FOREIGN FISHERY TRADE

Imports and Exports

GROUNDFISH IMPORTS: From January 1 through December 31 there were 49,171,089 pounds of fresh and frozen groundfish imported into the United States under the tariff classification, "Fish, fresh or frozen fillets, steaks, etc., of cod, haddock, hake, cusk, pollock, and rosefish." This was 6,001,933 pounds greater than the groundfish imports for the corresponding period in 1945, according to reports from the Bureau of Customs, Treasury Department, and the Bureau of the Census, Department of Commerce.

Commodity	December 1946	November 1946	December 1945	Jan.1-Dec.31,1946	Jan.1-Dec.31,1945
Fish, fresh or frozen fillets, steaks, etc., of cod, haddock, hake, cusk, pollock, and rosefish	1,458,080	3,024,902	2,643,199	49,171,089	43,169,156

Canada

COLD STORAGE: Canadian holdings of frozen fishery products totaled 38,511,000 pounds on January 1, according to a preliminary report received from the Department of Trade and Commerce, Dominion Bureau of Statistics. Compared with stocks held on December 1, this was a decline of 4,310,000 pounds, but was 10,782,000 pounds greater than holdings on January 1, 1946.

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FISH FILLETING PLANT: A portable fish filleting plant was put in operation at Meadow Lake in December 1946 by the Saskatchewan Fish Board, according to David F. Corney, Manager of the Meadow Lake plant. At present it comprises a portable freezing unit, which consists of a stainless steel body, 22 feet long and 8 feet wide, mounted on a heavy truck chassis, with dual wheels front and back. The entire body is insulated with spun glass and is divided into two compartments--the control room which houses two 3 hp. refrigeration units and a holding room which has a quick-freeze compartment capable of holding approximately 500 pounds of fish. The refrigerant used is Freon. The capacity of the quick-freeze is in the neighborhood of 3,000 pounds of frozen fillets per 24 hours.

The portable freezing unit is designed to connect to a refrigerated truck box which is also made of stainless steel and insulated with spun glass. The box has a hold-over period of approximately 60 to 70 hours after being disconnected from the portable freezing unit, and holds approximately 4,000 pounds of processed fillets. Its purpose is to transport the frozen products directly from the lake to the cold storage plant at headquarters and maintain them in a frozen condition.

A Diesel power unit completes the portable freezing unit. Plans are being made for a filleting room, built in sections, which will go right to the lake on a trailer where it will be assembled ready for operations.

The primary reason for having a portable filleting plant and freezing unit is because a large proportion of Saskatchewan's lakes are in remote areas. As the fish must be kept in first class condition, it saves time and money to process them, fresh out of the water, right at the lake. It also minimizes the possibility of deterioration, which might be brought about by poor roads or abnormal weather conditions. Further, tonnage is cut down when only the finished product is transported to the warehouse.

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MARKETING SMOKED FILLETS: Smoked fillets of fish are now being marketed by the Saskatchewan Fish Board, Resources Minister J. L. Phelps has announced.

Produced at the newly-established filleting plant at Meadow Lake, the fillets available include smoked whitefish, trout, pickerel, jackfish, and mullet. The plant is able to process about 1,000 pounds of fish daily.

Production of this product is still on an experimental basis, and the board is processing various kinds of fish to see which is the most suitable for the market and most economical for smoking purposes.

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HERRING PRODUCTION: Practically all of the herring landed by British Columbia fishermen are caught in the immediate vicinity of the shore of Vancouver Island and the fishery is known as a "shore fishery," according to the American Consulate General in Vancouver, B. C., Canada. The main season runs through the fall and winter months with huge catches being taken. During the 1946-47 season fishermen landed approximately 114,141 green tons of herring by means of purse seining, for the most part, although some gill net fishing was conducted. The price was fixed at $6.30 a ton in canning areas and $5.15 a ton in all other areas.

In prewar days, a production of even a million cases of herring would not have been thought of for the very good reason that there was no peacetime market for any such quantity. The 1946-47 pack, totaling 1,511,887 cases, each containing 48 pounds, as of February 1, 1947, is shown below:

Can Size	Plain Pack	Tomato Pack	Total Pack
1 lb. tall	242,322	62,959	305,281
1 lb. oval	671,511	484,886	1,156,397
¼ lb. oval	11,035	39,174	50,209
Total	924,868	587,019	1,511,887

The pack was allocated as follows: British Ministry of Food, 75,000 cases; UNRRA, 450,000 cases; and for commercial purchases for consumption in areas where food is scarce, 987,000 cases.

This year there was a wide variation in prices, commercial importers paying from $5.75 to $9.00 a case f.o.b. Vancouver for herring in oval tins packed in tomato sauce.

In addition to the herring canned and the quantities sold in other forms for human consumption, approximately 8,416 tons of herring meal and herring offal meal were produced and sold in the domestic market at a ceiling price of $1.07½ per unit of protein per ton. Exports were rigidly controlled due to the fact that the Canadian market was in short supply.

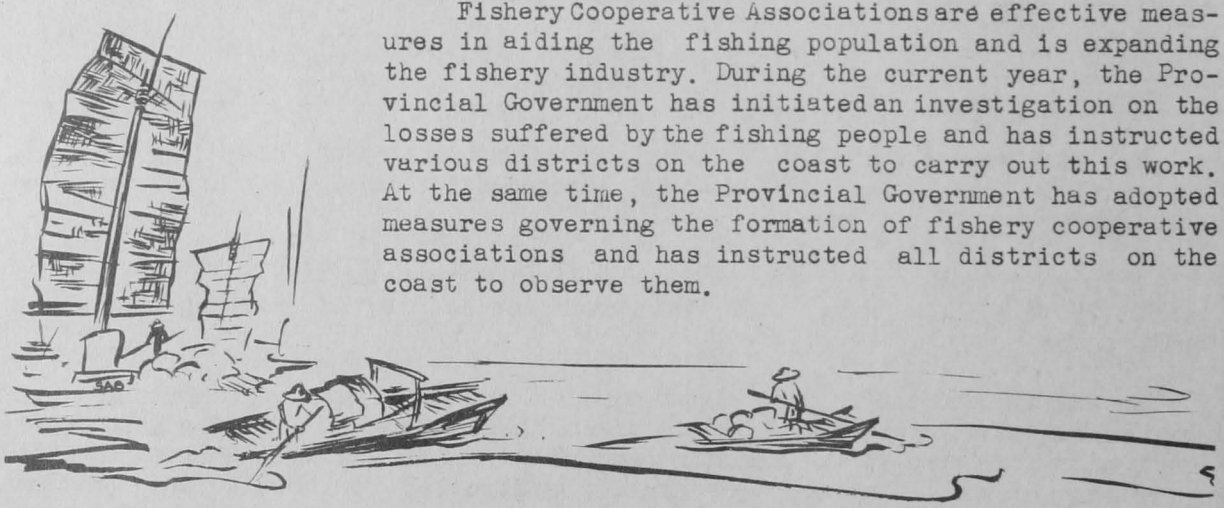
Herring oil and herring offal oil production during the 1946-47 season is shown as 837,644 Imperial gallons. The domestic ceiling price was fixed at sixty cents per seven and a half pounds in naked form f.o.b. Pacific terminal points. There was also an embargo on exports of herring oil.

The industry outlook for the following season is dependent upon the overseas demand for a cheap, nutritious food. In all probability, the pack will be considerably smaller, as the market in the Orient for dried salt herring has not developed to prewar proportions. It is possible that more herring will be converted into fish meal and fish oil. In this event, the industry hopes that the Canadian Government will remove the embargoes affecting export shipments.

China

FISHING INDUSTRY: The province of Kwangtung is the most ideal fishery base in south China, states a recent report from the American Consulate General, Canton, China.

It has a zig-zag coast line of over 1,000 miles, with fishing inlets dotted everywhere and fishery products in abundance. Its activities in the past covered a fish-breeding section established by the Department of Industry, an experimental area instituted by the Department of Reconstruction, a fish-producing section formed by the Second Division of the Reconstruction Department, a seafood products division set up by the Bureau of Agriculture, a fishery administration located at Kweng Hei, Chaechow, and Swatew, and the Liang Kwang Large-scale Fish Producing Station established jointly by this province and the Kwangsi Provincial Government. As a result of the war, the above institutions were forced to close down one after the other and the whole industry suspended operations. After the Japanese surrender, being aware that the establishment of these structural organizations is prerequisite to the development of fishery industry, it is planned to form the Provincial Fishery Administration and four fishery administrative districts. This planning has been drafted and submitted to the Central Government at Nanking for funds to be allocated for this enterprise.



Fishery Cooperative Associations are effective measures in aiding the fishing population and is expanding the fishery industry. During the current year, the Provincial Government has initiated an investigation on the losses suffered by the fishing people and has instructed various districts on the coast to carry out this work. At the same time, the Provincial Government has adopted measures governing the formation of fishery cooperative associations and has instructed all districts on the coast to observe them.

Prior to the war, this Province had a fishing population of 800,000 and more than 35,000 old type fishing boats. Fishing people killed by the enemy during the war amounted to 50,000 or 60,000 and 60 percent of their fishing boats were destroyed. The fishermen and their families are in urgent need of relief.

The Department of Reconstruction has undertaken measures for encouraging fishmongers to ship fresh water fish to Formosa for stocking lakes and rivers and has instructed various districts on the West River Coast to carry out this plan.

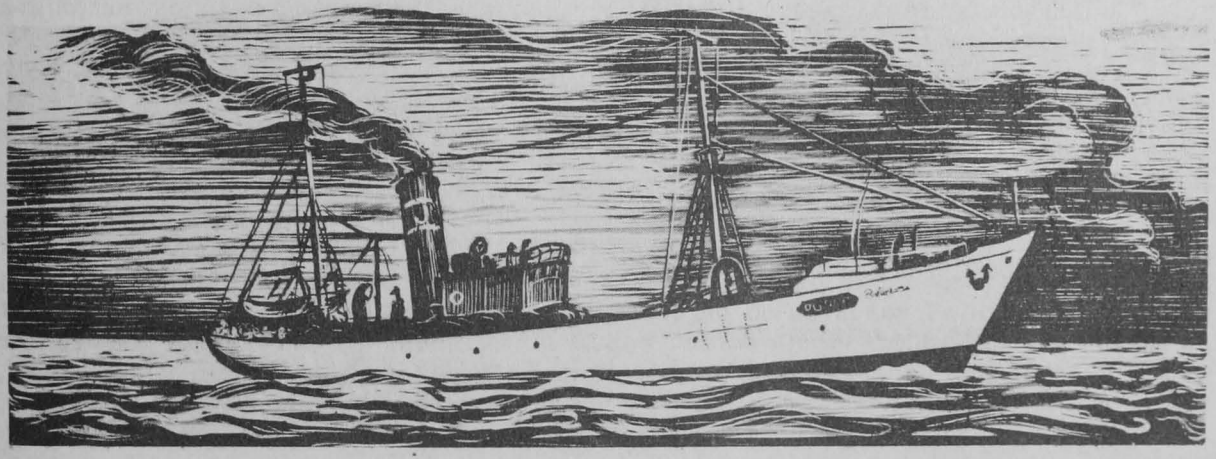
Germany

GERMAN FISHING VESSEL CONSTRUCTION PROGRAM: A meeting of the labor unions and the German Deep-Sea Fishing Association passed a unanimous resolution to reject the program outlined by the Allied Control Council to construct fishing vessels in order to improve the German fishing fleet, according to a report of the American Consulate in Bremen, Germany, which was based on an item in the German press in November. The program provides for the construction of 100 fishing vessels, but restricts 34 vessels to a maximum of 400 gross register tons, whereas the other 66 vessels must not be larger than 350 gross register tons. The approved length of the vessels, 141 feet, practically means that only ships with a maximum of 350 gross register tons can be constructed.

Economic Operations: It is not only the intention to increase catches but also to reduce operation costs in order to keep fish prices at a low level. Comparing the larger sized with the smaller sized vessel clearly shows the advantages of the larger types. A comparison of the outer measures shows the following:

	164 feet	141 feet	Difference
Length over all	164 ft.	141 ft.	-14 percent
Tonnage	500 grt.	350 grt.	-30 "
Engine performance	750 hp.	600 hp.	-20 "
Bunker coal space	250 tons	180 tons	-80 "
Fish storage space	4200 ctw.	2500 ctw.	-42 "
Speed	12 knots	10.5 knots	-13 "

Although the smaller type is only 14 percent shorter than the larger, its storage space is 42 percent less. The difference in speed is comparatively small



but is of great importance in landing catches as quickly as possible. The difference in engine performance is very important because it enables larger catches, deeper fishing, and longer trips.

Construction Costs: Construction costs of the vessels are indicated in the following figures:

	164 feet	141 feet	Difference
Steel	320 tons	220 tons	
Boiler-Sheeting, Machinery castings, Cast iron	260 "	200 "	
Total	580 "	420 "	-28 percent
Lumber	140 CBM*	100 CBM*	-30 "
Working hours	200,000 hrs.	150,000 hrs.	-25 "
Construction costs	900,000 rmk.	700,000 rmk.	-22 "

*CBM = Cubic meter, a German unit of measure corresponding to 'board foot' in this country.

In regard to size and fishing capacity construction costs of the smaller type are more unfavorable than for the larger type. The same applies to the use of iron and lumber as well as estimated working hours. In addition, there is a comparatively slight difference in consumption of coal and electric power for the production of the materials required.

Operating Costs: Operation costs show even more clearly the unfavorable results of the smaller type:

	164 feet	141 feet	Difference
Coal consumption per day	9.5 tons	8.5 tons	-12 percent
Nets and equipment	nearly the same		0 "
Cost of repairs	" " "		0 "
Amounts written off			-25 "
Crews	20 men	14 men	-30 "

The foregoing table shows but a slight difference in the costs of operation. Expenditures for equipment and repairs are practically the same. Crew costs are somewhat higher, but are hardly worth mentioning in view of the comparatively small percentage in total operation costs. The consumption of coal is practically the same and, considering the present German supply, should receive particular attention.

The following figures show the difference when comparing catches and costs of operation:

	164 feet	141 feet	Difference
Estimated annual catches	5,511,500 lbs.	2,755,750 lbs.	-50 percent
Estimated total costs of one trip	-	-	-25 "
Average operation costs per 100 German pounds	-	-	+50 "

Operation costs for one trip of the smaller type is but 25 percent less; whereas, the annual catch is 50 percent less which indicates that only 50 percent as much fish is landed at operation costs of at least 75 percent of the larger type, thus increasing the average operation costs per hundred German pounds (CTW,

equalling 110.23 avoidupois pounds) by 50 percent. That increase can only be balanced by a corresponding increase in the price of fish.

Restricted Radius of Operation: The restriction to permit operation of smaller fishing vessels only, will unavoidably tend to fishing in waters near the home ports. Although smaller vessels may be seaworthy, their radius of action will be comparatively restricted, as they cannot fish in greater depths than 400 meters. Excessive fishing in the North Sea was already a problem before the war for all international fishing companies. Increased activity of steam-fishing vessels in the North Sea would undoubtedly result in a sharp decrease in fish, thus constituting a danger for all countries interested and fishing in those waters.

German fishing companies already recognized the disadvantages of the smaller types of ships long before the war, and a tendency to construct larger vessels was noticeable after 1928 and 1929. Since that time and even during the war, 166 ships of the 164-foot type were constructed. Of those vessels, 125, or 27 percent of the total fleet of 459 vessels, were sunk during the war. The present fishing fleet comprises 132 vessels, including 32 vessels of the 164-foot type. Catches show that those 32 ships are much superior to the remaining 100 of the smaller type. Catches during the period July 1, 1945 to September 15, 1946, are given as follows:

	Fishing Days	Catches in lbs.	Average Catches per day in ctw.
100 ships smaller than 164 ft.	17,939	196,764,000	99
32 ships of 141 ft.	5,016	101,103,000	189

The figures reflect practical experiences during the past year and show that the big ships landed almost double the quantity of fish per fishing day.

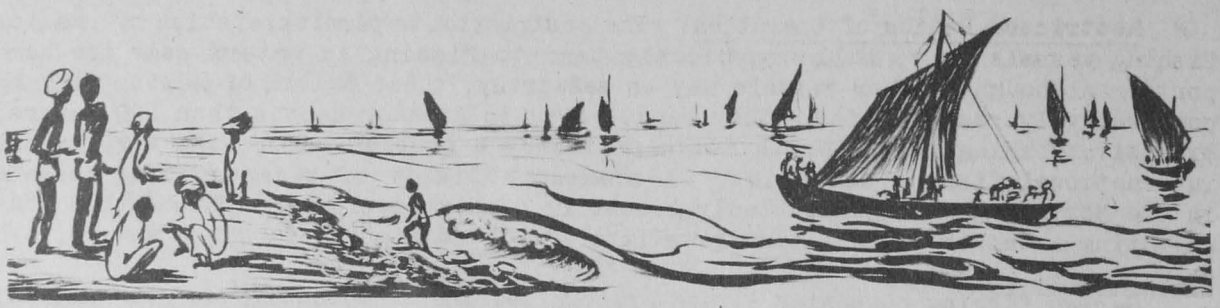
Fish Supply of the German Population: The supply of fish for the German population has been fixed at 12.5 kilos (27.5 pounds) per capita and year, which indicates that 798,000 metric tons (1,755,600,000 pounds) of fish will be required annually. The plan setup estimates that approximately 439,000 tons can be produced by domestic deep-sea, coastal, and inland fishing, while 225,000 tons have to be imported. The difference of approximately 134,000 tons has to be filled by construction of new fishing vessels. However, there are also many old and dilapidated vessels which have to be replaced. If construction is restricted to the smaller type, it would require almost twice as many fishing vessels as of the larger type.

Iceland

HERRING INDUSTRY: Approximately 4,000 metric tons of herring were caught by 39 Icelandic vessels operating just outside of Reykjavik harbor during the period January 17 to February 12, according to a report from the local American Legation. All of this herring has been sent to Siglufjord on the north coast for reduction into herring oil and meal. It is estimated that the oil and meal to be produced will be worth about $230,000.

The fishing activity is continuing, and it is believed in some quarters that this may be the start of a winter herring industry which will supplement the rich north coast herring season each year in July and August.

India



POSTWAR DEVELOPMENT: In the course of a speech, Bombay's Minister for Fisheries, assured the fishing trade that the Government of Bombay is anxious that all possible steps should be taken at an early date for the development of fisheries in this province on right lines, according to a report of the American Consulate General in Bombay, India. Dealing with the Government's plans toward this end, the Minister disclosed that the Bombay Government has sought the assistance of the Government of India to secure the services of a master fisherman from Japan. According to the Minister, Bombay will soon have an aquarium and marine biological station, and efforts will be made to establish research stations at convenient places. Young fishermen will be enabled to proceed abroad to obtain knowledge of the most up-to-date methods of fishing. The number of fisheries schools (of which there are at present five) will be increased. Fishermen's cooperative societies will be encouraged by subsidies and loans. Supplies of twine for making nets, which were short during the war, are now adequate. The Minister felt that there should be a network of ice factories throughout the coastal belt for affording cold storage facilities.

Ireland

FISHERIES: In 1945, Eire's sea fisheries amounted to 371,937 cwt.[1/] (41,657,000 pounds), valued at £551,820[2/] ($2,226,593), exclusive of shellfish which were valued at £127,926 ($516,181), according to its Report on the Sea and Inland Fisheries for the Year 1945. Demersal, or bottom fish, made up 18,374,160 pounds of the total; herring, 12,128,256 pounds; and mackerel, 10,703,616 pounds.

Persons engaged in the sea fisheries numbered 1,886 full time and 8,191 part time workers. The 3,472 vessels included 3 deep-sea steam trawlers, 568 motorboats, 758 sailboats, and 2,143 oared craft.

Japan

FISHERIES: Japanese fish landings for November amounted to 156,655 metric tons, exceeding the previous month's catch by 25 percent, according to General MacArthur's report on Japan for the month of December.

1/ Cwt. = 112 U. S. pounds.
2/ 1945 official rate of exchange of pound sterling equivalent to $4.035.

Two Japanese whaling fleets arrived in Antarctic grounds during December, and, by the end of the month, had landed 167 whales. In addition, Japanese coastal whalers caught 121 whales in the six-week period ending December 28.

The earthquake which struck southern Japan on December 21 caused the loss of 2,602 fishing vessels.

Mexico

SHRIMP INDUSTRY: Shrimp fishing during January 1947 showed an increase in the number of boats operating, but catches were reported to be spotty and voyages had to be extended to obtain paying loads, according to the United States Embassy's Monthly Economic Review for Guaymas, Sonora. The freezing plants found a ready market in the United States for jumbo size shrimp, and normal shipments went forward. Stocks of smaller sizes were accumulated and held in the hope of a better market price. A new freezing plant began manufacturing ice and an expected 18 to 20 tons of ice a day will be available to the fishing fleet.

Netherlands

FISHERIES: The 1946 fishing season was a memorable one for the Netherlands, according to a report from the American Embassy at the Hague. With a fleet less than two-thirds prewar capacity at the close of the season, catches from the bountiful North Sea banks were such, that the total harvest of herring and other sea fish equaled 1938 production. Total catch is estimated at about 142,000 metric tons, of which 68 percent was herring. Oysters and shellfish will add another estimated 48,000 tons. As a result of the meat shortage, total consumption of sea fish in the Netherlands has doubled prewar figures. Approximately 75 percent of the herring and sea fish went into domestic consumption, while for oysters and shellfish the estimate is about 40 percent. Good distribution facilities have made fish available even in the smallest towns, at least once a week, and in many places, oftener.

Government controls, particularly in the matter of price regulation, were equally strong in the fishing industry. Maximum prices are fixed, generally at the beginning of the fishing season, for the fishermen, wholesaler, and consumer. All fish, as is the case with fruits and vegetables, must be sold at auction under state supervision in the larger auctions such as Ijmuiden and Scheveningen, while in the smaller centers it is usually under joint control of the municipal officials and fishermen's organization. Whenever maximum prices are realized at auction, distribution is arranged by state officials who indicate different wholesalers to whom the fisherman will deliver his product. This is done for the intended purpose of securing adequate distribution. When supply is in excess of demand, the fisherman can deliver his product as he wishes.

Newfoundland

REGULATIONS: The regulations covering the filleting and freezing of fish, made by the Newfoundland's Commissioner for Natural Resources and referred to in the December 1946 issue of Commercial Fisheries Review (p. 50), are reported in full by the American Consul General at St. John's, as follows:

1. In these Regulations unless the context otherwise requires--

   (a) "Board" means the Newfoundland Fisheries Board;

   (b) "Fish" means all types of marine fishes including shellfish;

   (c) "Fillet" means fish from which all guts, bones, head, tail and fins have been removed, or, as the context requires, to remove all such parts from fish, and grammatical variations of the term shall be construed accordingly;

   (d) "Inspector" means any person authorized by the Board to act as an Inspector for the purposes of these Regulations;

   (e) "Person" shall include any body of persons, corporate or unincorporate and any society or association;

   (f) "Non-fatty" fish shall include cod, haddock, flounder, rosefish, hake (also called ling), cusk, and pollock.

2. All premises used in the filleting or freezing of fish shall have an adequate supply of clean, fresh or sea water free from pollution and all such premises and the equipment and implements used therein shall at all times be kept in a thoroughly clean and sanitary condition.

3. Fish showing any signs of deterioration, decomposition, or sourness shall not be filleted and fillets which are soft or show any such signs shall not be frozen.

4. When fillets cut from scale-type fish are to be marketed with skin on, the fish shall be scaled before filleting, in accordance with a method approved by the Board.

5. Immediately before any fish is filleted such fish shall be thoroughly washed in fresh or salt water which is projected directly on to such fish from a jet or pump.

6. Fillets, when stored in ice for transportation or holding before freezing, shall be kept packed in finely crushed ice in boxes the sides of which are not more than eight inches deep on the inside.

7. Before fillets are frozen, they shall be washed thoroughly clean in fresh or sea water and all blood clots or other deleterious matter shall be removed from them.

8. Immediately after fillets of non-fatty fish are washed and trimmed they shall be dipped in a clean sodium chloride brine solution for a sufficient time to strengthen the cell structure and to ensure a minimum amount of drip after defrosting. Whenever available, fresh water shall be used in making the sodium chloride brine solution.

9. Immediately after fillets are brined and drained they shall be weighed and placed in the wrapper and or container in which they are to be frozen and, until such fillets are put through the freezing process,

they shall be held in a refrigerated holding room at a temperature not higher than 40 degrees Fahrenheit.

10. Scales, balances, or weighing machines used in the weighing of fillets shall be accurate at all times, and in the weighing of fillets for freezing due allowance shall be made for evaporation during freezing.

11. All packages containing fillets for sale or export shall be plainly marked with a true and correct description of the contents, including the minimum weight in avoirdupois of the contents, and the name and address of the person, by whom they are packed.

12. The descriptive term "quick frozen" with its grammatical variations, as applied to the freezing of fish, shall not be used without the permission in writing of the Board. Such permission shall be granted only where the Board is satisfied that the process used is such that the fall in temperature of the fish during freezing from 32 degrees Fahrenheit to 25 degrees Fahrenheit occurs at a speed which ensures a minimum disturbance of tissue structure. Fish shall not be removed from the freezer before the fish reaches storage temperature.

13. Frozen fillets shall be kept stored at a temperature not higher than 5 degrees above zero Fahrenheit.

14. An Inspector may--

(a) Inspect any place in respect of which application is made for its use as a plant for filleting of fish or the freezing of fillets;

(b) Inspect any place for the filleting of fish or the freezing of fillets and the equipment used therein, and enquire into and ascertain the methods used and the sanitary precautions taken, and other matters in connection therewith;

(c) Inspect fillets and fish intended for use in the preparation of fillets;

(d) Take samples for further examination; and

(e) Initiate in his own name as Inspector and conduct prosecutions for breaches of these Regulations or offences thereunder.

15. If, after being requested to do so by an Inspector, any person who has in his possession or under his control any fillets or any fish intended for use in the preparation of fillets or who is the holder of a license issued and valid under the Processed Fish (Licencing) Regulations, 1944, to process fish, refuses or omits--

(a) To admit the Inspector into the plant in respect of which the licence is held;

(b) To show the Inspector all equipment in such plant, and the methods used in the plant;

(c) To produce any such fillets or fish for inspection, or

(d) To permit the reasonable taking of samples for examination

he shall be guilty of a breach of these Regulations.

16. No person shall export fillets unless they have been inspected and passed by an Inspector and if fillets are not exported within six months from the date of inspection, they shall not be exported without re-inspection.

17. The Inspector shall give an inspection certificate to the licencee or exporter and such certificate shall show the number of packages inspected and passed, the date of inspection and the name of the Inspector.

18. These Regulations may be cited as the Processed Fish (Filleting and Freezing) Regulations, 1946.

NOTE: Every person who commits a breach of any rules or regulations made under the Department of Natural Resources Acts, 1934-44, is liable for each offence on summary conviction at the suit of any person to a fine not exceeding two hundred dollars, or, in default of payment, to imprisonment for a period not exceeding three months.

Norway

FISHERIES: Norway's total fish catch for 1946, estimated at 835,000 metric tons valued at about $47,000,000, was about 100,000 tons greater than the 1945 catch, while the value of the catch was the highest on record, according to the American Embassy in Oslo, Norway, in the Annual Economic Review, 1946.

The year's cod catch of 169,000 metric tons valued at $8,800,000 was unusually large. The catch of winter herring, which ended in March, totaled 3,820,000 hectoliters (343,800 metric tons) as compared with 3,759,000 hectoliters (338,310 metric tons) the year before. The spring herring catch amounted to 2,448,000 hectoliters, (220,320 metric tons), a satisfactory figure. The total catch of fat herring up to November 2, 1946, was 269,000 hectoliters (24,210 metric tons) as compared with 308,000 hectoliters (27,720 metric tons) for the entire year 1945.

Mackerel fishing suffered considerably from lack of equipment. Coalfish fishing was generally good. Shark fishing was unsatisfactory off Spitzbergen, but good on the North Sea banks. The lobster and shrimp catches were good. The catch of seals off Greenland was large, but the Spitzbergen catch was unsatisfactory.

The total catch of Norwegian whaling companies in the 1945-46 season was 7,233 whales with an oil production of 520,811 casks, compared with 11,040 whales caught and 909,800 casks of oil produced during the 1939-40 season. The value of the 1945-46 catch, about $25,000,000, was the highest since the record 1930-31 season.

During the year, a law was passed prohibiting Norwegian companies or subjects from engaging directly or indirectly in whale fishing with foreign flag vessels, except upon receipt of special permission which could be given when a foreign company desiring to employ Norwegian seamen had engaged in Antarctic whaling during the last season before September 1939, or when the employment of Norwegians is

on a floating factory which was used for whaling before that time. Such special permission was granted during the year to enable Norwegian personnel to be employed on the Russian floating factory Slava, formerly the German Wikinger.

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INTERNATIONAL WHALING: The International Bureau of Whaling Statistics at Sandefjord, Norway, has informed the Fish and Wildlife Service that up to February 22, 1947, the factory ships of various nations whaling in the Antarctic had captured a total of 10,414 blue whale units. Under international agreement, the maximum catch quota for the 1946-47 Antarctic season, which extends from December 8, 1946, to April 7, 1947, has been fixed at 16,000 blue whale units.

Spain

FISHERIES: The fish catch in 1946 was about the same as in 1945 (510,000 tons), the national fishing syndicate and the Consulate at Vigo tentatively report, according to the Annual Economic Report on Spain for 1946, from the United States Embassy in Madrid. However, the sardine catch was only about 30 percent of that in 1945. The lack of olive oil for fish packing, higher prices paid in the domestic market and, to a minor degree this year, the shortage of tinplate, continued to restrict operations.

The fishing industry has also been handicapped by disagreements between the packers and the syndicate. Moreover, the price fixing and fresh fish distribution priorities systems have not always met with approval. While canned fish exports were almost negligible as compared with 1935, still they were more than double in volume the 1945 figure. Until the domestic market price falls somewhat, no substantial amounts of fish for export at lower prices were expected. Meanwhile, former markets were becoming accustomed to the cheaper Portuguese products.

U. S. S. R.

FISHERY PROGRAMS IN THE U.S.S.R.: While visiting the U. S. Fish and Wildlife Service Laboratory in Seattle, Dr. Alexander S. Bogdanov, Director of the Institute of Fishing and Oceanography at Moscow, U.S.S.R., was introduced by Mr. Harlan B. Holmes, Service biologist, to the biological and technological staffs and addressed them through his interpreter, Mr. V. C. Vezey. The stenographic record made of his talk is reproduced here with minor revisions as to spelling and grammar as made by Dr. Bogdanov and Mr. Vezey. Dr. Bogdanov came to this country late in November 1946, to attend the International Whaling Conference in Washington, D. C., and was taking this opportunity to visit the principal fishing centers and research laboratories of the U. S. Fish and Wildlife Service. His position in the Soviet Union is comparable to that of the Commissioner of the former Bureau of Fisheries in this country.

Dr. Bogdanov's remarks were approximately as follows:

I really regret that, while you probably expect an interesting talk, I shall hardly be able to give you one, as the circumstances of my departure for the United States were rather sudden and I came away unequipped with material to deliver an interesting talk. My object, as Mr. Holmes pointed out, was to attend the International Whaling Conference and I did not expect to travel in the United States. However, in Washington I made the acquaintance of some very interesting people, among them representatives of scientific organizations, and it was at their suggestion and with their assistance that the present trip to the Pacific coast was arranged.

To begin with, scientific and research work in the U.S.S.R. is carried on by organizations which may be classified in four groups. To the first group belongs the Academy of Sciences in Moscow (working chiefly in the realm of theory) and the large number of institutes under its jurisdiction. To the second group belong the institutes directed by the various industrial ministries, as is the case of the Institute to which I belong, which is directly responsible to the Ministry of Fisheries. While the Academy of Sciences group is concerned with major scientific problems of national importance, the group working under the Ministries is interested in more immediate problems, each in its own particular field.

The third category comprises universities and colleges throughout the land, and their ability to engage in scientific research is based largely on the requirement for university professors to do such research work over and above their educational activities. There is still a fourth category contributing to research in science; these are the various scientific unions, organizations, and clubs having a common interest in some sort of scientific work, such, for instance, as the Association of Natural History, the Russian Geographical Society, which has just celebrated its 100th anniversary, etc.

Before I take up the work carried on by the Institute of Fisheries and Oceanography, to which I belong, I must point out that it does not work alone in this field. At Leningrad there is the Institute of Lake and River Fisheries, with seven stations throughout the land, chiefly concerned with inland lakes and rivers; in Moscow, there is an Institute working on farm ponds and hatcheries; and, finally, an Institute in Kiev works only on inland waters within the Ukrainian Republic, having also a station at Odessa on the Black Sea.

The Institute of Fisheries and Oceanography, with headquarters in Moscow, has 18 stations strategically situated throughout the country as follows:

Murmansk, on the Barents Sea
Arkhangelsk, on the White Sea
Leningrad
Tallinn and Riga, on the Baltic Sea
Rostov, on the Don River
In the Straits of Kerch, between the Black Sea and the Sea of Azov
Batumi, on the Caucasian Black Sea Coast
Aralsk, on the Aral Sea
Saratov, on the Volga River
Two stations at Astrakhan on the Caspian Sea

Baku, also on the Caspian Sea
Petropavlovsk-on-Kamchatka
One station on Sakhalin Island
Vladivostok, on the Sea of Japan
Khabarovsk, on the Amur River, and
a Permanent Expedition based in Arkhangelsk and working in the Kara Sea

While the work of each one of these stations may be limited to one or more phases of oceanography and fisheries, the Moscow headquarters of the Institute is interested in all such phases, directing work in the following fields:

Ichthyology, breeding (including artificial breeding)
Morphology and embryology
Physiology
Fish diseases
Hydrology
Chemistry of water
Hydrobiology
Fishing techniques
Fish net treatment and maintenance
Salting
Smoking
Marinating and canning of fish
Fish fats
Utilization of fish by-products
Vitamins
Control methods in the fishing industry
Economics

As I have already said, the interests of the various stations may be more limited in scope. For instance, the Leningrad Station specializes in canning; the Saratov Station on the Volga, in breeding sturgeon; the Petropavlovsk Station on the Kamchatka Peninsula, in the biology of salmon and certain other species.

At the Moscow headquarters of the Institute, a Scientific Council, composed of heads of the various laboratories, meets from time to time for the purpose of discussing, working out and submitting for approval, programs for the ensuing periods. The programs are submitted to and approved by the Ministry of Fisheries, sometimes exactly as submitted, sometimes with modifications.

What kind of work does the Institute perform? What are some of its objectives and what are its methods of work?

The war years gave rise, of course, to some very specific problems. War operations resulted in the loss of fishing grounds, such as the Barents Sea in the north and the Black Sea in the south. It was necessary to find new fishing grounds to replace them, or, to put it differently, it was necessary to replace with other species, taken elsewhere, the catch that was no longer taken in the waters within the war zone.

For example, it was decided to turn to the Caspian Sea for a supply of a new kind of herring known as Kilka, but before its fishing could be begun on a commercial scale it was essential to study the location of this population, its breeding, its feeding habits, the various marine life that formed its food, etc. Moreover, the Fishing Techniques Laboratory specialists had to recommend the proper equipment to be used; methods of processing and packing had to be determined and, of course, the Economics Department had to establish proper supervision of this new fishery and the proper marketing of its catch.

This was a big job. However, within a year of receiving instructions to begin, the Institute was able to submit to the Government a complete plan for this new fishery. Two years after operations got under way, the catch rose from 2,000 to 20,000 tons a year.

Perhaps the most important problem which the Institute faces is that of the fish populations of the seas surrounding the Soviet Union and the so-called inland seas; i.e., the Caspian, Aral, and Azov.

Marking fish, particularly for the study of fish migration, is widely used in the Soviet Union, just as it is in the United States. It is used in the northern waters for the study of the migration of cod and in the Caspian Sea, in the south, that of the Volba.

Air reconnaissance is used for locating populations and in this work dirigibles are found to be especially useful. In the White Sea, they help find the Greenland seal, and the seal herds of the northern Caspian and of the northern waters of the Soviet Far East are also found by aerial observation. When a seal herd is spotted, its exact location is charted, the size of the herd is estimated and from that it is determined what part of the herd can be killed by the sealing expedition without unduly depleting the herd.

Planes sometimes set out to find a seal herd and on their way will discover something else of no lesser an interest. In the Black Sea area, for instance, planes sent out to determine the location and distribution of the porpoise observed large schools of the Pelamida off the Crimean and the Caucasian coasts. We decided to organize a Pelamida fishery in these waters.

To chart the areas of these schools and to estimate their size two planes and a dirigible were sent out, each proceeding to an area assigned to it. Some of the schools of the Pelamida were compact, some were sparse. A given area was divided into sectors and the population of a few sectors, taken at random, was estimated and, by the process of interpolation, the population of each of the three areas was determined. The dirigible was found to be very useful because of its ability to come down close above the surface and, using a megaphone, to instruct the crews of the seiners where to set their seines so that they might take virtually a whole school.

In the Sea of Azov, which is very shallow--usually about 40 feet deep--the entire sea was divided into sectors, random catches were counted and the whole population of the Pelamida in that sea was thus determined. In this fishery it was particularly necessary to study the seasonal migration of the Pelamida between the Black Sea and the Sea of Azov through the Straits of Kerch. In the autumn, very heavy catches were made, one season reaching the 70,000-ton mark. A close study of this migration enabled us to determine in advance both the time of the migration and the safe limit of the catch.

Dr. Thompson (University of Washington, School of Fisheries) has asked me whether it was true that hydrological conditions in the Black Sea forced the fish population to live near the surface. Bottom varieties in the Black Sea are found only in the coastal areas; in the open sea there is a concentration of sulphur dioxide at a depth of some 650 feet, a condition which led to the assumption that the Black Sea was uninhabitable by fish; this is not correct, as pelagic species do live in the upper layers of water in the open sea. At one particular time, for

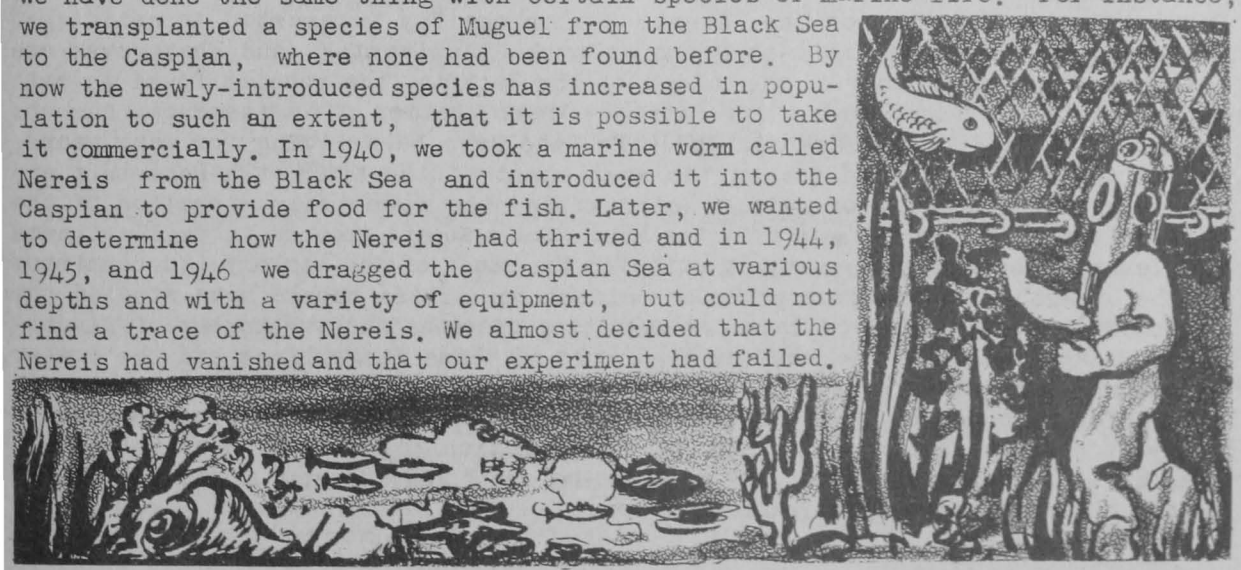
instance, the Pelamida population of the Black Sea was estimated at from 600,000 to one million tons, though this high figure is not necessarily representative.

Fish populations in the Caspian Sea are carefully studied. The spawning season in the northern waters of the Caspian are of great interest as a multitude of species come there to spawn. The fluctuation of the various populations is chiefly the object of study for the Institute, which is more interested in that than any actual count. Marine life on which the fish subsist is also studied--and its increase and decrease--because a knowledge of this food problem enables the Institute to predict the conditions into which the young fish will emerge each season.

What else do the workers at the Institute study? The rate of growth and the determination of the sexual maturity of various species are studied. A great deal of statistical material has been compiled, but the workers of the Institute are no less interested in actual observation of the habits and ways of fish. The dirigible, which we use for the location of schools of fish and seal herds, as I have said, is used for this purpose also, because it is practically noiseless and does not scare the fish away and, besides, it can come down right to the surface of the sea.

Behavior of fish in the vicinity of seines and traps is interesting. Fish are hesitant about approaching a seine, usually turning right or left some distance from it, although, of course, some manage to get caught in it. I remember my own observations when I was down at the bottom of the Black Sea in a diving suit; I discovered that fish in their local movements seemed to travel some unseen paths known to them alone. I would see a fish swim into my range of vision at some particular spot; it would proceed on its way, then lift at a certain point, turn left, swim on in that direction a while, turn again and finally swim out of sight. Then another would appear in the same spot and follow the same path, lifting where the first one lifted, making the same turns at the same spots, and go on its way, and a third would arrive following the same unseen path. I found that if I stood quite still the fish did not fear me, but, full of curiosity, would even poke their noses into the glasses of my headdress.

We have introduced species of fish from one body of water into another and we have done the same thing with certain species of marine life. For instance, we transplanted a species of Muguel from the Black Sea to the Caspian, where none had been found before. By now the newly-introduced species has increased in population to such an extent, that it is possible to take it commercially. In 1940, we took a marine worm called Nereis from the Black Sea and introduced it into the Caspian to provide food for the fish. Later, we wanted to determine how the Nereis had thrived and in 1944, 1945, and 1946 we dragged the Caspian Sea at various depths and with a variety of equipment, but could not find a trace of the Nereis. We almost decided that the Nereis had vanished and that our experiment had failed.



But in 1945, some sturgeon were caught and examined and their stomachs were found to contain numerous full-grown specimens of the Nereis. It appears that the Nereis is fed upon by the sturgeon in a very satisfactory way and has, in general, come to constitute a staple fish diet in the Caspian Sea.

To illustrate other types of work done by the Institute, I might tell you about one invention designed to protect nets anchored out at sea from rough weather. Storms at sea are hard on fish nets, as you know, so a net with what might be called "instinctive" properties was developed, which made it sink to some depth from the surface when a storm blew up and still deeper as the storm increased and the seas grew bigger; but, as the storm would abate the net would rise again to its previous position. Another problem was offered by a net reaching from shore to shore across the narrow strait of Kerch, where the fluctuating current cluttered the net with debris. How to ensure a clean net? A contraption was evolved which caused the net to tilt at an angle when debris accumulated, allowing automatic cleaning, so to speak, by the force of the current.

The end of the war confronted our Institute with a very great problem. During the war years, we had been called upon to supply great quantities of concentrated fish foods of all kinds to both the army and civilian population, but now nobody wanted these concentrated foods and clamored for delicacies. So we had to organize the switch from the concentrated products to the more tasty and higher quality items.

Before closing, a few additional facts regarding our Institute are:

Our Library in Moscow contains some 85,000 volumes. During the period 1935-1945, the Institute published some 4,200 separate books and pamphlets dealing with oceanography and fishery. Most of these were published either before or after the war, which, of course, seriously disrupted this work and it is only now that the Institute is resuming it on a large scale. The personnel of the Institute--headquarters at Moscow and the 18 stations--numbers 900, in round figures, including scientific and administrative personnel, seamen on the ships of the Institute and other workers; of these 900 employees some 350 are holders of various scientific degrees. I have given you these figures as I recall them and they may not be exact.

Mr. Holmes has asked me to add a few words regarding our work with salmon. Our station at Murmansk on the Barents Sea is cheifly interested in artificial breeding, while the stations at Petropavlovsk, Vladivostok, and Khabarovsk are interested in the biology of the salmon of the Pacific, the species found in both Soviet and American waters. The Petropavlovsk station, for instance, numbers among its staff two couples--man and wife--who have been living for many years, one on the east coast and one on the west coast of the Kamchatka Peninsula and observing the migration of salmon upstream and the downstream migration of the fingerlings. It must be said that the Kamchatka seaboard abounds in small streams and lakes, offering excellent opportunity for the study of the biology and chemistry of the spawning and breeding processes of salmon. These people have studied the ratio between the number of spawners migrating upstream and the number of fingerlings going downstream, as well as the ratio of these fingerlings and the number of mature fish later returning to the same stream to spawn. They have assembled much information on outside conditions affecting the spawning process and the early life of the salmon. Some of this information has already been published, some of it is being published now and just before I left Moscow, I went over some proofs of articles for publication.

Editorial Note: At this point Dr. Bogdanov read the following statement in English:

In conclusion, I would like to thank my American colleagues, who, like us, are interested in exploring and studying the seas and their inhabitants, for the kind reception and hospitality they have accorded me.

I sincerely hope that, in future, exchange of knowledge and literature between us and the development of personal friendships will further the work we are doing.

I attach especial importance to this development of personal friendships. The wartime friendship, which sprang up between our peoples, must grow into a peacetime friendship; and I think that these personal contacts that we workers in the field of science are establishing will greatly help in this direction.

At the conclusion of his talk, Dr. Bogdanov answered a number of questions. They follow:

Question: What is the approximate size of research vessels operated by the Institute and the total number?

Answer: There are 16 vessels of over 100 tons owned by the Institute.

Question: What is the main commercial species of salmon on the Pacific Coast?

Answer: Pink and chum; these two species account for 90 percent or more of the entire salmon population.

Question: What is the relative importance of canned, smoked, salted, and frozen fish?

Answer: I am afraid to quote any figures, but I may say that canning of fish is far less developed than here in the United States. A good deal of fish is smoked; a still greater percentage is salted, which does not yield a very satisfactory product with the exception of herring, which is better salted than in any other preparation.

Question: Is there any fish used entirely for byproducts instead of for food?

Answer: No. No species is used entirely for byproducts. However, some are used as bait in cod fishing in the Bering Sea; two species are so used.

Question: What is the annual production of fresh-water and marine fish?

Answer: I am unable to give you figures, which, however, will be contained in the publications which are to be supplied to you. No figures later than 1944 are as yet available. If we consider the northern part of the Caspian Sea (into which both the Volga and the Ural Rivers pour fresh water), as well as the Aral Sea and the Sea of Azov to be marine fisheries, then marine fish would account for 90 percent and inland fish for only 10 percent of the total catch. As to the relative position with respect to fish landings, the United States leads, with the U.S.S.R. coming second, while the position of Japan, which was first prior to the war, is now uncertain.

Question: What are the relative salinities of the inland seas of the Soviet Union?

Answer: The ocean has a salinity of 3.6 percent, the middle reaches of the Caspian, 1.2 percent; the Aral Sea, 1.2 percent; and the Black Sea, 1.8 percent; the upper part of the Caspian is practically fresh water.

Question: Has the Caspian Sea been reported to be declining in level?

Answer: There seems to be no progressive decline. It is a matter of historical cycles, the problem coming up seriously about 15 years ago, when we went to work on the historical, geological, and archeological aspects of its behavior. It was discovered that in the vicinity of Baku there was merely a shifting of the sea from east to west and a matter of alternate cycles of elevation and depression of the sea floor. This curve is not complete and we do not know what point of the cycle we have reached. The recession of the water in the northern part of the sea has led to certain changes in the spawning grounds and influenced the fish population and we are now striving to counteract these effects.

Question: Have you ever had any chemical nutrients added in the inland seas?

Answer: No such work has been done. The inland seas are very high in nutrient material. The Sea of Azov has the highest yield of fish, for its size, in the world, with catches of 165 pounds per 12,500 square feet (75 kilos to 1 hectar).

Question: What is the ratio of your appropriation for scientific work to the total value of the fisheries products landed?

Answer: There is no lack of funds, although difficulties are encountered. One of the difficulties is various technical equipment, production of which was halted during the war years. There is a lack of workers, especially in the middle and lower levels, though there are enough scientific workers. As a matter of fact, expeditions are known to have been called off just because, while the leadership was there, workmen and laborers couldn't be had.