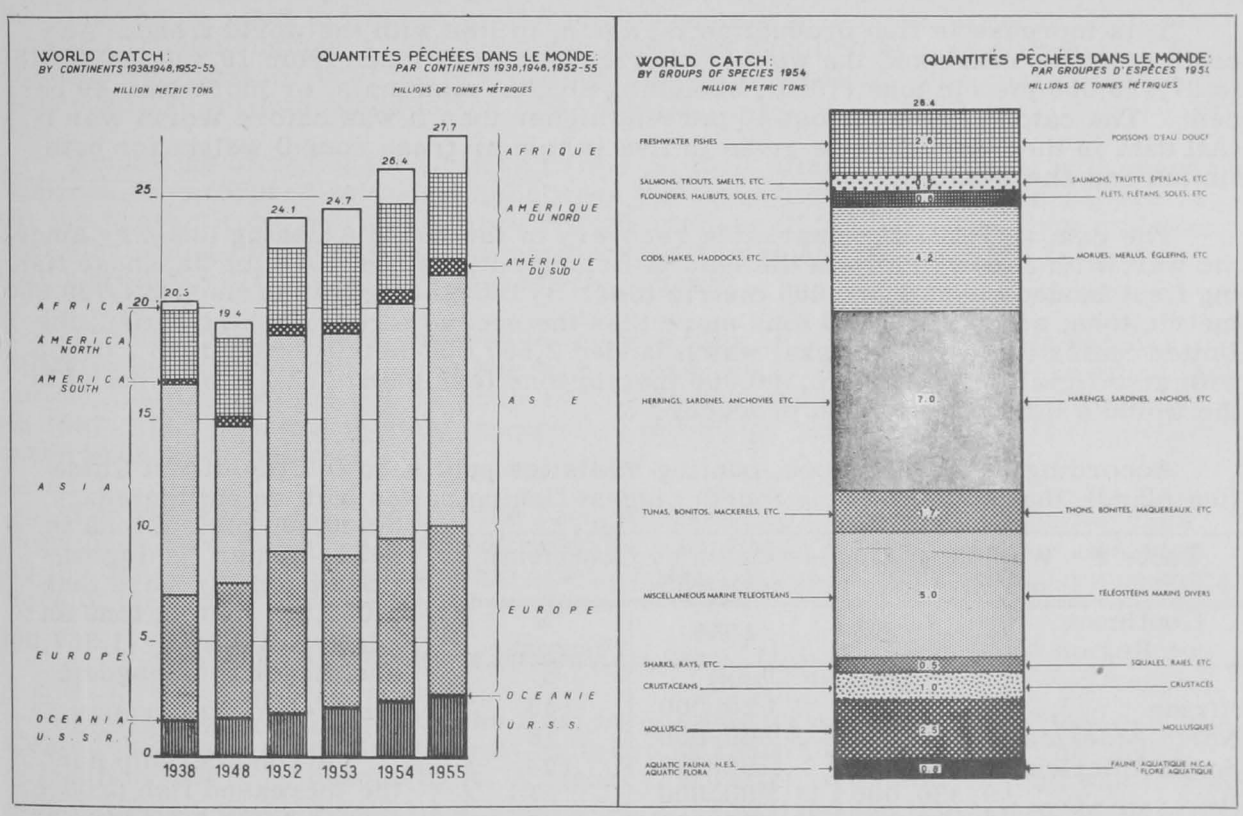
International

FOOD AND AGRICULTURE ORGANIZATION

UNITED STATES SECOND IN LIST OF FISHING NATIONS: The United States, with a fisheries catch of some 2,687,000 metric tons a year, is second to Japan as a fish catching nation, according to the Food and Agriculture Yearbook of Fishery



Statistics (Vol. V, Production and Fishing Craft), recently published. (Since the statistics in the yearbook are based on live (whole or fresh round) weight for both fish and shellfish, the data for the United States are higher in the Yearbook than in United States Fish and Wildlife statistics because the latter reports mollusks on the basis of the weight of edible meats instead of weight in the shell).

Although there was a slight reduction in the 1955 United States catch as compared with the 2,706,400 tons for 1954, the general trend is towards increased production, as the following figures (in metric tons) show: 2,253,100 (1938); 2,409,900 (1948); 2,390,600 (1952); and 2,437,500 (1953).

This increase in the catch over that of prewar years is in accordance with the general picture for North America and for the world in general. Table 1 illustrates the trend in fisheries production in North America during the past 17 years.

Table 1 - North American Fisheries Catch, 1938, 1948, and 1955

Area	1955	1948	1938
	(Metric Tons)		
Northern area 1/	3,660,000	3,490,000	3,100,000
Central mainland area	20,000	70,000	90,000
Central Caribbean Islands area	30,000	30,000	50,000

1/Includes the Bermuda Islands, Greenland, St. Pierre and Miquelon, Canada, and the United States (with Alaska).

Of the total catch of North America (3,800,000 tons), herring, sardines, anchovies, etc., account for the largest share, 1,260,000 tons (1955). Next come cod, hake, haddock, etc., with 630,000 tons; and third (of the fish), salmon, trout, smelt, etc., with 230,000 tons. Mollusks account for 660,000 tons and crustaceans for 220,000.

This increase in fish production is, again, in line with the world trend. According to the Yearbook, the world fisheries catch has risen from 19,390,000 (1948) to 27,720,000 metric tons (1955), excluding aquatic mammals, or more than 40 percent. The catch is now almost 40 percent higher than it was before World War II. (All data in the Yearbook are given in live (whole or fresh round) weight for both finfish and shellfish.)

The data reflect the remarkable recovery of the world's fishing industry since the war, with Japan firmly in the lead of fishing nations. In 1948 the Japanese fishing fleet landed about 2,430,000 metric tons. By 1955 the figure had risen to 4,720,000 metric tons, some 2,000,000 tons more than the second biggest fishing nation, the United States (including Alaska) which landed 2,687,000 metric tons in 1955. U.S.S.R., with an officially-published 2,500,000 metric tons (excluding aquatic mammals) is the world's third largest fish producer.

According to the Yearbook, quoting statistics published in Communist China (mainland), that country is the fourth biggest fishing nation with an estimated 2,000,000 metric tons in 1955. Other fishing nations catching more than 1,000,000 metric tons annually are Norway (1,867,000) and the United Kingdom (1,099,700).

Table 2 - World's Fisheries Catch by Continents and Regions, 1938 and 1955

Continent or Region	1938	1955	% Increase
	(Metric Tons)		%
Africa	440,000	1,620,000	168
North America	3,150,000	3,800,000	18
South America	230,000	760,000	124
Asia	9,350,000	11,280,000	27
Europe	5,540,000	7,650,000	35
Oceania	80,000	110,000	33
U. S. S. R.	1,520,000	2,500,000	66

Note: Excludes aquatic mammals, but includes all other aquatic flora and fauna.

A considerable part of the increased fish production is being used for reduction to fish meal and solubles. In 1938 some 656,000 metric tons were used for reduction purposes. Since 1948, the tonnage has increased yearly and by 1955 had reached 1,164,000 metric tons.

Among the many interesting tables in the new Yearbook is one which gives the world catch by groups of species in 1954. This table shows that herring, sardines, anchovies, menhaden, etc., make up the largest group, and account for 7,000,000 metric tons a year or 27 percent of the grand total of 26,600,000 metric tons (live weight), while the group made up of cod, hake, haddock, etc., yields 4,200,000 or 16 percent. Fresh-water fish account for 2,600,000 metric tons (10 percent) and

mollusks for 2,500,000 (9 percent). Tunas, bonitos, and mackerels account for 1,700,000 metric tons (6 percent).

The waters of the northern hemisphere temperate zone and Arctic are the most productive, yielding 18,700,000 metric tons live weight, or about 70 percent of the world total. The tropical zones account for 4,100,000 tons (16 percent), and the southern hemisphere temperate zone for 1,400,000 metric tons (5 percent).

WHALING

JOINT JAPANESE-CHILEAN WHALING FIRM PLANS: A joint Japanese-Chilean whaling firm will be formed with the Japanese and Chilean partner companies each contributing equally to the capital stock of US$1.2 million. The new venture will not only process whales into meat, oil, and meal, but will also produce frozen fish fillets and fish oils for export. A large Chilean trading firm will handle the new firm's exports and will be its United States representative.

The Chilean concern of the new firm was established in 1954, with offices at Santiago and a plant in Coronel. The plant was built under the direction of Japanese and Danish engineers, and the machinery was supplied by a Danish firm. The plant is equipped for both the processing of whales and fish. The cost of the plant exceeded 180 million pesos (about US$360,000).

According to one of the Chilean partners, the Chilean Government will soon approve the proposed partnership between the local firm and the Japanese firm. At the present time there are three representatives of the Japanese firm in Santiago discussing final details of the partnership, states a November 28, 1956, dispatch from the United States Embassy in Santiago.

The Japanese partner concern to the new firm will lease two whale catcher boats to the joint venture, complete with crews, and will also furnish 12 technicians for the plant at Coronel. The whale catcher boats are scheduled to arrive early in 1957. The processing plant is expected to employ between 150 and 200 workers when production begins.

The report from Japan that the regulations of the International Whaling Commission will be observed was confirmed by one of the Chilean partners. As soon as the details as to the partnership are complete, three Japanese will become members of the board of directors of the firm.

JAPANESE-RUSSIAN NORTH PACIFIC FISH COMMISSION

FIRST MEETING HELD: The first meeting between the Japanese-Russian Fish Commission was scheduled to meet in Tokyo on December 30, 1956. The Soviet delegation was to be headed by A. A. Ishkov, Minister of Fisheries, and was to consist of three commissioners and eight others. The first meeting was to be held on December 30 to discuss procedures. During subsequent meetings the most important subject was to determine the total amount of salmon which the Japanese will be allowed to catch in the convention area in the 1957 season. It is reported that the Japanese will insist on a minimum of 150,000 metric tons.

The Japanese felt encouraged by the fact that the Russians sent their Minister of Fisheries and a strong delegation. Due to the high level of this delegation, the Japanese believe that negotiations will be handled expeditiously and that an agreement will be reached by the end of January 1957.

Australia

DEVELOPMENT OF NEW GUINEA FISHING INDUSTRY PLANNED: An approved plan for the development of the fishing industries in Papua and New Guinea was announced in September 1956 by the Australian Minister for Territories.

The aims of the Government are to increase shell production and exports, to reduce imports of fish, and eventually to export fish. Development of the fishing industry will increase the amount of protein food available to the indigenous inhabitants and augment their cash income from trade.

The main points of the plan, which will be implemented by the Division of Fisheries of the Territory Department of Agriculture, Stock and Fisheries are:

1. Introduction of improved fishing techniques to native fishermen, including distribution to them of fishing gear.

2. Training of native fishermen ashore and as crews of Administration vessels in all aspects of fishing.

3. Encouragement of indigenous people to organize their activities to increase their consumption and trade in fish.

4. Recruitment and training by the Administration of indigenous people as Native Fishery Assistants to assist native fishermen.

Investigation of potential fishing grounds would be continued. Commercial fishing enterprises by European and native fishermen would be encouraged where they would not conflict with village communities dependent on fishing. A trawler would be acquired by the Administration.

An overseas expert had visited the Territory and visits by other overseas experts would be arranged as required. One would advise on long-line fishing for tuna.

Other objectives of the development plan were the encouragement of fresh-water fish production, particularly in inland areas, an increase in oyster production, and investigation of local production of salt for preservation.

As fishing developed, investigations would be carried out on economic and marketing aspects and an inspection system instituted. A marine biological station would be established when appropriate. (Australian Commonwealth Director of Fisheries Fisheries Newsletter, October 1956.)

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SCALLOP FISHERY TRENDS: The scallop beds located on Australia's east coast and discovered by shrimp fishermen out of the Queensland port of Bundaberg are reported to extend some about 80 miles, from Fraser Island to Round Hill and are 25 miles in width.

The Queensland scallops are not only a different species from the Tasmanian variety but also belong to a different family. The Tasmanian scallop belongs in the family Pectinidae and the commercial catch is made up of three species, Notovola meridionalis (Commercial), Mimachlamys asperrimus (doughboy), and Equichlamys bifrons (queen). The Queensland scallop is Amusium balloti (ballot saucer scallop), one of the family Amusiidae. This species is taken in shell sizes up to 6 inches and are reported to be faster swimmers than the Tasmanian species and for this reason are caught with shrimp trawls and not the usual scallop dredges.

The market for the Queensland scallops has been extended to Sydney, according to the Fisheries Newsletter, August 1956, of the Australian Commonwealth Director of Fisheries. Two consignments were made to that market in July 1956 and were sold readily. The frozen scallop meats were packed in 5-pound cartons (six cartons to the master), and sold for about 44-45 U. S. cents a pound for single cartons and about 42-43 cents by the master carton.

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SPINY LOBSTER FISHERY AND EXPORT TRADE 1955/56: The catch (table 1) and value of Australia's spiny lobster fishery has grown steadily during the past nine years. The catch of whole spiny lobsters reached a peak in the 1954/55 season of 20.1 million pounds. In 1955/56 the catch dropped to 18.5 million pounds, due to adverse seather during the fishing season, but the total export dollar value (US$4.3 million) was the highest on record.

Table 1 - Australian Catch of Whole Spiny Lobsters, 1954/55 and 1955/56 Seasons

Country	1955/56	1954/55
	(1,000 Pounds)	
Australia:		
West	10,530	10,906
South	4,000	4,589
Tasmania	2,900	3,259
Victoria	614	832
New South Wales	471	545
Total	18,515	20,131

The export trade in spiny lobsters has also increased steadily (table 3) and in 1955/56 amounted to 4.4 million pounds as compared with 4.7 million the previous year and 1.6 million pounds in 1948/49.

In the 1955/56 season the average price paid for spiny lobster tails f.o.b. Australia reached the high level of US$0.93 a pound with some lots bringing as high as $1 a pound late in the season. Average prices received in the 1954/55 season were close to $0.83 a pound (Fisheries News Letter of Australia's Commonwealth Director of Fisheries, October 1956).

Table 2 - Australian Exports of Spiny Lobsters (Tails and Whole), 1948/49-1955/56 Seasons

	1955/56	1954/55	1953/54	1952/53	1951/52	1950/51	1949/50	1948/49
	(1,000 Pounds)							
Tails	4,411	4,723	4,169	3,941	3,606	2,865	2,650	1,603
Whole	295	118	66	130	54	71	93	183
Total	4,706	4,841	4,235	4,071	3,660	2,936	2,743	1,786

Table 3 - Australian Exports 1/ of Spiny Lobster Tails by States, 1948/49-1955/56 Seasons

Seasons	Australia		Tasmania	Total	Dollar Earnings
	West	South			
	(1,000 Pounds)				(US$1,000)
1955/56	3,505	877	30	4,412	4,300
1954/55	3,601	1,108	14	4,723	4,200
1953/54	3,244	828	98	4,170	3,500
1952/53	2,823	956	162	3,941	3,220
1951/52	3,033	556	17	3,606	2,625
1950/51	2,221	537	107	2,865	1,850
1949/50	2,005	614	31	2,650	1,360
1948/49	1,215	324	64	1,603	1,000

1/ Exports of whole spiny lobsters not included.

Canada

DIFFICULTIES ENCOUNTERED IN GRADING NEW BRUNSWICK SMELT: During the years when two-year old smelt dominated the catches from the Miramichi River area of New Brunswick, Canada, the difficulties encountered in grading are increased, according to a report by a biologist of the Fisheries Research Board of Canada (Progress Reports of the Atlantic Coast Station, No. 65, Oct. 1956). Packers and inspectors claim (there are no actual records on the subject) that the 1949/50, 1951/52, and 1954/55 seasons were particularly bad in this respect while 1952/53 and 1953/54 were quite good.

Since 1939, as an aid in marketing, smelt have been packed in three grades, and more recently in four grades, according to length. The packers can usually judge the grade of most of the fish accurately. However, difficulty arises when many smelt are within $\frac{1}{4}$ inch of the limit between grades. Inspectors will not pass boxes of smelt when more than 5 percent of the fish are smaller than the proper grade.

The four grades now established by regulation are based on length measured from the tip of the snout to the end of the backbone at the round of the tail. These grades are: small, under 4 inches; medium or No. 2, 4 to $5\frac{1}{2}$ inches; No. 1 $5\frac{1}{2}$ to 7 inches; and extras, over 7 inches.

A study of the ages of the fish in the commercial catches and the size ranges of each age group shows how the grading trouble arises.

Between grades No. 1 and extras only a few of the fish are ever within $\frac{1}{4}$ inch of the limit, so mistakes in sorting are not important. Even if all the fish that were within $\frac{1}{4}$ inch of the grade limit were put in the higher grade, the number of undersized fish would be not more than 5 percent in all but one of the last seven commercial seasons.

Table 1 - Total Catches and Sampling Data for Miramichi Smelt Showing Proportion of Fish Within $\frac{1}{2}$ Inch (Either Side) of the Limit Between Number One and Extra Grade Smelt and Medium and Number One Grade Smelt for the 1948/49 to 1954/55 Commercial Seasons

Commercial Season	Total Miramichi Catch	Numbers Sampled	Proportion Within $\frac{1}{4}$ Inch of Limit Between	
			Number One And Extra	Medium and Number One
	1,000 Lbs.		.....(Percent).....	
1954/55	2,058	7,022	5	22
1953/54	1,183	5,106	11	16
1952/53	1,624	4,922	10	13
1951/52	854	5,647	4	25
1950/51	2,178	4,347	7	20
1949/50	1,178	5,596	2	28
1948/49	2,013	1,342	8	18

However, between grades medium and No. 1 (table 1) there are always many fish within $\frac{1}{4}$ inch of the limit. In the three bad seasons (1949/50, 1951/52, and 1954/55) from 22-28 percent of the catch was within $\frac{1}{4}$ inch of the limit. Real trouble occurred in packing during these seasons because every third or fourth fish was in the hard-to-grade group. On the other hand, there was little difficulty in 1952/53 and 1953/54. In these years there were only 13 percent and 16 percent of such fish in the catch. The 1948/49 and 1950/51 seasons showed only moderate difficulty, with 18 percent and 20 percent of borderline fish.

The difficulty is not necessarily related to the total catch, for in the three bad years the catch ranged from almost the highest in 1954/55 (2.2 million pounds) to the lowest of the seven seasons in 1951/52 (about 0.9 million pounds).

The most important fish in the catch are those nearing 2, 3, and 4 years of age and the 2's generally make up most of the catch (table 2). The 2's made up most of such fish between mediums and No. 1 and the 3's those between No. 1 and extras. The commonest size of the 2-year-old fish is usually close to the grade limit between mediums and number ones. Sampling of the catches for seven seasons demonstrated that grading difficulties were great when 2's made up a greater than average part of the catch. In the three seasons in which grading problems were most severe, the 2-year old fish made up 66 percent, 81 percent, and 70 percent of the catch respectively. In 1949/50 some 3-year olds were also near this grade limit, raising the total considerably above that of the 2-year olds alone. This is uncommon and was caused by these 3's (1947 hatch) growing more slowly than usual.

Table 2 - Percentage of "2-year-olds" in the Miramichi Smelt Catches for the 1948/49 to the 1954/55 Commercial Seasons

1954/55	1953/54	1952/53	1951/52	1950/51	1949/50	1948/49
(Percent)						
70	52	48	81	62	66	54

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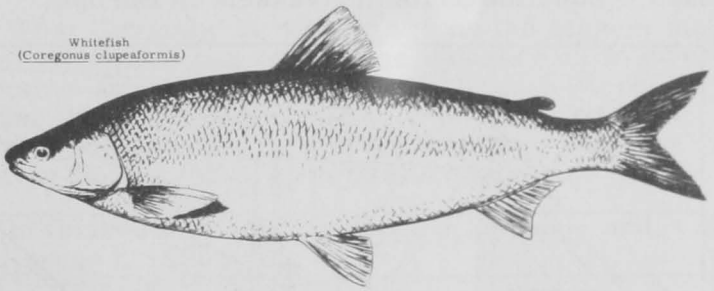
LAKE WHITEFISH: Half a dozen or so varieties of whitefish have been recorded from Canadian inland waters, but the common or lake whitefish is the only one of commercial importance in Canada's fisheries. It is found in Manitoba, Ontario, and Saskatchewan. Large landings are also made from Alberta waters and from Great Slave Lake, N. W. T. Some catches are taken by the fishermen of Quebec, New Brunswick, and the Yukon Territory. The whitefish belongs to the family Coregonidae, suborder "Salmonoidea," and thus is related to Atlantic and Pacific salmon, speckled and rainbow trout, tullibee, ciscoes or lake herring and several other fish.


Whitefish
(Coregonus clupeaformis)

In coloring the whitefish is olivaceous on the upper part of the body, with whitish sides and under portions. The lower fins may be dusky. The tail fin is deeply forked. Head and mouth are comparatively small, the scales large. The mouth is subterminal, distinguishing it from other members of the family. Some adult whitefish have a fleshy bump at the shoulders. So far as weight and body measurements are concerned, it is not possible to give exact averages for any species of fish, but the mature whitefish averages 18 inches in length and weighs about 2.5 pounds. This size makes up 75 percent or more of the catch.

The whitefish lives upon minute mollusks and crustaceans and other small aquatic creatures. Its summer habitat is the deeper, colder parts of the lakes, from which they move into more shallow water at spawning time. The spawning time varies somewhat in different years depending on the conditions of the weather and also with respect to the locality. Spawning begins in the latter part of October and continues into the first week of December. In Great Slave Lake it may continue into January in some areas.

Whitefish generally reach maturity in the third and fourth year. They mature in the eighth year in lakes where the average water temperature is low. A full-grown individual deposits from 10,000 to 75,000 eggs, depending on the fish's size.

The Northwest Territories, Manitoba, Ontario, and Saskatchewan are the main Canadian producers of whitefish. Commercial fishing for whitefish was undertaken at Great Slave Lake in the Northwest Territories for the first time in 1945.

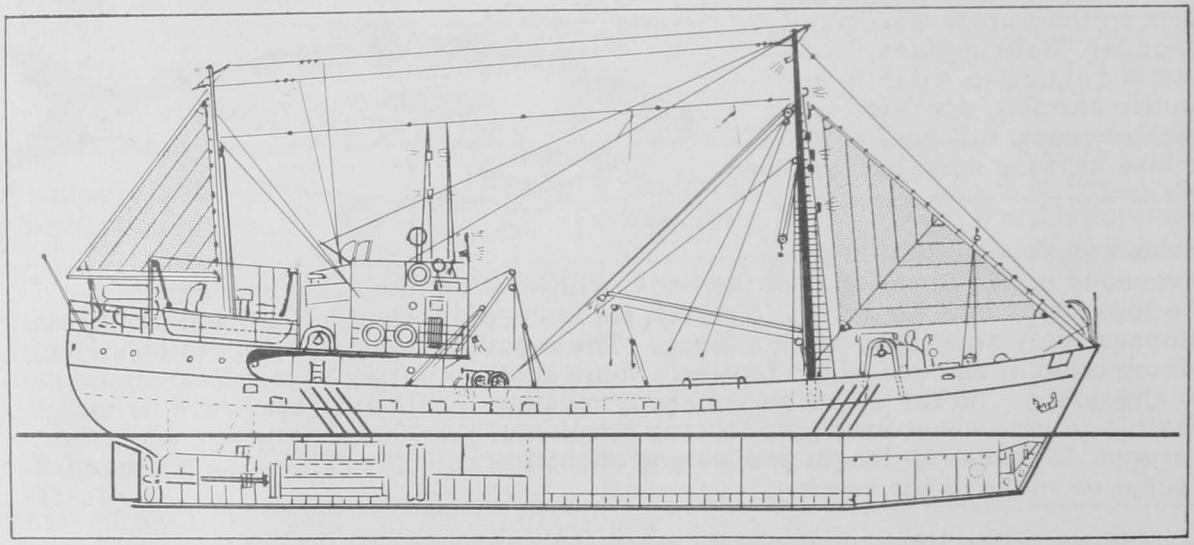
Gill-netting is the chief method used in fishing for whitefish, although stationary pound nets and trap nets are also used in some areas. In areas where winter fishing is done, and in the Prairie Provinces, the bigger part of the whitefish catch is usually taken in the winter season, the gill nets being set under the ice. The hook-and-line method of fishing for them is followed in commercial operations in Lake Simcoe, Ontario.

Virtually all of the whitefish marketed by Canadian fishermen is sold in the fresh and frozen forms, though small quantities are smoked. The catch is sold in Canada and the United States, most of it in the latter country.

The fishery resources of the Great Lakes are now under joint scientific investigation by Canada and the United States. This investigation, and an augmented program to rid the lakes of the predatory sea lamprey, are the responsibility of the International Great Lakes Fisheries Commission. (Trade News, October 1956, of Canadian Department of Fisheries.)

German Democratic Republic

SHIPYARD BUILDS TRAWLERS ON ASSEMBLY-LINE METHODS: The East German port of Stralsund, which lies on the Baltic seaboard about 20 miles northeast of Rostock, is nowadays the scene of one of the most interesting examples of mass production of fishing vessels in Europe.



Profile drawing of the 128-foot trawler constructed on assembly-line methods in East Germany.

Some eight years ago the yard, which is now turning out 100 fishing vessels a year, did not even exist. It now employs 6,000 men. Majority of these mass-produced craft are exported to Poland, Soviet Russia, and China at a cost of US$232,400 each, and it was to satisfy the big demands of these countries for fishing craft that the present method of mass production was evolved.

Full technical details of this method are not available, but it appears that, as is of course the practice in many yards in the non-communist countries, building is done in sections. Apparently the whole production process is along the lines of an automobile factory. The buildings on the outside perimeter prepare the parts for each section; those further inward are putting the parts together; the sections are then fed into a main building where they are assembled on three lines.

The final product, which is offered as a 400 horsepower fishing lugger, is registered in the highest class of the Maritime Register of the U.S.S.R. The yard states that they are very anxious to contact the Western world to draw attention to their vessels. It is anticipated that production will increase to 130 vessels a year.

Principal dimensions of the lugger are as follows: length over-all 128 ft. 3 in.; maximum breadth 24 ft. 2 in.; maximum draught 13 ft. 7 in.; power output 400 hp.; speed at displacement of 434.93 tons, 10 knots.

The vessel is a dual-purpose, steel-built drifter-trawler, designed for deep-sea work. There is 1-, 2-, and 4-man cabin accommodations fore and aft for a crew of 26, although the normal complement would be 23. Fuel-oil capacity provides for 21 days of uninterupted operation of the main engine at full power, as well as for 12 hours a day running of the auxiliaries over the same period.

Diesel power is provided by a direct-reversing, 4-stroke type 148-unit engine, developing 400 b.h.p. at 275 r.p.m. Reports say that they are "sea-kindly" and good fishing ships (World Fishing, October 1956).

German Federal Republic

CANNED SARDINE MARKET: West Germany is reported to be the biggest market in the world for canned sardines. Germany has no sardine industry of its own and imports all the sardines it consumes from Portugal, France, French Morocco, and Yugoslavia. Total imports during the past two years (table 1) averaged about 12,500 metric tons each year at a value of approximately US$6.2 million, an August 20 dispatch from the United States Consul General in Bremen reports.

Table 1 - German Federal Republic Canned Sardines (Sardina pilchardus and Culpea pilchardus), 1954-1955

Country of Origin	Quantity	Value		Quantity	Value	
	Metric Tons	DM 1,000	US$ 1,000	Metric Tons	DM 1,000	US$ 1,000
France	2.3	10	2	8.7	35	8
Yugoslavia	324.0	602	143	864.4	1,480	352
Portugal	11,717.1	24,539	5,840	9,624.6	20,960	4,988
Spain	7.7	14	3	17.5	38	9
French Morocco	386.0	844	201	2,378.6	3,803	905
Spanish Morocco	18.9	37	9	34.2	73	17
Others	-	-	-	2.2	3	1
Totals	12,456.0	26,046	6,198	12,930.2	26,392	6,280

Note: Values converted at rate of 1DM = US$0.238

An unusual situation prevails in Germany with regard to the importation and marketing of sardines. According to several spokesmen of the sardine import trade, the marketing of sardines in Germany is still subject to the stipulation that Germany shall use the designation "sardines" only for the species Sardina pilchardus and Clupea pilchardus caught in Mediterranean waters and along the European Atlantic coast up to and including the English Channel. This geographical limitation plus

the zoological definition of a "sardine" effectively limits West German imports of sardines to the present supplier countries.

West German importers have stated firmly that they definitely do not wish to import sardines and market them as such in Germany unless the sardines are actually from the area specified. These representatives furthermore frankly declared that they are not interested at all in a change in the present situation. During the last thirty years or so the designation "sardines" has become identified in the mind of the German consumer with a definite type product. Importers say that they do not want to endanger their carefully developed present market by introducing unfamiliar types of sardines.

Germany has a sizable domestic herring industry. In 1955 the total West German herring catch amounted to about 335,000 tons. Approximately half of this amount was canned--some 105,000 tons. About 40 percent of this production would compete with any product imported as canned herring. The remaining volume represents a so-called semi-preserved product, mostly the bigger type of filleted and marinated herring packed in a great variety of brines and sauces.

West German importers seriously doubt whether the United States industries could compete pricewise with the German product. The factory price for a $3\frac{1}{4}$-ounce flat can of small herring packed in natural oil is 26 Pfennigs (6 U. S. cents). This retails at 36-40 Pfennigs ($8\frac{1}{2}$-$9\frac{1}{2}$ U. S. cents) a can. In other words, to meet the domestic price, the United States product must not cost more than approximately 6 cents a can, c.i.f. West German sea port. Besides shipping costs this price would have to cover a 14-percent import duty plus a 6-percent compensation tax. German importers calculate that after the deduction of the above charges the remaining amount (about 4¢) represents about half the price at which United States fish canners are now selling their product in the United States. It has further been pointed out that, if a market were to be created for the United States product, the price quotations, at least for several of the pilot orders, would have to be lower still to provide an incentive for the importer to embark upon such an enterprise and to win the German consumer over to the new product.

Another impediment to the importation of canned herring is the fact that their purchase abroad has not yet been liberalized. Individual licenses within import quotas set by the Federal Government would still be required. As far as could be determined such quotas have never been allowed by the government which is trying to protect the domestic industry. Such protection from foreign competition is claimed to be indispensable because of the division of Germany. The canning industry, concentrated mostly in West Germany, suffered the loss of a large part of the domestic market in the East Zone.

Only 102 metric tons of canned sardines were exported by the German Federal Republic in 1955 as compared with 78 tons in 1954, mostly to the Belgium Congo and Austria.

Iceland

BECOMES PARTY TO INTERNATIONAL WHALING CONVENTION: On November 23, 1956, the Ambassador of Iceland to the United States signed the protocol to the International Whaling Convention in Washington, D. C., and deposited the ratification with the appropriate officials. This will make Iceland a party to the rules and regulations set up for the conservation of whales.

Iran

JAPANESE-IRANIAN FISHING AND MARKETING ENTERPRISE IN PERSIAN GULF AND GULF OF OMAN: Important development of Iran's marine food resources in the Persian Gulf and Gulf of Oman is anticipated following the approaching formation of a new company financed by the Seven Year Plan Organization and private Japanese capital. The enterprise plans to create new sources of foreign exchange through export trade and to fill the need for an augmented animal protein diet for the people of southern Iran. It will be complementary to a project begun a couple of years by the Plan Organization and the United States Operations Mission in Iran to rehabilitate the Government cannery at Bandar Abbas.

An Iranian-Japanese fishing and marketing venture in the waters bordering Iran's southern coastline is expected soon to begin deep-sea commercial operations after almost two years of study and trial fishing by a private Japanese enterprise. Forecasting sound opportunities for the development of foreign exchange for Iran through export trade and the provision of needed additional animal protein foods for the internal Iranian market, the Japanese company's reports led to the signing of a basic agreement on June 17, 1956, with Iran's Seven Year Plan Organization.

This agreement provides for the establishment of a joint stock company with headquarters in Abadan. Initial capitalization is to be 30 million rials (US$400,000), two-thirds to be subscribed by the Plan Organization and one-third by the Japanese company. After the third year of operation, the capital shall be increased by another 30 million rials ($400,000); and, after the fifth year, by an additional 30 million rials. Management of the joint company will be vested in a five-man board of directors: three Iranians; two Japanese. The president of the board will be Iranian and the managing director, Japanese. Fishing vessel crews and technicians will be largely supplied by the Japanese company. Actual Plan Organization participation in the company will be effected by the Chemical Industries Section, points out a December 26, 1956, dispatch from the United States Embassy at Tehran.

The company is authorized under the basic agreement to exploit fish and other edible marine life in the Persian Gulf and the Gulf of Oman, as well as to process and market its catch in Iran and abroad. Also provided for is the ownership and operation of fishing vessels, canning factories, refrigeration and ice-making plants, and related endeavors.

The Iranian market will probably be limited initially to the areas bordering the Persian Gulf, particularly in the Abadan area, where animal protein foods are not now in good supply. Export possibilities in much of the Middle East are good, according to one Japanese source. The sale of shrimp in the United States market is also believed feasible.

The key to the venture's success is stated to lie in the use of modern equipment and processing techniques, with emphasis on quick freezing of the catch on the fishing vessel itself and adequate cold-storage facilities at Abadan. The earlier studies of the Japanese company indicated that major attention should also be given to improving the present method of fish marketing along the Persian Gulf coastal areas.

Only one vessel, the Tatsuta Maru, property of the Japanese company, is now available for the operations of the new company. The ship, which carried on the trial studies, is described as a 550-ton refrigerated trawler, with a quick freezing capacity of 10 tons a day. The potential monthly catch with this equipment is estimated at from 100 to 200 metric tons a month. Additional vessels and equipment will be brought into operation following registration of the company and development of foreign and domestic markets.

The basic agreement does not give the Persian Gulf Fisheries Company a monopoly of fishing, marketing, or any other associated fields. In principal, however, equipment not available in Iran will be procured from Japan, provided Japanese prices are "not disadvantageous."

Japan

FISHERIES TECHNICIANS HOLD CONFERENCE: The Japanese Agriculture and Fisheries Technical Council held a conference beginning December 3, 1956, to discuss the various problems in connection with the Japanese fishing industry. Among the subjects under discussion were: (1) the reasons for the decline in the sardine catch in the postwar period compared to prewar catches and the results of research carried out with respect to the problems; (2) deep-sea tuna fishing and the problems raised by the restrictions imposed on albacore; (3) salmon fishing in the North Pacific and problems raised by Soviet restrictions; (4) matters involving the North Pacific Fisheries Agreement, including migration of salmon and distribution of species; (5) the forthcoming negotiations under the Russian-Japanese salmon fishing agreement.

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FROZEN SHRIMP IMPORTS FROM RED CHINA APPROVED: An application by the four leading Japanese fishing firms to import frozen shrimp from Communist China was approved in December 1956 by the Japanese Ministry of International Trade and Industry. The shrimp will be imported on a barter basis, 2,300 cases of Japanese king crab meat in exchange for 100 tons of Chinese frozen shrimp. The Japanese government approved the application with the proviso that the shrimp be packed in blocks of 1.1 pounds and 4.4 pounds and prepared in a specified manner. These stipulations were made in order to facilitate re-export. The Ministry was reported anxious to prevent the re-export of these frozen shrimp to the United States, states a December 14, 1956, dispatch from the United States Embassy in Tokyo.

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NATURAL FLUCTUATIONS IN POPULATIONS OF PRIME IMPORTANCE IN TUNA FISHERIES CLAIMS BIOLOGIST: Natural fluctuations in the tuna populations are of prime importance and fishing has had little permanent effect on the stocks, according to a talk given by Director Hiroshi Nakamura of the Nankai Regional Fisheries Research Laboratory at the Kanagawa Fisheries Experiment Station on August 14, 1956. This evidently represents a different point of view from the panel discussion held at Misaki, Japan, on August 23, 1956, where industry members considered the problems which might be taken up by the Tuna Fishery Investigative Committee recently established by the Japanese Fisheries Agency, and where the gist of the discussion was that lower daily catches of tuna experienced by Japanese fishing vessels in recent years might be an indication of overfishing, and that regulation might be in order some day. (See Commercial Fisheries Review, November 1956, p. 90).

In his discussion, Nakamura comments regarding the close relationship between currents and the fish faunas and points out documented instances of major changes in tuna populations, changes that could not possibly be ascribed to fishing. The final comments of Nakamura deal with forecasting tuna abundance.

Some excerpts from Nakamura's talk follow:

... If we may make some very rough approximations about the Pacific Ocean,

a. In the area where the North Pacific Current, that is the Kuroshio, is flowing to the eastward, there are fishing grounds mainly for albacore and bigeye with striped marlin and broadbill swordfish also taken.

b. In the area of the North Equatorial Current lying to the south, the fishing conditions are not clearly defined by or centered around any particular species, but if pressed, we might say that it is a fishing ground for a mixture of striped marlin, black marlin, and yellowfin. However, bigeye are abundant centered along the northern and southern boundaries of current system, and it is an important fishing ground for medium-sized vessels. This area is not a very clearly defined fishing ground, but it is thought to have an important significance as a spawning or nursery ground, and young of the tunas, spearfishes, and skipjack appear to be distributed there.

c. Next to the south is the Equatorial Countercurrent area where, as you know, the main catch is yellowfin with a mixture of bigeye and black marlin.

d. Moving into the South Equatorial Current next on the south, the northern part is a fishing ground on which yellowfin are extremely abundant. However, from the vicinity of 10° S. albacore suddenly become numerous. Until recently it was not known that there was a current boundary in this vicinity, but judging from the albacore fishing conditions we postulated that there must be a current boundary there. With the cooperation of the Daifuji Maru in carrying out oceanographic observations in this region it was found that during the season of northerly winds there is a clearly marked current boundary in the vicinity of 10° S. and it has been established that our hypothesis was correct. However, with the season of southerly winds this boundary fades out, and at the same time the albacore begin to be taken more to the northward.

The foregoing is the situation in the Pacific area and a similar situation obtains in the Indian Ocean, with each of the current systems forming a fishing ground of different characteristics.

To summarize the above,

a. Each current system is a fishing ground with its own characteristics, and when we cross the current boundaries the composition of the catch differs, or if the same species are taken, their sizes are different.

b. Consequently the current boundaries are for the fish like national borders which they cannot cross freely, and thus they are of such character as to restrain the distribution and migrations of the tunas and spearfishes.

Having gone this far, I am sure that you have all noticed a contradiction in what I have said. That is, I have stated on the one hand that the current boundaries are like national borders, which restrain the distribution and movements of the tunas and spearfishes, and at the same time I said that fish of the same species but of different sizes are taken in different current systems. If we say that the size of the fish differs with the current system, then this naturally means that there must be an interchange of fish between current systems.

I think, however, that I can eliminate this contradiction by adding the postscript that "while the fish remain in the same ecological state they do not cross the current boundaries." To put it in little more complicated terms, this means that "for the tunas and spearfishes the sea areas which are adapted to various ecological states are in different current systems and they live separately in different current systems according to their ecological state."...

It looks as if most of the tunas and spearfishes spawn throughout the year in tropical waters, but it is interesting to note that they seem to cross the current boundaries from one current system into another mainly at certain limited periods... .

In waters of high latitudes, which in some seasons are completely outside the area of distribution of the tunas, the fishing seasons are clearly marked, but in tropical waters the fishing seasons are not clear. For this reason it is easy to overlook the existence of fishing seasons in the tropical waters, but in actuality they are, as I have just said, definitely present, and every half year there is a large-scale exchange of schools of fish and a change in the character of the population, and this also causes a change in abundance.

Now if we again look at the matter of the movements of fish, it is thought that we can divide them broadly into two cases. The first is the case of movements within one current system and the second is the case of movement from one current system into another. The first may be called migration while in the same ecological state, and the second may be called migration accompanying a change in ecological state. In the first case the fish themselves are probably moving too, but mainly it is controlled by seasonal developments within the current system which is their biological envirnoment, whereas in the second case we may consider it a positive movement of the fish themselves. ...

Thus it is a mistake to say simply that the fishing is not as good as it was at some previous time without taking seasonal changes in the fish's movements into consideration and therefore conclude that the fish have grown scarcer.

Now the second case is that where the tuna have actually become fewer. We know of two or three examples of this sort. Our basis thinking with regard to this problem is to determine whether the reason for the decrease is one which can

be regulated by human power or whether it is due to natural conditions which are beyond human conditions which are beyond human control. If it is the first, then all we have to do is take positive action to remove the causes which interfere with the increase and maintenance of the resource. If it is the latter, the tuna fishery must establish itself in a form which will conform to these natural fluctuations. ...

If we take a combined view of the pattern of fluctuations in the quantity of the resources of black tuna, yellowfin, albacore, and bigeye, it is thought to be not far wrong to consider that with the present scale of the fishery the species which are going to increase regardless of how many are caught and those which are going to decrease will decrease even if they are not caught at all. Of course, if the scale of the fishery becomes much larger and if extremely efficient fishing methods appear, the story will be different, but if the fish which are going to increase do so despite fishing mortality, and if those which are going to decrease do so even though they are not fished, this means that the fluctuations in the resource are controlled by nature and that human activity need not be considered the causative factor. If this is the case, then the tuna fisheries must establish an operating regime which will conform to natural fluctuations.

Now we come to the question of how a type of organization can be developed that will conform to the natural fluctuations. I can think of no other way than to collect persistently through many years data on the basis of which we can clarify the question of whether or not there is any law or regularity to these natural fluctuations. If there were such regularity, it would probably be cyclical, and since it does not appear likely that such a secularity will be restricted to a single species in its appearance, I think that it will be easiest to grasp and the danger of falling into errors will be slightest if we take a synthetic view of all of the large tunas, spearfishes, and the skipjack as a whole. ...

We are at present putting together the 1955 edition of the charts of average year's fishing conditions based on data which we have received from you. I know that you have been urging our investigators in the markets to organize the data as early as possible, and with the whole year of 1957 as a period of preparation we are planning and hoping to begin to put out forecasts and news flashes on the fishing conditions beginning in 1958. The object of these forecasts will be to enable the fishery to conform to natural conditions. This will be the first time that we have undertaken this kind of work and since there appears to be no chance for oceanographic investigations covering the whole broad expanse of the Indian and Pacific oceans, the only method we will have for preparing these forecasts is to deduce the changes in oceanographic conditions from the reports on the fishing conditions obtained from you fishermen and then on that basis to make our predictions of the fishing conditions. If we can get you to write up the reports which we need on fishing conditions on your way back to port from the fishing grounds, and if you will turn them over to our investigators or put them in the mail as soon as you get into port, our small staff will be greatly aided and the preparation of the forecasts and news flashes will go smoothly.

Now once this work has been started, it is expected that there will be many defects in the forecasts, since it is our first attempt at this type of work, and there probably will be cases in which the forecasts will not be useful for their intended purpose, but the improvement in the quality of the forecasts will depend upon your cooperation... .

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SALMON EXPORTS TO THE UNITED STATES INCREASED: The short pack of canned salmon by the United States and Canada has resulted in a strong demand for the Japanese pack and earlier estimates for 1956 exports have been revised by the Japanese Salmon Sales Company, the sole export agent. Exports to these countries originally estimated at 535,000 cases (48 1-lb. cans), have been revised upwards to 700,000 cases. The additional exports were subtracted from the original allotment made to countries other than the United States, Canada, and the United Kingdom.

The United Kingdom contracted for only 140,000 cases of Japanese canned salmon from the 1956 pack out of an allotment of 480,000 cases. The delay is attributed to the fact that negotiations on the renewal of the United Kingdom-Japan Trade Agreement were still in progress when this report was made. The United Kingdom was not granting import licenses for Japanese canned salmon pending the completion of the negotiations. Canned salmon figures heavily in this trade agreement.

Malaya

IMPORT DUTIES INCREASED FOR SOME FISHERY PRODUCTS: The list of Malayan imports on which higher rates of duty were levied on November 7, 1956, included the following fishery products:

Item	Commonwealth Countries		Other, Including U. S.	
	Old Rate	New Rate	Old Rate	New Rate
	....(Percent Ad Valorem)....			
Salmon, canned (red, blue, black or or silver, sockeye	7½	15	free	7½
Fish maws and shark fins	10	20	free	10

Mexico

SHRIMP FISHERY TRENDS, 1956: Landings of shrimp from the offshore grounds at west coast Mexican ports in 1956 was estimated about one-third less than the record catch for 1955. Although the catch declined, higher prices limited the loss in the 1956 ex-vessel value to only 10 percent as compared to that of the previous year

The inshore shrimp fishery on the West Coast was a failure in 1956 due, it is believed, to light rainfall on the Pacific mountain slopes. The total production for this fishery was expected to be about 120 metric tons or less, a decline of about 60 percent from the 1955 season.

The shrimp catch on the East Coast was expected to exceed the 1955 catch slightly and the prospects for further increases in 1957 are good. Due to lower catches on the West Coast during the last quarter of 1956, it is likely that this trend will continue into 1957 and substantially lower the 1957 catch for the West Coast.

Mexican shrimp exports during 1956 were estimated at over 50 million pounds (headless) as compared with 46 million pounds in 1955. The value of the 1956 record shrimp exports was expected to exceed US$25 million. (United States Embassy, Mexico, dispatch dated January 9 and United States Consul, Nogales, dispatch dated January 2.)

The peak fishing season at Salina Cruz will probably start earlier than usual in 1957. Normally, trawlers from Mazatlan and Guaymas do not begin moving south to Salina Cruz until early February and remain until late April or May. This season five shrimp trawlers from Ciudad del Carmen were due to arrive in Salina Cruz in late December 1956, and additional boats from Mazatlan and Guaymas some time in January. The arrival of the Carmen boats marks the first season that trawlers from the Gulf of Mexico moved to the Pacific to fish the winter-spring run of shrimp near Salina Cruz.

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NEW SHRIMP FREEZING AND ICE PLANT: A new shrimp freezing and ice making plant was being constructed in Salina Cruz, Oaxaca, Mexico. The plant, with a daily capacity of 15,000 pounds of frozen shrimp and 10 tons of ice, was expected to begin operations some time in January 1957. With the new plant, Salina

Cruz has three freezers with a daily capacity of 45,000 pounds of shrimp and 120 tons of ice, reports the United States Embassy in Mexico City (December 20, 1956).

Norway

1957 WINTER HERRING FISHING SEASON OPENS: During December 1956, Norwegian fishermen were preparing for the winter herring fishery that usually begins in January. A catch of more than one million metric tons is expected to be taken by the 30,000 fishermen and 2,700 boats that participate in this fishery.

The Norwegian research ship G. O. Sars was at sea in December to track the movements of the vast schools of herring which move into the Norwegian coast every winter. The Norwegian fishery scientists aboard the research vessel will determine exactly the time and place for the appearance of the herring schools (Fishing News, December 21, 1956).

A report late in January pointed out that stormy weather kept vessels from going after the herring shoals off Norway's west coast and up through January 24 landings were light. (News of Norway, January 24).

Pakistan

EXPLORATORY FISHING RESUMED: The exploratory fishing program in the waters off the coast of West Pakistan was resumed on the termination of the monsoon in September 1956. Special stress is being laid on the exploration of the shrimp grounds. In addition to otter trawls, which were being used during the last few years, the use of purse seins during the current season is also planned.

In previous years existence of schools of various fishes was reported by the exploratory vessels. (Current Affairs Bulletin, November 1956, of the Indo-Pacific Fisheries Council.)

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ICA AID FOR FISHERIES: For the fiscal year 1956/57 US$525,000 and US$315,000, respectively, were allocated by the U. S. International Cooperation Administration for importing nylon twine for net making and 50 marine engines for mechanizing indigenous fishing craft. These commodities are for distribution to the fishing community on easy installment payments. These measures are in continuation of similar measures taken in 1955/56.

Peru

ANCHOVY FISH MEAL PLANT ADDITIONS OR ENLARGEMENT PROHIBITED: In a Decree dated December 1, 1956, and effective January 1, 1957, no new authorizations will be granted in Peru for the establishment of new fish meal plants or the enlargement of exisiting plants that use anchovies for reduction. The prohibition will be effective until Peruvian fisheries authorities can devise adequate measures to insure the future productivity of anchovy stocks, states a December 21, 1956, dispatch from the United States Embassy in Lima.

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THREE WHALERS PURCHASED FROM NORWAY ARRIVED: The three whale-catcher vessels purchased in Norway by the joint Peruvian-United States whale processing firm arrived at the port of Callao on November 7, 1956, from Sandefjord, Norway. The three vessels have been registered in Peru as the Don Juan, Don Tomas, and the Don Christobal and are at present manned by Norwegian crews.

The plant at Paita in the Northern part of Peru where the vessels will be based, was under construction. Operations were expected to begin early in 1957, states a December 13, 1956, dispatch from the United States Embassy in Lima.

Note: See Commercial Fisheries Review, January (1957) p. 80.

South-West Africa

PILCHARD SEASON FOR 1956 ENDED IN OCTOBER: Although the pilchard season in Walvis Bay, South-West Africa, remained open until the end of October 1956, reliable sources reported that commercial fishing for pilchards in the area had come to an end early in October.

The season was considered by the trade to have been a successful and better-than-average one and fish factories in the area closed in October as they caught their quota for the year. It is understood that some factories in Walvis Bay did more canning in the 1956 season than ever before. The average production of fish oil during the season was around 15 gallons per ton; the maximum 29 gallons per metric ton, according to an October 20 United States consular dispatch from Cape Town.

Union of South Africa

BROWN BREAD WITH FISH-MEAL PREMIX ON THE MARKET: The South African Government-backed project to develop a fish meal protein additive to enrich bread flours was scheduled to be tested beginning November 1, 1956, in all bakeries in the Western Cape. The new enriched brown bread, with fish-meal "premix" added, will be on sale in all these outlets. The premix is made up of 2.5 ounces of fish (maasbanker) meat equivalent, 2.5 ounces of skim milk, and $\frac{1}{4}$ ounce of fat for each two-pound loaf of bread. Calcium acetate also has been added to counteract any tendency to "ropiness" and make the bread last longer. The pilot plant operated by the Government and located at Simonstown will process one ton of fish meal a day for distribution to the bakeries in the Western Cape. All enriched brown bread baked in the Western Province will have the fish meal premix added.

The development of a tasteless, ordorless fish-meal premix, a special project of the Department of Health of the Union Government, has come after four years of experimentation and an expenditure of £25,000 (US$70,000). The Secretary for Nutrition of the South African Government recently stated to a Cape Times reporter that the new fish-meal premix would add important animal protein to the diets of South Africans. He added that a person eating between 6 and 8 slices of bread daily would get from 15 to 20 percent of his animal protein needs from the bread alone.

Reports are that consumption in Cape Town of enriched brown bread is one loaf for every two loaves of other types It is hoped that consumption of the brown bread can be increased.

If the new bread proves popular in the Western Cape, the premix will be used all over the Union. Should this prove to be the case, it is estimated that about 600 tons of the premix will be needed monthly, according to an October 29, 1956 dispatch from the United States Consul in Cape Town.

Enriched bread with the special fish-meal premix is said to be subsidized by the Union Government to the amount of £900,000 ($2,520,000), in addition to a general subsidy of £8,000,000 ($22,400,000) for bread.

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PILCHARD-MAASBANKER FISHERY FOR 1956 WORST ON RECORD: Even the widespread introduction of echo-sounders will not prevent the 1956 season on Union of South Africa's west coast from going down as one of the worst in the short history of the pilchard and maasbanker (jack mackerel) fishery. After reasonably good catches during July and August, the returns for September 1956 showed a sharp drop again.

The catch of pilchards and maasbanker for the first 9 months of 1956 totaled only 127,000 metric tons or just over half the 250,000-ton annual quota. Reports for October 1956 showed that that month was even worse than September.

Analysis of the figures to date shows that there has been no substantial drop in the pilchard catch, but there has been a drastic reduction in the maasbanker catch. The South African Shipping News and Fishing Industry Review of November 1956 reports.

U.S.S.R.

EXPERIMENTAL AND COMMERCIAL FISHING WITH ELECTRIC LIGHT: The use of electric light and fish pumps in the fisheries of Soviet Russia was described by P. G. Borisov in a paper presented at the last meeting of the Conseil International pour l'Exploration de la Mer in 1956. Some excerpts from the paper follow:

In the summer of 1945 we started our investigations in the Caspian Sea with electrical light as a stimulant to attract fish. We kept on conducting our investigations and later on transferred them to other seas--the Black and the Baltic--and to Lakes Pereslavl and Choud.

The earliest investigations carried out in the Caspian Sea indicated that the light of a common electric lamp (white light) is the most effective for attracting fish (sprat) at night, as compared to red, orange, yellow, green, and blue light; yellow light was found to be next to white in its effectiveness. In the experiments, a lamp with a waterproof socket was suspended by a waterproof cable at various depths.

In 1947 the work with electrical light in the Caspian Sea showed that more powerful electric lamps (1,000-1,500 watts) give better results in attracting sprat at night into the lighted area, which in its turn results in a bigger catch. A decline in catch was registered when the power of the lamp decreased.

Alongside with this a question was settled which is of great importance for fishing in the Caspian Sea--the question of vertical distribution of sprat on fishing grounds. It turned out that in summer (August) when the water in the upper layers becomes very warm sprat move to deeper layers where they cannot be reached by shallow purse seines. Fishing with electrical light at great depths during this period appeared to be very successful.

At the same time we described methods of commercial fishing for sprat with the help of electrical light. Three methods were described: fishing with conical nets, lift nets, and purse seines.

A special 1,000-watt lamp with the upper part of the bulb having a reflecting surface was proposed for purse seining. The lamp is inserted into a cupola-shaped buoy, the socket downwards, and is connected to an electric generator with the help of a waterproof cable. It may be kept at any distance from the fishing boat (100-200 meters or 328-656 feet). During fishing operations the boat either casts anchor or drifts. There are various designs of lift nets. The lift net used by our fishing boats was a rectangular (7 to 5 meters or 23 to 16 feet) cotton netting with a mesh size of 7-8 mm., lowered and lifted by booms. A common electrical lamp of 500 watts was attached to the center of the netting and the gear was lowered to a desired depth.

Since 1951 conical nets have been widely used in the Caspian Sea. A cone-shaped cotton netting (thread No. 34/6) with a mesh size of 7-8 mm. is fastened at its base (the upper part of the net) to a metal ring three meters (about 10 feet) in diameter. The vortex of the cone (the lower part of the net) is furnished with a metal lock which serves not only for "brailing" the fish but is a kind of sinker keeping the gear in the water in a proper (strictly vertical) position. An electric lamp of 1,000 to 1,500 watts with a waterproof socket and cable is fixed in the center of the ring with the bulb directed upwards. The length of the cable depends on the depth of fishing. In June sprat is fished in the Caspian Sea at depths of 15 to 20 meters (49 to 66 feet); in November-December at depths of 50 to 60 meters (164-197 feet) in accordance with seasonal distribution of sprat in water layers.

Conical nets are operated from both sides of the ship successively: at the time when the starboard net with the lamp on is being lifted to the dock, the port net is being lowered into water and its lamp is turned on as soon as the starboard net has been lifted. These successive operations allow time not to be wasted on attracting fish into the lighted space, for the fish concentrated around the source of light move to the side of the fishing boat from which the conical net with an electric lamp is suspended. The time during which the conical net is kept at a desired depth depends on the concentration of the fish (sprat). On heavy concentrations (catch varying from 50 to 100 kg. (110-220 pounds) per haul, the net is kept in the water for 2 or 3 minutes, the time being reduced to 1 minute when the catch per haul exceeds 100 kg. (220 pounds). When the catch per haul is small (from 10 to 25 kg. or 22 to 55 pounds) the net is kept in the water for 3 to 6 minutes. The setting and lifting of the conical net are accomplished only with the ship's winch via a pulley fixed at the tip of the boom. The lifting speed is of great significance as it affects the catch. Experience showed that the lifting of the conical net should be done at the speed of 0.45 m./sec.

Conical net fishing with light is usually done when the ship is at anchor because with the ship drifting the concentrations of fish in the underwater lighted area begin to thin out.

Strong currents, swell of the sea, or sharp winds cause a decline in catches with conical nets, the the more so if fishing is not done at great depths.

Fishing in the Caspian Sea proves the effectiveness of conical-net fishing with light. Two types of sprat are the object of fishing there: anchovy-type sprat (Clupeonella engrauliformis) and common sprat (C. delicatula caspia). Following our investigations in the Caspian Sea in 1948, commercial fishing for sprat with light started and was later on improved and developed.

At present Caspian sprat are fished in winter as well as in summer and not only on the eastern coasts of the Central and South Caspian Sea but on the western coasts too--in the waters of Daghestan and Azerbaidzhan.

A conical net requires an exceedingly small amount of netting--about 3 kg. (7 pounds) per net.

The Caspian fishermen's successes became widely known among the fishermen of other commercial basins of the U.S.S.R. The Black Sea fishermen after going to the Caspian Sea to see the new method in operation started successfully using it at home. . . .

N. N. Danilevsky carried out experiments in the Black Sea on fishing with a pelagic trawl with the help of flickering electric light. Underwater lamps of 500 to 1,000 watts were tied to a rope running from the lead line to the other board. In the course of trawling the light was successively turned on for 3-5 seconds and then switched off for 12-15 seconds.

"On thinly concentrated schools the catch amounted to 700 pounds for a 20-minute haul, while on dense schools the anchovy were so abundant that the catch broke the belly of the trawl"--N. N. Danilevsky writes in Rybnoe Khozjaistvo (No. 2, 1952). Apart from anchovy, a certain number of sprat (Sprattus) and horse mackerel (Trachurus) were captured. However the experiments were not repeated.

In August-September of 1948 the first experiments with electrical light fishing were conducted by our research group in the Far East seas. The experiments showed that the fishes attracted by the above-water light at night include saury (Cololabis sajra), small smelt (Hypomesus), Japanese dace (Leuciscus brandti) and Atka fish (Pleurogrammus azonus).

Fishing was done with a pyramidal net of our own design, the only difference between it and the conical net being the shape of the entrance to the net--square instead of round. Investigations were conducted in South Primorje (Precbrazhenje Bay) as well as on the western and eastern coasts of South Sakhalin.

I Piskounov (Rybnoe Khozjaistvo, No. 7, 1949) and G. Grishchenko Proceedings of the Pacific Institute of Marine Fisheries, v. 34, 1951) point out that the Far East herring are also attracted by electric light, but only during the periods before and after spawning (in the early period of after-spawning feeding).

In the summer of 1956 extensive experimental work on saury fishing with the help of above-water electric light was carried out in the Pacific Ocean in the area between the Hokkaido latitude and the latitude of Fritz Strait. The fishing was done with lift nets of Japanese design and conical nets of our own design with the help of above-water electric light. Thirty blue 0.5 kw. electric lamps were used to attract saury to the side of the fishing boat and five red 0.5 kw. lamps--to make saury concentrate in a small surface area. Both blue and red lamps were used in sets (chandeliers).

A quadrangle of 23 to 20 meters of netting was lowered from the starboard on a bamboo pole, the lifting being done with the help of 5 ropes or wires attached to the lead line of the net. A set of red lamps was fixed above the lift net. The blue lamps on the left side of the boat remained turned on for the fish to concentrate in the lighted area. Then the port lights were turned off and the starboard red lights above the net were turned on. The saury swarming under the port lights were attracted by the red lights, immediately swam toward them underneath the boat, and became trapped in the net which was quickly lifted. The catch per haul ranged from 300 to 2,000 pounds. The conical net catches with the help of above-water light ranged from 40-60 kg. (88-132 pounds) to 200-300 pounds per haul.

The Japanese get record saury catches with the help of electric light. In 1954 their total saury electric light catch amounted to 290 million pounds.

The use of the fish pump opens up new perspectives in the field of electric light fishing. In the U.S.S.R. this idea belongs to N. S. Forshtut, an engineer, who first recorded it in 1948 after the end of the earliest period of our investigations with electric light in the Caspian Sea. He was the first to carry out experiments on Caspian sprat fishing with a fish pump. A corrugated pump intake hose was lowered into the water in depths from 11 to 24 meters (35-79 feet). A powerful electric lamp in a wire-net funnel was attached to the intake of the hose. The catches were small and many fish were greatly bruised due to imperfections in the pump used.

Pump fishing was later on improved and developed by A. F. Leksoutkin, A. F. Shishkov, and A. H. Pateev under the guidance of I. V. Nikonorov. The RB-150 fish pump used by them is installed on the deck of the fishing boat and operated by an electric motor. The hose is 100 meters (328 feet) long in order to be able to fish at greater depths. One or two 1,500-watt electric lamps are fastened at the intake of the hose.

The fish (sprat) enter the lighted area and are pumped up the hose alongside with water into a receiving tank which separates the fish from the water. Caspian sprat catches per night of fishing by one of the fishing boats, the "Toros," ranged from 700 to 16,000 pounds in December of 1954 and from 500 to 15,000 pounds in January 1955. The total catch in December 1954 amounted to 95,000 pounds and in January 1955--104,000 pounds.

Pump fishing with electric light has a number of advantages as compared to conical net fishing: it is continuous, labor-saving, and requires no netting. Thus pump fishing with electric light on a commercial basis makes the problem of net-less fishing quite a realistic one.

Everything said above applies to those species of fish which are attracted at night by electric light. About 20 species are known to be attracted by electric light in the U.S.S.R. seas; however as yet only two of them--anchovy-type and common sprats (kilka) of the Caspian Sea--are the objects of commercial fishing. Work is going on to develop commercial fishing for the Black Sea horse mackerel and anchovy (Khamsa). Commercial fishing for saury and Atka mackerel in the Far East seas has not yet been started. The question of the possibility of electric light fishing for the Pacific and North Atlantic herrings on a commercial scale has not yet been settled.

Apart from the fishes attracted by the electric light at night, there are some species which are frightened away by light and try to leave the zone of above-water or underwater light. To these species belong: lamprey (Lamperta fluviatilis), eel (Anguilla anguilla), and mullet (Mugil).

Our investigations in the Caspian and Baltic Seas showed us the way to take advantage of this peculiarity of the fish. In 1951 N. I. Sementchenko started fishing for Caspian mullet with a trammel net using the searchlight to frighten the fish away in the direction of the net. The mullet finding themselves in the brilliantly lighted space try to leave it and, being surrounded by the trammel net, are entrapped in it. Using this method N. I. Sementchenko's crew captured 47,400 pounds of mullet in 1952 and 68,500 pounds in 1953.

It should be noted that with the help of the searchlight installed at the bow of the ship we scouted not only for mullet but for other pelagic fishes with negative reaction to electric light.

V. A. Abakoumow carried out experiments on fishing for lamprey (Lampetra fluviatilis) in the Gauja River (Gulf of Riga of the Baltic Sea). In the autumn of 1954 he fished on the runs of lamprey with fyke nets by lighting the bank parts of the river and leaving the middle part in darkness. "The total catch per hour by one fyke net with the help of electric light was twice as big as that by five control fyke nets set in a weir," V. A. Abaloumov writes in Rybnoe Khozjaistvo (No. 1, 1956)....

The efficiency of artificial light depends on a number of conditions: transparency of water, moon phase, intensity, intensity of light, species of fish, physiological condition of fish, their age, etc.

In the water basins with a small degree of water transparency (as the Azov Sea), the efficiency of the attraction of fish by light is sharply reduced. Moonlight and especially the light of the full moon in a cloudless sky also reduces the efficiency of attraction to a great extent.

The optimum efficiency of artificial light is different for different species, e.g. light optimum is higher for anchovy, pilchard, and mackerel than for horse mackerel

Many species do not approach a powerful source of light closely but keep at some distance from it. This distance increases with the increase in the intensity of light and vice versa.

A more thorough investigation into the behavior of fish under the influence of electric light, electrical current, and sound is one of the main tasks before our fishery research insitutes.

The development of and improvements in physical methods of influencing the fish will completely solve the problem of netless fishing.

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NEW FACTORYSHIP OPERATIONS DESCRIBED: The official Russian fishery paper Rybnoje Chosatswo published a detailed account of the first practical experiences with the factory trawlers built some time ago in Germany, according to a report in Fiskets Gang (August 23, 1956), a Norwegian fishery periodical. Maximum production per factory vessel is stated as 600 metric tons at the greatest actio radius of 3,000-3,500 nautical miles without taking on new supplies. This is the equivalent of 60 to 70 days at sea. All the deck machinery is driven electrically. There are two 2-ton cargo booms and winches forward and two 5-tons winches aft, an anchor winch for two anchors, and a trawl winch driven by a 130-hp. electric motor with a towing power of 9 tons.

For fish processing there is a fully mechanized installation and a fillet plant with partial manual operation. Fish which are 50 cm. (about 20 inches) long and over are handled in the fully-mechanized plant. This includes a beheading machine driven by a $1\frac{1}{2}$ hp. motor with a capacity of 22 to 24 fish a minute. The manual operation consists of three belt conveyors, a skinning machine, and a beheading machine for fish under about 20 inches with a capacity of 40 fish a minute. The cold-storage space on the port and starboard sides can store about 300 metric tons from the daily fillet production of 7 to $7\frac{1}{2}$ tons. Fish blocks are glazed and packed in cartons holding 9 blocks. Each block weighs about 3.5 kilograms (7.7 lbs.). The cartons measure 80 x 7.5 x 7 cm. (about 31.5 x 3.0 x 2.8 inches). Freezing the fillets and bringing their temperature to about -18° C. (0° F.) takes $3\frac{1}{2}$ to 4 hours.

The processing waste is collected in a tank (which holds three tons) from which it is conveyed to 2 vacuum dryers. The vacuum-dried material is then pressed in a press which is hydraulically operated. The fish-meal installation can handle 23

tons a day. The yield for the waste is about 22-percent fish meal with a water content of about 10 percent. The drying process requires about 4.5 hours in both dryers. The oil yield is about one percent. To dry one kilogram (2.2 lbs.) of waste requires about 2 kilograms (4.4 lbs.) of steam. Two liver-oil boilers, each of which holds 350 kilos (771 lbs.) of fish livers can be emptied about hourly and give a liver-oil yield of about 35 percent.

The experiences with the first two German-built trawlers of this class--Pusjkin and Gogol--in the summer of 1955 gave the results per trip shown in the table.

	Pusjkin	Gogol
Length of trip, days.....	63	65.5
At sea, days	49.1	54.5
On grounds, days	46.0	51.7
Gross catch, metric tons ..	1,088	1,227
Net catch, metric tons ...	636	712
Trawling hours a day	10.7	11.4
Gross catch a day, metric tons	11.8	11.9
Gross catch a trawling hour, pounds	2,400	2,300

While the Pusjkin required 1 hr. 45 min. to set and take in its stern trawl, the Gogol recorded times of only 38 minutes. Since experience should speed up the trawling operation it is hoped in the near future to attain a daily catch of 50 gross tons.

The procedures which had been developed for handling the trawl have been shown to be substantially correct. Taking the trawl in over the stern on the upper deck permits close examination and the discovery of defective portions after each haul; also, it is possible to make minor repairs at once. Since processing of the catch is done on another deck, it can take place independently of the trawling, which is not the case for other types of trawlers. It was stated that the crew did not, at all times, have adequate knowledge of the new vessels, and also certain unsatisfactory conditions had to be overcome. For example, the types of trawls were the same as used on the regular vessels, but the engines on the new vessels had double the power of the regular vessels. Larger and stronger gear must be used and a simplification of the arrangement on the stern for taking up the catch.

The fear that the hauling up of the trawl would be difficult and that in a strong sea there would be a continual danger of tearing the trawl has been shown to be unfounded. On the contrary, in heavy weather when the older-type trawlers had to cease fishing, the new vessels continue to fish. It is desirable to build larger trawlers of this type with the intention of expanding the factory installations to handle small fish (haddock) for canning, etc. At present these fish are utilized by the fish-meal plant.

With respect to the operating areas of the new large trawlers, it was stated that Russian research vessels had worked on the Newfoundland banks, and that when the catches were low in the Barents Sea, which is the normal operating area for trawlers from Murmansk, there were the following alternatives: Bear Island from November to February and from April to July; in the area West of Spitsbergen from August to October; off the Norwegian Coast from January to May; off Iceland from May to July; off West Greenland from July to February; and on the Newfoundland banks from February to July. The assumption was that the operations of the trawler fleets fishing these areas would be significantly improved, especially the new trawlers. More important, the fish in these latter areas, on the average, were much larger than those in the Barents Sea. It seems that Russian fishery circles are breaking away from the earlier "conventional" trawlers in the area around Murmansk to take part, to a greater degree, in the fisheries in international waters.

United Kingdom

BRITISH-ICELANDIC FISHERIES DISPUTE SETTLED: The settlement of the Anglo-Icelandic Fisheries Dispute, negotiated by the industries of both countries, and agreed to in April 1956, was signed in Paris on November 14, by the President of the British Trawlers' Federation and by the President of the Icelandic Trawler Owners' Union. The agreement was reached under the auspices of the Office of European Economic Cooperation, states The Fishing News of November 23, 1956.

The agreement provides for three main points: regulated landings of Icelandic-caught fish; a standstill on Iceland's present four-mile point-to-point territorial waters limit; and the appointment of a special conciliation group to deal with matters under dispute. The Icelanders have also agreed to allow British trawlers to run for shelter inside their fishing limits without stowing their gear.

The agreement, which will last for ten years and subject to reviews after two years, limits imports of Icelandic-caught fresh fish on ice to an annual total of £1,800,000 (US$5,040,000). This total is separated into four quarterly periods: January-March, April-June, July-September, October-December. Fish to the first hand value of £450,000 (US$1,260,000) can be imported during each of these periods.

Within any single month the imports shall not exceed two-fifths of the allowed value of the quarter. In an effort to avoid market gluts, expecially of single varieties, in no month or quarter shall the total value of haddock and flat fish exceed 40 percent of the total. Also during the same period the total value of cod and all other varieties shall not exceed 60 percent of the total.

Iceland has agreed to take no further action on the question of territorial limits while the whole Law of the High Seas is being discussed at the present General Assembly of the United Nations. The British Government, noting the Icelanders' declaration, states that this does not imply Britain's recognition of the validity of the present Icelandic limits.

The agreement gives Iceland the opportunity of resuming fish landings in Britain at a slightly higher rate than existed in the years before the dispute. The total amount of £1,800,000, means that Iceland can now supply about 8 percent of the total fish landed by British distant-water vessels. In the years prior to 1952, when the dispute began, Icelandic vessels landed 6.3 percent of the total.

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FIRST DIESEL-ELECTRIC TRAWLER "PORTIA" IS HULL'S FASTEST SHIP: The new British Diesel-electric trawler Portia during speed trials over a measured mile averaged a speed of 15.8 knots in very heavy weather. The vessel cost £250,000 (US$700,000), states the November 1956 issue of The Fishing News. This was almost

two knots more than the average attained by the latest steam trawler under calm conditions and makes her the fastest vessel in the Hull fishing fleet.

When fishing the distant grounds the vessel will be able to save 15 hours on the homeward trip from Iceland and cut the sailing time from Bear Island by 19 hours.

After her acceptance trials on the Tees, the Portia left Middlesbrough for Hull. En route the vessel tested her trawling gear and caught 1,400 pounds of fish including 700 pounds of haddock. Offered at the wholesale market in Hull, this North Sea fish realized US$473 ex-vessel.

* * * * *

NEW TIDE INDICATOR DEVELOPED: A new eight-inch tide indicator, designed to show the actual state of the tide at any particular hour and to be used in any port, has been invented by a British Central Electricity Authority engineer at East Yelland.

The great advantage of this new indicator is its size--it resembles a slide rule. By simple calculation the tide state can be worked out in a matter of seconds.

The indicator also gives the depth of water at dock gates and cuts down the use of nautical almanacs.

The device is undergoing certain corrections before being rigorously tested and submitted to the National Physical Laboratory of the Liverpool Observatory and Tidal Institute for their opinion (The Fishing News, September 21).

* * * * *

NEW WAGE AGREEMENT REACHED AT GRIMSBY FOR FISH PROCESSING WORKERS: The Grimsby Fish Merchants' Association and fish processing workers unions reached an agreement on wages and other conditions late in October 1956. The new rates were effective with the week beginning October 29, according to The Fishing News of November 2, 1956.

Under the agreement male splitters and filleters will now receive a minimum of 180s. (US$25.20) a week at 20 years of age; at the age of 15, 60s. ($8.40), rising by annual increments to 150s. ($21.00) at age 20. Female splitters and filleters will receive 110s. ($15.40) weekly at the age of 20 and other age classes will rise from 51s. ($14.21) at the age of 20. All rates are based on a 5½-day 45-hour week.

Where incentive or bonus rates are in operation, lower rates may be paid provided the guaranteed minimum earnings for a 45-hour week are not less than those provided in the agreement. Overtime and holiday pay are calculated at a rate not less than the appropriate minimum rates.

* * * * *

1957 INTERNATIONAL FISHERIES EXHIBITION AT LOWESTOFT: The International Fisheries Exhibition to be held at Lowestoft from October 21-26, 1957, will be the first of its kind in Great Britain. Representation has already been promised from firms in several overseas countries. Lowestoft is a progressive fishing port with excellent facilities for an exhibition, both on land and on water, points out a November 20, 1956, dispatch from the United States Embassy in London.

The Exhibition will cover all aspects of the commercial fishing industry--shipbuilding, engines, catching, processing, packaging and distribution, and all the equipment necessary for those operations. It has been granted the backing of both the White Fish Authority and the Herring Industry Board.

The Exhibition will be staged in two halls. The Pavilion will show sea-going equipment (shipbuilding, engines, navigational instruments, nets and ropes, life-saving equipment, etc.), and at the Palais will be products normally used on land (processing machinery, freezers, refrigeration, boxes, transports, foods, etc.). In addition to the two halls, the organizers have been granted the use of the Yacht Basin which adjoins the Pavilion. Modern trawlers and other fishing craft will be open for inspection, and the basin will also be made available for those firms with suitable vessels or products for demonstration.

HALIBUT ONE-DISH MEAL

Halibut is the largest of the flatfishes and is found in the cold waters of the North Pacific, the Arctic, and the North Atlantic oceans. Commercially, halibut range in size from 5 to more than 80 pounds, but a few as large as 400 pounds have been reported.

Even though the greatest proportion of halibut comes from the Pacific Northwest, halibut is available in all parts of the United States, mainly as frozen steaks. Steaks are the cross-section slices of dressed fish, each containing a short section of the backbone. Chunks and fillets are other forms in which halibut may be purchased.

Halibut is one of the most highly prized of all white-meated fish. This firm and flavorful fish is appreciated by all who are familiar with it. Halibut may be prepared by any of the basic cooking methods such as frying, baking, broiling, boiling, and steaming.

For your dinner menu, the home economists of the United States Fish and Wildlife Service are suggesting a one-dish meal, "Curried Halibut Casserole" which features boiled halibut in combination with noodles, asparagus, and cheese and flavored with curry.

Other attractive and nutritious recipes are contained in the recipe booklet How to Cook Halibut, Test Kitches Series No. 9, which is available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at a cost of 20 cents a copy.

CURRIED HALIBUT CASSEROLE

- 1 POUND HALIBUT STEAKS OR FILLETS, FRESH OR FROZEN
- 1 QUART BOILING WATER
- 1 TABLESPOON SALT
- 1 PACKAGE (8 OUNCES) NOODLES
- 1 1/2 TEASPOONS CURRY POWDER
- 2 TABLESPOONS BUTTER OR OTHER FAT, MELTED
- 1/2 CUP MILK
- 1 CAN (10 OUNCES) CREAM OF MUSHROOM SOUP
- 1 CAN (1 POUND 4 OUNCES) ASPARAGUS, DRAINED
- 1 1/2 CUP GRATED CHEESE

Place steaks in boiling salted water. Cover and return to boiling point; simmer for 10 minutes or until fish flakes easily when tested with a fork. Drain, remove skin and bones. Flake.

Cook noodles as directed on package; drain. Place in a well-greased 2 1/2-quart casserole. Cover with fish. Combine curry powder, butter, milk, and soup. Pour over fish and noodles. Arrange asparagus over casserole and sprinkle with cheese. Bake in a moderate oven, 350° F., for 25 to 30 minutes or until brown. Serves six.