, canned	368	370	382	344	858	880	759	633
Other canned	1,467	312	2,216	200	1,153	260	1,605	154

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MINIMUM PRICES, EXPORT QUOTAS, AND OTHER AID FOR TUNA INDUSTRY: Minimum Prices: Japan has "check" or minimum export price controls on frozen tuna (no fresh tuna is exported to the United States), including loins and discs, and canned tuna. The price controls are administered by the Ministry of International Trade and Industry (MITI) and through exporters' associations operating under the supervision of the Ministry. The price controls are designed to prevent the dumping of frozen or canned tuna on the United States market at prices which could result in dumping charges against the Japanese exporters.

Export Quotas: Canned tuna in oil exports to the United States are prohibited by MITI. However, canned tuna in oil has been entering the United States by transshipment from a third country.

Japan prohibits exports to California of frozen tuna loins and discs, but the prohibition is based on measures adopted by the Japan Frozen Food Exporters' Association and not by government measures. MITI, nevertheless, through its administrative power to withhold export licenses has enforced the Association's decision.

Subsidies and Financial Assistance: According to the Japanese Fisheries Agency, the Government currently does not provide any direct subsidies to the tuna industry, including tuna fishing, freezing, and canning sectors of the industry. The Government, however, did appropriate funds to be used for advertising tuna in the United States during fiscal years 1956 and 1957 (fiscal year ends March 31). In fiscal year 1956, of the total of 25,000,000 yen ($69,500) spent by the tuna industry for advertising in the United States, one-half of the amount was supplied by the Government. In fiscal year 1957, of the total estimated Japanese share of costs for the proposed joint United States-Japan tuna industry advertising in the United States totaling 150,000,000 yen ($417,000), one-half of the amount was appropriated in Japan's national budget. There is no information at present as to whether the fiscal year 1957 appropriations will be spent during this fiscal year, since United States tuna industry members have not agreed upon the desirability of carrying out joint tuna advertising with the Japanese.

Of greater significance to the Japanese tuna industry than the advertising subsidy, is the long-term low-interest rate loans by the Government. Long-term low-interest rate loans to the freezing, canning, and export sectors of the tuna industry are provided by the Agriculture, Forestry and Fisheries Finance Corporation, which was established in April 1953 pursuant to Law No. 355 of December 29, 1952. The Finance Corporation, which obtained its initial funds from the Central Government and whose funds have been augmented by subsequent budgetary appropriations, provides long-term loans to all sectors of agriculture, forestry, and fishing whenever such credit is difficult to obtain from private financial institutions. Although the Finance Corporation is permitted to make loans at an interest rate as low as 4.5 percent per annum and payable in 25 years, loans made to the tuna industry reportedly have been at 7.5 percent repayable in 15 years, with deferment of initial payment for two years. These loans, furthermore, have been made available to the tuna industry up to a maximum of 80 percent of the cost of building freezing equipment and canning facilities.

Japanese Government assistance to tuna boat 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 and Forestry Central Finance Corporation after review and approval by the Agriculture, Forestry, and Fisheries Finance Corporation. These loans are available for up to 60 percent of the construction cost at an interest rate of 7.5 percent annually and are repayable in seven years for individuals, or in six years for associations, after deferred payments for 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, after 30 days.

There is no detailed data readily available to determine how much long-term low-interest rate loans have been made directly to the tuna industry by the Finance Corporation. Estimates made by the Finance Corporation of total loans to the freezing industry in recent years indicate that between 800 and 1,000 million yen (US$2.2-3.6 million) have been made available annually. Estimates for fiscal year 1957 is that such loans will decline substantially from previous years to about 300 million yen ($834,000). This is because of the tight money policy of the government and because the industry has built a number of freezing facilities in recent years which have met the most urgent requirements. For the canning industry, current estimates of long-term low-interest rate loans to be made during fiscal year 1957 total about 100 million yen ($278,000).

Indirect Government aid to Japan's export trade, as of January 1, 1957, consisted chiefly of special taxation measures which permit exporters and manufacturers to deduct a large proportion of their export earnings from income tax calculations, and special low-interest rates on loans to finance exports of finished products and imports of designated raw materials. Beginning in June 1956, exporters have been permitted to deduct 80 percent of the export earnings or one percent of export sales, whichever is smaller, in calculating income subject to tax. The specially favorable interest rates on loans covering exports vary considerably with the type and length of the loan, as well as with the security involved, but they range in general from a minimum of 4.5 percent to a maximum of 8 percent in comparison with the going rate of 8-12 percent per annum for other commercial loans. Other Government promotion measures which involve smaller amounts of monetary assistance, include (1) an extensive export insurance system which covers the bulk of the risks faced by exporters; (2) an export foreign exchange retention system which permits exporters to retain 3 percent of the export earnings to be used for imports of designated commodities and for certain export promotion measures.

Available data do not permit firm conclusions regarding the impact which the above measures have had in financially assisting the Japanese tuna industry in its export trade. Other export promotion measures, such as tax exemption and government insurance, are also available to the tuna industry, states a December 27, 1957, despatch from the United States Embassy in Tokyo.

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NEW ELECTRONIC FISH-FINDER SUCCESSFUL: A new Japanese fish finder, developed by the Agriculture and Forestry Ministry's Fishery Agency, can locate such fish as sea bream, croaker, sharp-toothed eel, flatfish, and king crab. Although based on the principals of the echo-sounder for merchant marine and navy use, the fish finder is technically more involved. It is capable not only of gauging the depth of the ocean, but also of locating even a single fish 300 to 600 feet below the surface of the ocean. The new fish finder utilizes ultrasonic waves as high as 200,000 frequencies (200 kc.), which sharpens the discrimination between the sea bottom and the groundfish. Moreover, this high frequency lessens the attenuation of the sound waves resulting from air bubbles in the water created by a ship in motion, or when the sea is stormy.

This equipment has enabled Japanese researchers to locate many groundfish and king crabs, even during turbulent weather.

Modern electronics is playing an increasingly important role in the Japanese fishing industry, with such scientific aids as direction finders, radar, ultra short-wave equipment, echo sounder, sonar, and fish finders. At the present time 20 percent, or approximately 7,500, of Japanese fishing boats of over five tons are equipped with electronic fish finders. The number of vessels equipped with these instruments increases daily.

The Fishery Agency has recently been engaged in the research of a fish finder which can be used for tuna fishing. Tuna are difficult to locate because of their speed and the dispersals of tuna schools.

The early development of a fish finder which can be adapted for catching this fish is expected.

The increasing use of fish finders is contributing a great deal towards improving the life of the fisherman and also rationalization of fishing operations. At the same time it has proved to be indispensable for conducting surveys for marine resources and for developing new fishing grounds.

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TUNA CATCHES IN INDIAN OCEAN REPORTED LIGHT: The 1,100-ton tuna fishing vessel No. 1 Showa Maru was due to return to Shimizu, Japan, on December 24, 1957, from its first voyage of four months to the Indian Ocean. The vessel sailed from Japan on August 15 and spent about 61 days actively fishing around 2° S., 64° E. for a total catch of 660-700 metric tons of tuna. Smaller catcher boats were carried to the fishing area on the deck of the Showa Maru. Yellowfin fishing was not as good as expected, but a capacity load was finally taken.

The poor fishing in the Indian Ocean and elsewhere is raising some question as to the suitability of having large tuna fishing vessels engaged solely in this fishery the year-round (Nippon Suisan Shimbun, December 9, 1957).

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WINTER ALBACORE TUNA FISHERY CURTAILED: The winter albacore tuna fishing season, which attracts many boats from Shizuoka Prefecture as an activity to fill in on the off-season following the close of the autumn skipjack and saury fisheries, has been slow getting started this season due to unfavorable market conditions. Reports indicated that few boats would engage in this fishery before January 1958.

In 1953 and 1954, when the winter albacore fishery was at its height, about 80 boats from the ports of Shimizu, Mochimune, Yaizu, Omaezaki, Izu-Toda, Tago, and Ito in Shizuoka Prefecture engaged in the fishery, and the number for the whole country was about 375. Beginning in the middle of December fishing was carried on by live-bait and long-lining from off Kinkazan east to 1,000 miles offshore, just as in the summer albacore fishery, and the ports of Yaizu and Shimizu were usually busy with albacore landings from the latter part of December to March.

Lately, however, according to reports published by the fisheries section of Tokai University, the boats which in normal years would be making preparations for sea at Yaizu and Shimizu are not in evidence at all, and judging from the way things are moving in Mie and Ibaraki prefectures, it was expected that for the first time since the war there would be no landings of albacore before the end of 1957.

The reasons for this lack of interest in the winter albacore fishery are the effects of the low prices of the 1957 summer, the lack of good prospects for exports, and the fact that the trend to larger boats (a trend most marked at Omaezaki,

Shimizu, and Yaizu) has made it possible to fish the southern tuna grounds, eliminating the need for working in rough northern waters. This tendency to ignore the winter albacore has been growing stronger from year to year, and some elements in the industry are worried that it may be an obstacle to plans for export of albacore tuna to the United States. Present trends indicate that the winter off-season will find the boats shifting from winter albacore fishing to pole-and-line fishing for mackerel, to long-lining for yellowfin on the nearer southern grounds, or to southern skipjack fishing. The industry is pinning its hopes on landings at Yaizu and Shimizu after the middle of January by the approximately 60 small long-liners from Kagoshima Prefecture, which are putting their main effort into the winter albacore fishery. In industry circles, it is considered, in view of recent prices for southern albacore, that large fish will bring $167 to $200 per metric ton ex-vessel and they are pinning hopes particularly on buying by fresh fish dealers to bring the price up. However, according to some there is a need, in view of the tendencies in the fishing fleet in recent years, to make a major correction in attitudes toward winter albacore fishing, and the feeling is strong in the industry as a whole that since 1957 has been right up to the end a year of many troubles for the albacore fisheries, that 1958 will see a change for the better. (Nippon Suisan Shimbun, December 9, 1957.)

Mexico

MAZATLAN AREA SHRIMP FISHING TRENDS: The shrimp fishing season in Mazatlan area of Mexico's west coast as of December 1, 1957, was below average, although landings during September were up from the preceding months. The hurricane that hit this area the latter part of October resulted in the loss of 30 shrimp fishing vessels. The Mexican Government granted loans to help overcome the effects of the storm, but many of the smaller vessel owners had insufficient collateral to qualify for loans.

The hurricane hit Mazatlan at a time when the shrimp fishing industry was in the process of expanding. A new freezing and packing plant was ready to open and new plans had been made for shipping shrimp by refrigerator car over the rebuilt Pacific railroad. Use of these new facilities has been delayed. At the present time it is doubtful if the shrimp industry in the Mazatlan area will recover from the effects of the hurricane before the summer of 1958.

The shrimp industry producers and packers are satisfied with current market conditions. The marketing agency set up in San Diego, Calif., by Mexican shrimp processors is reported to be operating satisfactorily, the United States Consul at Nogales reported on December 17, 1957.

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NEW FISH-LIVER OIL PLANT: A new plant, producing refined oils from fish livers, started operations about December 16, 1957, in Guaymas, Sonora, on the west coast of Mexico. The livers from sharks, tuna, and totoaba will be the chief sources of supply. The plant is rated at a capacity of about one ton of refined fish-liver oils daily. The investment in the plant, exclusive of fishing gear and working capital, is reported to be about US$40,000, states a December 18, 1957, dispatch from the United States Embassy in Mexico City.

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NEW SHRIMP FREEZING PLANT ON EAST COAST: A new shrimp freezing plant, the first for Frontera, Tabasco, on the Bay of Campeche, was due to begin operation by the end of December 1957. This plant has a daily freezing capacity of 10,000 pounds of shrimp, 20 tons of ice, and a storage capacity of 150,000 pounds.

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SHRIMP FISHERMEN ADOPT TWO-TRAWL TECHNIQUE: The two-trawl fishing technique introduced over a year ago in the Gulf of Mexico by United States fishermen is beginning to be adopted by Mexico's Gulf of Mexico shrimp fishermen. This technique consists of towing simultaneously two trawls, 40 or 45 feet at the mouth, instead of using one large trawl of 90 or 100 feet. Each trawl is connected to a separate tow cable by a bridle. The trawls, one slightly in advance of the other, are towed, one from the port and the other from the starboard towing booms. Upon hauling, the trawl nearest the boat is hauled first. Some boat owners claim that shrimp catches with the new technique are as much as 30 percent greater than those with the single large-trawl method, a December 10, 1957, dispatch from the United States Embassy in Mexico City reports.

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SPINY LOBSTER CATCH IN ENSENADA AREA GOOD: The spiny lobster fishing season in the Ensenada area (off the west coast of Baja California a short distance from the United States border) which opened on October 1, 1957, was off to a promising start with a two-month catch of 800,000 pounds (valued at US$364,000). Fisheries officials in Ensenada predict that the season, which ends on March 15, 1958, will be the best on record due to efforts at conservation and stricter enforcement of regulations, states a January 7, 1958, dispatch from the United States Consul at Tijuana.

New Hebrides

TUNA FREEZING AND CANNING PLANT ESTABLISHED: During the last half of 1957 six Japanese technicians arrived at Santo, New Hebrides, to install processing and refrigeration equipment in a new tuna plant.

The plant was due to be completed by the end of 1957 with the freezer reported to have a holding capacity of 2,000 tons of frozen tuna. Seven 100-ton Japanese fishing vessels were scheduled to arrive later (Pacific Islands Monthly, November 1957).

Norway

FISH CATCH IN 1957 DOWN 22 PERCENT FROM 1956: The total Norwegian fish catch in 1957 of 1,556,402 metric tons was lower by 22 percent as compared to the 1,986,300 metric tons in 1956, according to the Norwegian Directorate of Fisheries. The ex-vessel prices in 1957 were somewhat higher than in 1956, however, and the total value of the catch was only 14 percent lower than in 1956. The value of 610.9 million kroner (US$85.5 million) for 1957 was the second best year on record on the basis of value.

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FISHERMEN WAIT ARRIVAL OF WINTER HERRING SCHOOLS: Early in January 1958 the Norwegian west coast port of Aalesund was teeming with fishermen waiting for the fat winter herring schools. Altogether some 26,000 fishermen, manning about 2,600 purse seiners and drift netters, were ready for the new season. In addition, the transport vessels used to carry the herring from the fishing grounds to oil and meal plants were ready to go.

The ocean research vessel G. O. Sars, cruising some 200 nautical miles off the coast, had not reported a major herring shoal as of January 11, 1958. However, another research vessel, the Peder Ronnestad, sighted some herring much closer to the shore.

Between Egersund and the southern border of Trondelag province, 51 herring oil reduction plants are ready for day-and-night operation. These plants can process over 40,000 metric tons a day, and have a storage capacity of about 750,000 tons. Approximately 80 percent of the total catch goes to these plants, while the rest is salted, frozen, or iced.

In 1957, Norwegian fishermen landed 1,017,402 metric tons of herring and brisling, valued at Kr. 255.6 million (US$35.8 million) ex-vessel. The fishermen hope to make out better this year.

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FROZEN FILLET PRODUCTION LOWER IN 1957: Operations of the Norwegian frozen fish fillet plants were very limited in 1957 because of a short supply of raw material, according to the Norwegian Ministry of Fisheries. The dried fish industry was the largest competitor of the frozen fish industry for the available fresh fish. Total production of frozen fish fillets in 1957 was expected to amount to about 13,000 metric tons, 27 percent less than in 1956. (United States Embassy dispatch from Oslo dated November 29, 1957.)

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RESTRICTIONS BY SWEDEN ON FISH IMPORTS PROTESTED: Following the failure of Norwegian and Swedish officials to reach an agreement concerning a Swedish import tax on Norwegian frozen fish fillets, the Norwegian Government sent a strongly-worded note to Sweden protesting this tax.

The note pointed out that Norwegian exports of frozen fillets to Sweden were increasing rapidly until the imposition of the import tax; but dropped sharply in 1957 to almost 30 percent below the previous year's level. The note also asked Sweden to free the import of Norwegian mackerel (mackerel is already on the Norwegian Free List), and to reclassify Norwegian frozen fish balls and fish sticks at a lower rate of duty.

The note concluded by emphasizing that the Norwegian Government was greatly concerned by the increasing distortion in favor of Sweden of import balances, a January 3, 1958, dispatch from the United States Embassy in Oslo reports. The range of Norwegian exports to Sweden is limited and frozen fish fillets were one of the few Norwegian products which gave promise of expanded sales on the Swedish market.

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REVIEW OF FISHING AND WHALING INDUSTRIES FOR 1957: Fishing: Poor weather during the 1957 winter herring season and the scarcity of cod on the Lofoten fishing grounds reduced substantially Norway's 1957 fish landings. Estimates placed 1957 results at 1,550,000 metric tons, or 300,000 metric tons below the Norwegian National Budget forecast for 1957 and about 160,000 metric tons below the five-year average for 1952-1956.

The winter herring catch was only 70 percent of the total for 1956; deliveries to the oil and meal industry were down to only 64 percent of the amount for 1956. Consequently, the 1957 production of oil and meal was reduced to 62,000 metric tons and 162,000 metric tons, respectively, compared with 104,000 tons and 245,000 metric tons, respectively, for 1956.

Results from the brisling herring fishing showed a substantial improvement over the previous years. The total pack in 1957 was expected to exceed 500,000 cases, compared with only 197,000 cases in 1956.

Exports: Norwegian exports of fish during the first three quarters of 1957 were slightly higher than during the same period of 1956 despite the poorer returns from the cod and herring catches. An increase in exports of canned brisling and sales from stocks of frozen fish carried over from 1956 were mainly responsible. However, the total for all exports of fish and fish products (including meal and crude and processed fish liver and body oils, and whale and sperm oils) were about 90 million kroner (US$12,640,000) below the same period of 1956. One-half of this decrease was caused by lower herring meal exports, the other half by delays in whale oil sales this year as compared with 1956.

About 24 percent of total Norwegian foreign currency earnings from commodity exports came from exports of fish and fish products (including marine oils) during the first nine months of 1957, compared with about 29 percent during January-September 1956.

The markets for Norwegian fish and fish products remained virtually unchanged during 1957. The Soviet bloc countries took about two-thirds of total herring exports and about one-third of total exports of frozen fish fillets. In addition, a major portion of the exports of hardened fats went to the Soviet Union under the bilateral trade agreement.

Outlook for 1958: The outlook for the 1958 fishing season is uncertain. Participation in the winter herring operations is expected to be larger than ever. A forecast by the Directorate of Fisheries in Bergen at the end of November 1957 on the availability of winter herring was about 75 percent of the estimate for 1956. This estimate is more than adequate for another record-breaking year if the weather is favorable during the relatively short herring season.

It is also expected that the herring season will be lengthened during 1958 by greater participation than in 1957 by Norwegian fishermen in the operations off the coast of Iceland after the close of the season along the Norwegian coast. The catch from the Icelandic waters goes to the Norwegian herring meal and oil plants, thus extending their operating season.

Decisions should be reached during 1958 on the unresolved problems from 1957 relating to guaranteed prices and centralized exports. A special committee formed by the Government has been given the mandate to make recommendations for a long-range solution to the economic problems of the fishing industry. This report is to be completed by the summer of 1958. Statements to date by government leaders indicate a preference for a solution that entails rationalization of the fishing industry rather than price subsidization. It has been suggested that this rationalization be accomplished through more ocean-going vessels that can operate throughout the year.

Table 1 - Norwegian Winter Herring[1/] Catch and Utilization, 1954-57

	1957	1956	1955	1954
	(Metric Tons)			
Total Catch	795,615	1,145,853	865,433	1,082,192
Utilization:				
Exported fresh	106,289	101,649	116,064	84,072
Salted	81,003	107,508	111,600	104,897
Canned	14,601	11,997	11,067	11,439
Oil and meal	584,970	913,074	717,402	883,872
Bait	4,278	6,417	4,929	3,255
Marketed fresh	4,464	5,208	4,371	4,557

1/DOES NOT INCLUDE FAT HERRING, SMALL HERRING, AND BRISLING.

The North Norway fishermen are the major source of demands for government action to solve their price and export problems. Largely small fishermen, they suffered most from the poor winter cod season of 1957 because their equipment restricts them largely to the coastal waters. Their dissatisfaction has a longer history, however, because it stems from their inability to adjust their costs to the downward trend of world fish prices during the past few years.

They have also asked the government to solve the problem of losses to their nets caused by trawler operations. They have demanded that the government take steps to extend the fishing boundary to 12 miles from the current 4 miles. Ocean-going fishermen, as well as Norwegian shipowners, do not share this viewpoint, however.

Whaling: Norway had an especially successful 1956/57 Antarctic whaling season with oil production amounting to 1,003,694 barrels (includes 904,453 bbls. of whale oil and 99,241 bbls. of sperm oil), compared to 852,168 barrels (includes 719,706 bbls. of whale oil and 132,462 bbls. of sperm oil) in 1955/56. Prices were favorable in relation to the previous season.

Norwegian policy continued to favor more effective international regulation of whaling in the Antarctic. Some of the concern expressed during 1956 over failure to achieve agreement on the steps to be taken over alleged violations by a few of the whaling countries largely disappeared during 1957. As a result of this and other developments, Norwegian whaling circles approached the 1957/58 season with more confidence than had been evident for some time. Even the potentially-crippling whaling fleet strike of October was resolved in time through Government action to permit the whaling fleet to depart after only a short delay (U. S. Embassy in Oslo, dispatch dated November 29, 1957).

Peru

FISH PROCESSING PLANTS AND WHALING STATIONS: There were 85 fish-processing plants and 4 whaling stations in Peru as of July 1957, some of which were not operating, according to the Peruvian Bureau of Fish and Game. Many plants carried on multiple operations, such as fish canning and fish meal and oil production. According to this same source, there were 54 canneries, 45 fish-meal plants (one of which was afloat), 31 oil plants, 13 freezers, 11 salting plants, 5 whaling stations, and 2 smoking establishments.

On the other hand, the National Fishery Society listed 37 canneries and 36 fish-meal plants. Most of these were believed to be in operation, a December 3, 1957, United States Embassy dispatch from Mexico points out.

Philippines

CANNED FISH RETAIL AND WHOLESALE PRICES, DECEMBER 1957: Retail and wholesale prices on December 2, 1957, for canned sardines and canned salmon in Manila were as shown in table.

Product	Wholesale	Retail
	US$/cs.	U. S. ¢/can
Canned sardines:	(48 15-oz. cans)	
U. S. brand	13.75	32.5-35
Japan brand	11.15	22.5-25
Canned salmon:	(48 16-oz. cans)	
U. S. brand	31.25	70-72.5
Japan brand	31.50	70-72.5

Singapore

JAPANESE-SPONSORED FISH PLANT AND TUNA CANNERY PLANNED: Details of a Japanese-sponsored fish processing plant and tuna cannery were made public in a statement to the press by the Singapore Minister of Commerce and Industry. If the plans materialize, it is expected that the plant will process tuna and other fishery products obtained from the Indian Ocean and elsewhere. The plant, a multimillion dollar investment, will be equipped for freezing, processing, and canning. A large part of the output is destined for export. It is also contemplated that the Japanese Antarctic whalers will land part of their catches for processing at Singapore.

Surinam

FISHERIES SUFFER FROM UNUSUAL CLIMATIC CONDITIONS: As of November 30, 1957, the fisheries for shrimp and fish in Surinam (Dutch Guiana) had declined seriously due, it is believed, to high water temperatures, high salinity, and the excessive growths of algae in the coastal waters and estuaries. The situation in the fish ponds at Mattapica and in the Nickerie area was also abnormal. The effect was to remove shrimp (seabob) and most of the local varieties of fish from the retail markets. In addition, the one shrimp processing plant was idle during the period of peak production, the United States Consul in Panamaribo reported on November 30, 1957.

The Director of the Surinam Fisheries Service described the situation as follows:

(1) The algae, believed to be a type called "nostoc" (classification is uncertain), causes an oil-like scum on the surface for two days and then sinks to the bottom. This type of algae normally occurs in Surinam waters in limited quantities during the month of September. In 1957 it was present from May to November. It collects on nets and affects the bait of the handline fishermen. The shrimp do not enter coastal and estuarine waters while the water is heavily infested with this algal growth.

(2) The shrimp were also kept offshore by the unusually high water temperatures. Temperatures were estimated to be about 8° F. above normal. The area of abnormally high water temperatures extended as far as 20 miles off the coast.

(3) The salinity of the water increased (due to the lack of rainfall and high water temperatures) to about 38.5-40.4 parts per thousand from a normal of 29.4-33.0 parts.

(4) The situation as to abnormal water conditions was believed to extend into British and French Guiana.

(5) The last good catches of seabob shrimp occurred in April 1957. The stocks of this species were believed to be about 20 miles offshore.

(6) The usual sea trout and other finfish found in estuarine waters disappeared in recent months.

(7) Conditions in the fish ponds were the worst since 1929. Tarpon (which are smoked for local consumption) and other predatory fish were killed off to a large extent, but the same was true of more desirable varieties such as snook. The salinity of the ponds was about 45 parts per thousand. In the Government control ponds at Mattapica it was estimated that about 800 pounds of snook were lost. In private ponds in the area the losses were close to 2,200 pounds.

(8) Tilapia, however, seemed to continue to thrive in the Mattapica ponds despite the heavy salinity.

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SHRIMP FISHERY TRENDS: The United States-owned shrimp trawler Coquette, which had been under charter to the Government of Surinam for a fisheries survey, was sold to the Government for US$32,500 on November 18, 1957. The vessel has now been chartered to a Surinam-American company for a period of 12-18 months. The Coquette, manned by a United States crew, left for its first trip on November 25.

Under the charter arrangement the vessel will trawl for shrimp and fish (mainly sea trout) for export. The company will continue to process and handle the small shrimp--sea bobs--caught in the inshore waters. The supply of sea bobs has been poor in recent months due to unusual climatic conditions.

Sweden

GROUP LIFE INSURANCE FOR WEST COAST FISHERMEN: Swedish west coast fishermen will benefit from group life insurance policies in an amount of 1,500 crowns (US$290) for each fisherman. The policies are effective with the beginning of 1958. Those insured comprise all active commercial fishermen who will not be over 65 years of age in 1958. The number of fishermen who qualify is estimated at 4,400. The premium on the group policy will be paid by the West Coast Fishermen's Central Association, the United States Consul in Goteborg reported on December 16, 1957.

Provision has been made to increase the amount of the individual policies to a total death benefit of 3,000 crowns (US$579) subject to the wishes of the various local member groups of the Association. In such cases, the Association will pay the part of the premium which exceeds 10 crowns

(US$1.93) per member. The total amount of premiums to be paid by the Association is about 50,000 crowns (US$9,650) yearly.

The Association has about 7,000 members, including 4,400 active fishermen under the age of 65, 600 active fishermen over 65 years, and 2,000 who fish on a part-time basis.

The present group insurance plan is a test project and if successful it is probable that at a later date a proposal will be made to the Association that the age limit be raised to 67 years.

The plan covers insurance in case of death. Swedish west coast commercial fishermen are already covered by accident or in-line-of-duty insurance. Originally this protection was afforded by special governmental accident insurance. This was discontinued, however, in 1954 and since the beginning of 1955 the Association has carried group accident insurance for all members with The National Insurance Institution.

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LIGHT CATCHES OF SPRAT REDUCE CANNED PACK: The catches of sprat (Clupea sprattus) by Swedish fishermen were very light, both during the early part and fall of 1957. This situation has caused some reduction in working hours for the workers in west coast fish-canning-plants.

Canning company officials were quoted during the latter part of November as predicting that if sprat catches did not improve there was danger of more extensive lay-offs by the fish-canning industry during the early part of 1958. One plant manager reported that due to the shortage of sprat his firm kept workers busy packing the larger herring to the extent that there may be difficulty in selling the product. It is possible that sprat catches will improve early in 1958 as they did early in 1957. If so, sprat canning could be resumed by the middle of January.

Some sprat has been imported from Denmark, but catches in that country have also been poor, according to a December 4, 1957, dispatch from United States Consul in Goteborg.

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NEW POLISH-BUILT TRAWLER DEMONSTRATED: A modern trawler-type fishing vessel, designed especially for use in the Baltic and built by a shipyard in Poland, recently visited a number of fishing ports on the east coast of Sweden for the purpose of exploring sales possibilities for this type of vessel.

The craft's length is 17.45 meters (57.2 feet), its width is 5 meters (16.4 feet), and its draft is 2.44 meters (8.0 feet). The boat is described as being made entirely of steel with a reinforced bow constructed particularly for operation in ice. It has a large hold. Spacious tanks for fuel oil and water make possible fishing trips of up to 14 days.

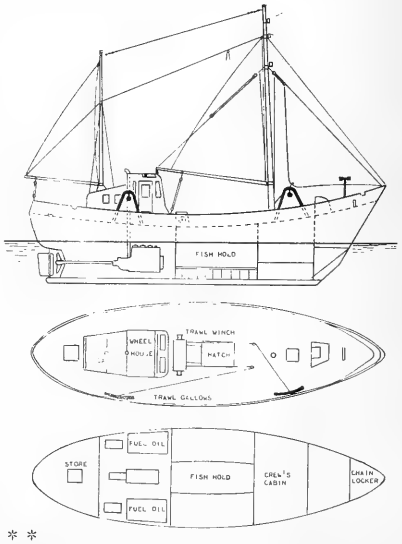
Powered by a Danish Diesel engine of 110 horsepower, it also has echo-sounding equipment and radio telephone, both of Polish manufacture. The Polish shipyard, however, is prepared to deliver the boat with a Swedish motor, Swedish radio equipment and optional echo-sounding equipment if the purchaser so desires.

The wheelhouse is located aft and over the engineroom and there is a radio and navigator's cabin in the stern connected with the wheelhouse. In the stem there are cabins and a galley.

The price of the boat is 220,000 Swedish crowns (US$42,460) sea-ready on delivery and including machinery, a 500-watt radio plant (telephone plus direction finder), echo-sounding apparatus, central heating, powerful and well-dimensioned electrical equipment with generators and batteries of good capacity, steel masts with sails of the Marconi type, main-yard sail, "fishing sail" mizzen, and 1,000 meters of steel wire.

In commenting on this Polish-built fishing boat, the author of the article says that the price is very reasonable measured by Swedish conditions. He states further that even though objections might be made to "certain details," the craft is a great step forward in technical fishing developments. The boat, he says, is very well suited for trawl fishing for Baltic herring and cod. It is also well adapted for mobile salmon fishing with hooks and nets.

In noting that the Polish boat is reinforced for operation in ice, the author mentions that ice in the Baltic and the Gulf of Bothnia paralyzes fishing completely for long periods practically every year. In order to overcome this adversity a type of fishing boat is needed, he says, that is not so easily hampered by ice and snow as are most of the boats presently in use on the east coast. (December 12, 1957 dispatch from the United States Consul in Goteborg.)



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PROTESTS INDIA'S EXTENSION OF TERRITORIAL WATERS: The Swedish Government, through its Embassy in New Delhi, has protested intentions on the part of the Government of India to regulate all fishing activities within 100 nautical miles from the outer limits of Indian territorial waters. In two proclamations issued in November and December 1957, India promulgated measures to enforce customs, fiscal, immigration, and sanitary regulations within a distance of 12 miles from the coast, and to regulate all fishing activities within 100 nautical miles from the outer limits of Indian territorial waters.

The Swedish note points out that the rules of international law relative to the sea will be considered at a conference on the "law of the sea" to be held in Geneva late in February 1958. Pending an international agreement on the many questions involving territorial waters and other controversial matters pertaining to the "law of the sea," the Swedish Government put forward its reservations against any measures aiming at limitation of the freedom of the seas outside of accepted territorial waters.

United Kingdom

NEAR-RECORD TRIP LANDED BY BRITISH TRAWLER: The trawler St. Britwin landed close to 578,000 pounds (valued at US$45,886) of fresh fish at Hull, England, during the middle of November 1957. The near-record trip was caught in seven days (22 days dock to dock) fishing off Cape Farewell, Greenland. The catch created tremendous interest in the trade because for many weeks landings at Hull had been light. The vessel's skipper said the weather conditions while fishing "were not good, but it did not stop our work and fishing was consistently good all the time."

The catch would have brought more, but for a maximum quota regulation which stipulates that any landings in excess of a prescribed amount per vessel must go to the fish-meal plants and the proceeds devoted to the Hull Fishermen's Widows and Orphans Fund. The maximum quota for the St. Britwin was 532,000 pounds; the surplus of about 46,000 pounds was sold for the benefit of the Fund.

After some speculation as to whether or not the trip was a fresh-fish landing record for Hull, it was determined that the trip of the St. Bartholomew, landed in February 1956, was still the highest on record. That vessel after a 22-day trip to the Norwegian coast landed 591,000 pounds of headless fish, the equivalent of 770,000 of whole fish. This catch brought US$48,446. The trip of the St. Bartholomew was landed during the period of controlled prices, but before maximum quota regulations were introduced. Another large postwar trip landed at Hull was that of the Northella with a stock of US$44,882.

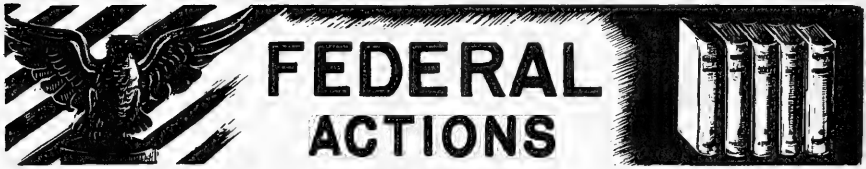
The value of the St. Britwin trip was almost double that of the Cape Trafalgar, which had the second highest return on the day that the St. Britwin landed. After a White Sea trip the Cape Trafalgar grossed US$24,657 for 268,100 pounds of fish.

Other landings at Hull during the middle of November 1957 did not fare so well as the St. Britwin. In the same week the St. Elston landed at Hull and grossed only US$9,495 from a Bear Island trip--this was only a little more than one-half the expenses for the trip (Fishing News, November 22, 1957).

TREATING SPINY LOBSTER MEAT PRIOR TO CANNING

Treatment of spiny lobster meat with dilute citric acid solutions before canning showed a slight improvement in color after canning, while texture and flavor were unaffected.

Official Bulletin of the South African Fishing Industry Research Institute, No. 23.



Department of Agriculture

AGRICULTURAL MARKETING SERVICE

FROZEN RAW BREADED SHRIMP
STANDARDS ESTABLISHED:

Voluntary standards for the production of good quality frozen raw breaded shrimp became effective March 1, 1958. Notice of the promulgation of these standards was issued in the Federal Register on January 7, 1958, by the U. S. Department of Agriculture under the terms of its agreement with the U. S. Department of the Interior.

These voluntary standards were developed by the Bureau of Commercial Fisheries, in cooperation with the fishing industry and the National Fisheries Institute.

Products which conform to these standards are readily identifiable to the consumer. Firms which have continuous inspection are entitled to mark their packages with the Federal shield. Those which subscribe only to sample inspection may certify that the product meets the requirements of the grade specified but cannot use the prefix "U. S." nor the shield.

The standards for frozen raw breaded shrimp apply to wholesome, clean, headed, peeled, and deveined shrimp which have been breaded and frozen. The grades include "U. S. Grade A" and "U. S. Grade B." Quality below these grades will be classified as substandard. Products to be graded must conform to the industry-accepted production definition. The most important elements of the definition require that the raw material be wholesome and suitable, that the shrimp be of regular commercial species, and that the product consist of at least 50 percent by weight of shrimp material.

The standards do not define proper labeling for this product. Frozen raw breaded shrimp, when sold in interstate commerce, must conform to the labelling regulations of the Food and Drug Administration, U. S. Department of Health, Education, and Welfare.

Notice of the proposed shrimp standards was published in the Federal Register, May 18, 1957. This was followed by a public hearing conducted by the Bureau of Commercial Fisheries and by a trial period during which the National Fisheries Institute and the breaded shrimp industry had an opportunity to test the proposed standards and comment to the Bureau on the findings.

The frozen raw breaded shrimp standards as published in the Federal Register of January 7, 1958 follow:

TITLE 7—AGRICULTURE

Chapter I—Agricultural Marketing Service (Standards, Inspections, Marketing Practices), Department of Agriculture

PART 52—PROCESSED FRUITS AND VEGETABLES, PROCESSED PRODUCTS THEREOF, AND CERTAIN OTHER PROCESSED FOOD PRODUCTS

SUBPART—UNITED STATES STANDARDS FOR GRADES OF FROZEN RAW BREADED SHRIMP [1]

On May 18, 1957, a notice of proposed rule making was published in the FEDERAL REGISTER (22 F. R. 3484) regarding a proposed issuance of United States Standards for Grades of Frozen Raw Breaded Shrimp and interested persons were given until July 18, 1957 in which to submit views or comments concerning the proposal. Because of the nature of the comments and suggestions received provision was made in the FEDERAL REGISTER publication of July 30, 1957 (22 F. R. 5980) for an additional period of time until October 16, 1957 for comment. This period was again extended by FEDERAL REGISTER publication of November 7, 1957 (22 F. R. 8961) to November 23, 1957.

After consideration of all relevant matters presented, including the proposal set forth in the aforesaid notice, the following United States Standards for Grades of Frozen Raw Breaded Shrimp are hereby promulgated pursuant to the authority contained in the Agricultural Marketing Act of 1946 (60 Stat. 1087 et seq., as amended; 7 U. S. C. 1621 et seq.).

[1] Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

PRODUCT DESCRIPTION, TYPES, AND GRADES

FACTORS OF QUALITY

DEFINITIONS AND METHODS OF ANALYSIS

LOT INSPECTION AND CERTIFICATION

SCORE SHEET

AUTHORITY: §§ 52.3601 to 52.3609 issued under sec. 205, 60 Stat. 1090, as amended; 7 U. S. C. 1624.

PRODUCT DESCRIPTION, TYPES, AND GRADES

§ 52.3601 *Product description.* Frozen raw breaded shrimp are clean, wholesome, headed, peeled, and deveined shrimp, of the regular commercial species, coated with a wholesome, suitable batter and breading. They are prepared and frozen in accordance with good commercial practice and are maintained at temperatures necessary for the preservation of the product. Frozen raw breaded shrimp contain not less than 50 percent by weight of shrimp material.

§ 52.3602 *Types of frozen raw breaded shrimp*—(a) *Type I, Fantail*—(1) *Subtype A.* Split (butterfly) shrimp with the tail fin and the shell segment immediately adjacent to the tail fin.

(2) *Subtype B.* Split (butterfly) shrimp with the tail fin but free of all shell segments.

(b) *Type II, Round fantail*—(1) *Subtype A.* Round shrimp with the tail fin and the shell segment immediately adjacent to the tail fin.

(2) *Subtype B.* Round shrimp with the tail fin but free of all shell segments.

(c) *Type III, Split.* Split (butterfly) shrimp without attached tail fin or shell segments.

(d) *Type IV, Round.* Round shrimp without attached tail fin or shell segments.

§ 52.3603 *Grades of frozen raw breaded shrimp.* (a) "U. S. Grade A" is the quality of frozen raw breaded shrimp that when cooked possess an acceptable flavor and odor, and that for those factors which are rated in accordance with the scoring system outlined in the following sections the total score is not less than 85 points.

(b) "U. S. Grade B" is the quality of frozen raw breaded shrimp that when cooked possess an acceptable flavor and odor, and that for those factors which are rated in accordance with the scoring system outlined in the following sections the total score is not less than 70 points.

(c) "Substandard" is the quality of frozen raw breaded shrimp that fail to meet the requirements of "U. S. Grade B."

FACTORS OF QUALITY

§ 52.3604 *Ascertaining the grade*—(a) *General.* In addition to considering

other requirements outlined in the standards, the following quality factors are evaluated in ascertaining the grade of the product:

(b) *Factor not rated by score points: acceptability of flavor and odor.* A product with an acceptable flavor and odor is one that is free from any abnormal flavor and odor. The acceptability of flavor and odor is determined on the product after it has been cooked in a suitable manner.

(c) *Factors rated by score points.* The quality of the product with respect to factors scored is expressed numerically on the scale of 100. Weighted deductions from the maximum possible score of 100 are assessed for essential variations of quality within each factor. The score of frozen raw breaded shrimp is determined by observing the product in the frozen and thawed states.

§ 52.3605 *Factors evaluated on product in frozen breaded state.* Factors affecting qualities which are measured on the product in the frozen state are: loose breading or frost; ease of separation; uniformity of size; condition of coating; and damaged or fragmented breaded shrimp. For the purpose of rating the factors which are scored in the frozen state, the schedule of point deductions in Table I applies. This schedule of point deductions is based on the examination of one complete individual package (sample unit) regardless of the net weight of the contents of the package.

§ 52.3606 *Factors evaluated on product in thawed debreaded state.* Factors affecting qualities which are measured on the product in the thawed debreaded state are: degree of deterioration; dehydration; sand veins; black spot; extra shell; and swimmerets. For the purpose of rating the factors which are scored in the thawed debreaded state, the schedule of point deductions in Table II applies. This schedule of point deductions is based on the examination of 20 whole shrimp selected at random from one or more packages.

DEFINITIONS AND METHODS OF ANALYSIS

§ 52.3607 *Definitions and methods of analysis*—(a) *Halo.* "Halo" means an easily recognized fringe of excess batter and breading extending beyond the shrimp flesh and adhering around the perimeter or flat edges of a split (butterfly) breaded shrimp.

(b) *Balling up.* "Balling up" means the adherence of lumps in the breading material to the surface of the breaded coating, causing the coating to appear rough, uneven, and lumpy.

(c) *Holidays.* "Holidays" means voids in the breaded coating as evidenced by bare or naked spots.

(d) *Damaged frozen raw breaded shrimp.* "Damaged frozen raw breaded shrimp" means a frozen raw breaded shrimp which has been separated into two or more parts or that has been crushed or otherwise mutilated to the extent that its appearance is materially affected.

(e) *Fragmented shrimp.* "Fragmented shrimp" means a breaded unit containing less than one headed, peeled, deveined shrimp.

TABLE I—SCHEDULE OF POINT DEDUCTIONS FOR RATING IN FROZEN BREADED STATE

Factor	Quality description	Deductions allowed
1. Loose breading or frost	Less than 2 percent by weight of product	0
	2 percent but less than 3 percent	3
	3 percent but less than 6 percent	6
	6 percent or more	10
2. Ease of separation	Separate easily immediately after opening package	0
	Separate easily after being removed from carton and exposed to room temperature for not more than 4 minutes	4
	Separate easily after being removed from carton and exposed to room temperature for not more than 6 minutes	6
	Does not separate easily after being removed from carton and exposed to room temperature for 6 minutes	10
3. Uniformity	Ratio of weight of 3 largest to 3 smallest breaded shrimp in sample unit:	
	Up to 1.70	0
	1.71–1.80	1
	1.81–1.90	2
	1.91–2.00	3
	2.01–2.10	4
	2.11–2.20	5
	2.21–2.30	6
	2.31–2.40	7
	2.41–2.50	8
	2.51–2.60	9
	Over 2.60	10
4. Condition of coating	Degree of halo or balling up or holidays (identify type of defect by circling proper word):	
	No obvious	0
	Slight	1
	Moderate	2
	Marked	4
	Excessive	8
5. Damaged or fragmented breaded shrimp.	None	0
	For each unit	3
	Tail fin broken or missing per unit (except in Types III and IV)	1

TABLE II—SCHEDULE FOR POINT DEDUCTIONS FOR EXAMINATION IN THAWED, DEBREADED

[Subtotals brought forward]

Factor	Quality description	Deductions allowed
1. Degree of deterioration	None obvious	0
	Slight, but obvious, on average	3
	Moderate, on average	6
	Any marked—each shrimp	3
2. Dehydration	None obvious	0
	Slight but obvious, on average	3
	Moderate, on average	6
	Excessive—each shrimp	3
3. (a) Sand veins[1]	For each dark vein present deduct according to following schedule:	
	In first segment (adjacent to tail fin)	0
	Equivalent in length to 2 segments	1
	Equivalent in length to 3 segments	2
	Equivalent in length to 4 or more segments	3
(b) Black spot	None obvious	0
	Slight, but obvious, on average	3
	Moderate, on average	6
	Excessive—each shrimp	3
4. (a) Extra shell[2]	(Beyond first segment adjacent to tail fin):	
	Less than one whole extra shell segment	1
	One extra segment or more	3
(b) Swimmerets	For last pair only adjacent to tail fins	1
	For more than last pair	3

[1] The deduction points assessed for sand veins and black spot occurring together on an individual shrimp shall not exceed the larger deduction for either factor.

[2] The deduction points assessed for extra shell and swimmerets occurring together on an individual shrimp shall not exceed the larger deduction for either factor.

(f) *Black spot.* "Black spot" means any blackened area which is markedly apparent on the flesh of the shrimp.

(g) *Sand vein.* "Sand vein" means any black or dark sand vein that has not been removed, except for that portion under the shell segment adjacent to the tail fin when present.

(h) *Loose breading and frost.* "Loose breading and frost" is determined by use of a balance by following the steps given below:

(1) Remove the overwrap.

(2) Weigh carton and all contents.

(3) Remove breaded shrimp, and weigh shrimp alone.

(4) Weigh carton less shrimp but including waxed separators (if used), crumbs and frost.

(5) Remove crumbs and frost from carton and separators.

(6) Weigh cleaned carton and separators.

(7) Calculate loose breading and frost:

$$\text{Percent loose breading and frost} = \frac{\text{weight carton less breaded shrimp material (d)} - \text{weight cleaned carton (f)}}{\text{weight of carton and all contents (b)} - \text{weight cleaned carton (f)}} \times 100$$

(i) *Percent of shrimp material.* "Percent of shrimp material" means the percent by weight of shrimp material in a sample as determined by the method described below or other methods giving equivalent results. Results are commonly expressed as percent of breading which is calculated by difference.

(1) *Equipment needed.* (i) Two-gallon container approximately nine inches in diameter;

(ii) Two vaned wooden paddle, each vane measuring approximately one and three fourths inches by three and three fourths inches;

(iii) Stirring device capable of rotating the wooden paddle at 120 rpm;

(iv) Balance accurate to 0.01 ounce (or 0.1 gram);

(v) U. S. standard sieve—ASTM—No. 20, twelve-inch diameter;

(vi) U. S. standard sieve—one-half inch sieve opening, twelve-inch diameter;

(vii) Forceps, blunt points;

(viii) Shallow baking pan.

(2) *Procedure.* (i) Weigh sample to be debreaded. Fill container three-fourths full of water at 70–80 degrees Fahrenheit. Suspend the paddle in the container leaving a clearance of at least five inches below the paddle vanes, and adjust speed to 120 rpm. Add shrimp and stir for ten minutes. Stack the sieves, the one-half inch mesh over the No. 20, and pour contents of container onto them. Set the sieves under a faucet, preferably with spray attached, and rinse shrimp with no rubbing of flesh, being careful to keep all rinsings over the sieves and not having the stream of water hit the shrimp on the sieve directly. Lay the shrimp out singly on the sieve as rinsed, remove top sieve and drain on a slope for two minutes, then remove shrimp to weighing pan. Rinse contents of the No. 20 sieve onto a flat pan and collect any particles other than breading (flesh, tail fin or extraneous material) and add to shrimp on balance pan and weigh.

(ii) Calculate percent shrimp material:

$$\text{Percent shrimp material} = \frac{\text{weight of debreaded sample}}{\text{weight of sample}} \times 100 + {}^{1}5$$

(iii) Calculate percent breading:

Percent breading = 100 − percent shrimp material.

(j) *Cooked in a suitable manner.* "Cooked in a suitable manner" means cooked in accordance with the instructions accompanying the product. However, if specific instructions are lacking, the product for inspection is cooked as follows:

(1) Place the sample to be cooked while still frozen in a wire mesh deep fry basket sufficiently large to hold the shrimp in a single layer without touching each other;

(2) Lower the basket into suitable liquid oil or hydrogenated vegetable oil at 350–375 degrees Fahrenheit. Fry for three minutes, or until the shrimp attain a pleasing golden brown color; and

(3) Remove basket from oil and allow to drain for fifteen seconds. Place the cooked shrimp on a paper napkin or towel to absorb excess oil.

LOT INSPECTION AND CERTIFICATION

§ 52.3608 *Ascertaining the grade of a lot.* The grade of a lot of Frozen Raw Breaded Shrimp covered by these standards is determined by the procedures set forth in the Regulations Governing Inspection and Certification of Processed Fruits and Vegetables, Processed Products Thereof, and Certain Other Processed Food Products (§§ 52.1 through 52.87; 22 F. R. 3535).

SCORE SHEET

§ 52.3609 *Score sheet for frozen raw breaded shrimp.*

Size and kind of container	
Container mark or identification	

Label	
Size of lot	
Number of samples	
Actual net weight (ounces)	
Number of shrimp per container	
Descriptive size name	
Product type	
Breading percentage	
Loose breading percentage	
Ratio weights: 3-largest/3-smallest	
Ease of separation	
Condition of coating	
Damaged shrimp	
Degree of deterioration	
Dehydration	
Sand veins	
Black spot	
Extra shell	
Swimmerets	
Rating for scored factors	
Flavor and odor	
Final grade	

The United States Standards for Grades of Frozen Raw Breaded Shrimp (which is the first issue) contained in this subpart shall become effective on March 1, 1958.

Dated: December 30, 1957.

[SEAL] ROY W. LENNARTSON,
Deputy Administrator,
Marketing Services.

[1] A tentative correction factor of five percent is employed pending completion of definitive studies.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, JUNE (1957) P. 65.

Department of Commerce

TRADE POLICY COMMITTEE ADOPTS STATEMENT OF FUNCTIONS AND OPERATING PROCEDURES:

The Trade Policy Committee with the approval of the President has adopted a statement of functions and operating procedures, the Secretary of Commerce announced on January 13. The statement is set forth in a memorandum for the President signed by the Secretary as Chairman of the seven-member Cabinet Committee. The statement was approved by all the members of the Committee and the Secretaries of Commerce, State, Treasury, Defense, Interior, Agriculture, and Labor.

The President, in issuing the Executive Order (November 25, 1957) establishing the committee, stated that it would advise and assist him in the administration of the reciprocal-trade program.

In part the memorandum as approved by the President provides:

Functions of the Trade Policy Committee: The functions assigned to the Trade Policy Committee by the Executive Order of November 25, 1957 establishing the Committee are to (1) make recommendations to the President on basic policy issues arising in the administration of the trade-agreements program, which, as approved by the President, shall guide the interdepartmental Committee on Trade Agreements; (2) advise the President with respect to the recommendations made by the Trade Agreements Committee to the President; and (3) make recommendations to the President as to what action he should take on escape clause reports submitted by the Tariff Commission.

In carrying out these functions, the Trade Policy Committee will be concerned, therefore, with the following types of activities among others: (1) recommendations with respect to tariff negotiations, including compensation cases, (2) review and recommendations in escape clause cases, (3) recommendations in certain other tariff matters such as the use of the Geneva Wool Reservation, (4) recommendations on U. S. positions with respect to any voluntary export arrangements of foreign countries, and (5) recommendations on other policy is-

sues arising in the administration of the Trade Agreements program including all policy position papers for the GATT.

Operating Procedures of the Trade Policy Committee: Procedures include Escape Clause action, review of Trade Agreements Committee recommendations, and recommendation on basic policy issues.
NOTE: SEE COMMERCIAL FISHERIES REVIEW, FEBRUARY 1957, P.

Federal Trade Commission

FISH CANNER DENIES CHARGES OF ILLEGAL BROKERAGE:

A Washington State fish canner and its sales subsidiary (Answer 6942, Canned Seafood) have denied Federal Trade Commission charges of making illegal brokerage payments to some customers. In answering a Commission complaint issued November 18, 1957, the companies deny giving favored customers discounts or allowances in lieu of brokerage in violation of Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act.

They admit the salmon and other seafood packed by the company generally are sold by the subsidiary through other brokers. They also admit that direct sales are made to certain buyers without utilizing brokers, but deny these customers are granted prices lower than those paid by buyers who purchase through brokers. The complaint had alleged these reduced prices to favored customers (chains and large buying groups) reflect the 2.5 percent brokerage fee ordinarily paid.

The parties ask that the complaint be dismissed, a January 13 news release issued by the Commission points out.

* * * * *

INITIAL DECISION DISMISSES CHARGES ON ALLEGED TUNA PRICE FIXING BY SEATTLE BOAT OWNER ASSOCIATION:

A U. S. Federal Trade Commission hearing examiner on January 17, 1958, issued an order which would dismiss without prejudice charges that Fishermen's Cooperative Association (of Seattle), a boat owner association, has engaged in a conspiracy to fix tuna prices and to prevent competition in this industry.

This is not a final decision of the Commission and may be appealed, stayed, or docketed for review.

The examiner issued his order based on a motion to dismiss made by counsel supporting the complaint. Included in his order are the Association's officers, directors, and members; the officers and directors individually, and as representative of the entire membership of the Association.

On July 24, 1957, the examiner pointed out, the Commission accepted agreements for consent order and issued its order to cease and desist as to 138 other respondents named in the complaint, filed August 29, 1956. The parties, comprising substantially all of the West Coast tuna industry, were ordered to stop fixing prices for the tuna they produce--well over half of the nation's pack. The Commission's order also prohibits attempts to suppress competition.

The examiner said this order effectively will prevent the continuation or repetition of the alleged unlawful practices, even though these respondents are not parties to such order. He then added: "...it would not be in the public interest to expend the time and money which would be necessary to try the entire case for the purpose of securing an order to cease and desist against this single group of respondents."

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, OCTOBER 1957, P. 39.

* * * * *

SEAFOOD PACKER AND SELLING AGENT CHARGED WITH MAKING ILLEGAL BROKERAGE PAYMENTS:

The U. S. Federal Trade Commission on January 27, charged a Seattle, Wash., seafood packer and its affiliated selling agent with making illegal brokerage payments to some customers (Complaint 7021, Canned Seafood). A Commission complaint cites the two companies and also named are the officers of the packing company who are also partners in the second company.

The complaint alleges that the parties give favored customers discounts or allowances in lieu of brokerage, or reduced prices reflecting brokerage, in violation of Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act.

According to the complaint, the seafood products packed by the packer usually are sold by the partnership through field brokers who receive 2½ percent of the net selling price for their services. In these transactions, the complaint alleges, favored customers are allowed discounts under the guise of advertising allowances, accomplished by cutting the field brokers' normal brokerage.

In addition, the complaint says, the parties make direct sales to favored customers without utilizing field brokers. On such sales the price is reduced by the 2½ percent which ordinarily would be paid as brokerage fees, the complaint charges.

The parties are granted 30 days in which to file answer to the complaint. A hearing is scheduled March 25 in Seattle before a Federal Trade Commission hearing examiner.

Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

PORTION OF CANNED TUNA DEFINITION AND STANDARD OF IDENTITY ORDER POSTPONED:

That portion of the canned tuna definition and standard of identity order (published in the February 13, 1957, Federal Register) concerning the labeling provisions in section 37.1 (h) was revoked by the Food and Drug Administration by a notice published in the January 14, 1958 Federal Register. The effective date of that section is postponed from February 13, 1958, until a final ruling shall have been made as a result of the findings determined at the public hearing held on January 29, 1958, Washington, D. C.

The purpose of the hearing was to receive data on the objections to the requirement in section 37.1 (h) of the identity standard that the words "in water" are to be included in the name of the food when water is used as the packing medium and to the requirment for label declaration of tuna darker than Munsell value 5.3 as "dark tuna." The section in question also has a number of other labeling provisions than those listed here.

The announcement postponing the effective date as it appeared in the January 14, 1958, 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 POSTPONING EFFECTIVE DATE OF PORTION OF DEFINITION AND STANDARD OF IDENTITY FOR CANNED TUNA

In the matter of fixing and establishing a definition and standard of identity for canned tuna:

Effective as of the date of publication of this order in the FEDERAL REGISTER, that portion of the order published in the FEDERAL REGISTER of February 13, 1957 (22 F. R. 892), concerning the effective date of the identity standard for canned tuna, insofar as it concerns the labeling provisions set forth in § 37.1 (h), is hereby revoked; and: *It is ordered*, That the effective date of the aforesaid paragraph be postponed from February 13, 1958, until a final ruling shall have been made as a result of the findings determined at the public hearing to be held in accordance with the notice published in the FEDERAL REGISTER of December 28, 1957 (22 F. R. 10964).

(Secs. 401, 701, 52 Stat. 1046, 1055, as amended 70 Stat. 919; 21 U. S. C. 341, 371)

Dated: January 7, 1958.

[SEAL] GEO. P. LARRICK,
Commissioner of Food and Drugs.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1957, P. 60.

Interstate Commerce Commission

RAIL FREIGHT RATE INCREASE REQUESTED:

In a series of petitions to the Interstate Commerce Commission, the railroads requested a 2-percent general in-

crease, with a specific increase of 5 cents per 100 pounds on fresh and frozen seafoods. The increase on canned or preserved fish is 1 cent per 100 pounds, but no increase is proposed on these products within the South. Frozen foods generally are to be increased 1 cent per 100 pounds. Animal or poultry feed ingredients are to be increased 3 percent, except for shipments within the South. Fish oils are to be increased 5 cents per 100 pounds.

In addition to these increases, Diversion and Reconsignment rules are being drastically revised and the charges are being increased in varying amounts up to $20. Furthermore, a new charge of $2 per ton is to be added to line-haul rail rates on all freight moving to or from the United States and Canadian ports to cover the cost of loading and unloading presently being absorbed by the railroads.

The increased rates and new charges were due to become effective February 1, 1958, and the Interstate Commerce Commission established special rules for handling requests for suspension of these increases. Protests were due on January 20 and Oral Argument was scheduled for January 29 in Washington.

Eighty-Fifth Congress

(Second Session)

Public bills and resolutions which may 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.

ALASKA-SPAWNED SALMON PROTECTION: H. Res. 439 (Tollefson) introduced in the House on January 15, 1958, a resolution requesting the Secretary of State to secure an agreement with Japan to protect Alaska-spawned salmon; to the Committee on Foreign Affairs. Also introduced in the House on January 20, H. Res. 448 (Magnuson), similar to H. Res. 439.

S. Res. 247 (Magnuson and Jackson) introduced in the Senate on January 23, 1958. "Resolves, that the Secretary of State together with other appropriate officials of our Government immediately initiate negotiations with the appropriate officials and agencies of the Government of Japan for the purpose of: (a) effectuating the purpose of the treaty entered into by the United States, Canada, and Japan in 1951, and (b) establishing a zone in which there shall be a cessation of all fishing in waters on the high seas where a substantial proportion of salmon of North American origin were found.

H. Res. 451 (Tollefson) introduced in the House on January 23, 1958, a resolution requesting the Secretary of the Interior and all departments of Government to protect Alaska-spawned salmon; to the Committee on Merchant Marine and Fisheries. Also introduced in the House on January 27, H. Res. 455 (Pelly), similar to H. Res. 451.

CHEMICAL ADDITIVES IN FOOD: H. R. 10404 (Williams of Mississippi) introduced in the House on January 30, 1958, a bill to amend the Federal Food, Drug, and Cosmetic Act for the protection of the public health, by prohibiting new food additives which have not been adequately pretested to establish their safe use under the conditions of their intended use; to the Committee on Interstate and Foreign Commerce. Bills and resolutions introduced on this subject during the first session of the 85th Congress were as follows: H. R. 4014 (Delaney); H. R. 4432 (Sullivan); H. R. 6747 (Harris); S. 1895 (Hall and Smith, New Jersey); H. R. 7798 (Delaney), replaces H. R. 4014; H. R. 7938 (Mrs. Sullivan); H. R. 7700 (Fulton); H. R. 8112 (Miller, Nebraska); H. R. 8390 (Harris), this bill was sponsored by National Canners Association; H. R. 8629 (Wolverton), similar to H. R. 8112; H. Res. 273 (Teller), provides for Committee to study subject; H. Res. 311 (Farbstein).

Food Additives Hearings: Hearings on food additive legislation that started July 15, 1957, were resumed by the Health and Science Subcommittee of the House Interstate and Foreign Commerce Committee on February 18-19. Administration's views were presented by the Commissioner of Food and Drugs and the Assistant Secretary of Health, Education, and Welfare. The hearings during the first session of this Congress featured a panel of experts from the National Academy of Science. Witnesses at those hearings were representatives of consumer groups and of the chemical and food industry.

DISTRICT OF COLUMBIA FISH AND GAME LAWS: H. R. 10160 (Hyde) introduced in the House on January 21, 1958, a bill to revise and modernize the fish and game laws of the District of Columbia, and for other purposes; to the Committee on the District of Columbia. Also bills on the subject were introduced in the House and Senate during the first session of the 85th Congress--H. R. 2454 (Hyde) and S. 532 (Beall).

ECONOMIC RELIEF FOR DISTRESSED AREAS: H. R. 10230 (Byrd) introduced in the House on January 23, 1958, a bill to establish a program of eco-

nomic relief for distressed areas through a system of loans and grants-in-aid; to the Committee on Banking and Currency. This bill is similar in purpose to S. 1433 (Martin and others) introduced in the Senate on February 28, 1957. Four House bills: H. R. 5459 (Carrigg); H. R. 5500 (Van Zandt); H. R. 7029 (Fenton); and H. R. 7046 (Saylor) introduced in the first session of the 85th Congress are closely related in purpose to H. R. 10230.

FISHERIES ASSISTANCE ACT OF 1958: S. 3229 (Saltonstall, Kennedy, Payne, Smith of Maine, and Magnuson), introduced in the Senate on February 5, 1958, a bill to provide a 5-year program of assistance to enable depressed segments of the fishing industry in the United States to regain a favorable economic status, and for other purposes; to the Committee on Interstate and Foreign Commerce. Also introduced in the House on February 5, 1958, H. R. 10529 (Bates)--similar to S. 3229 and referred to the House Committee on Merchant Marine and Fisheries. The proposed legislation is entitled "The Federal Fisheries Assistance Act of 1958" and provides for assistance to depressed segments of the fishing industry. The bill contains four major provisions: (1) Incentives to reduce vessel insurance costs. (2) Construction differential subsidies for vessels built in American yards. (3) A loan program for repair and modernization of processing plants. (4) Incentive payments to both fishermen and processing plants. Briefly, the bill calls for Federal assistance in maintaining vessel inspection and procuring safety equipment; this is designed to reduce the present high rates of insurance. The bill sets up a loan program specifically for processors so that they may repair and modernize their now obsolete and inefficient facilities. Thirdly, the bill calls for a ship construction subsidy similar to that now offered our maritime industry to offset the higher construction cost in American yards. Fourth, the bill calls for incentive payments to both the fishermen and the processing plants. The latter provision is designed to encourage the boat operators and processors to improve the quality of the fish caught and processed. These incentive payments would aid the industry in making up the price differential between foreign and domestic products and thereby retain their present share of the market. But more importantly, this would place certain requirements on the industry to improve its own practices, thereby improving the ultimate product to be distributed to the American consumer. Senator Saltonstall's statement when the bill was introduced in part pointed out "I wish to emphasize that this legislation is not a subsidy. This legislation offers financial assistance to the industry to encourage constructive measures of its own to improve the quality of the finished product and thereby to maintain its competitive position. Equity demands that some legislation of this nature be enacted in that the Federal Government has been at least partially responsible for the industry's decline. The national interest further demands that such legislation be enacted so that this vital industry and source of domestic food supply be preserved in case of war."

FISHERY EXTENSION SERVICE: S. 2973 (Payne) introduced in the Senate on January 13, 1958, a bill to authorize the Secretary of the Interior to establish a fishery extension service in the Fish and Wildlife Service of the Department of the Interior for the purpose of carrying out cooperative fishery extension work with the States, Territories, and possessions; to the Committee on Interstate and Foreign Commerce. The bill provides for the establishment of a fishery extension service patterned closely after the Agricultural Extension Service. The bill supplements the Fishery Education Act passed in the 84th Congress, that provides for grants to colleges and universities to promote the fishery industry in the United States and its Territories by providing for the training of needed personnel in such industry S. 2973 provides that:

Cooperative fishery extension work shall consist of (1) the giving of instruction and practical demonstrations in fishery and subjects relating thereto to persons engaged in commercial fishing or desiring to engage in commercial fishing, and who are not attending or resident in a college or university, (2) the imparting of information on such subjects through demonstrations, publications, and otherwise, and (3) aid for the necessary printing and distribution of information in connection with the foregoing; such work to be carried on in such manner as may be mutually agreed upon by the Secretary and the college or university concerned.

Any amount appropriated for the purpose of carrying out the provisions of this Act, except such amounts as may be appropriated pursuant to subsection (d) of this section, shall be apportioned on an equitable basis, as determined by the Secretary, among the several States, Territories, and possessions. In making such apportionment the Secretary shall take into account the extent of the fishing industry within each State, Territory, and possession as compared with the total fishing industry of the United States (including Territories and possessions), and such other factors as may be relevant in view of the purposes of this Act. Also introduced in the House on January 27, 1958, H. R. 10275 (Hale) and referred to the Committee on Merchant Marine and Fisheries, similar to S. 2973.

FISHERIES LEGISLATION AND NORTH PACIFIC FISHERIES PROBLEMS (Hearings before the Committee on Interstate and Foreign Commerce, United States Senate, Eighty-Fifth Congress, First Session, on S. 1483, a bill to amend the Act of August 27, 1957 (68 Stat. 883) and relating to the rights of vessels of the United States on the high seas and in territorial waters of foreign countries; and S. 2719, a bill to provide for the payment of bounties for the control of certain predators on salmon and halibut of the Pacific Coast and Alaska, October 1 and 3 and November 27, 1957), 94 pages, printed. Contains statements submitted at the hearings held in Seattle, Wash., and at Fairbanks and Anchorage, Alaska.

HAWAII STATEHOOD: H. R. 10155 (Dooley) introduced in the House on January 21, 1958, a bill to provide for the admission of the State of Hawaii into the Union; to the Committee on Interstate Interior and Insular Affairs. During the First Session of the 85th Congress five or more House bills and one Senate bill (S. 50) were introduced on this subject. S. 50 was approved on July 30, 1957, by Senate Committee on Interior and Insular Affairs (Rept. No. 1164, parts 1 and 2). S. 50 was passed over by the Senate on August 30, 1958.

INCOME TAX LAW REVISION IN FAVOR OF FISHERMEN: H. R. 10280 (King) introduced in the

House on January 27, 1958, a bill to extend to fishermen the same treatment accorded farmers in relation to estimated income tax; to the Committee on Ways and Means. Two House bills, H. R. 3061 (King) and H. R. 4521 (Pelly), and one Senate bill, S. 1669 (Magnuson), were introduced on this subject during the first session of the 85th Congress.

POWER PROJECTS FISHERIES RESOURCES PROTECTION: S. 3185 (Newberger) introduced in the Senate on January 29, 1958, a bill to promote the conservation of migratory fish and game by requiring certain approval by the Secretary of the Interior of licenses issued under the Federal Power Act; to the Committee on Interstate and Foreign Commerce. The bill would give to the U. S. Fish and Wildlife Service collateral jurisdiction in Federal Power Commission decisions where rivers are involved with important fisheries resources.

RESEARCH AND ACTIVITIES UNDER SALTONSTALL-KENNEDY ACT: House received a letter on January 21, from the Secretary of the Interior transmitting the third annual report of activities and research conducted by or under contract with the Fish and Wildlife Service of the U. S. Department of the Interior to encourage the distribution of domestically produced fishery products for the fiscal year ending June 30, 1957, pursuant to the act of July 1, 1954 (commonly referred to as the Saltonstall-Kennedy Act) as amended by the Fish and Wildlife Act of 1956; referred to the Committee on Merchant Marine and Fisheries. (Title of report: "Research and Activities under the Saltonstall-Kennedy Act, Fiscal Year 1957.")

SALMON IMPORT RESTRICTIONS: H. R. 10244 (Pelly) introduced in the House on January 23, 1958, a bill to facilitate the application and operation of the Fish and Wildlife Act of 1956, and for other purposes; to the Committee on Merchant Marine and Fisheries. Provides that it shall be unlawful to import for market and distribution within the United States or its possessions, salmon in any form taken on the high seas of the North Pacific Ocean and adjacent seas, by nets or other means, or at times, places, and under conditions or methods of fishing which would be unlawful if practiced or performed by citizens of the United States or of the States of Washington, Oregon, and California.

SMALL BOAT LIEN RECORDING: H. R. 10149 (Ashley) introduced in the House on January 21, 1958, a bill to amend the Act of June 7, 1918, to provide for the notation of liens, mortages, and other encumbrances on the certificate of award issued for a vessel under the act; to the Committee on Merchant Marine and Fisheries. This bill proposes to have liens and other encumbrances against an undocumented craft recorded on certificate of award to protect buyers and sellers when transferring title and certificate of ownership.

SMALL BUSINESS DISASTER LOANS: H. R. 9727 (Smith of Mississippi) introduced in the House on January 7, 1958, a bill to amend the Small Business Act of 1953 to provide that disaster loans to cover economic injury may be made to small-business concerns in a duly designated disaster area without regard to the nature of the disaster; to the Committee on Banking and Currency. Also introduced in the House on January 13, H. R. 9926, similar to H. R. 9727.

SMALL BUSINESS RESEARCH AND DEVELOPMENT ACT OF 1958: S. 2993 (Fulbright) introduced in the Senate on January 13, 1958, a bill to expand the opportunities of small business to participate in and derive the benefits from research and development; to the Committee on Banking and Currency.

SMALL BUSINESS TAX RELIEF: S. 3194 (Sparkman and others) introduced in the Senate on January 30, 1958, a bill to amend the Internal Revenue Code of 1954 so as to establish an initial program of tax adjustment for small and independent business and for persons engaged in small and independent business; to the Committee on Finance. H. R. 10389 (Holtzman) similar bill introduced in the House on January 30, and referred to Committe on Ways and Means. Also introduced on February 3, H. R. 10440 (Horan); on February 4, H. R. 10499 (Rains)--similar to S. 3194. Five or more House bills and one Senate bill similar in purpose to S. 3194 were introduced in the first session of the 85th Congress.

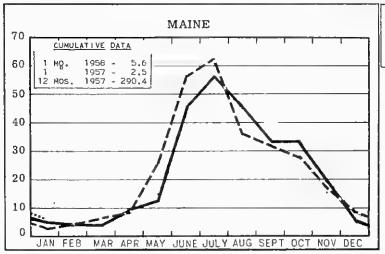
TRADE AGREEMENT EXTENSION ACT: H. R. 10368 (Mills) introduced in the House on January 30, 1958, a bill to extend the authority of the President to enter into trade agreements under section 350 of the Tariff Act of 1930, as amended, and for other purposes, to the Committee on Ways and Means.

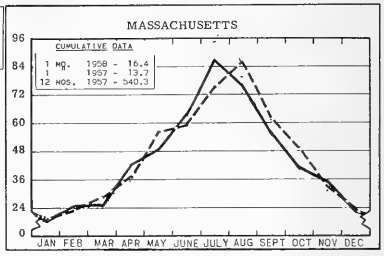
TRADE AGREEMENTS ACT EXTENSION HEARINGS: Hearings on bills to amend and extend the Trade Agreements Act were scheduled for February 17 by the House Ways and Means Committee. H. R. 10368 was introduced at the request of the Administration to carry out the President's recommendation for a five-year renewal of the Trade Agreements Act. Under the President's proposal the President would be authorized to reduce rates of duty existing July 1, 1958: (a) By 5 percent of the duty annually for five successive years. However, as an alternative, the President could reduce a duty by this same total amount over a three-year period if no yearly reduction exceeded 10 percent of the duty. (b) By 3 percentage points ad valorem, without any yearly reduction exceeding 1 percentage point. (c) To 50 percent ad valorem if an existing duty is in excess of that amount. In such cases no more than one-third of the total reduction could be made in any one year. These would be alternative methods which could not be used cumulatively. The President also has proposed that he be authorized to raise the duty 50 percent above the level in effect July 1, 1934, in cases found to warrant such protection.

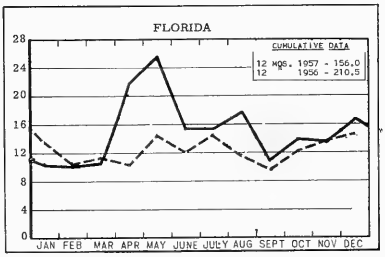
TUNA IMPORT ACT: H. R. 9734 (Tollefson) introduced in the House January 7, a bill to regulate the importation of tuna; to the Committee on Ways and Means. One Senate bill, S. 2734 (Magnuson) and three House bills, H. R. 9237 (King), H. R. 9243 (Utt), and H. R. 9244 (Wilson) were introduced in the First Session and refer to the same subject, but may differ in some respects.

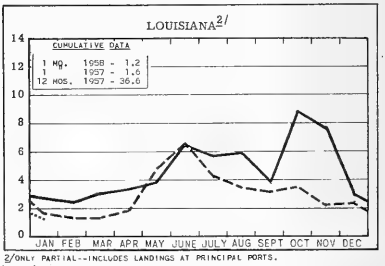
CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

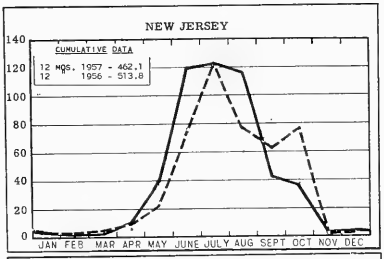


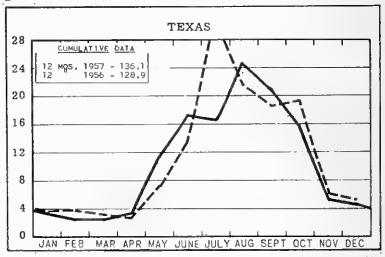


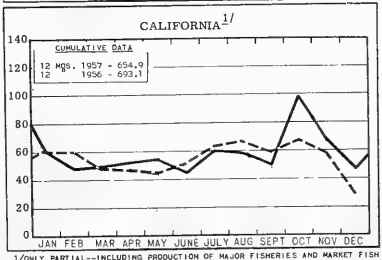




2/ONLY PARTIAL--INCLUDES LANDINGS AT PRINCIPAL PORTS.







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

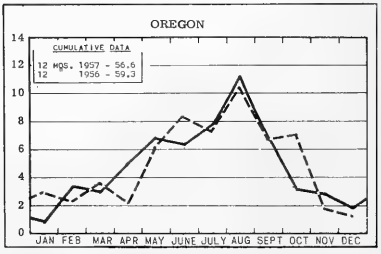
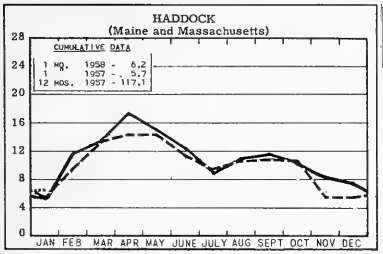
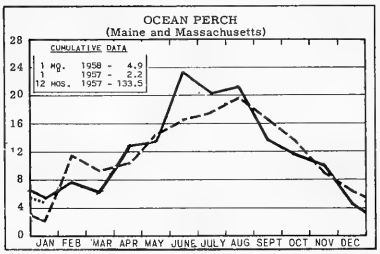


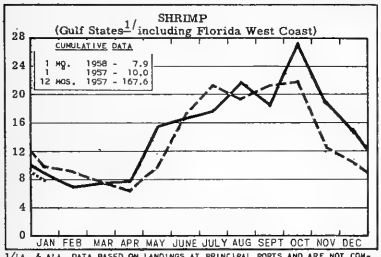
CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

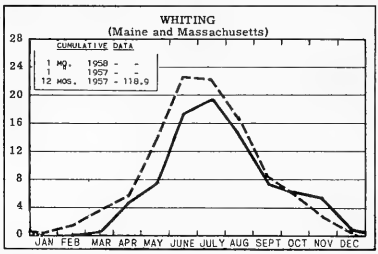




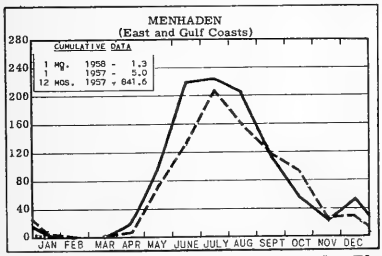
In Millions of Pounds

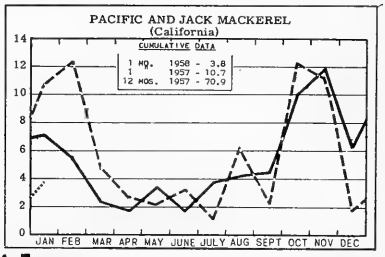


1/LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

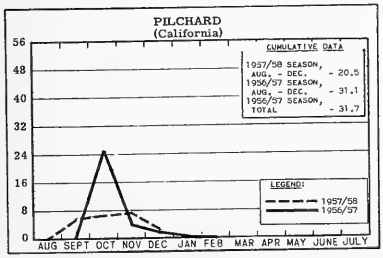


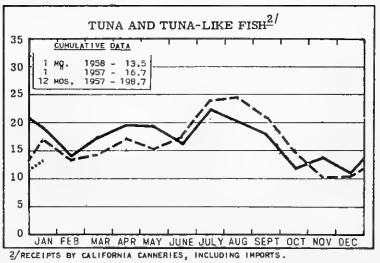
In Thousands of Tons





In Thousands of Tons

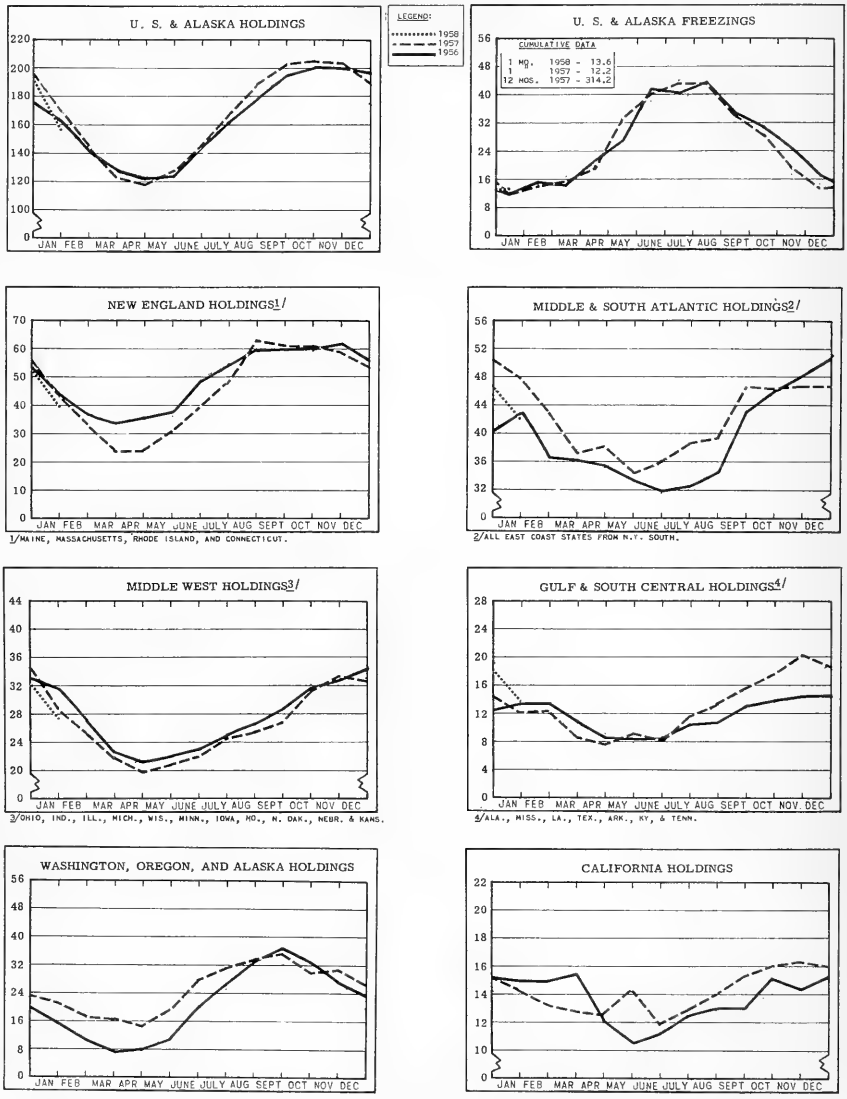




2/RECEIPTS BY CALIFORNIA CANNERIES, INCLUDING IMPORTS.

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

In Millions of Pounds



1/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.

2/ALL EAST COAST STATES FROM N.Y. SOUTH.

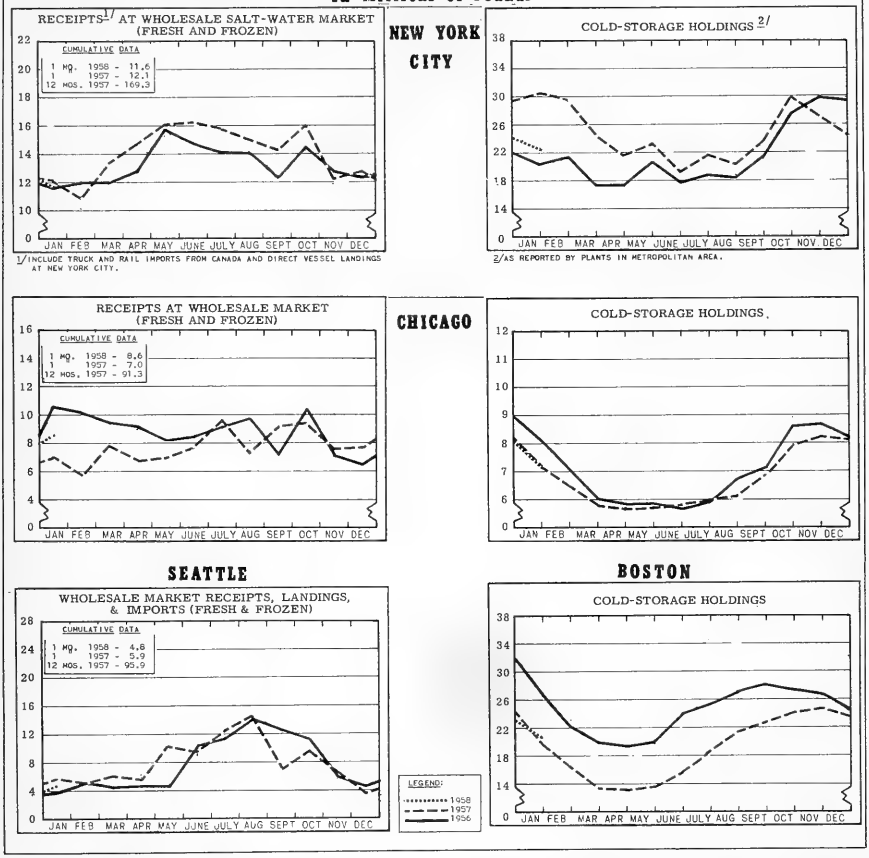
3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR. & KANS.

4/ALA., MISS., LA., TEX., ARK., KY, & TENN.

*Excludes salted, cured, and smoked products.

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

In Millions of Pounds



1/ INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

2/ AS REPORTED BY PLANTS IN METROPOLITAN AREA.

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

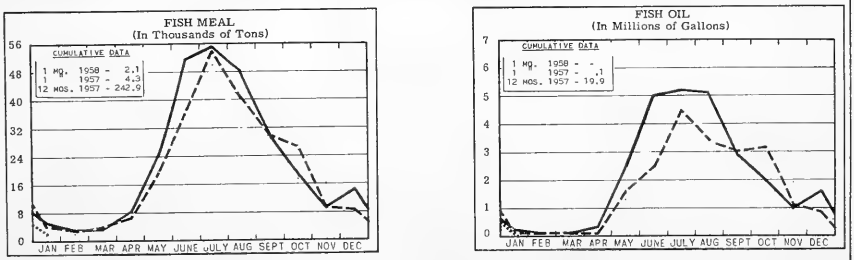
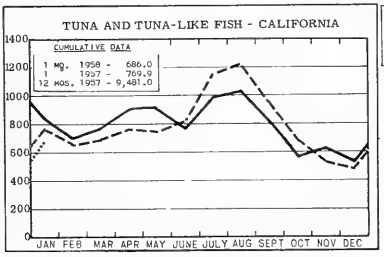
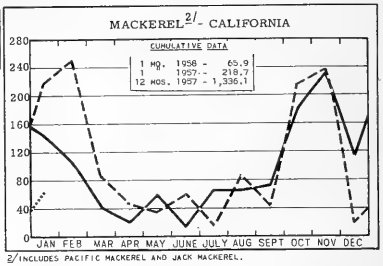


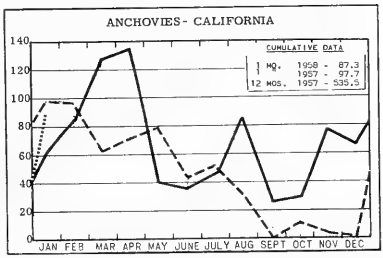
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

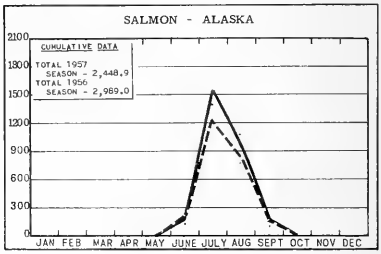
In Thousands of Standard Cases

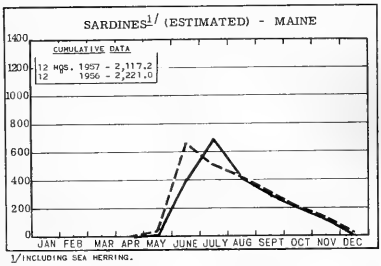




2/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.



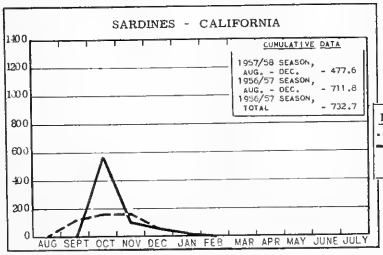


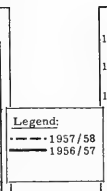


1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Can Designation	Net Wgt.
SARDINES	100	¼ drawn	3½ oz.
SHRIMP.....	48	--	5 oz.
TUNA	48	No. ½ tuna	6 & 7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
SALMON	48	1-pound tall	16 oz.
ANCHOVIES	48	½ lb.	8 oz.





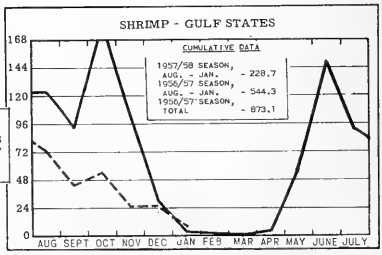
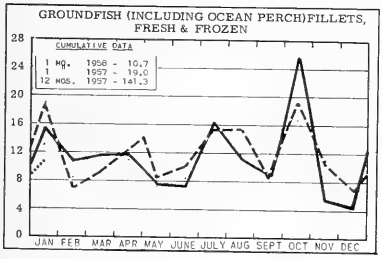
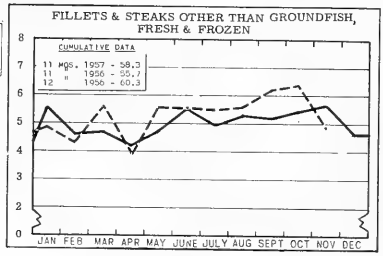
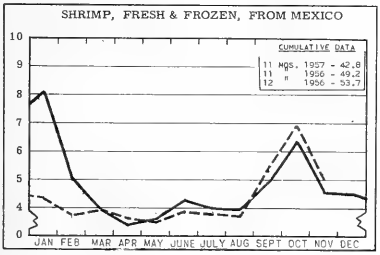


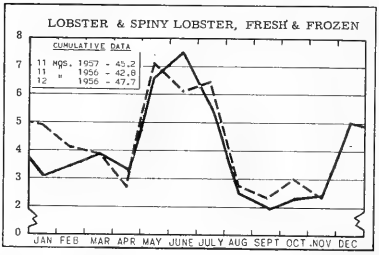
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

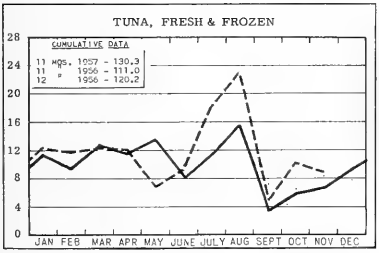
In Millions of Pounds

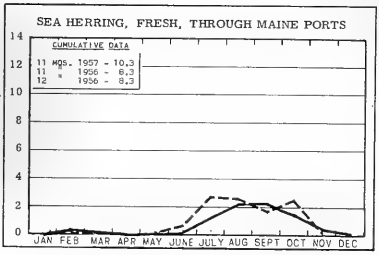


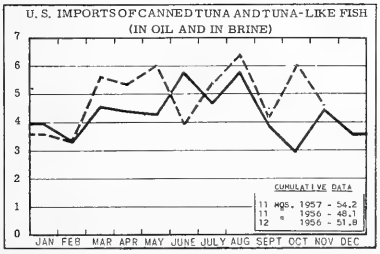


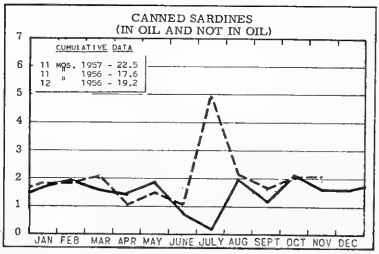












FISH AND WILDLIFE SERVICE PUBLICATIONS

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.
FL - FISHERY LEAFLET.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number Title

CFS-1629 - Georgia Landings, July 1957, 2 pp.
CFS-1643 - Fish Meal and Oil, August 1957, 2 pp.
CFS-1649 - Frozen Fish Report, September 1957, 8 pp.
CFS-1657 - Fish Stick Report, July-September 1957, 2 pp.
CFS-1664 - Fish Meal and Oil, September 1957, 2 pp.
CFS-1678 - Ohio Landings, October 1957, 2 pp.
CFS-1680 - Alabama Landings, September 1957, 2 pp.
CFS-1681 - Mississippi Landings, September 1957, 2 pp.
CFS-1683 - Georgia Landings, October 1957, 2 pp.
CFS-1684 - Fish Meal and Oil, October 1957, 2 pp.
CFS-1685 - Texas Landings, September 1957, 3 pp.
CFS-1686 - New Jersey Landings, October 1957, 3 pp.
CFS-1687 - South Carolina Landings, October 1957, 2 pp.
CFS-1688 - Rhode Island Landings, October 1957, 3 pp.
CFS-1689 - Frozen Fish Report, November 1957, 8 pp.
CFS-1690 - Shrimp Landings, August 1957, 7 pp.
CFS-1691 - New York Landings, October 1957, 4 pp.
CFS-1692 - Florida Landings, October 1957, 6 pp.
CFS-1693 - Massachusetts Landings, June 1957, 5 pp.
CFS-1695 - Maine Landings, October 1957, 3 pp.
CFS-1696 - Louisiana Landings, September 1957, 2 pp.
CFS-1698 - North Carolina Landings, November 1957, 3 pp.
CFS-1699 - Mississippi Landings, October 1957, 2 pp.
CFS-1700 - Rhode Island Landings, November 1957, 3 pp.
CFS-1701 - South Carolina Landings, November 1957, 2 pp.
CFS-1702 - Louisiana Landings, October 1957, 2 pp.
CFS-1703 - Alabama Landings, October 1957, 2 pp.
CFS-1704 - Georgia Landings, November 1957, 2 pp.
CFS-1705 - Fish Meal and Oil, November 1957, 2 pp.
CFS-1706 - New Jersey Landings, November 1957, 3 pp.
CFS-1709 - New York Landings, November 1957, 4 pp.
CFS-1713 - Florida Landings, November 1957, 6 pp.
CFS-1715 - Maine Landings, November 1957, 3 pp.

Wholesale Dealers in Fishery Products (Revised):
SL- 2 - New Hampshire, 1957.
SL-26 - Illinois, 1956.
SL-30 - Pennsylvania, 1957.
SL-32 - Minnesota, 1957.
SL-38 - Missouri, 1957.

FL - 440 - Marine Fishery Development in Liberia, 1952-54, by George C. Miller, 41 pp., illus., September 1957. A report covering the general pattern of investigation and progress of the Foreign Operations Administration's program for aiding the development of Liberian fisheries during 1952-54. During its inception, the fishery program--undertaken at the request of the Liberian government--was supervised by the U. S. Fish and Wildlife Service. The report describes the results of an extensive survey of the fisheries and fishery resources, providing details of the gear and methods used. An account of the development program includes marine fisheries and brackish-water river surveys; sport fishery observations; trials with commercial fishing gear in trolling, gill netting, and trawling; shellfish surveys; and net-making demonstrations. A section on current production and prospects of expansion includes speculation on the possibilities and future effects of increased production. An appendix to this report contains additional data summarizing major accomplishments in the development of Liberian fisheries during 1955.

FL - 446 - Pacific Coast Shrimp Recipes, by Thelma S. Rose, Helen H. Snyder, and Rose G. Kerr, 12 pp., October 1957.

Sep. No. 500 - Pacific Coast Fishing Ports.

Sep. No. 501 - Federal Specifications for Fishery Food Products and the Responsibility of the U. S. Bureau of Commercial Fisheries.

Sep. No. 502 - Correlation of Midwater Trawl Catches with Echo Recordings in the Northeastern Pacific.

Sep. No. 503 - Research in Service Laboratories (February 1958): Contains these articles--"Pacific Coast Program on the Irradiation Preservation of Fish--Phase Report;" "Technical Note No. 43 - Considerations on the Use of Refrigerated Brine for Chilling and Storing Fresh Fish."

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

Boston Fishery Products Monthly Summary, December 1957, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Landings and ex-vessel prices by species for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; and Boston frozen fishery products prices to primary wholesalers; for the month indicated.

California Fishery Products Monthly Summary, November 1957, 10 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, November 1957, 12 pp.; December 1957, 14 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 months indicated. The December 1957 issue contains a preliminary review of 1957 fishery products receipts at Chicago.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, December 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, December 1957, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and 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.

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.

AUSTRALIA:

Australian Journal of Marine and Freshwater Research, vol. 8, no. 4, November 1957, pp. 369-507, illus., printed. Commonwealth Scientific and Industrial Research Organization, 314 Albert St., East Melbourne, C.2, Victoria. Contains, among others, the following articles: "The Tasmanian Trout Fishery. I. Sources of Information and Treatment of Data," by A. G. Nicholls; and "Continuous Crayfishing Tests: Pelsart Group, Houtman Abrolhos, Western Australia, 1953," by R. W. George.

"Continuous Crayfishing Tests: Pelsart Group, Houtman Abrolhos, Western Australia, 1953," by R. W. George, article, Australian Journal of Marine and Freshwater Research, vol. 8, no. 4, November 1957, pp. 476-490, illus., printed. Commonwealth Scientific and Industrial Research Organization, 314 Albert St., East Melbourne, C.2, Victoria, Australia.

CANADA:

Fisheries Statistics of Canada; 1955, vol. 1, part 3-A, 34 pp. (tables), printed in English and French, 25 Canadian cents. Dominion Bureau of Statistics, Ottawa, Canada, 1958. (For sale by Queen's Printer and Controller of Stationery, Ottawa, Canada.) This report provides a summary of the Canadian fisheries and the information is arranged to show separately the three main fisheries areas--Atlantic, Pacific, and Inland. It includes data on the quantity and value of the catch of selected fishery products for Canada, 1952-55; production of frozen, smoked, salted, and pickled fish, canned fish and shellfish, and fishery byproducts, 1954-55; landings by trawlers, draggers, etc.; capital equipment in the primary fisheries operations; and employment in fish processing establishments. Also contains data on the quantity and value of exports and imports of fishery products; quantity and value of Canada's fishery products and byproducts, by provinces, 1946-55; Canada's canned lobster pack by provinces, 1946-55; and fishing bounties paid to vessels and boats in 1955.

Journal of the Fisheries Research Board of Canada, vol. 14, no. 6, pp. 797-1008, illus., printed. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1957. Contains, among others, the following articles: "Reactions of Juvenile Pacific Salmon to Light," by W. S. Hoar, M. H. A. Keenleyside, and R. G. Goodall; "Nematodes in the Fillets of Cod and Other Fishes in Newfoundland and Neighbouring Areas," by Wilfred Templeman, H. J. Squires, and A. M. Fleming; "The Redfish (Sebastes marinus L.) in the Western Gulf of St. Lawrence," by D. H. Steele; "Further Study of the Influence of Short Storage Periods, 3 days to 2 weeks at 15° F., on the Quality of Frozen Cod Stored at 0° F.," by W. J. Dyer, Doris I. Fraser, and W. A. MacCallum; and "Variation in the Incidence of Larval Nematodes in Atlantic Cod Fillet Along the Southern Canadian Mainland," by D. M. Scott and W. R. Martin.

CLAMS:

Survival and Growth of VENUS MERCENARIA, VENUS CAMPECHIENSIS, and their Hybrids in Suspended Trays and on Natural Bottoms, by Dexter Haven and Jay D. Andrews, Contributions from the Virginia Fisheries Laboratory

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

No. 74, 8 pp., illus., processed. Discusses the crossing of the southern hard-shell clam (Venus campechiensis) with the northern species (Venus mercenaria). (Reprinted from Proceedings of the National Shellfisheries Association, vol. 47, 1957.) Virginia Fisheries Laboratory, Gloucester Point, Va.

COMMISSIONS:

Inter-American Tropical Tuna Commission Annual Report for the Year 1956 (Comision Interamericana del Atun Tropical Informe Anual Correspondiente el Ano 1956), 113 pp., illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1957. This report includes the recommended program of investigations; progress on investigations; publication of research results; a short report on the Inter-American Conference on Conservation of Natural Resources; and a short resume of the Commission's regular annual meeting in San Diego, Calif., on July 30, 1956. An appendix to the report describes the investigations conducted by the Commission during 1956 including the following activities: compilation of current statistics of total catch, amount and success of fishing, and abundance of the fish populations; compilation and analysis of historical data on tunas; estimation of the relationship between fishing effort and equilibrium catch for yellowfin tuna; potential fishing power of the fishing fleets; compilation and analysis of historical data on the bait fishes; research on tuna population structure and migrations; other aspects of tuna life history and behavior; investigation of physical, chemical, and biological oceanography and tuna ecology; and investigations of the biology, ecology, and life history of bait fishes.

CULTURED PEARLS:

"Pearls Prove a Gem for Japan," article, Business Week, December 28, 1957, pp. 72-76, illus., printed, single copy 50 cents. McGraw-Hill Publishing Co., Inc., 99 N. Broadway, Albany 1, N. Y. Japan's pearl industry is described from its beginning about 65 years ago when a Japanese merchant turned to collecting oysters in his spare time on the theory that it might be possible to help nature produce the treasured pearl. Now the demand is so intense that Japan's cultured pearl exports for 1957 are expected to reach a record $17 million and, according to the article, in 1958 may top $20 million.

DIRECTORIES:

Scandinavian Fishing Year-Book, 1956-57 (Year-Book and Directory for the European Fish Trade), edited by Willy Rose, 312 pp. text, 16 colored plates, illus., printed, 50 kroner (US$7.50). Jørgen Frimodt, 59-61 Nyhavn, Copenhagen K. Denmark. A useful handbook for the international fishing trade. Contains 16 colored plates showing the 62 most important species of fish and shellfish of Scandinavia--the names of which are given in Latin, Danish, Dutch, English, Faroe, Finnish, French, German, Icelandic, Italian, Norwegian, Polish, Portuguese, Russian, Spanish, and Swedish. Sections on each of the countries of Denmark, Faroe Islands, Norway, Sweden, Iceland, Finland, The Netherlands, Germany, and France, contain articles on the fisheries, maps, addresses of embassies and legations, names of importing and exporting firms, and other trade data. Included also is a list of European importers and exporters covering Austria, Belgium, Bulgaria, Czechoslovakia, France, Great Britain, Greece, Hungary, Ireland, Italy, Malta, Poland, Portugal, Spain, Switzerland, and Yugoslavia. Also lists importers and exporters in Africa and Asia; Australia; New Zealand; Philippines; United States; Canada; and Central and South America. The book concludes with a main index for advertisers.

FISH MEAL:

"Biological Value of the Proteins of a Variety of Fish Meals," by A. E. Bender and S. Haizelden, article, British Journal of Nutrition, Proceedings of the Nutrition Society, vol. 11, 1957, pp. 42-43, printed. Cambridge University Press, 200 Euston Road, London N.W. 1, England.

FOOD:

Activities Report, vol. 9, no. 4, fourth quarter, January 1958, pp. 235-343, illus., printed. Research and Development Associates, 1849 W. Pershing Rd., Chicago 9, Ill. Relates to food and container research and development work of the Quartermaster Food and Container Institute for the armed forces together with related information pertinent to improving military rations; also relates to activities of other governmental, industrial, or institutional groups engaged in food and container research of direct or indirect applicability to national defense.

FOOD AND AGRICULTURE ORGANIZATION:

Canada: Amending the Small Fishing Vessel Inspection Regulations, Pursuant to the Canada Shipping Act (SOR/57-106. Order in Council P. G. 1957-391), Food and Agricultural Legislation, vol. VI, no. 2, XVI.4/57.1, 1 p., printed. 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.)

Canada: Pacific Halibut Fishery Regulations 1957, Pursuant to the Northern Pacific Halibut Fishery Convention Act (SOR/57-97. Order in Council 1957-372), Food and Agricultural Legislation, vol. VI, no. 2, XVI.1/57.1, 15 pp., printed. 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.)

Denmark: Order No. 68 Relating to the Use of Antibiotics, and Antibiotic Destroying Substances in Foodstuffs, Food and Agricultural Legislation, vol. VI, no. 2, XI.9/57.1, 2 pp., printed. 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.)

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

Ecuador: Decree No. 391 Making the Prior Completion of Buildings and Installations on Ecuadorian Territory a Condition Governing Grant of Fisheries Contracts or Licences, Food and Agricultural Legislation, vol. VI, no. 2, XVI.3/57.1, 3 pp., printed. 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.)

El Salvador: Decree No. 77 Containing Regulations Made Under the Sea Fishing and Hunting Act, Food and Agricultural Legislation, vol. VI, no. 2, XVI.3/56.1, 14 pp., printed. 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.)

General Fisheries Council for the Mediterranean, Proceedings and Technical Papers No. 4, 438 pp., illus., printed in French and English, $5. Food and Agriculture Organization of the United Nations, Rome, Italy, 1957. (Available from Columbia University Press, International Documents Service, New York 27, N. Y.)

FREEZING:

"Biochemical Change in Thaw Rigor in Relation to the Quality of Frozen Fish," by K. Amano, M. Bito, and M. Suyama, article, Proceedings of the 9th International Congress on Refrigeration, Paris, 1955, pp. 4066-4073, 4092-4095, printed. International Institute of Refrigeration, 177 Boulevard Malesherbes, Paris 17°, France.

"Experiments on the Freezing of Fish in an Air-Blast Freezer," by J. Nagaoka, S. Takagi, and S. Hotani, article, Proceedings of the 9th International Congress on Refrigeration, Paris, 1955, pp. 4105-4110, printed. International Institute of Refrigeration, 177 Boulevard Malesherbes, Paris 17°, France.

"Frozen Fish. Quality Aspects," by E. Heen, article, Proceedings of the 9th International Congress on Refrigeration, Paris, 1955, pp. 4046-4050, 4092-4095, printed. International Institute of Refrigeration, 177 Boulevard Malesherbes, Paris 17°, France.

"Necessary Equipment for the Freezing of Fish," by W. A. MacCallum, article, Proceedings of the 9th International Congress on Refrigeration, Paris, 1955, pp. 4096-4104, printed. International Institute of Refrigeration, 177 Boulevard Malesherbes, Paris 17°, France.

FREEZING FISH AT SEA:

"La Congelation Continue du Poisson a Bord," (Continuous Freezing of Fish on Board Ship) by M. Sadorge, article, Proceedings of the 9th International Congress on Refrigeration, Paris, 1955, pp. 4111-4115, printed in French with English summary. International Institute of Refrigeration, 177 Boulevard Malesherbes, Paris 17°, France.

GENERAL:

"Look to the Sea," by Mark Ronayne, article, Trade News, vol. 10, no. 5, November 1957, pp. 3-13, illus., printed. Department of Fisheries of Canada, Ottawa, Canada. This article describes briefly the nature and significance of the work being done at the Fisheries Research Board's Technological Station in Halifax. Studies and experiments are constantly going on to find new ways of processing, preserving, and utilizing the teeming sea resources. The Halifax Station seeks by means of fundamental and practical research to find the answers to two over-all problems: (1) how best to utilize the fish resources--the popular food species, the leftovers from the food processing operations, and unexploited species of low commercial value--to manufacture a wider range of more valuable products than those now coming from the fisheries; and (2) how best to retain the fresh, flavorsome, nutritious qualities in the wide variety of food products that the Canadian fishing industry markets at home and abroad. The following subjects are covered briefly in this article: fish flour; residual products; utilizing the viscera; research on herring, herring oil, cod livers, quality, freezing, and engineering.

HAKE:

"Sobre Algunos Procesos Bioquimicos en la Decomposicion de la Merluza (Merluccius merluccius)," (Some Biochemical Processes in the Decomposition of European Hake.) by G. Varela and R. Wojciech, article, An. Bromatol., vol. 8, 1956, pp. 5-18, printed in Spanish with summary in English. (Chemical Abstracts, vol. 50, 1956, no. 14139.) American Chemical Society, 1155 16th St. NW., Washington 6, D.C.

HERRING:

Report of the Atlantic Herring Investigation Committee, by A. H. Leim, S. N. Tibbo, L. R. Day, L. Lauzier, R. W. Trites, H. B. Hachey, and W. B. Bailey, Fisheries Research Board of Canada, Bulletin No. 111, C$3.50. Queen's Printer, Ottawa, Canada. Results of the Committee's work, which constitute an important step towards the development of the very great potential herring fisheries of the Gulf of St. Lawrence and the Atlantic Coast as a whole, are presented in great detail in this report. It is explained that the Committee attacked the problem of learning how to find and catch more and better herring on a broad front. "To provide background for the search the Committee contributed greatly to a study of the physical oceanography of the Gulf region, working in close cooperation with the Atlantic Oceanographic Group of the Fisheries Research Board. Against this background the Committee conducted explorations for herring with old and new methods. It made the first successful catches in the Bay of Islands area; its findings and its gear enabled the Fisheries Research Board to discover the abundant high-quality herring which can be caught with drift nets in the Gulf. The Committee showed that there are several more or less distinct herring populations in the Gulf and

adjacent areas differing in growth rate and other characteristics but none of them fully exploited. The geographical and seasonal variations in quality, especially oil content, were explored."

DEPARTMENT OF THE INTERIOR:
1957 Annual Report of the Secretary of the Interior (For the Fiscal Year Ended June 30, 1957), 473 pp., illus., printed, $1.50 (paper). U. S. Department of the Interior, Washington, D. C. (For sale by the Superintendent of Documents, Washington 25, D. C.) The activities of the Department's bureaus and offices, including the United States Fish and Wildlife Service, are summarized in this report. Specifically discussed are utilization of the commercial fishery resources (describes the activities of the Bureau of Commercial Fisheries): research in fishery biology (coastal, inland, and marine fisheries); conservation of Alaska commercial fisheries; Pribilof Islands fur-seal industry; and foreign activities. Summaries are also included of the various activities of the Bureau of Sport Fisheries and Wildlife.

IRRADIATION PRESERVATION:
"Effect of Ionizing Radiations on Southern Oysters," by E. A. Gardner and B. M. Watts, article, Food Technology, vol. 11, 1957, pp. 329-331, printed. Institute of Food Technologists, 176 W. Adams St., Chicago, Ill.

KENYA:
Report on Kenya Fisheries, 1956, 18 pp., printed. Ministry of Forest Development, Game and Fisheries, Fisheries Division, Nairobi, Kenya, 1957. A complete review of Kenya's fisheries for 1956. Reports on work at a tilapia culture farm and at a trout hatchery, and developments in the trout fisheries. A section on the marine fishing industry covers: general developments in progress, trade, exploratory work, demand, and fishery legislation; frozen, dried, and salted fish trade; sedentary fisheries; exploratory and experimental work in fishing gear and methods; sociological aspects of the industry; game fishing; and notable game fish catches made in 1956. A report on an inspection of coastal oyster beds is also included as well as several tables of catch statistics.

OYSTERS:
"Application of the Thiobarbituric Acid Test as a Quantitative Measure of Deterioration in Cooked Oysters," by M. G. Schwartz and B. M. Watts, article, Food Research, vol. 22, 1957, pp. 76-82, printed. Department of Food Technology, University of California, Davis, Calif.

"The Louisiana Oyster Story," by Ednard Waldo, article, Louisiana Conservationist, vol. 9, no. 10, November 1957, pp. 2-5, 22, illus., printed. Louisiana Wild Life and Fisheries Commission, 126 Civil Courts Bldg., New Orleans 16, La. Describes briefly the life history of the oyster, the various stages of its growth, the many enemies of the oyster, and cause of oyster mortalities. The author also discusses the food value of oysters, and the three classifications of the oysters produced from Louisiana reefs--steam-canned, raw-shop (sold as raw shucked oysters), and counter stock (sold on the half-shell).

The Survival and Growth of South Carolina Seed Oysters in Virginia Waters, by Jay D. Andrews and J. L. McHugh, Contributions from the Virginia Fisheries Laboratory No. 73, 15 pp., illus., processed. (Reprinted from Proceedings of the National Shellfisheries Association, vol. 47, 1957.) Virginia Fisheries Laboratory, Gloucester Point, Va.

OYSTER DRILLS:
Some Effects of High-Frequency X-Rays on the Oyster Drill, UROSALPINX CINEREA, by William J. Hargis, Jr., Contributions from the Virginia Fisheries Laboratory No. 75, 5 pp., illus., processed. (Reprinted from Proceedings of the National Shellfisheries Association, vol. 47, 1957.) Virginia Fisheries Laboratory, Gloucester Point, Va.

Trapping Oyster Drills in Virginia--III. The Catch per Trap in Relation to Condition of Bait, by J. L. McHugh, Contributions from the Virginia Fisheries Laboratory No. 76, 19 pp., illus., processed. (Reprinted from Proceedings of the National Shellfisheries Association, vol. 47, 1957.) Virginia Fisheries Laboratory, Gloucester Point, Va.

PAKISTAN:
Fishing Craft of East Pakistan, by Nazir Ahmad, 9 pp., illus., printed. Government of East Pakistan, Directorate of Fisheries, Dacca, East Pakistan, 1955. Describes the different types of fishing craft used in East Pakistan for all phases of the fisheries.

Fishing Gear of East Pakistan, by Nazir Ahmed, 35 pp., illus., printed. Government of East Pakistan, Directorate of Fisheries, Dacca, East Pakistan, 1956. Provides brief descriptions of the different fishing nets (gill, seine, drag, trawl, clap, fixed-purse, stake, dip, and cast), fish traps, spears, harpoons, barricades, and other fishing implements used in East Pakistan fisheries. The text is substantiated by a large number of sketches.

PRESERVATION:
"Antibiotics in Food Preservation," by Henry Welch, article, Science, vol. 126, no. 3284, December 6, 1957, pp. 1159-1161, printed, single copy 35 cents. Science, 1515 Massachusetts Ave., NW., Washington 5, D. C. Describes the extensive experiments which have been conducted to explore the potentialities of antibiotics as food preservatives. Investigations of the usefulness, as well as the public health and regulatory aspects of antibiotics in the preservation of fish and other foods are discussed.

"Application of Refrigerated Sea-Water as a Medium for Storing Fresh Fish on Board Fishing Vessels," by S. W. Roach and J. S. M. Harrison, article, Proceedings of the 9th International Congress on Refrigeration, Paris, 1955, pp. 4116-4118, printed. International Institute of Refrigeration, 177 Boulevard Malesherbes,

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Paris 17°, France. Describes refrigerating equipment installed on a vessel consisting of three tanks of refrigerated seawater, 7 feet deep. Fish are collected in these tanks from various points along the coast and transported by sea to processing centers.

"Effect of Aureomycin Chlorotetracycline in the Processing and Storage of Freshly Shucked Oysters," by A. Abbey, A. R. Kohler, and S. D. Upham, article, Food Technology, vol. 11, 1957, pp. 265-271, printed. Institute of Food Technologists, 176 W. Adams St., Chicago, Ill.

"Evaluation of Chlorpactin WCS-50 as a Bactericidal Wash for Crab and Oyster Meats," by M. A. Benarde, article, Applied Microbiology, vol. 5, 1957, pp. 137-140, printed. William & Wilkins, Publishers, Mt. Royal and Guilford Aves., Baltimore 2, Md.

"Uptake of Aureomycin Chlorotetracycline by Fish and Its Heat Inactivation," by T. Tomiyama, Y. Yone, and K. Mikajiri, article Food Technology, vol. 11, 1957, pp. 290-293, printed. Institute of Food Technologists, 176 W. Adams St., Chicago, Ill.

RANCIDITY:

"2-Thiobarbituric Acid Method for the Measurement of Rancidity in Fishery Products. II. The Quantitative Determination of Malonaldehyde," by Russell O. Sinnhuber and T. C. Yu, article, Food Technology, vol. 12, no. 1, January 1958, pp. 9-12, printed, single copy: domestic $1.50; foreign $1.75. (Published monthly by the Institute of Food Technologists.) The Garrard Press, 510 North Hickory, Champaign, Ill. The present paper, although presenting a quantitative method for the determination of malonaldehyde, does not definitely establish that free malonaldehyde exists in rancid fishery products. The procedure presented in this report employs TEP as a standard for the TBA determination of malonaldehyde. Acid hydrolysis of TEP yields malonaldehyde which reacts quantitatively with TBA and affords a procedure for the determination of this carbonyl compound. By this method the malonaldehyde content of fishery products may be quantitatively measured and the degree of oxidative rancidity expressed in milligrams of malonaldehyde per 1000 g. of sample.

RESOURCES:

Land and Water Resources of the New England-New York Region, Senate Document No. 14, 85th Congress, 1st Session, 1957, 429 pp. with maps and illustrations, printed. U. S. Government Printing Office, Washington 25, D. C. This report is the result of a comprehensive survey of the resource problems of the New England-New York region. Its purpose is to provide an overall view of the developed and undeveloped resources of the region as a general framework within which the States, the Federal agencies, and the Congress may consider future recommendations for specific program developments. The individual comments of the governors of the States and the heads of the Federal agencies are included as a part of the report. Utilization of the fish and wildlife resources is discussed in the report.

SABLEFISH:

"The Fishery for Sablefish, Anoplopoma fimbria," by J. B. Phillips, article, California Fish and Game, vol. 44, no. 1, January 1958, pp. 79-84, illus., printed, single copy 75 cents. California Department of Fish and Game, 722 Capitol Ave., Sacramento 14, Calif. Sablefish or black cod, Anoplopoma fimbria, are found in the ocean waters along the Pacific coast of North America from northern Baja California northward into the Bering Sea, but are not abundant south of Monterey, Calif. This species is the object of a moderately important commercial fishery, based primarily on the demand for the product smoked or kippered. Annual fluctuations in the catch are associated with demand. Since a large portion of the catch is placed in cold storage for future smoking, large holdings in one year are associated with a relatively low catch the ensuing year, and vice versa. Racial and tagging studies indicate that there are several stocks of sablefish along the Pacific Coast. Since intermingling of these stocks or subpopulations was determined to be negligible, any contemplated regulations would have to be applied on a regional basis. Although there has been an apparent decline in the stock of sablefish off Oregon and Washington, no evidence has been found to indicate a depleted condition of the stocks in the northern and central California regions.

SALMON:

"Predicting the Color of Canned Sockeye Salmon from the Color of the Raw Flesh," by P. J. Schmidt and D. R. Idler, article Food Technology, vol. 12, no. 1, January 1958, pp. 44-48, printed, single copy: domestic $1.50; foreign $1.75. (Published monthly by the Institute of Food Technologists.) The Garrard Press, 510 North Hickory, Champaign, Ill. Describes a project which was undertaken to determine a basis for indicating the visual color preference for canned sockeye salmon and to ascertain the feasibility of predicting the color of canned sockeye salmon from the color of the raw meat. Other aspects included in this study were: (a) a comparison between color measurements of raw and canned salmon made with the Beckman-DU spectrophotometer, the Lovibond-Schofield Tintometer, and the Gardner Color-Difference Meter; (b) the correlation between the oil content and color of canned sockeye salmon; (c) the effect of increased temperature and time of processing on the color of the canned product; (d) the effect of post-mortem storage on the color of canned salmon. This study has shown that the Gardner Color-Difference Meter is a suitable instrument for the color measurement of raw and canned sockeye salmon. It was found that the a reading alone is a suitable measure of the color of canned salmon and can be best predicted from the a/b ratio of the raw fish. Three grades with specifications in terms of color measurements of both raw and canned fish have been proposed. It was found that in general the canned salmon with the higher oil content had a more desirable color. Small increases in the time and temperature of processing resulted in slightly greater color

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losses. Color losses during processing were not significantly affected by the post-mortem storage of the fish in ice or refrigerated sea water prior to canning.

SHRIMP:
"Studies in the Nutritive Value of Bombay Prawns. I. Chemical Composition of Prawns," by F. Shaikhmahmud and N. G. Magar, article, Journal of Scientific and Industrial Research, India, vol. 16A, 1957, pp. 44-46, printed. Journal of Scientific and Industrial Research, Old Mill Road, New Delhi 2, India.

SOUTH CAROLINA:
(Bears Bluff Laboratories) Annual Report 1956-1957, Contribution No. 26, 14 pp., illus., printed. (Reprinted from Report of South Carolina Wildlife Resources Department, Fiscal Year July 1, 1956-June 30, 1957.) Bears Bluff Laboratories, Wadmalaw Island, S. C., January 1958. Covers the activities of the Laboratories for the fiscal year 1956-57. Perhaps the most outstanding work of the year, after seven years of cooperative studies with other state laboratories on the production of seed oysters, the Laboratory was able to promote a small commercial planting of seed oysters for export to northern waters. Research was also continued on shrimps, crabs, and finfishes. Offshore exploratory fishing was continued with moderate success.

SPECIALTY PRODUCTS:
"Studies on Fish Sausage. I. On Properties of Casing," by W. Shimizu, S. Ueno, and M. Fujita, and "II. Chemical Compositions and Effects of Storage," by W. Shimizu, S. Ueno, S. Hibiki, M. Fujita, Y. Shimizu, K. Endo, U. Shimizu, T. Ikeuti, I. Takagi, H. Terasima, and A. Nakagosi, articles, Bulletin of the Research Institute for Food Science, vol. 19, 1957, pp. 35-43, 44-51, printed in Japanese with summaries in English. Research Institute, Kyoto University, Kyoto, Japan.

SWORDFISH:
"On the Frozen Meat of Swordfish," by Y. Tsuchiya, article, Proceedings of the 9th International Congress on Refrigeration, Paris, 1955, pp. 4084-4095, printed. International Institute of Refrigeration, 177 Boulevard Malesherbes, Paris 17°, France.

TROUT:
"'Rainbow' Trout Freezing in Japan," by S. Kato, article, Proceedings of the 9th International Congress on Refrigeration, Paris, 1955, pp. 4051-4057, 4092-4095, printed. International Institute of Refrigeration, 177 Boulevard Malesherbes, Paris 17°, France.

TUNA:
"Studies on the Quality Inspection of the Frozen Tunny in the Frozen State," by S. Hotani, article, Proceedings of the 9th International Congress on Refrigeration, Paris, 1955, pp. 4074-4077, 4092-4095, printed. International Institute of Refrigeration, 177 Boulevard Malesherbes, Paris 17°, France. Describes a useful method for determining the extent of deterioration or development of "jellied meat" of frozen tuna. The apparatus used consists of a thin, slender, steel plate which acts as a vibrator, and after insertion in the fish meat is oscillated electromagnetically.

UNITED KINGDOM:
Journal of the Marine Biological Association, vol. 36, no. 3, November 1957, pp. 445-723, illus., printed. Cambridge University Press, 32 East 57th St., New York 22, N. Y. Includes, among others, the following papers: "The Age and Growth of the Scallop, Pecten maximus (L), in Manx Waters," by James Mason; "Vitamin A and Carotenoids in Certain Invertebrates. VI. Crustacea: Penaeidea," by L. R. Fisher, S. K. Kon, and S. Y. Thompson; and "Lernaeocera obtusa, n.sp., a Hitherto Undescribed Parasite of the Haddock (Gadus aeglefinus L.)," by Z. Kabata.

WHALING:
"Giant Killers of the California Coast," by John Wesley Noble, article, The Saturday Evening Post, vol. 230, no. 24, December 14, 1957, pp. 36, 37, 49, 50, illus., printed, single copy 15 cents. The Curtis Publishing Company, Independence Square, Philadelphia 5, Pa. A very interesting first-hand account of whaling operations in the Monterey-Farallon Grounds off San Francisco, Calif. The Del Monte Fish Company plant from which the operations are conducted is the only shore whaling station now operating in the United States. The author describes and presents photographs of the chase, killing, hauling, and subsequent butchering of humpback whales. The whale meat is used primarily in the manufacture of pet foods and mink feed.

"The Whalers are Sailing Again," article, Business Week, No. 1474, November 30, 1957, pp. 100-101, 103-104, 106-107, illus., printed, single copy 50 cents. McGraw-Hill Publishing Co., Inc., 99 N. Broadway, Albany 1, N. Y. A processor of agricultural products and fish oils in the United States, in partnership with Peruvian investors, is going after sperm whales off the coast of Peru to assure a supply of oil for its refineries. This article describes the old and new techniques of catching and processing whales.

CONTENTS (CONTINUED)

Editorial Assistant--Ruth V. Keefe Illustrator--Gustaf T. Sundstrom

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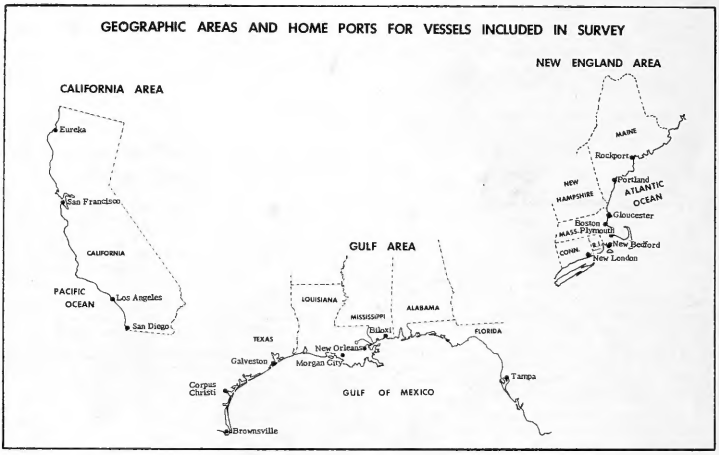
HULL INSURANCE AND PROTECTION AND INDEMNITY INSURANCE OF COMMERCIAL FISHING VESSELS

The report Hull Insurance and Protection and Indemnity Insurance of Commercial Fishing Vessels (Special Scientific Report--Fisheries No. 241) is the result of a study sponsored by the U. S. Fish and Wildlife Service and made by the Boston University College of Business Administration with funds provided by the Saltonstall-Kennedy Act of 1954. Problems of the commercial fishing industry with marine insurance are analyzed in this report.

The report, which covered the years 1950-54 inclusive, emphasizes that any Government plan to alleviate high cost of fishing vessel insurance should be in the form of services rather than direct subsidies or other type of payment. These services should consist of measures to prevent or reduce accidents or reduce their severity and that best results will come from the formulation of a well-



considered masterplan and adherence to the plan. The fundamentals of the masterplan suggested by the Boston University authors include an extensive engineering survey of commercial fishing vessels from the standpoint of navigation and safety devices; a study of possible conflict between safety at sea and fishing operations; and a program to obtain maximum safety and minimum conflict with fishing operations. In addition, such a plan should contain provisions encouraging the construction of vessels conforming to standards of structure and safety developed by the survey and rigid enforcement of such provisions. Also, that existing vessel owners be encouraged to install recommended safety devices.

Special Scientific Report--Fisheries No. 241 can be obtained free from the U. S. Bureau of Commercial Fisheries, Washington 25, D. C. A limited supply of a supplement to this report, Special Scientific Report--Fisheries No. 241 Supplement is also available from the same source. The supplement contains a description of accidents, the owner's reasons for insurance coverage, and his occupational activities, together with comments made by the interviewed vessel owners on the hull and protection and indemnity insurance problem.