



## International

**CONVENTION RECOMMENDED BETWEEN UNITED STATES AND CUBA ON CONSERVATION OF GULF OF MEXICO SHRIMP RESOURCES:** As a result of meetings November 18-22, 1957, in Havana, Cuba, on the conservation of the shrimp resources of the Eastern Gulf of Mexico, the official delegations of the United States and Cuba drafted an agreement that is to be recommended to their respective Governments for adoption in the form of a Convention. This agreement contemplates international cooperation between Cuba and the United States aimed at developing and maintaining the maximum sustainable yield from these shrimp resources. The agreement also contemplates cooperation in the enforcement of regulations that may be adopted in accordance with the Convention.

The Convention will provide for the establishment of a bi-partite commission constituted by representatives of both Governments, which will be in charge of the fulfillment of the functions provided for in the agreement.

During the course of the meetings, the delegates to the conference examined carefully the problem of the conservation of the shrimp resources of common interest in the Eastern Gulf of Mexico in the light of available scientific information.

## FISHERY TRADE FAIRS HELD IN DENMARK AND ENGLAND

The Fishery Trade Fair held in Copenhagen, Denmark, from September 30 to October 5, 1957, and the International Fisheries Exposition held in Lowestoft, England, from October 21-26, 1957, consisted primarily of exhibits of equipment for the fishing industry. No types of equipment radically different from types well known to the United States fishing industry were shown, but there was evidence that European manufacturers have attempted to design some of their equipment to answer specific needs of the fisheries. The potential market for equipment for new vessels is substantial since most northwestern European construction yards appear to have a large backlog of fishing vessel construction orders. Furthermore, the wide use by the fishing industry of electronic and mechanical aids was evident from the number of exhibitors showing sonic devices for fish location and electronic aids to navigation. Northwestern European fishing vessels in general appear to carry more instruments than do United States vessels of comparable size.

The large number of net and twine manufacturers with exhibits, featuring synthetic nets and twine for many fishing uses, is suggestive of a highly competitive but expanding market for this equipment in Europe.

Equipment for depth-sounding and fish finding was shown in an especially large number of models. Some particular advantages were claimed for each model, and also something was added to the cost of the instrument for each refinement.

Two conclusions about the primary fish production equipment of northwestern Europe are inevitable from a visit to these fairs as well as from observations of typical fishing vessels of the area. One is that they have more specialized equipment than most United States vessels of comparable size. Another is that the electronic equipment carried is usually more precisely adapted to a particular kind of fishing situation than it is in the United States.

In such a good and compact marketing area, it is not surprising to find equipment manufacturers spending more effort on the development of fishing equipment and incidentally on the development of fisheries. The "Decca" system of navigation

is an example of this. It has come into very general use on the medium-size and small trawlers which operate in the North Sea and adjacent areas. The system requires the erection and permanent maintenance of shore stations. It is said to be more accurate than Loran, but the range from shore stations is a maximum of about 240 miles. The system or similar systems have long been in use for aircraft. Although the equipment is said to be in use on about 1,000 medium-size fishing vessels, it was not on the several distant-water trawlers observed. This supports the argument that the "Decca" navigation equipment is principally used to find specific fishing locations, and to avoid snags or wrecks which are in known positions rather than to function primarily in traverse navigation. Distant-water trawlers which fish in areas not covered by the "Decca" shore stations use radio-direction finders, depth-sounders, radar, and, on some vessels, Loran for traverse navigation as supplements to celestial navigation and dead reckoning.

One distant-water trawler visited was only two years old, but it had two radar receivers, three separate sonic depth-sounders, or fish-finder systems, and two radio-direction finders.

The Fishery Trade Fair at Copenhagen also had exhibits of processed fishery products, but the greater emphasis was on equipment for fishing vessels or fish processing. Approximately 100 companies had booths at each fair. The Copenhagen fair had a wider range of exhibits and a greater representation of manufacturers from Continental Europe and Japan. The Lowestoft Exhibition, although not exclusively for English manufacturers, had a more local flavor and a particularly large section devoted to Diesel engines.

The Copenhagen Fair was housed in a single large auditorium-like structure which occupied about one city block in the central part of the city.

The Lowestoft Exhibition was held at the Pier Pavilion and at Kensington Hall, located about a mile apart in Lowestoft. Very few United States manufacturers were represented, except through their European subsidiaries, at either exhibition.

## NORWEGIAN-U. S. S. R. NORTH ATLANTIC SEALING AGREEMENT

At the invitation of the Norwegian Government, negotiations have been conducted in Oslo during the period November 13-22, 1957, between a Norwegian and a Soviet delegation concerning sealing in the areas in the northeastern Atlantic Ocean where the two countries are engaged in sealing.

It was decided to conclude an agreement between the two countries with the view to establishing cooperation with regard to scientific investigations and control measures to ensure a rational and responsible utilization of the seal population. The agreement comprises Greenland seal, hooded seal, and walrus, eventually with the possibility of later expanding the agreement also to embrace other types of polar animals.

Agreement was reached on implementing the following regulations on catching:

For the Jan Mayen field (the Western ice field) and for the northern catching area (the Northern ice field), the catching season is fixed from March 20 to May 5, and for the eastern catching area (the Eastern ice field), from March 1 to May 10. In the Denmark Straits, Norwegian ships which have been catching in this area in recent years will temporarily be permitted to catch during the period June 15 to July 15. As regards catching of walrus, agreement was reached on holding to the complete ban which both countries now maintain.

Under the agreement, a commission will be founded with representatives of the two countries, and this commission can make proposals on amendments and annexes to the regulations on which agreement has now been reached.

The negotiations also touched upon sealing in the White Sea where Norwegian sealers, according to an agreement with the Government of the Soviet Union in 1926, have had limited access to catching seals. Norwegian seal catchers have not been engaged in this activity since the last war.

The Soviet delegation, for its part, pointed out that for various reasons, among others, biological and catching, there was no basis for giving Norwegian seal catchers permission to resume catching in the White Sea.

As agreement on satisfactory control measures in the other areas was also achieved, and both delegations positively supported maintaining the foundation for a continued responsible utilization of the seal population, the Norwegian delegation found that it could make a statement that it would recommend to the Norwegian authorities to request the Norwegian seal catchers to relinquish their rights under the agreement of 1926.

The negotiations took place in the best understanding and showed that both parties laid great stress on the establishment of future cooperation with regard to the question of a rational utilization of the seal population in the interest of both countries.

## FOOD AND AGRICULTURE ORGANIZATION

WORLD FISHERY CATCH, 1956: The total world fishery catch continues to increase and is now approaching 30 million metric tons a year (round or live-weight basis), according to figures published in the latest Yearbook of Fishery Statistics issued on October 31, 1957, by the Food and Agriculture Organization (FAO). The actual catch for 1956 was 29,330,000 metric tons. The continued increase in the world fishery catch is indicated by the following (in metric tons): 20,440,000 in 1938; 19,160,000 in 1948; 24,750,000 in 1953; 26,690,000 in 1954, and 27,940,000 in 1955.

There now are eight countries catching more than one million tons of fish yearly, India having reached this total for the first time in 1956. Japan remained far in the lead as the number-one fishing country.

The first eight accounted for 62.1 percent of the world catch; the remaining 26 countries caught 30.4 percent of the total.

Herring, sardines, anchovies, and related species (6,990,000 metric tons) make up the largest section of the world catch by species. Next in order are mixed and unidentified fish, 5,240,000 tons; cod, hake, haddock, etc. 4,880,000 tons; and fresh-water fish 3,070,000 tons.

Asian countries accounted for 11,830,000 tons of the world total catch. Europe came second with 7,970,000 tons, and North America third with 4,180,000 tons. The U. S. S. R. was fourth with 2,620,000 tons.



Table 1 - World Fishery Catch and Catch of 8 Largest Fish-Producing Countries, 1938, 1948, 1953-56

Countries	Per- cent <sup>1/</sup>	1956	1955	1954	1953	1948	1938
	%	(1,000 Metric Tons)					
World Total	100	29,330.0	27,940.0	26,690.0	24,750.0	19,160.0	20,440.0
Japan . . . . . <sup>2/</sup>	16.3	4,762.6	4,912.8	4,544.6	4,521.6	2,431.4	3,562.0
United States . . . . . <sup>2/</sup>	10.0	2,935.9	2,738.9	2,706.4	2,437.5	2,409.9	2,253.1
China Mainland	9.0	2,640.0	2,518.0	2,294.0	1,890.0	<sup>3/</sup> (448.0)	1,500.0
U. S. S. R. . . . .	8.9	2,617.0	2,498.0	2,258.0	1,983.0	1,486.0	1,523.0
Norway . . . . .	7.3	2,128.9	1,813.4	2,068.2	1,557.1	1,504.0	1,152.5
Canada <sup>4/</sup> . . . . .	3.7	1,076.9	954.1	1,025.8	925.1	1,052.9	836.8
United Kingdom	3.6	1,050.4	1,100.4	1,070.2	1,122.0	1,206.1	1,198.1
India . . . . .	3.4	1,012.3	839.0	828.5	819.0	-	-
Total for 8 Largest Countries	62.1	18,220.0	17,370.0	16,800.0	15,260.0	11,840.0	12,730.0

<sup>1/</sup> CATCH AS PERCENTAGE OF GRAND TOTAL BASED ON 1956 FIGURES OR LATEST YEAR SHOWN.  
<sup>2/</sup> INCLUDES ALASKA. | <sup>3/</sup> DATA FOR 1949 SHOWN. | <sup>4/</sup> INCLUDES NEWFOUNDLAND.  
NOTE: LIVE- OR ROUND-WEIGHT BASIS.

Most of the approximately 10-million-ton increase in the world catch since the World War II (19,160,000 tons in 1948; 29,330,000 tons in 1956) took place in Asia, where the total catch has risen by more than 5,000,000 tons--from 6,580,000 in 1948 to 11,830,000 tons in 1956. The next biggest increase was in Europe, where the total in 1956 was 7,970,000 tons compared with 6,140,000 tons in 1948--a rise of more than 1,800,000 tons. The U. S. S. R. catch increased by more than 1,000,000 tons over the same period.

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**FISHING GEAR CONGRESS HELD:** The first International Fishing Gear Congress, held in Hamburg, West Germany, October 6-12, 1957, under the auspices of the Food and Agriculture Organization (FAO) was attended by two representatives of the U. S. Bureau of Commercial Fisheries.

These representatives report that the most remarkable feature and accomplishment of the first International Fishing Gear Congress was that it assembled a group of participants including not only fishing gear technologists, fishing gear manufacturers, and fishermen, but also fishery biologists, fishery administrators, publishers of fishery periodicals, and others. Furthermore, the subjects discussed were sufficient to sustain the interest of most of those present through six days, five of which were devoted to formal meetings.

More than 480 participants from 37 countries were registered and more than 100 papers were discussed. The arrangements for the Congress were competently handled by the FAO staff, and a simultaneous system gave a choice of English, French, Spanish, or German translations. A. W. Anderson, Assistant Director of the U. S. Bureau of Commer-

cial Fisheries, acted as general chairman. Since there was insufficient time for all papers to be read and discussed, a rapporteur appointed for each session summarized papers for discussion by the group.

Extensive discussions concerned nomenclature to designate types of twines for nets. The subject is complicated by the fact that textile manufacturers have a complex terminology of their own differing from that familiar to fisheries people. Furthermore, new types of synthetic materials and new methods of processing natural materials, knitting, and handling nets are appearing so rapidly that a standard nomenclature is difficult to establish. Some papers presenting basic data for future classification of net materials were presented.

Scientific approaches to problems with trawl efficiency require knowledge of speed of trawling and factors of water resistance. Discussions brought out the fact that almost nothing, which is sufficiently exact to be useful, is known about trawling speeds. Also, very little is known about the water resistance of various parts of the gear or the relative effects of water resistance and ground friction in trawling gear. Dis-

ussions about the use of models called attention to the difficulty in bridging the gap between very small models and full-size gear. It was suggested, however, that model studies should be worth while especially with larger models used in large model basins. These discussions were of special interest in connection with present work of the U. S. Bureau of Commercial Fisheries gear research unit since a project involving precise measurements of trawling speeds and gear resistance is in progress.

Reports of additional refinements in methods for attracting fish with light were of considerable interest and other attraction methods were discussed at length. It was pointed out that basic studies in the behavior and responses of fishes to attracting devices and materials needed more study and offered a promising field for investigation.

A summary of the subjects discussed follows:

**Materials:** Old and new net materials, their use and life, with particular reference to new synthetic fibers such as terylene, dacron, saran, vinylon, and various mixtures. Research on strength of natural fibers. Standardization of terms and possibility of universal conversion tables. Comparison of characteristics of modern nets and methods of testing. Preservation and maintenance of gear nets and lines made from different materials.

**Net Construction and Use:** Testing theory by experiment with models; measuring instruments and observation under-water of behavior of gear and reaction of fish to gear; selectivity of gear; comparative fishing experiments; methods of

NOTE: A BOOK, MODERN FISHING GEAR, IS TO BE PUBLISHED AS A COMPANION VOLUME TO FISHING BOATS OF THE WORLD (PUBLISHED IN 1955) AND WILL CONTAIN MUCH OF THE MATERIAL AS PRESENTED AT THE HAMBURG CONGRESS. IT WILL BE AVAILABLE THROUGH FISHING NEWS, 110 FLEET STREET, LONDON EC 4, ENGLAND.

specifying the shapes, dimensions, quality, and other characteristics of nets.

**Mechanics of Net Construction:** Mechanical knitting and various problems with synthetic fibers; Japanese knotless nets; relative merits of different fibers; bonded twines; thermoset twines; single, double, and special knots; knot tightening, etc.; tailoring of nets according to drawing and diagrams; specifications of work and maintenance.

**Operation of Fishing Gear:** Deck equipment, layout of vessels, choice of gear for principal fisheries; labor-saving and power-handling of gear by deck machinery, remote control, automatic release, and overload; instruments for measuring gear and recording and controlling performance; hauling techniques, treatment and storing of catch; unloading facilities on vessels.

**Tactics in Locating and Catching Fish:** Charts of known grounds; hydrographic aids in thermometers, current meters, and plankton samplers; direction-finding gear; echo-sounders of all types; aerial scouting, acoustic aids, and underwater television cameras; light and other lures, bait, and chemical attractants.

**Electrical Fishing:** Factual summary of existing knowledge in both fresh- and sea-water application.

Likely future developments in all classes of world fishing--new devices for locating and attracting fish; newly-developed gears and methods of increased power handling; new methods in preserving and processing catches on board which affect the size of vessels, their range, operation, and type of equipment; factoryship operation; use of catchers as supplements; fish carriers to market, etc.

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**REPORT ON NINTH SESSION OF FAO CONFERENCE:** The Ninth Session of the Conference of the Food and Agriculture Organization opened on November 2, 1957, in Rome, Italy. The Conference, which is the chief legislative and policy-making organization of FAO (of which the United States and 76 other countries are members), was opened by the Director-General who welcomed delegates and observers of both governmental and nongovernmental organizations. The meetings lasted three weeks and ended on November 22, 1957. World problems in agriculture, fisheries, forestry, and nutrition were discussed.



THE BEST WAY OF OVERCOMING THE GENERAL LACK OF PROTEIN IN THE DIETS OF THE FAR EASTERN POPULATIONS IS BY INCREASING THE PRODUCTION AND CONSUMPTION OF FISH. THE FOOD AND AGRICULTURE ORGANIZATION SENT AN EXPERT IN FISH CULTURE TO THAILAND TO TRAIN AND ASSIST THAI TECHNICIANS IN IMPROVING AND DEVELOPING THE INLAND FISHERIES RESOURCES OF THEIR COUNTRY. THIS PHOTOGRAPH SHOWS EXPERIMENTAL FISHING IN A RIVER WITH A SEINE NET.

Fishery advisers on the United States delegation to the Conference included A. W. Anderson,

Assistant Director, U. S. Bureau of Commercial Fisheries, and Charles E. Jackson, General Manager, National Fisheries Institute, Washington, D. C.

**Director-General's Policy Statement:** At the third plenary meeting on November 5, B. R. Sen, Director-General of FAO, presented a policy statement to the Conference in which he stressed that balanced development of the economy as a whole, including the agricultural sector, was essential to the practical success of all economic programming. He added that technical aid to development can only have its greatest effect if it is geared to the capacity of the recipient country to absorb it effectively, and therefore proposed an extension of FAO's program of fellowships and training centers as a means of enabling domestic administrative systems to increase their capacities to absorb. He called on delegates to help in the promotion of an international code of ethics in economic affairs, and referred to the FAO principles of surplus disposal which have been subscribed to by nearly 40 members in their commodity dealings. In addition, he asked the National FAO Committees and National Committees to use their greatest efforts to bring to the villages and homes the benefits of science and technology in improving their positions as both producers and consumers of food.

**Conference Organization and Agenda:** The Conference was divided into three Commissions: Commission I covered the world food and agriculture situation; Commission II concerned itself with the current and prospective activities of FAO; and Commission III discussed constitutional, administrative, and financial questions.

Principal items on the agenda included a statement on the over-all Technical Assistance position, consideration of work accomplished, and program of work for 1958/59; reports of fisheries councils; report on public relations activity; and program trends and development beyond 1959.

**Program of Work and Budget:** At the Tenth Plenary Meeting of the Conference on November 8, the Conference approved the Report of the General Committee, "Consideration of the Program of Work and Budget" (C 57 Limited/20).

**Food Shortages:** At the first meeting of Commission I, the Director-General pointed out that for FAO the basic problem is still one of food shortages, and the specific problem of surpluses is one of distribution rather than of overproduction. He further referred to the need of securing a measure of stability for the prices of agricultural products. The Director-General also referred to data contained in Document 57/8 regarding nutrition levels, which clearly demonstrate that poverty is at the root of the world nutritional inadequacies and that therefore these can be overcome ultimately only by general economic development.

**New Members:** The Conference on November 10 voted to re-admit Poland and to grant membership to the newly-independent countries of Ghana and Malaya. This brings FAO's total membership to 77.

**African Regional Office:** The Conference was asked to establish an African Regional Office to stimulate and guide the agricultural development of the member countries of that continent. A Commission of the Conference approved a resolution put forward by the delegate of Morocco, asking the Director-General to put into effect "as soon as possible" a proposal he had made earlier for the establishment of an FAO Regional Office for Africa.

The Director-General, in outlining his request for funds to strengthen the Organization's regional structure, said that "for some time to come, the problems of the African countries will fall largely within the field of FAO's responsibility."

The Moroccan resolution was passed by a vote of 44 to one, with one abstention. The new African countries of Morocco, Tunisia, the Sudan, and Ghana strongly urged immediate action. The Ghana representative summed up their viewpoint when he said that FAO's help was urgently needed in Africa which is "so vast and has so many problems and needs."

**Improving Regional Structure:** The Director-General's over-all plan for improving the regional structure of FAO and strengthening the service and liaison it can provide to member governments was approved in principle by the Conference Commission.

The Director-General's plan calls for the appointment of 21 highly-qualified technicians--5 in the Far East, 5 in the Near East, 10 in Latin America and 1 in North America--and the assignment of a senior officer at FAO Headquarters, to develop closer liaison with European Governments.

**Technical Committee on Fisheries:** The first meeting of the Technical Committee on Fisheries was held on November 12 at which time it adopted its agenda (Document C 57/LIM/10) and appointed Erik Heen of Norway as chairman and A. W. Anderson of the United States and Luis Howel Rivero of Cuba as Vice Chairmen. Anderson indicated that there was excellent representation by countries at the meetings of the Committee and that they were the best ever held from the point of view of discussions and interest. There were participants from 34 countries, including Australia, Belgium,

Burma, Canada, Ceylon, Chile, Colombia, Cuba, Denmark, Egypt, France, Germany, Ghana, Haiti, Honduras, Iceland, India, Indonesia, Italy, Japan, Lebanon, Libya, Morocco, Netherlands, Norway, Pakistan, Portugal, Philippines, Spain, Sweden, Turkey, United Kingdom, United States, and Yugoslavia. In addition, there were two observers.

The Technical Committee on Fisheries at its first three meetings (November 12 and 13) received an introductory statement by the Director of FAO's Fisheries Division and later the Chief of the Program Coordination Service of the Fisheries Division described the over-all Technical Assistance Program of the Division. This was followed by consideration of the work accomplished and program of work for 1958/59 for the Biology Branch, the Technology Branch, and the Economics and Statistics Branch. Also, the Committee received a report on the work of the General Fisheries Council for the Mediterranean, the activities of the Indo-Pacific Fisheries Council, and the work carried out in the Latin American region. General consideration was given to the over-all program of work of the Division of Fisheries and the Committee found it to be sound and well balanced.

The draft of the report (C 57/LIM/34) of the Drafting Committee was approved by the Technical Committee on Fisheries at its fifth meeting on November 16 and the report was then presented to Commission II for approval. After approval by Commission II, the report was adopted by the Conference.

**REPORT OF THE TECHNICAL COMMITTEE ON FISHERIES:** 1. The Conference examined the results achieved by the Fisheries Division during the past two years, as well as the program of work for the succeeding two-year period. It recorded its satisfaction of the way in which the Division had performed its task within the funds available and was of the opinion that the proposed program of work was sound, adequately balanced, and suitably orientated.

2. Regret was expressed regarding the discontinuation of the FAO Fisheries Bulletin and it was hoped that the substitute publications proposed would prove satisfactory.

3. The Conference commended the summary form in which the various Branches of the Division had reported on their work; this resulted in a much

clearer picture of the accomplishments achieved and projects proposed. The desirability of circulating such summaries to governments at least two months ahead of future sessions of the Conference was stressed.

4. The progress of the Technical Assistance Program was noted with satisfaction. Recipient countries were urged to make proper preparations before arrival of experts, to provide suitable working facilities, necessary equipment and counterpart assistance. There was general agreement that every means should be explored to improve the method of recruitment experts and to make more use of the assistance which national fisheries administrations could provide. It was also recommended that, in the case of fellowships, the maximum of advance information should be supplied to the country to be visited and careful programming be made in good time and adhered to.

5. The Biology Branch's performance and program as a whole was endorsed. It was agreed that primary attention should be given to those projects having a direct bearing on increased food production and the optimum utilization of aquatic resources. The Conference was glad to note the close cooperation in scientific research which continued between FAO and other agencies and satisfied themselves that there was no duplication in that respect.

6. The program of the Technology Branch and the work performed by it was fully appreciated and approved on account of its direct relation to the improvement of fish production, processing and distribution. It was the general opinion that the meetings which had already taken place on the subjects of fishing boats, fishing gear, and fish processing had served a most useful purpose in calling attention to recent developments and in bringing together fishermen, administrators, scientists and representatives from various branches of the industry. It was recommended that such meetings be followed by other meetings of the same kind and that a six-year period between each seemed reasonable, it being understood that each meeting should be centered around a definite theme. Appreciation of the usefulness of World Fisheries Abstracts, already expressed by previous Conferences, was reiterated and the Conference noted with satisfaction the work being undertaken with respect to the preparation of handbooks and of technological dictionaries. Interested countries stated their willingness to review the drafts of such dictionaries and urged that the project be completed with the utmost celerity.

7. The work accomplished by the Economics and Statistics Branch was highly commended, particularly the rapidity with which the Yearbook of Fishery Statistics was now produced and the improvements which had been introduced in the latest edition. It was recommended that the direct contacts established with fisheries administrations in various countries, which had proved of the greatest assistance in this connection, should be expanded. The difficulties still to be overcome in the collection of statistics on fishing boats, manpower and productivity, and in the organization of fisheries censuses were noted. It was recognized that the limitation in these matters rested not only with the facilities available to this Branch, but also with the ability of governments to supply this particular kind of information. The interest in developing fishery cooperatives was noted. While FAO does not normally take the initiative in promoting the development of cooperatives, it will have to study this system to be able to assist governments interested in this field in determining the most appropriate forms of organization and management.

8. It was noted that, with the staff now available, the Branch could not undertake a wider program in procuring commodity information and comprehensive fisheries intelligence.

9. The reports of the Indo-Pacific Fisheries Council and the General Fisheries Council for the Mediterranean were received and approved, and the budget proposed by the Director-General for the Indo-Pacific Fisheries Council was adopted. The collaboration and cooperation between the Fisheries Division and these councils were reviewed and approved.

10. The work of the Latin American Regional Office in relation to the formation of a Latin American Fisheries Council was considered, as well as the results obtained by the various training centers which took place in this part of the world.

11. The Conference was impressed by the activities of the Division since the last session in disseminating intelligence and information on its work, and by the many reports and feature articles written and distributed to the world press, and it was recommended that this work should be continued and improved.

Future Trends and Developments Beyond 1959:  
12. With the increase in the number and activities of the regional fisheries councils, it was apparent that the cost of servicing them should be studied, and a policy should be recommended which would recognize the extent of FAO's role. Special attention should be given to African territories south of the Sahara, especially in the fields of marketing and cooperatives.

13. The program of work in biology should continue to give primary attention to those projects having a direct bearing on increased food production, and the optimum utilization of aquatic resources; emphasis should be laid on giving support to the efforts of individual countries in discovering and forecasting stocks.

14. FAO should intensify its work in matters of water pollution, pollution of the sea by oil, and by radio-active wastes. The closest possible collaboration should be established with other international bodies dealing with these matters.

15. Every effort should be made to continue to improve the circulation of World Fisheries Abstracts.

16. The convening of technological meetings or congresses was recommended, in order to keep abreast with the latest developments.

17. The paramount importance of problems related to boat construction was confirmed, and special attention should be given to all questions of general interest in this field, such as the question of scantlings of wooden boats.

18. The collection and publication of statistics should be continued and intensified but every effort should be made to simplify the reporting of statistics by individual countries to FAO and other international agencies.

19. Assistance in the study of the economic aspects of the rational exploitation of fishing grounds should be emphasized.

20. Note was taken that the increase of fish production would lead to development of international trade and to problems of adjustment. Countries would therefore appreciate being supplied with the necessary commodity information which would facilitate trade expansion, but care should be taken not to duplicate work already in progress.

21. Particular attention should be given to the work relating to cooperatives and work on marketing should be emphasized.

22. In view of the difficulty in recruiting experts, it would be of great assistance to all concerned if arrangements could be made to grant long-term appointments to them.

23. Attention was drawn to the advisability of granting more fellowships, to the selection of the

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, DECEMBER 1955, P. 43.

regions where the fellows were to be trained, and to permitting countries which were not eligible for Technical Assistance to benefit from this scheme.

24. The encouraging results obtained warranted an increase in the number of suitably selected training centers. A system of study tours for groups should be considered.

### INTERNATIONAL (EUROPEAN) FISHERIES CONVENTION OF 1946

SIXTH MEETING OF PERMANENT COMMISSION: The Sixth Meeting of the Permanent Commission of the International (European or North Sea) Fisheries Convention of 1946 took place in London October 22-25, 1957. Delegations attended from all the 13 member countries, namely, Belgium, Denmark, the Federal Republic of Germany, France, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Sweden, and the United Kingdom. Observers were present from the Union of Socialist Soviet Republics for the second time and from the United States for the first time. Observers from the International Council for the Exploration of the Sea, the Food and Agriculture Organization, and the International Commission for the Northwest Atlantic Fisheries also attended. The Convention provides for regulating the size of net meshes and fish size limits.

Much of the discussion in the Commission was concerned with the comments by Contracting Governments on the content of the report of an Ad Hoc Scientific Committee which had been set up in 1955 to review available information and to advise the Commission on minimum mesh sizes and minimum size limits for fish.

The Commission decided to appoint a committee to consider what were the precise difficulties of member countries as regards the application of the present mesh provisions of the 1946 Convention and what might be done to meet those difficulties consistent with the purposes of the Convention and to report back to the Commission at its next Meeting. The committee will hold its first meeting in London in January 1958. It was decided that, in the meantime, for a further period of three years ending on April 4, 1961, the minimum mesh size for ordinary trawls should remain at 75 mm.

The Commission also decided that the provisions of the Convention whereby landings of fish taken by the industrial fisheries of member countries should be allowed to include 10 percent by weight of undersized fish of species covered by the Convention until May 1, 1960. The effect of industrial fisheries on the species of fish covered by the Convention was brought to the attention of the Liaison Committee of the International Council for the Exploration of the Sea in order that they might keep the question under close review.

The Commission also considered the question of the effectiveness of the conservation measures introduced in the northern part of the Convention area and requested the Liaison Committee of the International Council for the Exploration of the Sea to promote as a matter of urgency a study of the problem of conservation of the Arctic cod stocks and to report to the Commission as soon as possible.

The Commission will hold its next meeting in Dublin beginning on November 25, 1958.

### INTERNATIONAL WHALING COMMISSION

AMENDMENTS TO CONVENTION ENTER INTO FORCE: The amendments to paragraphs 5, 8(a) and (c), and 11 of the schedule of the International Whaling Convention of 1945 adopted at the ninth meeting of the Commission, held in London June 24-28, 1957, entered into force on October 4, 1957.

## NORTH PACIFIC FUR SEAL COMMISSION

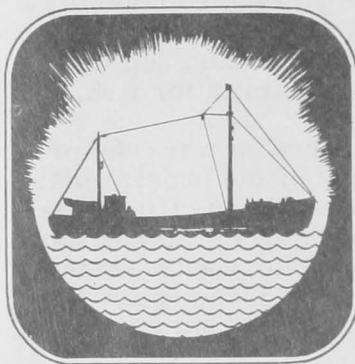
JAPAN AND U. S. S. R. RATIFY INTERIM CONVENTION: Japan on September 20, 1957, and the Union of Soviet Socialist Republics on October 14, 1957, deposited ratifications for the Interim Convention on the Conservation of North Pacific Fur Seals, signed at Washington February 9, 1957. As the United States and Canada have already deposited their ratifications, the Interim Convention entered into force on October 14, 1957.

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CONVENTION ENTERS INTO FORCE: The Interim Convention on the Conservation of North Pacific Fur Seals, signed at Washington on February 9, 1957, entered into force on October 14, 1957. A proclamation by the President of the United States was issued on November 15, 1957.

## NORTHWEST ATLANTIC FISHERIES COMMISSION

TRAWL REGULATIONS: By a circular note of November 15, 1957, the Depository Government (United States) has informed the Contracting Governments that following notification of acceptance by the Governments concerned, the 1955 proposals for regulations of the trawl fisheries for cod and haddock in Subareas 3, 4, and 5 become effective for all contracting Governments from January 1958.



The amendment to the regulations providing for a restricted use of a cover for the protection of the cod end agreed to at the 1957 Annual Meeting of the International Commission for the Northwest Atlantic Fisheries (ICNAF) is being considered by the Governments concerned.

PANEL 5 ADVISERS MEET: A meeting of the Scientific Advisers to Panel 5 was held in Quebec City from December 3-5, 1957. Scientific Advisers to Panel 4 were invited but no European representatives were able to attend. Scientists from Canada, the United States, and the ICNAF Secretariat attended the meeting. Meeting facilities were arranged by the Quebec Department of Fisheries.

Among the topics studied were the assessment of the effects of the 4½-inch mesh regulation on the haddock fishery of Subarea 5; the results of current research work on the cod, haddock, and ocean perch (redfish) of Subareas 4 and 5.

The research on the scallop fishery of Subarea 5 (Georges Bank) was reviewed in relation to the possible need for regulation of this valuable fishery. Suggestions were made for special lines of research; the results of which were considered essential before appropriate regulations could be designed or recommended.

1958 ANNUAL MEETING: The Commission's annual meeting will be held at its headquarters on the Campus of the Dalhousie University, Halifax, Canada, in the week beginning June 9, 1958. It will be preceded (June 4-7) by meetings of the Groups of Advisers and the Standing Committee on Research and Statistics. (Commission's Newsletter No. 26, reporting activities during October-December 1957.)





## Australia

CANNED FISH PACK INCREASED IN FISCAL YEAR 1956/57: The canned fish pack (exclusive of shellfish and fish paste) in Australia during the 1956/57 fiscal year (ending June 30) amounted to about 7.9 million pounds. This was an increase of about 32 percent over the 6.0 million pounds canned during fiscal year 1955/56. Record packs of tuna and Australian salmon (Arripis trutta) helped to boost the canned fish pack, according to figures released by the Australian Commonwealth Bureau of Census and Statistics. No breakdown of the canned fish pack by species was given. During the present fiscal year, Australian fish canneries may have to face the competition of increasing imports from Japan.

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QUEENSLAND SHRIMP FISHING GROUNDS MAY BE EXTENDED: Following the discovery of shrimp fishing grounds off Fraser Island in southern Queensland, the Australian government-chartered fishing vessel Challenge explored the areas north of Hervey Bay for shrimp. During August 1957 exploratory shrimp fishing was conducted between Rockhampton and Cape Hillsborough, north of Mackay. Small quantities of banana, king, and tiger shrimp were caught. As the banana shrimp are taken in Hervey Bay immediately after the rainy season, it was suggested to the fishermen that they try fishing in the new areas during and shortly after the rainy season.

The survey turned up two new species of shrimp. One species, previously known only from Japan, is a pink to crimson hunchbacked shrimp (Metapenaeopsis lamellatus, De Haan) and the other, a small spring shrimp with a heavy carapace (Eusicyonia lancifer, Olivier). (Fisheries Newsletter, October 1957.)

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SCALLOP FISHING AREAS MAY BE EXTENDED: It has been known for some time that scallop beds exist in Port Phillip Bay (southeastern part of Australia in State of Victoria). The species is Notovola alba, which is similar to the Tasmanian king or commercial scallop.

Besides occurring in Port Phillip Bay, the commercial scallop occurs off Lakes Entrance in Victorian waters. It has been common for scallops to be brought up attached to various fishing gear. After strong westerlies, live scallops are washed up on the shore of the southeast corner of Port Phillip Bay near Rosebud. All this evidence suggested that beds extensive enough to support a small commercial fishery might exist.

The extent of the Port Phillip Bay beds was investigated by the Victoria Fisheries and Game Department in 1949/50. Trial dredgings were carried out over the most promising localities. Two standard Tasmania scallop dredges with a 4-foot wide blade and a 2-inch cyclone wire mesh in the bag were used. The best catch in a 15-minute haul was 65 scallops per dredge.

The heaviest concentrations were found off Dromana, Point Cook, Portarlington, Williamstown, and Rickett's Point in depths from 7 to 10 fathoms. Due to the large mesh of the dredge bag, the catch was necessarily large-size scallops.

Early in 1957 the Port Phillip beds received attention from underwater swimmers using aqualungs. Equipped with the heavier type of rubber suits, these swimmers have been able to visit the beds in May when the scallops are in their best condition. Two divers were able to gather 23 dozen scallops in one hour off Portarlington.

All this evidence would indicate that a small commercial fishery could be established in Port Phillip Bay, during the winter months, with a ready and expanding market available in Melbourne (Fisheries Newsletter, Australian Commonwealth Director of Fisheries, October 1957).

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TUNA CANNING TRENDS: The Australian tuna canning firm with packing plants at Eden and Narooma in the State of New South Wales has agreed to pay 5½d. a pound (about US\$102 a short ton) to the vessels that land tuna at ports as far north as Nowra. Deliveries to ports north of Nowra will receive 5d. a pound (about US\$93 a ton).

A mechanical shaper has been installed at the Narooma plant and other improvements have been made. The machine can handle both 7-oz. and 3½-oz. cans and should raise the production rate, and thus ease the pressure on the cold-storage facilities when catches are heavy.

About ½ ton of tuna was caught on September 3 for a trial run of the new shaper (Fisheries Newsletter, Australian Commonwealth Director of Fisheries, October 1957).



## Brazil

OPERATIONS OF JAPANESE FISHERY COMPANY: The Japanese fishery company that has been incorporated to operate in Brazil is gradually overcoming marketing difficulties by establishing distributing and processing facilities in Santos, and building its own depot. The venture has met some opposition from established Brazilian fishing companies, and the new Government warehouse at Santos has insufficient capacity for the Japanese company and other fishing companies. The problem of water supply will be solved by artesian wells.

Present plans call for processing fillets at the Santos plant and distribution by trucks to the city of Sao Paulo and other points in the interior. The fish will be marketed through supermarkets and 11 company-owned retail outlets. Due to a delay in the arrival of refrigeration equipment for the retail stores, the Japanese were granted permission by the municipal authorities to sell fish directly from the trucks.

The planned fleet of six Japanese vessels will be completed with the arrival on or about November 11 of a purse seiner and a tuna-fishing vessel (equipped with electronic devices) now on the high seas (United States Consul in Sao Paulo, October 30, 1957).

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SARDINE SURVEY BY FAO REPRESENTATIVE: Observations made with the help of an echo sounder-equipped commercial fishing boat indicated that the sardines kept close to the coast. Very few were noted more than 400 meters from the shore.

The head of the Norwegian Herring Investigation Section returned to Norway recently from a 17-month assignment as an advisor to the Brazilian Government on research in fisheries biology and to survey and appraise the marine fisheries resources on behalf of the Food and Agriculture Organization (FAO). Much of the work performed by the Nor-

wegian Scientist was concerned with the sardine schools off the coasts of Rio de Janeiro and Santos.

Both sardines and mullet were tagged during the assignment. The mullet tagged in the lakes of the Grande River migrate to the sea and move more than 2,000 miles northward along the Brazilian Coast. Two mullet were recovered as far north as Recife.



Canada

BRITISH COLUMBIA SALMON PACK, 1957: The 1957 pack of canned salmon in British Columbia for the season ending in November amounted to over 1.4 million standard cases (48 1-lb. cans), the Canadian Department of Fisheries reported on December 4, 1957.

Table 1 - British Columbia Salmon Pack, 1952-1957						
	1957	1956 1/2	1955	1954	1953	1952
	.....(Standard Cases--48 1-Lb. Cans).....					
Sockeye (Red) . . . . .	227,436	320,096	244,821	680,718	510,147	449,494
Spring (King) . . . . .	12,571	11,671	17,853	14,080	13,049	9,279
Steelhead . . . . .	1,315	1,254	1,590	3,733	3,030	3,763
Blueback . . . . .	12,147	10,549	10,544	4,302	2,055	5,583
Coho (Silver) . . . . .	193,726	207,366	175,179	123,778	108,109	59,370
Pink . . . . .	751,048	363,633	831,253	335,550	794,764	679,182
Chum (Keta) . . . . .	245,024	203,710	124,860	580,575	394,113	91,886
Total . . . . .	1,443,267	1,118,279	1,406,100	1,742,736	1,825,267	1,298,557

1/ -REVISED.

The total pack of canned salmon was 29 percent higher than the 1956 pack and was only 2 percent less than the average annual pack for 1952-1957. The pack of sockeye or red salmon continued to show a downward trend and was the smallest in the last six years. The pack of pink salmon for the cycle year was about up to expectations, but down about 9.6 percent from the previous cycle year of 1955. The silver pack was up 34 percent and the chum pack was down about 10 percent from the six-year average.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, JANUARY 1957, P. 65.

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MOBILE FISH INSPECTION LABORATORY: A new mobile fish inspection laboratory was recently placed in operation in the Maritime provinces by the Canadian Department of Fisheries. The unit, a large truck-trailer assembly, is designed to provide rapid on-the-spot investigation where any unusual technological problems are encountered in fish and shellfish processing and packing.

The mobile laboratory, which is operated by the Department's Inspection and Consumer Branch, supplements the services provided by the fish inspection lab-

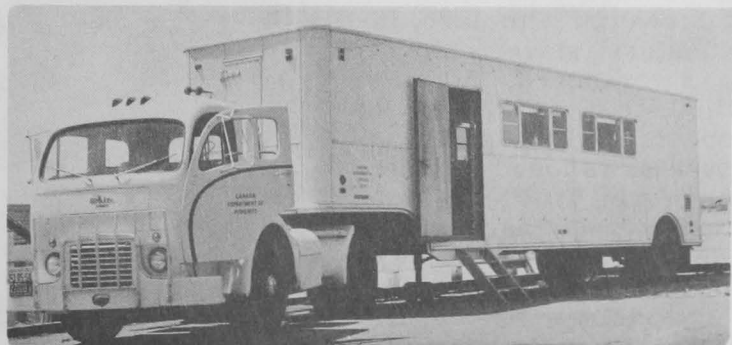


FIG. 1 - THE TRUCK-TRAILER ASSEMBLY WHICH HOUSES THE LABORATORY.

oratories at Halifax, N. S., Shediac, N. B., St. Andrews, N. B., and Charlottetown, P. E. I., and two small mobile laboratories.



FIG. 2 - THE CENTRAL WORK AREA SHOWING VARIOUS ITEMS OF EQUIPMENT.

The laboratory is housed in a large trailer resembling a furniture van. Every inch of its capacity--34 feet in length, 8 feet in width, and 11 feet 6 inches in height--is fully utilized in providing for the special appliances with which it is equipped and for working and storage space.

Among the larger fixed pieces of equipment are hot and cold water tanks, a pressure pump, generating plant, propane-gas storage tanks, refrigerator, autoclave, incubators, stove, sinks, and workbench. Added to these is a wide variety of specialized equipment such as is found in laboratories dealing in bacteriological analytical work.

Cabinet, cupboard, and storage fixtures and areas are designed in a manner to provide as much

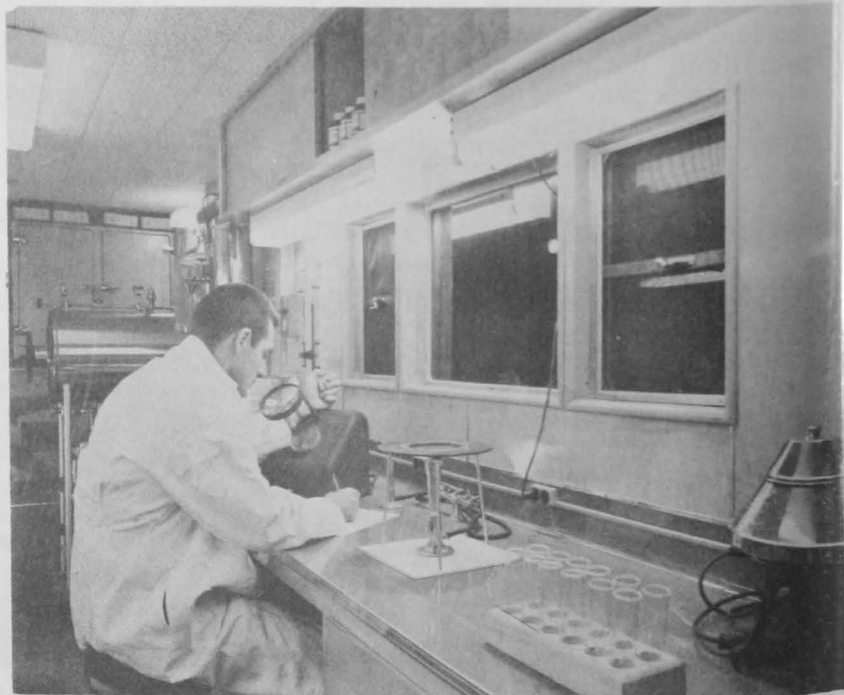


FIG. 3 - SCIENTIST CARRYING OUT CONTROLLED TEST OF FILLETS.

space of this nature as the interior will permit without overcrowding. The floor is covered with linoleum, the walls with plywood, and the ceiling with acoustic tile.

The walls and ceiling are fully insulated and adequate lighting is provided by the ceiling and wall fluorescent fixtures.

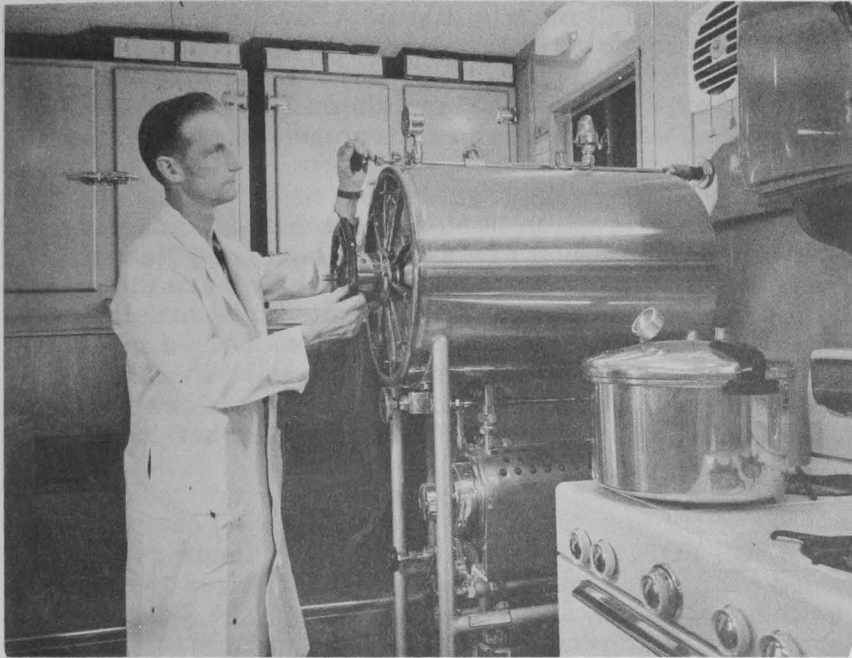


FIG. 4 - TECHNICIAN OPERATING AUTOCLAVE USED FOR STERILIZATION OF EQUIPMENT.

The electrical services, which utilize 100 volt 60 cycle A.C.-D.C. current, are capable of being operated from either an outside "hi-line" power supply or from the laboratory's own generating plant.

Similarly, the water supply for normal operations can be supplied to the laboratory's piping system by either an outside pressure source via a hose, or from the trailer's storage tank via an electric pressure pump.

Motive power is provided by a large truck-tractor which has a maximum carrying capacity of 22,000 pounds.

The mobile laboratory is based in Halifax, N. S., and will serve the entire Maritimes area. Its outstanding feature is that it will be able to provide a highly technical service to outlying areas in a matter of hours.

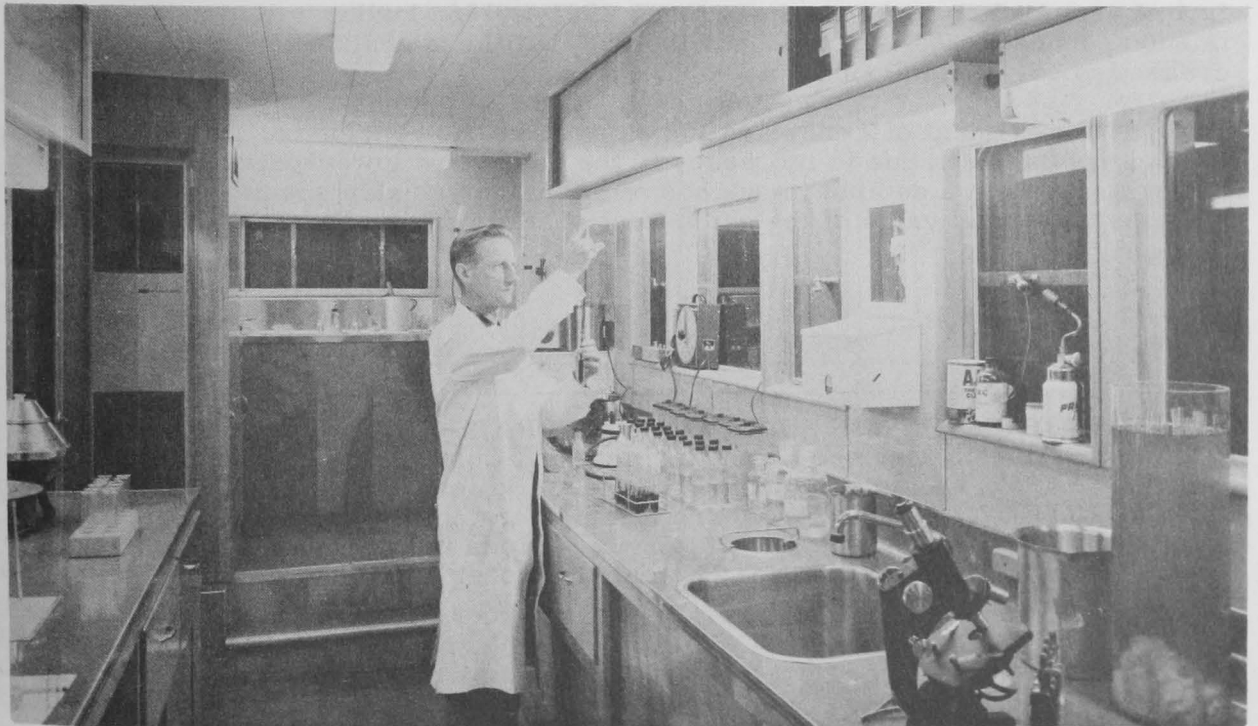


FIG. 5 - TECHNICIAN CONDUCTING TESTS TO DETERMINE THE PURITY OF WATER USED IN A LOBSTER-MEAT PLANT.

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NEW FILMS ON SALMON AND POTHEAD WHALES: Two documentary films dealing with fisheries have been produced recently by the National Film Board of Canada. One, The Salmon's Struggle for Survival, was made for the Federal Department of Fisheries, and shows graphically how a dilemma facing fisheries authorities in British Columbia is being met and overcome: the need, on the one hand, to use the swift-flowing waters of the Fraser and other rivers of the province for industrial and public uses and, on the other hand, to keep them uncontaminated and unobstructed so as not to impede the Pacific salmon in its annual migration to fresh-water spawning grounds.

Produced by the Film Board for a television series, the other documentary titled Encounter at Trinity shows the annual sea drama at Trinity Bay, Newfoundland, where in the summer and fall months herds of pothead whales are driven in-shore by fishing boats and killed in shallow water. Whale meat makes excellent food for fur-bearing animals and this "fur fishing," as it is called, is supported largely by Newfoundland's growing mink ranch industry. The film explains all this and shows the actual round-up and killing of the potheads in several exciting and realistic sequences (Trade News of the Canadian Department of Fisheries, October 1957).

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ONTARIO FISHERY LANDINGS FOR 1956: Ontario's fishery landings of 60 million pounds in 1956 exceeded all past records, a news release dated December 3, 1957, from the Ontario Department of Lands and Forests states. The Lake Erie fishery, with near-record landings of blue pickerel or pike and white bass, and record landings of yellow perch, yellow pickerel or pike, and smelt, accounted for 75 percent of the 60-million-pound total landed in the Province.

Comparisons of the 1956 landings and ex-vessel values with past years show a relatively stable  $7\frac{1}{2}$  cents a pound average ex-vessel value from 1935-41. After 1941 ex-vessel prices increased gradually to an average of  $22\frac{1}{2}$  cents a pound in 1951. During this period, yearly landings remained fairly constant at an average of 31 million pounds yearly. During the 1935-51 period, the ex-vessel value increased from C\$2.5 million to \$7 million. From 1951 to 1956 landings increased from 31 million pounds to 60 million pounds in 1956, but the average ex-vessel price had decreased to  $13\frac{1}{2}$  cents a pound in 1956.

The Department of Lands and Forests draws the conclusion that the increase in landings has been due to increases in the catches of lower-priced species and this, coupled with a decline in catches of the more valuable species, has tended to keep the ex-vessel value of the catch almost static during the past six years.



Cuba

CLOSED SEASONS ON SNAPPERS AND CRABS ENDS: The closed season on the fishing for gray snapper ("caballerote") and Cuban snapper ("cubera"), imposed on July 25, 1957, was terminated by the Cuban National Fisheries Institute effective October 15, 1957. Fishing for Morro or stone crabs (closed since July 15, 1957) was permitted effective October 31. The revisions in the closed seasons were published in the Official Gazette No. 211, dated October 16, 1957, states a November 4 dispatch from the United States Embassy in Habana.



## Denmark

**STUDIES ON LAUNCE TO BE EXTENDED:** Due to the growing importance of the landings of sand eel or launce ("tobis") for processing into meal and oil, the Danes have been making preliminary studies on races, lengths, ages, stage of maturity, and stomach contents since 1955 by analyzing market samples. In order to conduct further studies on this species, the Danish Fishing and Sea Researchers (Danmarks Fiskeriog Havundersogelser) announced in the periodical *Borsen* on October 22 that the Danish research ship *Dana* will work in the North Sea in the spring of 1958. Investigations to date have disclosed that there are five species of the genus *Ammodytes* under which launce falls, each with separate spawning habits. Previously only two species were known. The Netherlands is participating in the studies now under way on the launce and the English are conducting investigations in the Irish Sea near the Isle of Mann.

Plans for future work investigations on this fishery are not completed, but in general, the research is expected to include the following: (1) fishing experiments on different fishing grounds; (b) race, age, and length studies; (3) tagging studies with emphasis on internal tags; (4) feeding cycles and vertical movements between day and night; (5) escapement studies with various sizes of cod ends; and (6) stomach contents of sand eel predators (United States Embassy dispatch dated November 4, 1957).



## Ecuador

**CANNED SARDINE MARKET:** Production of sardines in Ecuador is so small that it has little or no effect on the quantity consumed, states a recent dispatch (October 1, 1957) from the United States Embassy at Quito. Within the past year an Ecuadoran company at Guayaquil has packed and marketed sardines under the name

Table 1 - Ecuador's Imports of Sardines-Salmon and All Marine Products, 1949-56<sup>1/</sup>

Year	Sardines <sup>1/</sup> and Salmon <sup>1/</sup>			All Marine Products		
	Quantity	f.o.b. Value		Quantity	f.o.b. Value	
	1,000 Lbs.	1,000 Sucres	US\$1,000	1,000 Lbs.	1,000 Sucres	US\$1,000
1956 <sup>1/</sup>	2,225	4,231	242	2,372	4,370	250
1955	2,177	4,979	284	2,347	5,478	313
1954	3,002	7,200	411	3,278	8,103	463
1953	1,903	4,657	266	3,117	7,946	453
1952	3,122	4,869	278	2,421	5,937	339
1951	3,154	5,533	316	3,289	6,012	344
1950	2,885	4,383	250	3,051	4,849	277
1949	1,685	3,312	189	1,871	3,966	227

<sup>1/</sup> PROBABLY ALL CANNED.

of "Parodi." Their product is aimed particularly at the medium- and low-income market. No information is available as to the pack; however, importers of canned sardines in Quito have reported that it is insignificant. Therefore, consumption is presumed to be equal to the quantity imported.

Imports of canned sardines and salmon (no separate figures are available) from all sources in 1956 amounted to approximately 2.2 million pounds valued f.o.b. at US\$241,811 as compared to 2.2 million pounds valued f.o.b. at \$284,548 in 1955 (see table 1). The imports of canned sardines and salmon in 1956 and 1955 comprised about 93 percent of the quantity of all marine products imported in each of those years. Approximately 98.1 percent in 1956 and 86.9 percent in 1955 of the quantity

of canned fishery products imported into Ecuador through Guayaquil were from the United States (see table 2).

The last available figures on the importation of sardines and salmon are for the first three months of 1957. Imports for the first quarter of 1957 amounted to 0.7 million pounds with an f.o.b. value of US\$89,999 as compared to 1.2 million pounds valued at \$146,091 for the first quarter of 1956. The level of imports of sar-

Table 2 - Ecuador's Imports at Guayaquil Only of Canned Fishery Products

Year	All Imports		From the U. S.		Percentage Imported from U. S.	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 Lbs.	US\$1,000	1,000 Lbs.	US\$1,000	%	%
1956	2,184	271	2,225	279	98.1	97.1
1955	1,688	228	1,941	284	86.9	80.2
1954	2,466	339	2,650	371	93.0	91.4

dines and salmon during 1957 will probably be lower than in 1956. Importers claim that a rise in the cost of sardines, caused by the scarcity of this product is the principal reason for the decline of imports. The slight shift to the national sardine product by low-income purchasers may well have assisted this trend. Ecuadoran importers hope that once the situation in export centers becomes more normal, the volume of importation will again reach its previous level or even improve. Imported canned goods have a preferred status in the local market, and at the moment there is little danger of competition from domestic packs.

Of the canned sardines consumed in Ecuador, 95 percent are in 15-oz. cans and 5 percent are in 3 $\frac{1}{4}$ - to 5-oz. cans. Tomato is the medium of packing preferred by 95 percent of all consumers, and olive oil by the remaining 5 percent. Although sardines packed in natural brine are available, consumption of this type is so limited that it is not reflected in the percentages given.

Of the Ecuadoran sardine consumers, it is estimated that 70 percent are of the high-income level and that 25 percent and 5 percent are of the medium- and low-income levels, respectively. Sardines in 4 $\frac{1}{2}$ -oz. cans, packed in olive oil, sell for 4.00 sucres (23 U. S. cents) and those in 5-oz. cans, packed in brine, sell for 3.00 sucres (17 U. S. cents). An imported 15-oz. oval can of sardines packed in tomato sauce sells for 10.00 sucres (57 U. S. cents) as compared to a price of 8.00 sucres (46 U. S. cents) for a domestically-produced can of the same size and pack.

Sardines are imported into Ecuador by wholesalers who either sell directly to the public or who sell to retailers who in turn sell to the public. The Government of Ecuador does not purchase sardines.

NOTE: VALUES CONVERTED AT THE FREE MARKET RATE OF 1 SUCRE EQUALS US\$0.05714.



### German Federal Republic

**IMPORT TENDER FOR MILD-CURED SALMON:** An import tender for the importation of mild-cured salmon from the United States and Canada was requested by the West German Government on November 13, 1957. Applications for import licenses were to be submitted to the Foreign Trade Agency from November 18, 1957, until the value limit was reached, but not later than March 31, 1958. Products purchased for freely convertible currency must not be re-exported for currency not freely convertible. The value or tonnage limit was not disclosed and last day for customs clearance not announced.





## Hong Kong

**COMMERCIAL FISHERIES INDUSTRY:** Marine products, ranking first in importance among the Colony of Hong Kong's primary products, were valued at US\$7 million in the fiscal year ended March 1956. Fisheries are, however, of even greater significance to the economy of the Colony than this value would indicate. In addition to providing an above-average income and an important part of the dietary requirements for more than 56,000 fishermen and their families, the industry supplies much of the food needs of the entire Colony.

The fishing fleet consists of some 6,400 junk-type fishing craft of various sizes and 32 deep-sea trawlers. Almost 95 percent of the fishing fleet is owner-operated, the remainder belonging to fish dealers and fishing companies. Mechanization of the fleet is spreading, with 1,342 vessels at present motor-propelled and the rest sail-driven. The Government assists in the development of mechanization by allocating money from the Colonial Development and Welfare Fund for loans to fishermen, and private sources are also loaning money for the purpose.

An important new development has been the taking of shrimp on nearby grounds. These are landed fresh, quick-frozen, and most of them are shipped to the United States.



## Iceland

**NEW FREEZING PLANTS CUT INTO EXPORTS OF ICED FISH:** The need for fish supplies to support the two quick-freezing plants already completed and a third to be completed indicates that Iceland may soon cease to sell iced fish abroad. The first new quick-freezing plant was opened at Akueyri on Iceland's north coast in the summer of 1957. This was followed by a second plant at Hafaarfjaerdar, south of Reykjavik. The plant under construction is located on the northwest coast of Isafjordur.

Restrictions by the Icelandic Government are already in effect on the number of trawlers which can sell iced fish in England and East and West Germany. These restrictions are imposed to insure supplies for processing by the freezing plants. Due to restrictions on overseas sales, it is likely that Iceland will drop East Germany from the countries receiving fresh iced fish and England will very likely receive less.

The quota for iced fish vessels permitted to land at English ports in September was cut from 22 to 12, but actual arrivals amounted to only seven, the November 1, 1957, issue of The Fishing News states.



## Indonesia

**EXPLORATORY FISHING FOR SHRIMP:** The Indonesian Sea Fisheries Service is conducting exploratory trawling for shrimp along the east coast of Kalimantan with the research vessel Muna. The operations are being directed by a Canadian marine biologist assigned to Indonesia by FAO.

During April 1957, 36 tows were made in the region between Balikpapan and Kota Baru, at depths of 5 to 25 meters (16-82 feet). The best haul of about 220 pounds of good quality shrimp was made in a one-hour tow near Tandjung Maroeat, South of Balikpapan at a depth of 10 meters (about 33 feet).

The explorations are being continued and another research vessel Lollipop is soon to be commissioned for the purpose. (Indo-Pacific Fisheries Council Current Affairs Bulletin, No. 19, July 1957.)



## Japan

EXPORT CONTRACTS FOR TUNA LOINS AND DISKS SUSPENDED: Exporters of frozen tuna loins and disks have ceased to accept future contracts, state officials of the Japanese Export Frozen Aquatic Products Manufacturers Association. This suspension is apparently intended for a short period pending a study of new sales methods that are expected to be more satisfactory to both the exporter and the importer. Exports of loins and disks have been suspended since the latter part of October, reports a November 22, 1957, dispatch from the United States Embassy in Tokyo.

Firm contracts with importers in the State of Washington and in Puerto Rico for 900 tons will be met by the Japanese exporters.

It is believed that this decision was suggested by the Government in order to meet complaints that Japan was exporting loins and disks only to selected areas in the United States, and thus discriminating against importers in other areas.

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KNOTLESS FISH NET MADE FROM SYNTHETIC FIBER POPULAR: A knotless net, made of rot-proof synthetic fibers, has become popular among Japanese fishermen, according to a paper by a representative of the Japanese manufacturer to the International Fishing Gear Congress in Hamburg in October 1957.

The firm, which invented the nets in 1922, claims remarkable merits for them, and says they may eventually replace ordinary nets in Japan.

Pointing out that an ordinary net cannot be made without knots, the paper describes the making of the knotless net by a doubling process in which several single yarns are doubled together without twist by a machine.

Two or more of these doubled yarns are then again doubled and twisted into a strand in "Z" direction. This strand is then wound on the bobbin of the netting machine.

Twine in the knotless net has an "S" twist of two-ply strands.

Special features of the knotless net include lighter weight and less bulk since as much as 50 percent of raw material can be saved; higher strength; less resistance to currents; easier to handle and no friction; less labor and smaller tackles; no damage to the fish; mesh size almost 100 percent exact; easier and more complete dyeing; and less adherence of dirt and microbes.

By a heat-setting process, the "S" twist in the twine is fixed in position and the twine becomes stronger by about 15 percent. Also, hard fibers become soft and soft fibers can be given suitable hardness.

Nets of nylon and similar yarns are dyed with commercial dyes, pigment colors, or coal-tar.

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**TUNA RESOURCES OF THE EQUATORIAL ATLANTIC:** Some study of the tuna resources of the Atlantic Ocean has already been done in the United States, but it has been extremely limited in area and amount and is inadequate for the information of the Japanese fishing boats, which recently have been advancing in some numbers into the Atlantic.

Therefore, the authors, having obtained some interesting results from an analysis of the reports of the Kanagawa Prefecture Fishery Experiment Station's vessel Sagami Maru, present this report in the hope that it may be of value to fishermen. The report covers, however, the results obtained from only a small amount of data, and it is possible that it will need correction in the future as more data accumulate. Further reports will be published as the need for such corrections arises. Furthermore, in any area there is a decline in catch rates when an unexploited fishing ground is first fished, and this point must be borne in mind until the catches become stabilized. In the present report the catch rate has been used to compare the density of distribution.

It is planned that from now on this Station will compile and publish data from the Atlantic according to the geographical divisions shown in figure 1.

**Yellowfin Tuna:** Catch rates for the various areas of operation are shown in figure 2A for winter and in 2B for late spring.

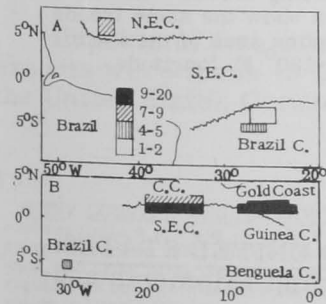


FIG. 2 - YELLOWFIN CATCH RATES IN THE EQUATORIAL ATLANTIC OCEAN-- (A) FOR THE WESTERN AREAS IN WINTER, AND (B) FOR THE EASTERN AREA IN LATE SPRING. (A) AND (B) HAVE THE SAME MEANING IN THE SUBSEQUENT FIGURES.

In winter, in the north equatorial current there is a considerable catch of this species, with a catch rate of 7.64 fish per hundred hooks, but the rates are lower in the Brazil current, 5.30 having been recorded in December at 5°-6° S. longitude, and in February-March at 3°-5° S. latitude, 24°-27° W. longitude, it was down to 1.54. In late spring the south equatorial current area had the highest rates, over 10.0, with

an especially high figure of 19.95 at the boundary between the south equatorial current and the Guinea current. The Guinea current area was next, with 7.8-11.9, while the equatorial countercurrent, with 7.0, had about the same rate as the north equatorial current in winter. On the other hand, the Brazil current area had 4.32, about the same rate as in December and much lower than the other areas.

From these facts it can be deduced that in both winter and late spring the south equatorial current area has the highest catch rates, followed by the north equatorial, the countercurrent, and the Guinea current, which are likewise high, while the Brazil current area has the lowest rates. It can also be deduced that in the Brazil current August-October is the best fishing season and February-March is the off-season. However, in order to come to any conclusions we need data from summer to fall, and the foregoing deductions are still uncertain.

**Big-eyed Tuna:** The winter catch rates are shown in figure 3A and the late spring ones in 3B.

In winter the catch rate in the north equatorial current was 0.61 fish per hundred hooks and in the Brazil current it was 0.46 in December and 0.52 in February-March. In late spring the south equatorial current had rates of 0.27-0.34, the countercurrent had 0.18, the Brazil current had 0.13, and there were no catches of big-eyed in the Guinea current area.

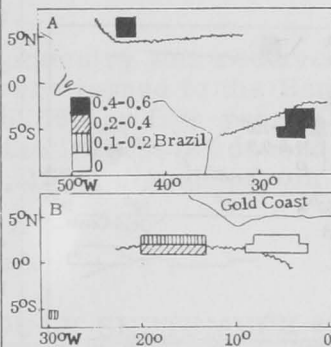


FIG. 3 - BIG-EYED CATCH RATES (NUMBER OF FISH PER HUNDRED HOOKS).

Consequently it is deduced that the species does not occur abundantly in the Guinea current, that in the Brazil current the good season is in winter and the off-season in summer, and that the seasonal picture for the north and south equatorial currents is the same as for the Brazil current, with better fishing in the north equatorial than in the south equatorial current. Further, whereas yellowfin and albacore catch rates are generally higher than in the equatorial Pacific, big-eyed catch rates are considerably lower.

**Albacore Tuna:** Winter albacore catch rates are shown in figure 4A, late spring catch rates in 4B.

In winter the Brazil current area had high rates, 9.28 fish per hundred hooks in December and 9.12 in February-March. The north equatorial current showed a low rate of 1.82. Late in the spring the south equatorial current had 1.3-2.6, the Guinea current area

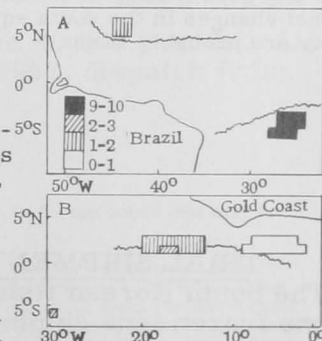


FIG. 4 - ALBACORE CATCH RATES (NUMBER OF FISH PER HUNDRED HOOKS).

1/ TRANSLATED BY W. G. VAN CAMPEN, PACIFIC OCEANIC FISHERY INVESTIGATIONS, FROM AN ARTICLE BY MITSUO NAGAI AND ATSUSHI NAKAGOME, KANAGAWA PREFECTURE FISHERIES EXPERIMENT STATION (TUNA FISHING, NO. 42, 1957, PP. 21-26).

was very low, with 0.20-0.74, while the Brazil current area had 2.47.

Consequently, it can be deduced that in the Brazil current area the winter is the good fishing season, and the summer is the off-season. In winter the north equatorial current offers far lower catch rates than the Brazil current, but in late spring the south equatorial, the counter-current, and the Guinea Current have about the same rates as the Brazil current. These areas also appear to have seasonal changes, but nothing certain is known about them.

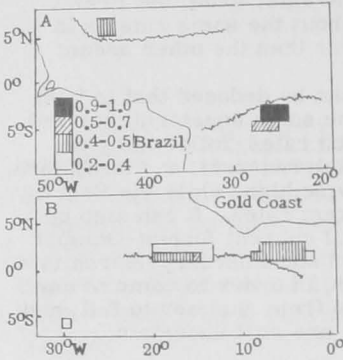


FIG. 5 - BLACK MARLIN CATCH RATES (NUMBER OF FISH PER HUNDRED HOOKS).

**Black Marlin:**

Winter catch rates are shown in figure 5A, late spring catch rates in 5B.

In winter the Brazil current area had a catch rate of 0.62 fish per hundred hooks in December and 0.95 in February-March, while the north equatorial current had 0.42. In the late spring the south equatorial current and the Guinea current had rates of 0.41-0.56, the counter-current had 0.32, and the Brazil current had 0.23.

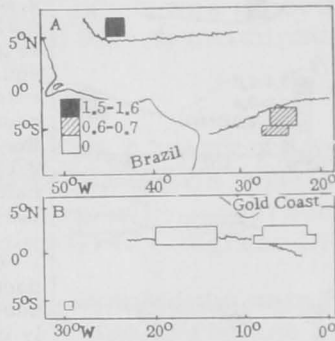


FIG. 6 - STRIPED MARLIN CATCH RATES (NUMBER OF FISH PER HUNDRED HOOKS).

Thus the Brazil current area had better fishing in winter and poorer in summer. If it is assumed that there is a north-south migration like that of the Pacific, it can be deduced that the north equatorial current area will have poor fishing in winter and good fishing in summer. If there are seasonal changes in the south equatorial current area, they are probably slight.

**Striped Marlin:** Winter catch rates are shown in figure 6, late spring rates in 6B.

In winter, the catch rate is highest in the north equatorial current, with 1.52 fish per hundred hooks; the Brazil current area is somewhat lower but still high, with 0.68 in December and 0.61 in February-March. In late spring there was no catch except in the north equatorial current.

Thus, although the situation in the south equatorial current is unknown, in the other areas there are large seasonal variations, and it appears that the Brazil current area offers good fishing in winter.

**Sailfish:** The winter catch rates are shown in figure 7A, the late spring catch rates in 7B.

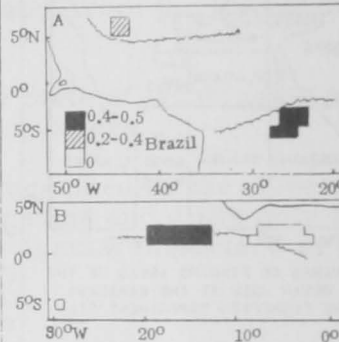


FIG. 7 SAILFISH CATCH RATES (NUMBER OF FISH PER HUNDRED HOOKS).

In general the differences among the areas are small, but no sailfish were taken at all in the Guinea current and in the Brazil current in spring; seasonal variation can be detected in the Brazil current area.

**Summary:** Yellowfin are abundant in the north and south equatorial currents, the equatorial counter-current, and the Guinea

current, and scarce in the Brazil current. Big-eyed are not present at all in the Guinea current, but occur generally in the other current systems. Albacore are plentiful in the Brazil current; the situation is not known in the north equatorial current; in summer there are very few in the Guinea current. Black marlin are extraordinarily abundant in the Brazil current area in winter. Not much is known of striped marlin in the south equatorial current, the counter-current, and the Guinea current, but they are very abundant in winter in the north equatorial current and the Brazil current. Sailfish have about the same distribution as big-eyed. Seasonal variations are seen in each species, but it is especially interesting that the variations in the Brazil current area show the same trends as those seen in the Solomons area of the Pacific at 0°-5° S. latitude, 170°-180° E. longitude.

JAPANESE GOVERNMENT



Korea

**TRIAL SHIPMENTS OF FROZEN SHRIMP AND TUNA TO UNITED STATES:**

The South Korean fishing industry is preparing two frozen shrimp shipments and one frozen tuna shipment for the United States.

Introduction of shrimp trawling equipment, instruction in construction of shrimp trawls, demonstration and instruction in the use of trawls on existing vessels have been the major activities of Office of Technical Cooperation fisheries technicians during November 1957. A second trawl project, in cooperation with a private fishing company, has been initiated near the Pohang area. No conclusive results have yet been obtained because the "shrimp run" is late in starting this year.

A Diesel engine training school at the Fisheries Experiment Station, Pusan, sponsored by the Korean Office of Marine Affairs, is training 19 students in the actual installation, operation, maintenance, and repair of Diesel engines. At least two classes are planned to train Korean instructors who will then teach courses for fishermen in the fishing ports throughout Korea, according to a report of December 5, 1957, from the Office of Technical Cooperation in Seoul.



## Mexico

**MAZATLAN SHRIMP INDUSTRY REPAIRS STORM DAMAGE:** The hurricane which hit the Mazatlan shrimp fishing port on October 22, 1957, resulted in the sinking or beaching of 57 vessels. Of these, 22 vessels are reported to be a total loss and as of November 13, 35 percent of the fleet was still inactive due to storm damage. Previous reports had stated that 40 shrimp trawlers were totally destroyed and 36 seriously damaged.

Among the shrimp vessels beached or sunk 12 are now back in operation. The major shipyard in Mazatlan was still blocked by a grounded Mexican Coast Guard boat.

A delegation from the Mazatlan fishing industry was received by the President of Mexico in Mexico City and instructions were issued to the Banco de Mexico to accept for discount 10 million pesos (US\$800,000) in five-year loan notes. As the loans will be made against collateral, only the largest producers will be able to avail themselves of the aid, a November 13, 1957, dispatch from the United States Consul in Nogales reports.

\* \* \* \* \*

**MERIDA SHRIMP FISHERY TRENDS, JULY-SEPTEMBER 1957:** The east coast Mexican shrimp fishing industry operating from the Merida area exported close to 5 million pounds of shrimp during July-September 1957. Brown shrimp prices at Brownsville, Tex., for 15-20 count headless were 96 U.S. cents in July, 93 cents in August, and dropped to 80 cents in September.

The operators of more than 300 fishing vessels belonging to the fishing cooperatives in Ciudad del Carmen, after first protesting the Government order to register for Social Security, finally complied.

Exports of fish other than shrimp during the quarter totaled 40,000 pounds. All exports were made to the United States, states an October 30, 1957, dispatch from the United States Consul in Merida.

\* \* \* \* \*

**SPINY LOBSTER REGULATIONS REVISED:** Revised Mexican regulations provide for a new method of measuring live spiny lobsters to determine legal size, open and closed seasons, and prohibiting the export of live spiny lobsters. The regulations became effective on October 9, 1957, upon publication in *Diario Oficial*.

The closed season for spiny lobsters (*Panulirus interruptus* and *P. inflatus*) occurring in the Mexican territorial waters of the Pacific Ocean and the Gulf of California, and *Panulirus argus* occurring in the territorial waters of the Gulf of Mexico, shall be from March 16 to September 30, both dates inclusive. Previous regulations had provided, for a limited time, a closed season in the Gulf of California between N. latitude 23° and 29° from April 16 through October 31. In addition, the new regulations empower the Ministry of Marine

to determine refuge zones and to fix the zones that may be indicated as nursery grounds.

The minimum legal size for lobsters shall be 82.5 millimeters (3.25 inches). Measurements are to be made along the midline of the shell of the carapace from the interocular space to the posterior edge. The capture, possession, transportation, and sale of undersize spiny lobsters is prohibited. The change in this regulation was made to bring Mexican methods of measurement into line with those now in use in California. As most of the Mexican west coast catch of spiny lobsters is exported to California, the new regulation does away with the necessity of two sets of measurements to meet the regulations of both California and Mexico. The system now in use is subject to less variation and the measurements can be made more readily. No provision was made in the

new regulations for a maximum legal size which formerly was 400 millimeters (15.75 inches).

Spiny lobsters may be taken by any method, which in the judgment of Ministry of Marine, does not prejudice the conservation of the species. This provision is designed to cover the possibility of commercial diving for spiny lobsters. Studies have indicated that divers using aqualungs are much more efficient than the conventional traps. Also, trap-caught egg-bearing females and undersized spiny lobsters shall be returned to the sea in the best possible condition.

All traps and other equipment used for catching spiny lobsters must be out of the water and away from the fishing grounds by the end of the last legal fishing day.

The exportation of live lobsters is prohibited. Previous regulations permitted only the exportation of cooked lobsters. The law now permits the export of uncooked and frozen spiny lobster tails. At the present time this is not important in the trade with California since the bulk of the exports from Lower California are in the form of iced cooked whole spiny lobsters. It may, however, assist in the development of an export trade in frozen spiny lobster tails from the east coast of Mexico.

\* \* \* \* \*

**TUNA PACKING PLANT IN VERACRUZ PROPOSED:** A fish packing plant may be established in Veracruz, Mexico, due to the discovery of a yellowfin tuna resource in the Gulf of Mexico about 60 miles offshore of that port. There is some question as to the extent of the tuna resource, both quantitatively and seasonally, states a November 6, 1957, dispatch from the United States Consul at Veracruz.



### Morocco

**FISHING INDUSTRY INCREASES IN IMPORTANCE:** The Moroccan fishing industry has been becoming increasingly important to the nation's economy in recent years. In 1956 about 110,000 metric tons of fishery products were landed by the commercial fishermen. At the present time there are 200 fish canneries engaged primarily in the canning of sardines. Production of canned sardines amounted to about 70,000 tons in 1956. Most of this sardine pack is exported.



### Netherlands

**NEW INDUSTRIAL FISHERY FOR LAUNCE:** Although before the last war the Netherlands had a fishery for scrap or unutilized fish for the fish meal industry, it was a surprise when at the end of May 1957 some small Dutch cutters started an industrial fishery for launce or sand eel. During May and June the greater part of the Dutch cutter fleet is usually fishing in the German Bight for sole. But the landings of sole were well over 30 percent below normal. It was understandable that many fishermen were searching for better catches, and that about 44 vessels finally entered the industrial fishery for launce or sand eel (*Ammodytes marinus* raitt).

The Dutch fish meal plants were not adapted to the rapidly increasing supply of sand eel and in the middle of July the landings were sharply restricted by the fish meal plants. But this measure coincided more or less with the end of the fishery as a very sudden decline of the catches during the second half of July made a further industrial fishery for sand eel near the Dutch coast impossible.

The total landings were 5,800 metric tons of sand eel, of which one third was landed by 54 Norwegian and German fishing vessels. A large fleet of Danish cutters was fishing together with the Dutch cutters, but they were not allowed to bring their sand eels to the Dutch ports.

In July the Dutch fishermen were obliged by the fish meal plants to preserve their catch with sodium nitrite.

The most remarkable fact about this fishery was the discovery of new fishing grounds near the Dutch coast. Probably discovered by Norwegian trawlers, the fishing area was further explored by Dutch and Danish fishermen. Beginning in the vicinity of the isle of Texel, the area was extended along the Dutch shore between 8 and 25 miles from the coast seaward, down to the Zealand isles. This area is well known as a fishing ground for small cutters, yielding mostly moder-

ate quantities of flatfish and whiting. It was never thought that such immense quantities of sand eels could be caught so near the coast.

Another remarkable fact was the selectivity of the nets for sand eels. The catch consisted almost entirely of sand eels (*Ammodytes marinus*), with less than 1 percent of *Ammodytes lancea* and *Ammodytes lanceolatus*. Occasionally some mackerel, horse mackerel, a few whiting, and greater weever were caught with the sand eels, but always less than 10 percent of the total catch. Some foreign vessels landed up to 40 percent of other species, but never undersized fish in any quantity.

The sand eel was caught in two colors--specimens with bluish backs and specimens with brown-yellowish backs. Vertebrae countings showed that both varieties belonged to *A. marinus* and not, as is sometimes stated, the bluish variety to *A. marinus* and the brown-yellowish variety to *A. lancea*.

The poor catches of sole during last spring were attributed by many Dutch fishermen to the industrial fishery for sand eel in the German Bight, and these fishermen were annoyed about the new Dutch fishery for this species. Although the sand eel in different stages of its life is undoubtedly an important food for fish, biologists believe that the fishery would not yet seriously harm the food situation for other species in the North Sea.

Shortly after World War II the quantity of fish in the North Sea was much larger than now. Nevertheless the growth rate of all economically-important species was practically the same as now. This indicates that at that time there was enough food for a more dense fish stock so that now there must be a surplus of food.

There is a possibility that some species such as whiting and haddock will switch over from sand eel to young herring

in certain seasons. But tarbut, sole and the greater weever will still feed on bottom invertebrates.

An industrial fishery is worthwhile only when large quantities are caught within a short time. When the density of the sand eel stock is reduced too much by the fishery, there will no longer be a possibility for industrial fisheries, and a good deal of the stock will remain untouched.

To study the relative importance of the sand eel in the food spectrum of different fishes, commercial trawlers collected stomachs of many species for the biologists. This program was begun at the end of the sand eel fishery. Since then 1,000 stomachs of sole, plaice, tarbut, whiting, haddock, and cod were examined: only in the large soles of about 40 cm. (almost 16 inches) were any quantities of sand eel found. On the other hand fishermen indicated that they sometimes found that 10 percent of the weight of their catch consisted of sand eel contained in the stomachs of the gutted fishes. These are observations made during the fishery for sand eel: possibly the sand eel is catchable for man as well as for predator fish only during a short period?

The program of investigations for sand eels includes:

1. The position of the sand eel in the food chain of the sea will be studied in greater detail. Stomachs of sand eel were examined: all the common species of copepods and cladocera were found up to a size of 1.5 mm. (*Pseudocalanus*, *Paracalanus*, *Temora*, *Podon*, *Evadne*). No phytoplankton was found, neither nauplii. A few fish eggs (anchovy) and polychaet larvae could be detected. It was found that most of the stomachs were empty during the early morning, whereas in the afternoon and evening the stomachs were well filled. Probably the catchability of the sand eel (only fished during the day) depends on the feeding behavior of this species.

Plankton samples taken during the fishery for sand eel showed roughly the same composition as the stomach con-

tents of the sand eel. The sudden disappearance of the sand eel from the fishing grounds is presumably connected with the changes in abundance and the behavior of the plankton.

2. Little is known of the behavior of the sand eel. Does it migrate during certain seasons? Does it show a daily vertical migration? Does it burrow itself into the sandy bottom? Does it attach its eggs on the bottom or in the bottom? etc. Many of these problems have a direct bearing on the fishery and on the influence of this fishery on other species. Probably some aspects of this behavior can be studied by means of echograms on which the sand eel concentrations are plainly visible.

3. Growth and propagation are being studied. Otoliths are easily readable. Most of the sand eels caught were in their first or second year, only a few in their third year. The size of the sand eel varied between 13 and 23 cm. (5-9 inches) with a majority 17 cm. (6.7 inches). All sand eel studied were immature. It is intended to keep sand eel in an aquarium to study their propagation and other problems.

4. The main problem is: will or can this fishery continue, and if so how much of the stock can be caught without diminishing seriously the food supply for fish in the North Sea? This year the fishery for sand eel was a welcome one because it partly relieved the heavily-fished stocks of other commercial species. In this connection 15 percent of the Dutch cutter fleet fished sand eel. But the future is uncertain. It is a bad sign that the large fleets of German and Danish cutters did not catch enough sand eel in the German Bight this year, but that they all concentrated near the Dutch coast. Is the stock of sand eel declining so rapidly?

It is interesting to note that shortly after the end of the fishery described, very good catches of sole were recorded on the same grounds where some weeks before hundreds of tons of sand eel were caught. (From a paper presented at a meeting of the International Council for the Exploration of the Sea, by M. Roessingh.)



## Norway

**HERRING BEHEADING AND GUTTING MACHINE SUCCESSFUL:** During the past two years a Norwegian manufacturing concern in Bergen, Norway, has been working on the development of a herring beheading and gutting machine. This machine is of special interest to the Norwegian fishermen fishing for herring in Icelandic waters where the herring is salted aboard the vessels.

The three main parts of this equipment are the conveying belt, the circular knife, and the suction wheel.

The herring are placed in pockets arranged on the conveying belt, and pass by the rotating circular beheading knife. The suction wheel has a hole for each pocket on the conveying belt, and each hole is connected with a piston suction device. This arrangement is synchronized. When the beheaded herring pass the suction wheel, the suction device sucks the entrails out of the herring.

The machine has a capacity of 30 barrels of beheaded and gutted herring an hour. After some training, two men can

handle the machine. A watertight 3-horsepower motor drives the machine. The machine, which may be washed while operating, is operated by means of strong chains, chain wheels, and worm gear. All shafts have ball bearings with watertight packings.

Total length of the conveying belt is 2.5 meters (about 8.2 feet). The machine itself is 0.8 meters high (2.6 feet), 0.9 meters (3.0 feet) wide, and 0.9 meters long. The conveying belt may be locked by means of two screws, dismantled in the course of 2-3 minutes and stowed away, which is essential on small vessels.

The machine is thoroughly tested. During two seasons it has been tried on board the Norwegian research vessel *G. O. Sars*. Last season 4 such machines were in use on fishing vessels during the herring fishery in Icelandic waters. The machines worked smoothly.

The machine has been designed on a principle invented by the Chief Engineer aboard the *G. O. Sars*. Production of the new equipment has now been started.



## Panama

**BAIT FISHING BY TUNA CLIPPERS PERMITTED NOVEMBER-JANUARY:** In a decree (No. 83) dated November 7, 1957, the Panamanian Government provisionally permitted the taking of anchovies ("anchoveta") for bait by tuna clippers during the months of November and December 1957 and January 1958. For the past few years this three-month period has been a closed season for this species. The new decree provided for a fee of US\$4.00 a net ton of registered length for foreign vessels desiring to take bait in Panamanian waters during this three-month period. This

amount was in addition to US\$11.00 a net ton of registered length charged during the regular open season from February 1-October 31 (United States Embassy in Mexico dispatch dated November 18, 1957).



## Philippines

**EXPERIMENTS WITH TUNA PROCESSING:** Experiments on the processing of tuna for commercial use were recently commenced by the Philippine Bureau of Fisheries. Heavy tuna catches by the M/V David Star Jordan, operating under the guidance of an FAO fishery expert, stimulated these experiments. The fish used in the experiments came exclusively from the catches of this research vessel.

The various canned packs tried were solid pack in brine and oil, and flakes in oil. Development of (1) tuna viscera-rice bran, (2) tuna scrap meal, and (3) tuna glue as possible byproducts of the tuna-processing industry were also considered.



## Portugal

**CANNED FISH EXPORTS, JANUARY-SEPTEMBER 1957:** For the first nine months of 1957, canned fish exports amounted to 36,424 tons, valued at US\$22.2 million. Sardines in olive oil exported during the first nine months of 1957 amounted to 23,284 tons, valued at US\$14 million (Conservas de Peixe, November 1957).

During January-September 1957 the leading buyers of canned fish were: Italy, 7,007 tons (valued at US\$4,164,000), Germany, 5,413 tons (US\$3,237,000), Great Britain 4,050 tons (US\$2,380,000), the United States 3,267 tons (US\$2,746,000), and France 2,311 tons (US\$1,449,000). These countries purchased 74.4 percent of the quantity and 68.3 percent of the value of all Portuguese exports of canned fish. Exports of sardines in olive oil for the first nine months of 1957 to the United States amounted to 1,464 tons (valued at US\$1,167,000), and 1,354 tons of anchovies (valued at US\$331,000).

Portuguese Canned Fish Exports, January-September 1957

Product	January-September 1957	
	Metric Tons	US\$ 1,000
Sardines in olive oil . . . . .	23,284	14,003
Sardinelike fish in olive oil . . . . .	4,139	3,184
Sardines & sardinelike fish in brine . . . . .	1,159	288
Tuna & tunalike in olive oil . . . . .	2,193	1,753
Tuna & tunalike in brine . . . . .	355	207
Mackerel in olive oil . . . . .	4,558	2,383
Other fish . . . . .	736	340
Total . . . . .	36,424	22,158

\* \* \* \* \*

**CANNED FISH PACK, JANUARY-JULY 1957:** The total pack of canned fish for January-July 1957 amounted to 23,306 tons as compared with 10,781 tons in the similar period of 1956. Canned sardines in oil (7,519 tons) accounted for 32.3 percent of the January-July 1957 total pack, much higher than the pack of 3,258 tons for the same period in 1956. For the first 7 months of 1955 the total pack of all canned fish amounted to 14,976 tons (9,076 tons sardines in oil).

Portuguese Canned Fish Pack, January-July 1957

Product	Net Weight	Canners Value
	Metric Tons	US\$ 1,000
<b>In Olive Oil:</b>		
Sardines . . . . .	7,519	5,731
Sardinelike fish . . . . .	7,644	3,711
Anchovy fillets . . . . .	1,755	1,757
Tuna . . . . .	1,277	915
Other species (incl. shellfish) . . . . .	475	292
<b>In Brine:</b>		
Sardinelike fish . . . . .	4,169	1,069
Other species . . . . .	467	103
Total . . . . .	23,306	13,578

The Portuguese pack of canned sardines in oil totaled 2,393 metric tons during July 1957. The pack of all canned fish in July 1957 amounted to 8,826 tons, the November 1957 Conservas de Peixe reports.

\* \* \* \* \*

**FISHERIES TRENDS, SEPTEMBER 1957:** Sardine Fishing: During September 1957, the Portuguese fishing fleet landed 13,093 metric tons of sardines (valued at US\$1,340,000 ex-vessel or \$102 a ton). In September 1956, a total of 19,883 tons of sardines (valued at US\$89 a ton) were landed.



Canneries purchased 45.4 percent or 5,944 tons of the sardines (valued at US\$735,860 ex-vessel or \$124 a ton) during September. Only 42 tons were salted, and the balance of 7,107 tons, or 54.3 percent of the total, was purchased for the fresh fish market.

Matosinhos lead all other ports in September landings of sardines with 7,183 tons or 54.9 percent, followed by Setubal 2,205 tons (16.8 percent), and Peniche 1,756 tons (13.4 percent).

Other Fishing: The September 1957 landings of fish other than sardines consisted of 65 tons (value US\$7,200) of anchovy, 3,224 tons (value US\$217,704) of chin-chard, 305 tons (value US\$54,296) of tuna, 17 tons of bonito (value US\$3,235), and 2,241 tons of mackerel (value US\$119,478). (Conservas de Peixe, November 1957.)



### Surinam

FISHING INDUSTRY EXPANDS UNDER TEN YEAR PLAN: The fishing industry of Surinam (Dutch Guiana), under the stimulus of a Ten Year Plan, showed continuing progress in 1956. Catches of fish and shellfish rose to about 7.3 million pounds in 1956 as compared with 5.5 million in 1955, and 4.0 million in 1954. The increase in 1956 was due largely to the Government's system of leased fish farms on reclaimed plantations.

The increased catches led to a sharp increase in the consumption of fish meal by the recently-emerging local poultry and cattle feed industry. At the same time, the importation of fish meal showed a significant decline. In 1955, annual imports were valued at Sf 276,000 (US\$146,000). In 1956, they dropped to Sf 243,000 (US\$129,000). Local production of fish meal in 1956 amounted to 36 tons. During 1957 production of 100 to 110 tons of fish meal is predicted.

A new, modern shrimp-processing and freezing plant opened in 1956. One major shipment of about 35,000 pounds of frozen cooked, and peeled shrimp (sea bob) was made to the United States. Shrimp catches, however, were erratic. The Government was concerned about this matter and by the end of the year had signed a contract for an offshore shrimp survey using a modern trawler from the United States.

There are now fishing stations at Coppename Point, Paramaribo, Alliance, and Albina. Work on a new station at Nickerie started in 1957. Work continued on increasing the freezer capacity of the station at Coppename Point. Considerable progress was made on the construction of a new fish station at Alliance. The stations include an electric plant (except at Paramaribo); refrigeration space; storage and processing sheds; and housing (except at Paramaribo) for the families of the fishermen. For the most part, funds from the Ten Year Plan were used.



### Thailand

EXPERIMENTS WITH FISH FLOUR AS PROTEIN SUPPLEMENT: About 600 people in the village of Nongkorn in the Ubol Province of Thailand recently took part in an experiment that may have a radical effect upon the diets of this particularly protein-hungry part of Thailand. Under the supervision of Food and Agriculture Organization (FAO) nutritionists, members of 150 families received a daily ration of 15 grams (about  $\frac{1}{2}$ -oz.) of fish meal in an effort to supplement their meagre intake of protein, usually only available in the form of fermented fish.

The experiment was carried out by trainees of the Thailand-UNESCO Fundamental Education project, who hope eventually to qualify as social and educational workers in the fight to raise the living standards of the country's villagers. People receiving the flour were given instruction in its use along with simple recipes supplied by the Government's Health Department.

The flour, which also is a good source of calcium, is produced at Chumporn, 468 miles from Bangkok by the Fish Marketing Organization, and is made from "platu" and some "slipmouth" fish. The factory can turn out about 28 tons of fish into 5 tons of flour every day and can use the smaller fish which previously had little or no market.

Originally fish flour was thought of only as food for poultry, but nutritionists, realizing its high protein content, checked the manufacturing process and found that it was in every way suitable for human use.

The main reason for the experiment was to test the acceptability of the flour among the village population. The Thai Department of Fisheries has indicated that if the experiment is a success the flour will be made available to all the villages of the province (FAO Bulletin No. 2, 1957).

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SHRIMP PACKING COMPANY ESTABLISHED IN THAILAND: A joint Thai-United States Company has been formed to catch, process, and freeze shrimp from the Gulf of Thailand. A factoryship, equipped with modern freezing devices, is expected to arrive in Bangkok early in 1958. The vessel, owned by a firm incorporated in Panama, will employ about 150 Thais in the processing of the shrimp and has a storage capacity of about 1,100 metric tons. The new company hopes to process 5 million pounds of shrimp in its first year of operations. A United States firm has guaranteed to purchase the entire pack, according to a November 15, 1957, dispatch from the United States Embassy in Bangkok.



### U. S. S. R.

RAPID EXPANSION IN FISHING FLEETS FROM 1938 TO 1956: For the first time the Soviet Union has released figures on the composition of its fishing fleets. Figures released in the Food and Agriculture Organization's Yearbook of Fishery Statistics 1955-56 (Vol. VI) indicate that Russia's total number of powered fishing

Category	Unit	1956	1955	1954	1948	1938
Powered craft: . . . . .	Number	12,387	10,872	9,925	3,158	2,727
	Horsepower	982,600	834,200	725,300	243,200	123,900
Trawlers . . . . .	Number	1,785	1,598	1,379	329	107
	Horsepower	549,300	451,800	362,400	88,000	62,500
Seiners . . . . .	Number	1,724	1,517	1,395	407	376
	Horsepower	225,700	194,200	175,800	29,200	18,900
Other . . . . .	Number	8,878	7,757	7,151	2,422	2,244
	Horsepower	207,600	188,200	187,100	126,000	42,500
Non-powered craft: . .	Number	48,056	47,752	45,912	41,174	33,679
	Tonnage	127,400	126,100	125,800	83,300	103,600
Total All Craft . .	Number	60,443	58,624	55,837	44,332	36,406

craft has increased close to 454 percent since 1938 (2,727 in 1938 as compared with 12,387 in 1956). The increase in horsepower, which is often a better indicator of catching capacity, has been even more pronounced with an increase of close to eight-fold. The increase in the number of nonpowered craft was not so pronounced (33,679 boats in 1938 as compared to 48,056 boats in 1956, or about 43 percent). The sharp increase in the number and horsepower of powered vessels is a measure of Russia's capacity to exploit productive distant fishing grounds as distinguished from the over-exploited inshore banks, lakes, and rivers to which nonpowered craft are limited.



## Union of South Africa

### FISH FLOUR USED AS PROTEIN ADDITIVE IN BREAD:

After four years of research, South African scientists claim to have perfected a process by which fish flour is now made completely tasteless and odorless.

It is being supplied to bakers by the South African Department of Nutrition for use in fortified brown bread. All bread in the Union is subsidized, but to encourage the consumption of this bread, which has been named "Bremer bread" in honor of a former Minister of Health, an additional subsidy is given. This enables a 2-pound loaf to be sold at 7d. (about 8 U. S. cents) as against 9-1/2d. (about 11 U. S. cents) for a white loaf. Since the introduction of "Bremer" bread, the demand for brown bread has increased by 12 percent.

The National Nutritional Research Institute of South Africa points out that the flour when added to the protein already in the bread has the effect of increasing the biological value of the existing protein content.

The loaf contains about two percent fish flour and, when the scheme is fully operative, 5,000 tons of fish flour a year will be required.

The raw material for the flour consists of commercial fish meal or press-cake prepared from small fish. The process involves the following steps:

(1) The crude meal is extracted with a solvent mixture consisting of 90 percent of industrial ethyl alcohol of 96 percent strength and 10 percent ethyl acetate.

(2) Five or more extractions are carried out, until the drained solvent appears colorless. Each extraction takes 20 minutes at the boiling point (approximately 180° F.) of the solvent. The ratio of solvent to meal is about 2.5:1 by weight.

(3) Each extraction is followed by a 1:1 wash with clean solvent.

(4) After extraction the flour is completely freed from all traces of solvent by drying in hot air or by vacuum (with or without the aid of "steam stripping").

The fish flour produced by this process has a light brown color and is free from the effects of heating. It is neutral and, in particular, is absolutely free from all fishy or other foreign odors.

The material obtained by acetone extraction of the final product (after acid hydrolysis) does not exceed 0.7 percent by weight and the moisture content of the flour varies between 2 and 3 percent.

The biological value of the protein in the raw material is not impaired by this process, and the resultant fish flour is therefore considered eminently suitable for the enrichment of bread and maize meal. (Current Affairs Bulletin, No. 19, July 1957, of the Indo-Pacific Fisheries Council, FAO)



## United Kingdom

**CONTRACT FOR CONSTRUCTION OF 20 TRAWLERS FOR RUSSIA ABOUT COMPLETE:** Construction of 20 trawlers for the Soviet Union by a British shipyard is proceeding apace. To date, 12 of these 700-ton vessels have been delivered, and 4 more launched. The £6-million (US\$16.8 million) order should be completed well up to schedule.

Seen during a visit aboard one of these trawlers in the fitting basin was an oilskin-clad workman directing a high-pressure jet of water at the wheelhouse, while a group of serious-faced Russian inspectors watched keenly for leaks in the windows.

The trials of the first trawler delivered took six weeks for, although all equipment installed undergoes rigorous factory tests before delivery to the yard, the Russians insist on even more thorough tests once it is installed in the ship.

For example, electric motors rated for 24 or 48 hours have to be run for that full length of time. All wiring is checked before and after running. Even a missing nameplate on a casing has been cause for rejection of a particular piece of equipment. Time for trials has been cut down to 10 days on more recent deliveries, but none of the Russians' stringency has been relaxed.

The skipper of each Russian trawler delivered has, as a member of the Acceptance Commission, insisted on his own rigging modifications. This has meant the scrapping of standard rigging design, and the extra cost and time of fabricating individual rigging for each trawler--although specifications were thrashed out for 7 or 8 months before construction got under way.

A sidelight on Russian thoroughness is the incorporation of four alternative methods of steering, against the two methods standard on British trawlers. Steering by power, by power-assisted manual operation, by hand operation only, or by tiller with relieving tackle from the winch are all provided on these vessels.

These vessels are built to the highest class of Lloyd's Register of Shipping (motor trawler), and are assigned a free-board. This is contrary to general British practice for trawlers, and the Russians will not be able to put into foreign ports loaded down below their marks. They carry a crew of 44--it is rumored that some will be women, who will work in the fish meal and liver plants on board (Fishing News, August 30, 1957).

NOTE: SEE COMMERCIAL FISHERIES REVIEW, DECEMBER 1956, PP. 81, 82.

FISH WORKERS' WAGE DISPUTE AT GRIMSBY UNSETTLED: The deadlock at Grimsby, England, over the application of Grimsby fish workers of a substantial increase in their wage rates was unsettled at the beginning of November. Workers rejected as "totally inadequate" an offer of an increase of 5 shillings (70 U. S. cents) a week for women and unskilled workers only.

The majority of the 3,500 workers involved are members of the National Union of General and Municipal Workers, though some are members of the Transport and General Workers' Union.

Talks opened in June between the Grimsby Fish Merchants' Association and the unions, which were asking for a substantial increase in wage rates and a deletion of incentive and bonus schemes.

At one meeting the owners offered an increase of 5 shillings (70 U. S. cents) a week for the women workers, the majority of whom are employed in making fish cakes, fish sticks, and engaged in preparing prepacked fish foods. A similar increase was offered to unskilled male workers with relative increases for juniors. The offers would bring the minimum rates for adult women to £5 6s. 6d. (US\$14.91) and for adult unskilled men to £7 15s. (US\$21.70) a week. No offer was made for the skilled workers, filleters, and splitters.

After the meeting an official of the General and Municipal Workers' Union said that the higher-grade workers were of the opinion that the offer would only reduce the differential between them and the lower grades (Fish Trades Gazette, November 1, 1957).

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FROZEN FISH FILLETS USED FOR PET FOOD: A cat-food pack consisting of four whiting fillets is the latest development in quick-frozen pet food, the November 1, 1957, issue of The Fishing News states. The packers report that sales are encouraging and that it is difficult to obtain enough raw material. Another firm in Grimsby reports that they have been packing raw fish for cats (usually whiting) for the past two months. The raw small whiting are packed in an 8-oz. carton that is overwrapped with heat-sealed cellophane to prevent odor and seepage.

More than £40 million (US\$112 million) a year is spent in Great Britain for pet food, with about £13 million (US\$36.4 million) estimated as spent for cat food. Sales of prepared pet foods amount to about £10 million (US\$28 million). According to a booklet on the Economics of Domestic Pets, the average monthly cost of specially-made and nonprepared foods per cat is about 4s. 6d. (63 U. S. cents). There are 5 or 6 firms now manufacturing prepared pet foods, one of which packs 1 million cans weekly. Pet food utilizes most of the whale meat imported by Britain and also large quantities of fish equal in quality to that which enters the retail market.

One British firm began marketing a frozen pack for pets about six years ago, and the demand for its product has been increasing. There is a ready market for a frozen raw fish product, states this company, for besides national coverage, it also exports the frozen pet-food pack to more than 20 countries.

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GOVERNMENT COMMITTEE TO STUDY FISHING INDUSTRY: The British Annual Fisheries Report for 1957 referred to the Government's intention to appoint a "Committee of Inquiry into the fishing industry." The British Government has now announced the appointment of the committee and made public the terms of reference, which are: "To assess, in relation to developments in fishing and the marketing of fish, the size and pattern, and implications, of an economic fishing industry in the United Kingdom, and to report."

Answering a question in Parliament regarding this study, the British Minister of Agriculture and Fisheries said: "The main object of this inquiry is to find people

who are independent of the industry itself and so will be able to consider objectively the evidence that will be given to them from all sections and branches of this industry," reports a December 4, 1957, dispatch from the United States Embassy in London.

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GRIMSBY IMPORTS LARGEST CARGO OF FROZEN HALIBUT: What is believed to be the largest single cargo of frozen halibut to be imported through Grimsby, England, from Norway was reported on November 4, 1957. The Norwegian refrigerated ship Polaris delivered 200 metric tons of halibut to a large Grimsby cold storage company. This was the second time in less than three weeks (70 tons arrived on October 18) that the Polaris had brought in a cargo of frozen Norwegian halibut, states the November 9, 1957, Fish Trades Gazette.

The British firm is building up stocks of frozen halibut for winter trade when supplies of fresh fish are apt to be light. The Norwegian halibut had been caught by quick-freezing vessels, chiefly off the west coast of Greenland, and had been frozen at sea. The cargo of the Polaris represented the catch of about four Norwegian vessels.

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IMPORT QUOTAS FOR JAPANESE CANNED TUNA, SARDINES, AND CRAB MEAT: Included in the extension of the Anglo-Japanese trade agreements for the six-month period ending March 31, 1958, were quotas for canned tuna, crab meat, and sardines (pilchards). A previous announcement stated that the six-month quota for canned salmon was £2,610,000 (US\$7,308,000 c.i.f. The tuna quota was reduced from £250,000 (US\$462,000) to £85,000 (US\$238,000) and that for canned sardines was set at £15,000 (US\$42,000). Imports of canned crab meat are permitted under "Open Individual License" without limitation of quantity, the United States Embassy in London reports in a dispatch dated November 25, 1957.

NOTE: SEE COMMERCIAL FISHERIES REVIEW, JANUARY 1958, P. 100.

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PRE-AUCTION SALES OF FISH INITIATED AT HULL: A pre-auction fish sales scheme, which will enable Hull's wholesale merchants to get their filleting staffs working by 8 a.m., the time at which normal quayside sales begin, was initiated on November 11, 1957.

It was a proposal of the port's trawler owners, and it should be of particular benefit to firms whose premises are away from the dock area, to help speed up processing and dispatching.

The terms of the concession apply solely to limited drawings of bulk cod, subject to the following provisions:

(1) Those who buy in advance of the Dutch auctions must pay 1s. (14 U. S. cents) a kit (140 lbs.) above the average price realized at the normal auctions for the nearest unwithdrawn lot.

(2) The minimum amount of fish which anyone is allowed to tally and remove from any one vessel before 8 a.m. is 40 kits (5,600 lbs.) and the maximum pre-auction purchase by any one buyer from all vessels serving the day's market must not exceed 120 kits (16,800 lbs.).

(3) No fish may be withdrawn before 7 a.m., and then only after it has been inspected by the sanitary authorities.

(4) The maximum daily pre-auction sales shall be limited to 10 per cent of the total quantity of fish from any one vessel.

(5) Such sales shall be at the discretion of the owners of the individual vessels concerned. (The Fishing News, Nov. 8, 1957.)

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PROPERTIES OF NYLON YARN AND NETTING: How to lower costs and increase catches by using the most suitable nets was discussed by a representative of a British nylon manufacturing firm in a paper given at the International Fishing Gear Congress held in Hamburg, West Germany, in October 1957. Different aspects of the strength of nylon nets and the mechanics of knotting were discussed.

It was suggested that costs could be lowered by reducing the initial cost of the net; increasing the life of the net; reducing maintenance and handling; and savings in power (as in trawls). To increase catches, the nets should be rendered less detectable (as in gill nets); their holding capacity increased (as in seines); greater speed through the water (as in midwater trawls); net size increased (as in vessels of limited deck capacity); and available fishing hours increased.

No one fiber can find universal acceptance, but it is possible to devise a specification satisfactory for a majority of nets. The author pointed out that nylon was not the cheapest fiber available, but nylon yarns were stronger than any other fiber commercially available.

Comparing the properties of three nylon 66 yarns, he said the energy absorption of 210 denier type 300 on a weight-for-

weight basis was higher than the other two--205 denier type 100 and 840 denier type 600.

The high energy absorption of this particular yarn has been one factor in its ready acceptance in fishing nets. Nylon's present place in fishing nets is largely due to its comparatively high energy absorption under dry and, even more, under wet conditions.

Nylon nets, like all others made from fibers, slowly lose strength in use, but the author stressed their excellent resistance to rotting and attack by chemicals, oils, insects, vermin, bacteria, and molds, and their ability to stand up to considerable flexing and abrasion.

Since they do not rot, drying out in the sun is not essential, so this source of strength loss can be avoided. In certain African fisheries, it is now the habit to store gill nets in the water when they are not being fished.

The abrasion resistance, dry and wet, of nylon 66 was extremely good, the author added. This could be varied by a choice of filament denier. (The Fishing News, October 11, 1957)

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REACTION OF FISH TO NETS TESTED WITH MODELS: Model nets about one-eighth commercial size are being used successfully in developing trawler nets, a Scottish Aberdeen Marine Laboratory scientist announced in a paper read before the International Fishing Gear Congress held in Hamburg, Germany, early in October 1957. It was also stated that the performance of models differs from the full-size originals, but when used with care, models can give results difficult to achieve in any other way. The paper described the comparison made between models and full-size gear during trials between 1954 and 1956 and gave an outline of the theory of modeling; a method whereby faithfulness of reproduction in the model can be determined on the drawing board; an account of the shape assumed by the models in the towed condition; and a short study of fish reactions.

The choice of a model size is dependent on the towing power of the available boat and, when looking for bad features in the design of a net, the model should ideally correspond mesh for mesh with the original, with twine diameter proportionately reduced.

Practical considerations, however, often force a compromise, and a quarter-scale model with a half-scale mesh are reasonable compromises.

To obtain information on the reactions of fish to the gear, a small net of some 20 feet headline length, towed by a 15

horsepower cable, is big enough. The net should be made with meshes of the size used commercially.

The net chosen for comparison was the small Aberdeen trawl used by most trawlers from that port, with headline of 62-1/2 feet.

For the model to have the same shape underwater as the original, the weights and flotation should bear the same ratio to the lifts and drags.

In a discussion of underwater observations, it was stated (1) the reaction of fish to small nets most observed was that they tended to swim away perpendicularly in front of a moving wire or rope when both were on or near the bottom; (2) if the maximum sustained swimming speed which the fish can or is inclined to attain is known, it becomes possible to make some calculations on the optimum angle of attack of the wire; (3) not all fish that come within the path of sweeps and spreading wires finish up in the path of the net, nor does every fish in the path of the net finish up in the cod end; (4) a common line of escape from the path of a net was below the ground-rope (flatfish were often pinned against the netting by the flow of water through it); (5) shoaling fish are in some respects easier and in others harder to catch than fish in company, so that any defect in design is doubly serious (this seems to hold a significant lesson in the design of trawls or the capture of shoaling fish, with the object of delaying the escape reaction until the possibilities are precluded).

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TRAWLERS LAND BOXED FISH: Some Scottish trawlers are boxing their fish at sea and landing their boxed catches at Grimsby, England. However, this has created a problem as to the correct number of lumpers or unloaders to be employed when boxed fish is unloaded from trawlers.

The number of men needed to land an ordinary catch is laid down in a manning scale agreed to by owners and lumpers. This scale, planned for catches where the fish had to be dug out of ice in the fish hold, and subsequently sorted and weighed on shore, is obviously not suited to boxed fish.

The lumpers are of the opinion that catches of this good-quality fish should be encouraged at a port like Grimsby, which has a name for quality.

They are also anxious to get some form of manning scale laid down for boxed fish and have asked the trawler owners to meet them to discuss the whole question of landings of boxed fish.

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**USE OF SYNTHETIC FIBER "TERYLENE" IN FISH NETS DESCRIBED:** The synthetic fiber "terylene" is beginning to be used successfully in the manufacture of fish nets, according to a report made to the International Fishing Gear Congress, held in Hamburg, West Germany, October 7-12. This synthetic fiber, developed by a British firm, has been used successfully in gill- and trawl-netting. According to the report, a number of British trawler companies are testing the fiber for near-, middle-, and distant-water fishing.

The British Ministry of Fisheries is conducting trials with "terylene" in middle-water trawls and purse-seine netting, and expect to test the fiber in other fisheries in the near future.

"Terylene polyester" fiber, it was stated, has been used also for lifeboat and hatch covers, yacht sails, and tarpaulins. The fiber is now being manufactured in several European countries and Canada. The British firm produces 25 million pounds a year, and larger outputs are expected.

Development of a high tenacity extra-heavy denier yarn is under way and, when commercially available, the heavier yarn, such as trawls, will be produced more economically.

"Many fishermen, net manufacturers, and twine producers have shown favorable reaction to "terylene," and the filament yarn has been exported for twines and nets."

Most important properties claimed for this filament yarn for twines and nets are high tensile strength, unaffected by wetting, and high wet-knot strength; rotproof, not weakened by mildew; good resistance to sunlight; stability on water immersion coupled with low moisture absorption; good resistance to abrasion under wet conditions; and smoothness and transparency of the material.

While "terylene" may lose relatively more strength on knotting than natural fibers, its actual knotting strength remains above their level.

Unlike most synthetic fibers, its abrasion resistance hardly differs under wet conditions. It also has good resistance to attack by acids and oxidizing agents, is resistant to sea water, and unaffected by contact with oils and tar.

Both "terylene" and nylon single-knotted nets are prone to knot slippage, but the tendency to slip is less with "terylene." It is possible to treat the net itself with bonding agents to prevent knot slippage. Nets can also be given a heat treatment to consolidate the knots, either in steam or hot air. Steaming the nets on a frame at 150° C. for 15 minutes has been found most satisfactory.

The paper questioned the necessity to dye synthetic nets, although dyeing has been shown sometimes to give increased catches. As an example, blue-grey nets are used for Norwegian lake trout.

"It is clear that fishermen in general demand nets dyed to a wide variety of shades, from reddish-brown to green and blue, and in many cases they prefer to dye their own nets."

"Suitable dyestuff packages are available to enable the fisherman to dye his nets satisfactorily to a variety of shades at

home if need be. An allowance for shrinkage must be made if the mesh size of the net is critical."

"Terylene" nets are easy to handle because thinner twines can be used and the result is lighter nets, and trawl nets can be towed more easily through the water. "It is thus possible to use larger nets than normally possible with traditional fibers or alternatively smaller vessels can be employed to handle the net."

The synthetic-fiber nets are more expensive than those of natural fiber. The difference in price is less marked when fiber is made into nets because twines of greater runnage (number of feet per pound) can be used.

"Terylene" filament twines can be handled on traditional net-making machines. They are said to be easier to make than from other synthetic fiber because of their high resistance to stretch. The twines have been processed satisfactorily on single-knot machines.

Describing the development of "terylene" fiber for netting, the paper said a mixed tenacity acetate netting twine was being developed, mainly for pilchard nets. Such a twine would not bruise or damage the fish and would not slip when single-knotted.

The gill-netting has been used successfully, principally for catching salmon and cod. "Terylene" nets have shown up to particular advantage in fast-moving water or ocean currents, where lively fish can dive straight through the net, or when caught by the gills can escape by expanding the net mesh.

"Terylene" drift-netting is being developed to give thicker and more suitable twines, as all synthetic fibers cut into and damage soft fish such as herring. The filament yarn has been used successfully for bottom trawls.

During tests by distant-water trawlers it was found that each trawl net lasted on the average about nine trips and there was one instance of 15 trips recorded before the net was finally lost. The normal net under these conditions is generally good for an average of one trip.

The "terylene" nets were much easier to tow and, being completely rotproof, drying was unnecessary.

It is understood that cleaner catches were obtained. The ship's crew reported that the "terylene" nets were more pleasant to handle than nets normally used. With a "terylene" trawl, unloading of the cod end may sometimes be made in fewer operations because of its greater strength.

A "terylene" purse-seine net may cost as much as £5,000 (US\$14,000), but trials carried out in Canada with drum seines are encouraging and, with suitable modifications, it should be possible to use these purse seines with great profit.

The twines are also being tried with encouraging results for lobster pots in place of natural fibers, chiefly because of their rot resistance and general toughness. Head ropes made from the fiber are also being tried nets.

