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COMMERCIAL FISHERIES REVIEW

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

A. W. Anderson, Editor
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Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C.

The printing of this publication has been approved by the Director of the Bureau of the Budget, November 5, 1952.

CONTENTS

COVER: Fish auction at Nam Fong-o fish market, Suao, Y-lan hsien, Formosa. The U. S. Foreign Operations Administration Mutual Security Mission has financially and technically assisted the Formosan fishery industry through improvement of fish processing and preservation facilities, including ice making, freezing, cold storage, and other processing activities. (See pp. 57 & 58 of this issue.)

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JAPANESE HIGH-SEAS MOTHERSHIP-TYPE DRIFT GILL-NET SALMON FISHERY--1954

By Francis M. Fukuhara*

CONTENTS

BACKGROUND

Japanese salmon fishery interests in 1954 resumed their third year of operation in the North Pacific Ocean since the signing of the Tripartite Fishery Treaty (May

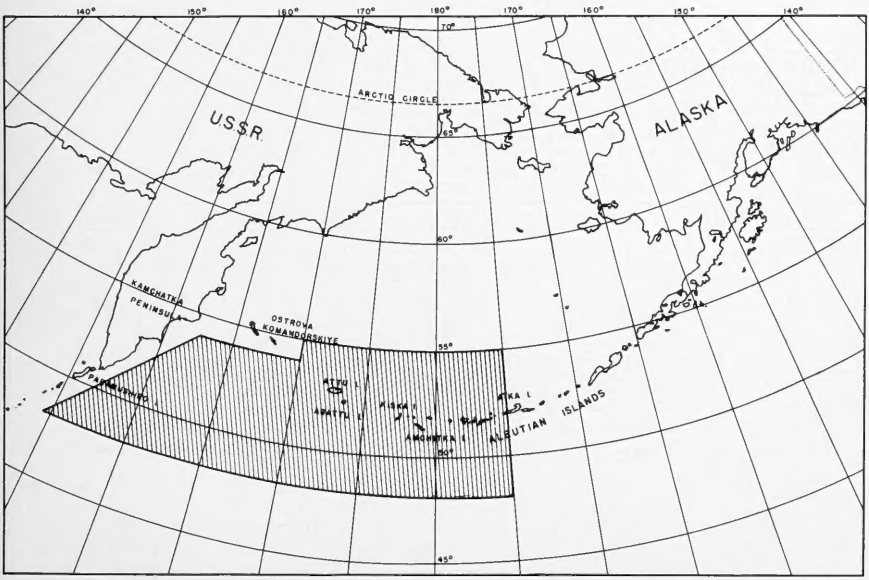

Fig. 1 - Chart of the Bering Sea and North Pacific Ocean. Shaded portion shows fishing area authorized by the Japanese Fishery Agency for the 1954 salmon-fishing fleets.

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1952). Prior to departure of the 1952 expedition the Japanese Fishery Agency extended an invitation to the U. S. Fish and Wildlife Service to place a biologist aboard one of the motherships to accompany the fleet during its fishing operations in the offshore waters of the Aleutian Islands and Kamchatka. The activities of that expedition were described by Fukuhara (1953). A similar invitation was extended by the Japanese Fishery Agency to the Service in 1954. In response to this invitation the author was assigned to accompany the Japanese fleet during the 1954 high-seas salmon-fishing season.

The following is a narrative account of the activities of the 1954 salmon fleet.

Transportation to the Japanese fleet was provided by the U.S. C.G.C. Clover. Between June 20 and July 9 the writer was aboard the S. S. Einin Maru, mothership of the Taiyo Fishing Co., Ltd., and from July 10 to August 23 aboard the M.S. Miyajima Maru, mothership of the Nippon Suisan Co., Ltd. The ships' logs, catch data, and the fishing logs of these two fleets were made accessible to the author. These courtesies, extended by Mr. S. Mori and Mr. T. Ito, fleet managers of the Taiyo and Nippon Suisan fleets, respectively, are gratefully acknowledged.

THE FISHING FLEETS

Seven fleets participated in the 1954 high-seas salmon fishery. Descriptions and facilities of all motherships and accompanying catcher boats appear in a Japanese fishery periodical (Anonymous 1954).

Table 1 - Facilities of Motherships

Name	Facilities for:	
	Refrigeration	Canning
Einin Maru	23 compartments	2 lines
Meisei Maru	14 "	-
Kyoho Maru	-	2 lines
Miyajima Maru	40 "	1 line
Ginyo Maru	9 "	-
Kyodo Maru No. 3	15 "	-
Saipan Maru	3 tons	-

All motherships were equipped with radio direction finder, Loran, radar, and gyrocompass. Position fixes of motherships were determined by sun sights and by Loran.

The catcher boats of the fleets were coastal trawlers modified for gill-net fishing. Each boat was equipped with a free-wheeling roller on the stern. The catchers ranged in size from 50 to 75 net tons and were driven by 160 to 250 hp. Diesel engines. Maximum speed of catcher boats was 5 to 7.5 knots. Each was equipped with a 50-watt transmitter and in addition carried a radio direction finder. Catcher boats carried crews of 15 to 20 men.

Table 2 - Mothership Descriptions

Name	Gross Tonnage	Length in Meters	hp.	Speed
Einin Maru	7,456	129.9	2,200	11.0 knots
Meisei Maru	5,603	-	2,100	-
Kyoho Maru	6,900	-	2,100	-
Miyajima Maru	8,964	151.3	5,500	17.0 knots
Ginyo Maru	3,542	96.2	1,800	-
Kyodo Maru No. 3	2,313	85.8	1,700	-
Saipan Maru	3,778	-	900	11.5 knots

The exploratory boats were in some cases slightly larger than the catcher boats; a few exploratory boats were of about 100 net tons. However, these too were trawlers and equipped with a roller on the stern. Exploratory boats carried crews of 18 to 22 men.

The positions of catcher boats were calculated relative to the position of the mothership. Their bearings were established by the radio direction finder from the mothership. The distance of a catcher boat from the mothership was computed from the cruising speed of the catcher boat and the number of hours run from the mothership (cruising speed times hours under way). Due to their greater range of operation, the exploratory boats used sun sights to establish positions.

Table 3 - Number of Catcher Boats by Fleet

Name	No. of Catchers	No. of Scout Boats	Total
Einin Maru	32	6	38
Meisei Maru . . .	28	6	34
Kyoho Maru	19	4	23
Miyajima Maru . .	33	6	39
Ginyo Maru	20	4	24
Kyodo Maru No. 3 .	14	4	18
Saipan Maru	14	4	18
Total	160	34	194

FISHING SEASON

Exploratory boats of all fleets were fishing on the grounds early in May, in advance of the main fleets; however the first motherships to arrive on the fishing grounds commenced fishing operations on May 15, with later fleets commencing operations on May 20.

FISHING AREA AND REGULATIONS PERTINENT TO FISHING

The 1954 mothership-type salmon-fishing operation was limited to an area within a line joining the following points: 55°00'N., 175°00'W.; 55°00'N., 170°00'E.; 54°00'N., 170°00'E.; 54°00'N.; 162°30'E.; 48°00'N., 154°30'E.; 48°00'N., 175°00'W. (fig. 1).

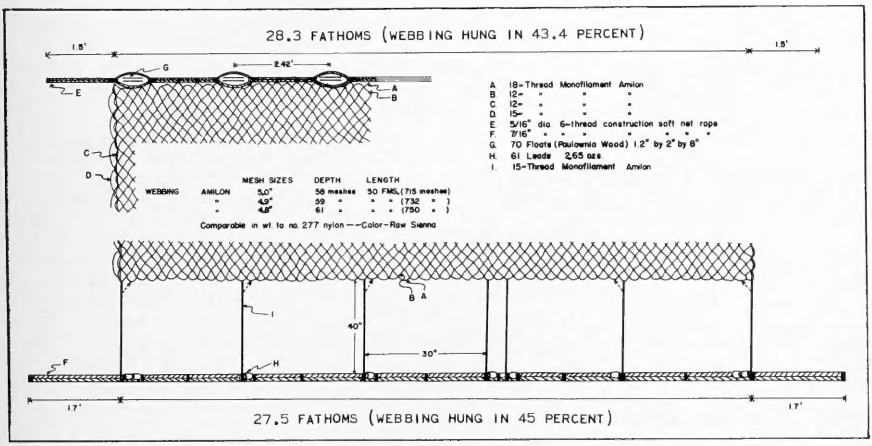

Fig. 2 - Details of a "tan" of gill net of the type used by the Nippon Suisan Co. Ltd. fleet. Webbing in net is "Amilon," a synthetic product similar to nylon but with less stretch factor.

All motherships were required to remain at least 50 miles from the boundary of the authorized fishing area and 50 miles away from any of the Aleutian Islands included within the area. Catcher boats were required to remain at least 3 miles from the islands. Five inspection vessels of the Japanese Fishery Agency constantly patrolled the fleets to enforce these regulations. In addition, all catcher boats were required to return to the mothership daily. Because of their limited speed, catcher boats were limited to within a 50-mile radius of the motherships. A Fishery

Agency inspector was assigned to each mothership and among his other duties he checked in all catchers daily. The Fishery Agency inspectors aboard the motherships also received carbon copies of the daily catch by species and by catcher boat, and catcher-boat positions. These data were coded and transmitted to the Chief Inspection vessel every evening.

Fishing operations commenced in the eastern portion of the authorized fishing area and with the advance in season the movement of the fleets was westward. By mid-July all fleets were westward of 160° E. longitude (about 300 miles south of Bering Island in the Kommandorskii group).

SOURCES OF DATA

CATCH DATA: The daily catch by species for the entire fishing season from all the fleets was obtained from the Taiyo Fishing Co., Ltd. As previously stated, daily catch statistics from all motherships were requested by the Japanese Fishery Agency. Related data, such as noon position and numbers of "tan" (units of gill net)

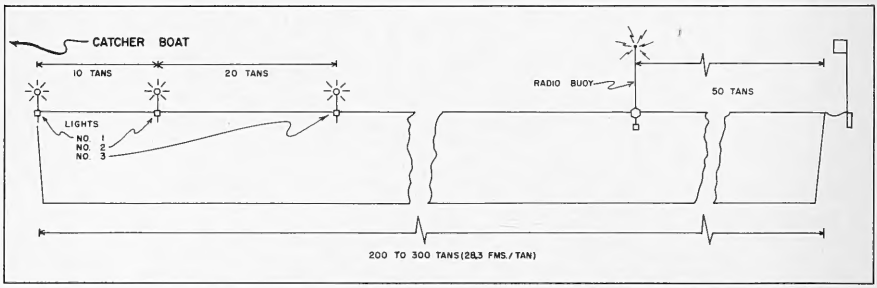

Fig. 3 - Sketch of drift gill-net set.

set by each catcher boat, were also compiled by the Chief Inspector of the salmon fleet. These data were transmitted to Japan where the information was made available to the companies engaged in the fishery. The companies in turn relayed the information to their motherships on the fishing grounds. Thus the noon position and performance of all fleets for any particular day was common knowledge to all motherships on the following day.

Catch data for the Einin Maru fleet from June 20 to July 6 was obtained from the Japanese Fishery Agency Inspector assigned to that ship. Catch data for the Miyajima Maru fleet from July 10 to August 17 was obtained from the ship's office.

Species identification and enumeration was done once aboard the catcher boat by the fishermen; a second count was made by sorters aboard the motherships before final figures were entered in the ships' records.

HYDROGRAPHIC OBSERVATIONS: The following data were obtained from the fishing logs of the Einin Maru and Miyajima Maru:

1. Einin Maru (June 20 to July 6)

   (a) Daily catcher boat positions.

   (b) Surface water temperatures taken daily by all catcher boats at position of set.

2. Miyajima Maru (May 16 to August 17)

(a) Daily catcher boat positions.

(b) Surface water temperatures taken daily by all catcher boats at position of set.

(c) Water color (Forel Scale) taken daily by catchers.

(d) Secchi disk visibility taken daily by catchers.

(e) Subsurface temperatures to 60 meters taken by exploratory boats only.

Surface water temperatures were taken by all catcher boats generally while under way. All thermometers used by catchers of the Nippon Suisan fleet were calibrated for error by a meteorological agency in Japan. Errors in the instruments for the temperature ranges encountered in the North Pacific during the fishing season were less than 0.1° C. A printed manual was issued with each thermometer to standardize methods of taking temperatures and reading the thermometer.

Table 4 - Average Water Transparency, Water Color, and Surface Water Temperature Recorded by the Miyajima Maru Fleet, May 14 to August 5

Date	Water Transp. 1/	Water Color 2/	Surface Water Temp. °C.	Date	Water Transp. 1/	Water Color 2/	Surface Water Temp. °C.
May 14	13.1	4.3	3.6	June 29	11.9	4.4	5.5
15	13.0	4.1	3.7	30	12.2	4.6	5.4
16	12.8	3.9	3.6	July 1	11.2	4.8	5.2
17	14.6	4.0	3.6	2	12.0	4.7	5.3
18	15.0	4.2	3.9	3	11.2	4.8	5.1
19	14.9	4.4	3.7	4	11.5	4.7	5.3
20	14.9	4.4	3.8	5	11.9	4.7	5.4
21	14.8	4.3	3.8	6	11.5	4.6	5.6
22	14.5	4.4	3.8	7	11.4	4.4	5.4
23	14.4	4.2	3.7	8	11.2	4.7	5.7
25	14.6	4.4	3.6	9	10.8	4.5	5.9
29	15.1	4.3	3.3	10	10.5	4.7	5.9
30	14.9	4.2	3.3	11	11.2	4.5	6.4
31	15.2	4.4	3.4	12	10.4	4.7	6.1
June 1	14.8	4.2	3.3	13	10.6	4.8	6.0
4	14.8	4.3	3.3	14	11.1	4.5	6.2
5	15.1	4.3	3.4	15	11.4	5.4	6.9
7	15.0	4.3	3.6	16	9.8	5.4	7.3
8	15.2	4.4	3.4	17	8.8	5.7	7.8
9	15.1	4.3	4.0	18	7.6	6.2	8.0
10	14.9	4.2	4.0	19	7.3	6.1	8.8
11	14.7	4.2	3.6	20	6.7	6.1	8.4
12	14.7	4.3	3.5	21	9.3	5.2	7.8
13	14.3	4.3	3.7	22	9.1	5.1	8.0
14	14.4		3.8	23	9.2	5.1	7.9
15	14.7	4.3	4.4	24	9.1	5.2	8.2
16	14.6	4.2	4.4	25	8.9	5.3	8.6
17	14.4	4.4	4.5	26	9.1	5.5	8.7
18	13.4	4.6	4.6	27	9.3	5.1	8.4
19	13.1	4.5	4.6	28	9.2	5.4	8.2
20	13.4	4.4	4.7	29	8.8	5.5	8.3
21	13.2	4.7	5.1	30	8.1	5.4	8.4
22	13.2	4.3	5.7	31	8.4	5.7	9.7
23	13.2	4.4	5.9	Aug. 1	8.1	5.8	9.9
24	13.2	4.1	6.1	2	6.5	6.0	10.5
25	13.3	4.3	6.0	3	6.9	5.8	10.6
26	12.8	4.4	5.8	4	9.0	5.3	10.5
27	12.8	4.6	5.6	5	7.3	5.8	10.5
28	12.3	4.5	5.3				

1/ Limit of Secchi-disc visibility in meters.

2/ On the Forel scale.

Color standards were carried by all catcher and exploratory boats of the fleet. These color standards were used in rating the water color on the Forel scale. The Secchi discs used by the Nippon Suisan fleet were all white and 30 cm. in diameter. The exploratory boats of this fleet carried electric thermometers with which surface water and subsurface temperatures were obtained.

FISHING OPERATIONS, METHODS, AND GEAR

MOTHERSHIP MOVEMENT: In a mothership-type fishery the catcher boats are entirely dependent on motherships for fuel, rations, and processing of catch. Furthermore, the cruising range of the catchers was restricted, as stated previously, for they were required to return to the mothership daily except when circumstances (e.g. net caught in screw) made this impossible. In view of these limitations, the success of catcher boats in catching salmon depended almost entirely upon the ability and judgment of the fishing experts whose job it was to situate the mothership in areas of salmon abundance.

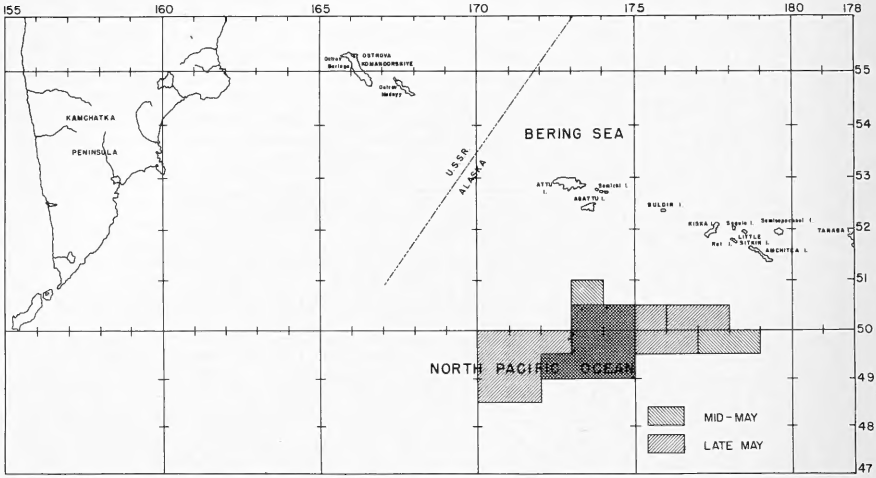

Fig. 4 - Fishing area during May.

Table 5 - Monthly Performance of the Miyajima Maru Fleet, 1954

Item	May	June	July	August	Total
Total days at fishing grounds . . .	17	30	31	17	95
Actual fishing days	13	28	29	17	87
Rest days	4	2	2	0	8
Boat days fished	433	923	947	558	2,861
Total tans fished	58,876	194,332	225,888	137,015	616,111
Average number of tans fished per day per catcher boat	136	211	239	246	215

Communication was an important factor in the deployment of the fleet and in determining areas to be fished. A communication schedule was maintained between catchers and motherships twice daily, from 1600 to 2000 hours (after the gear was set), and again at about 0400 hours (while the set was being, or had been, retrieved). In the evening, catchers reported position, direction of set, number of units set,

surface water temperature, water color, water transparency, and related meteorological data. In the morning schedule, the catchers reported progress in gear hauling, catch by species to that time, and the direction in which the fish were moving as ascertained from the face of the net in which the fish were "gilled." These data were inspected and analyzed by the fishing experts and collated with data from other sources. The fishing area for the day was determined as soon as the data were analyzed, this being very soon after morning reports of catchers were received. The following factors were considered in determining fishing grounds:

1. Experience gained from previous years of fishing with respect to the path of migration of salmon through the authorized fishing area.

2. Reports of the exploratory boats which operate a considerable distance away from the motherships.

3. The previous night's catch, e.g. direction of migration of salmon and abundance, size, and species composition of catch and stomach contents of samples from catch.

4. Performance of competing fleets and their positions; this is not only an ethical consideration, but also desirable because moving to areas occupied by other fleets leads to confusion and congestion of gear due to numbers and proximity of catchers.

5. Weather and sea conditions (regardless of the presence of fish, fleets cannot operate practicably when weather is very bad).

6. Position of mothership limited to authorized area.

7. Intuition is also considered to be a factor in deciding upon a fishing area.

FISHING GEAR: As in previous years, gill nets were used exclusively in this operation. A detailed diagram of a "tan" (one unit of gill net) is shown in fig. 2. All dimensions were converted from Japanese units to English equivalents where possible. For specifications of the cordage, a sample of the gear was examined by an experienced netmaker who provided descriptions for comparable American cord-

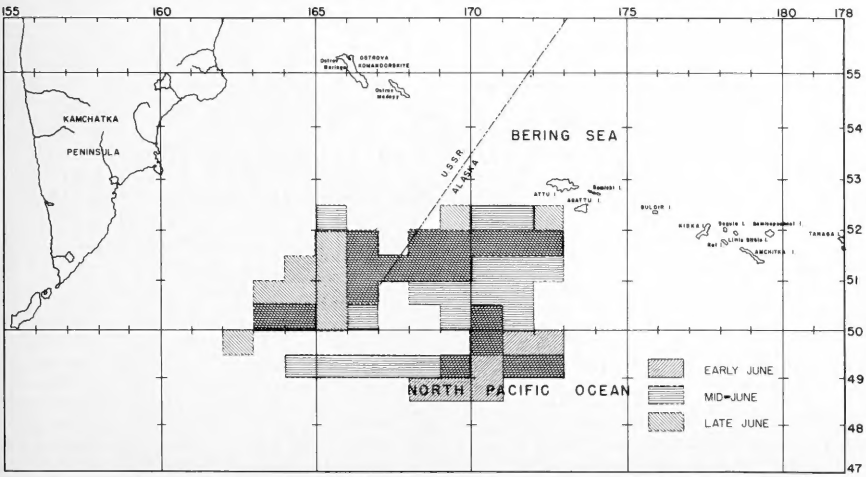

Fig. 5 - Fishing area during June.

age. The webbing is of a synthetic material bearing the trade name "Amilon." "Amilon" is very similar to nylon but reportedly has less stretch factor and good knot-holding qualities. The nets were fished in strings of from 200 to 300 "tans" (one unit of gill net), with each catcher and exploratory boat fishing such a string. The extensions of float and lead lines of adjoining units were linked and knotted. Webbing on the units were fastened by a cotton or nylon drop line, interlaced on the breast lines of adjoining units.

Table 6 - Cumulative Salmon Catch of All Seven Fleets by Species--Biweekly Totals

Date	Red	Chum	Pink	Silver	King	Total
	(Number of Fish)					
May 31 . . .	462,365	940,050	4,916	15	750	1,408,096
June 15 . . .	905,071	2,334,259	63,328	18	2,464	3,305,140
June 30 . . .	1,487,253	4,723,079	216,440	147	8,535	6,435,454
July 15 . . .	2,249,789	6,119,194	1,256,515	67,563	17,723	9,710,784
July 31 . . .	3,405,162	8,546,171	3,974,389	459,222	40,834	16,425,778
Aug. 15 . . .	3,710,434	9,229,298	5,709,108	1,265,896	63,478	19,978,214
Aug. 24 . . .	3,817,159	9,375,620	5,802,196	1,398,066	75,107	20,468,148

The color of most of the webbing used was raw sienna to burnt umber; however some catchers and exploratory boats used various colored webbing experimentally. In the opinion of the fishing experts, dark-gray webbing was better for fishing in the clear waters of the high seas and the color of the webbing of no apparent significance when fishing in the turbid waters nearer the coast of Kamchatka (western fishing area).

METHOD OF FISHING: When the mothership had determined the fishing area for the day, catcher boats were deployed around the mothership within a radius of 50 miles. Within this area catcher boats selected their own fishing areas.

On the high seas one very rarely sees visible signs of salmon or bait abundance, i.e. no "finners," "jumpers," or aggregations of birds. Therefore the fishermen depend almost entirely upon hydrographic conditions to locate areas for setting gear. From past experience Japanese fishermen have found that areas of confluence of

Table 7 - Salmon Catch of All Seven Fleets by Biweekly Periods

Date	Red	Chum	Pink	Silver	King	Totals
	(Number of Fish)					
May 16-31	462,365	940,050	4,916	15	750	1,408,096
June 1-15	442,706	1,394,209	58,412	3	1,714	1,897,044
June 15-30	582,182	2,388,820	153,112	129	6,071	3,130,314
July 1-15	762,536	1,396,115	1,040,075	68,416	9,188	3,275,330
July 16-31	1,155,373	2,426,977	2,717,874	391,659	23,111	6,714,994
Aug. 1-15	305,272	683,127	1,734,719	806,674	22,644	3,552,436
Aug. 16-24	106,725	146,322	93,088	132,170	11,629	489,934
Total	3,817,159	9,375,620	5,802,196	1,398,066	75,107	20,468,148

currents are abundant in salmon fishing. Temperatures are taken at frequent intervals while under way to find areas where abrupt changes in temperature occur. Records of water color are kept, and prior to setting gear a Secchi disc is lowered to determine limits of visibility (or water transparency). The method of setting gear was similar to that described for the Japanese high-seas salmon fishery of 1952 (Fukuhara 1953). The gill nets were paid out over stern rollers while the catcher was under way. About $1\frac{1}{2}$ to 2 hours were required to set 250 to 300 "tans." In the past, gill-net sets were made either into the wind or with the wind. However, this year fishermen reportedly set gill nets with respect to direction of movement of the salmon, regardless of wind direction (except in very strong wind). Salmon in the area

were thought to be migrating in an easterly or westerly direction, the latter predominating. Therefore gill nets were generally set in a northerly or southerly direction.

Experience of the Japanese in 1952 and 1953 indicated that in the clearer waters of the high-seas areas gear competition resulted unless the interval between gill nets was at least five miles. Therefore on extremely foggy days the mothership took bearings of all ships in the fleet and partially supervised the deployment of the catchers.

Figure 3 shows a sketch of a drift gill net in operation. All gear of the Nippon Suisan fleet was fished completely detached from the catcher boats. While the gear was "soaking," catcher boats maneuvered to keep the lights in sight. Light No. 1 was generally red. In addition to maintaining a position within sight of the light, the catcher boat remained clear of the gill net by keeping the white lights (lights #2 and #3) behind the red light. The number of "tans" between lights was changed with conditions of visibility. The radio buoy shown in the figure was used only by the exploratory boats. This was felt to be an excellent device for locating gear, however, its use on the gear of all catcher boats was thought to be impractical unless each catcher was assigned its own operating frequency.

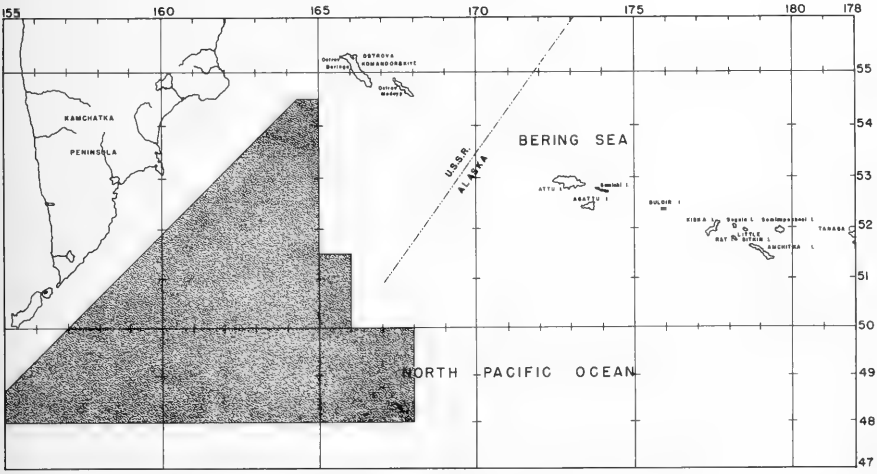

Fig. 6 - Fishing area during July and August.

Usually gear was started aboard between midnight and 0100 hours. With the exception of exploratory boats, all catcher boat crews retrieved gear by hand. Gear was hauled in by hand at the rate of 41 to 45 "tans" per hour. Thus gear retrieving required from five to seven hours (for a string of 200 to 300 "tans") depending upon the weather and the size of the catch. Exploratory boats used net haulers experimentally. The net hauler was in fact a line hauler, which pulled only on the lead line, while the slack in the float line was pulled in by hand. The method of handling gear while retrieving was described in the report on the 1952 Japanese salmon fishery (Fukuhara 1953).

HYDROGRAPHIC CONDITIONS: Surface water temperatures in the area in which the seven fleets operated during the 1954 fishing season ranged from 2.8°C.

(37° F.) in May to 11.8° C. (53.2° F.) in August. Water color for the same period was from 3 to 7 on the Forel scale, generally increasing with westward movement and advance in season. This corresponds in color to a range from bluish-green to yellow-green. Limit of Secchi-disc visibility increased from about 13 meters in mid-May to about 15 meters in early June, decreasing again to about 7 meters in August. The average surface water temperature, water color, and limit of Secchi-disc visibility, calculated from the daily log entries of the 33 catchers of the Miyajima Maru fleet, from May 14 to August 5, are listed in table 4.

A summary of the Miyajima Maru fleet's fishing schedule is given in table 5.

THE CATCH

During the 1954 season the combined fleets took a total of 20,468,148 salmon, of which 3,817,159 were red salmon (Oncorhynchus nerka), 9,375,620 chum salmon (O. keta), 5,802,196 pink salmon (O. gorbuscha), 1,398,066 silver salmon (O. kisutch), and 75,107 king salmon (O. tshawytscha). Table 6 shows the cumulative catch by species for biweekly intervals. The catch for biweekly periods is given in table 7. The general areas in which these fish were taken are plotted by month; figure 4 shows the fishing area for May, figure 5 shows the fishing area for June, and figure 6 the fishing area in July and August. In addition to salmon, steelhead trout (Salmo gairdnerii) and Dolly varden trout (Salvelinus malma) were landed occasionally.

Table 8 - Catch Per Unit of Effort--Miyajima Maru Fleet

Species	Number of Fish Per Tan For:				
	May	June	July	August	Entire Period
Red	1.47	1.13	2.23	0.69	1.47
Chum . . .	3.16	3.48	2.88	1.36	2.76
Pink	0.02	0.26	1.69	1.64	1.06
Silver . . .	0	0	0.32	0.95	0.33
King	0	0.01	0.03	0.05	0.03
Total . .	4.65	4.98	7.09	4.69	5.65

Table 9 - Average Weight[1/] of Individual Salmon by Species and Date

Month	May				June				July				August			
Species	Red	Chum	Pink	Silver	Red	Chum	Pink	Silver	Red	Chum	Pink	Silver	Red	Chum	Pink	Silver
Day	(In Pounds)															
1					4.5	4.4	2.8		4.7	4.2	2.8	4.8	4.7	4.2	3.0	5.5
2					4.0	4.1	3.0		4.7	4.3	2.9	4.8	4.7	4.7	3.0	5.5
3									4.5	4.3	3.0	4.6	4.6	4.2	3.0	4.6
4									4.6	4.4	3.2	4.8	4.2	4.1	3.0	5.3
5					5.0	4.3	2.8		4.8	4.3	2.8	5.1	4.3	4.1	3.0	5.5
6					4.9	4.3	3.0		4.5	4.2	2.7	4.9	4.0	4.2	3.1	5.2
7					4.0	4.3	2.9		4.5	4.2	2.8	4.3	4.6	4.1	3.2	5.2
8					4.1	4.1	2.8		4.3	4.4	2.9	4.9	4.1	4.0	3.0	5.2
9					4.0	4.1	2.9		4.6	4.3	2.8	4.6	4.1	4.2	3.0	5.7
10					4.1	4.1	2.7		4.1	4.3	2.9	4.7	4.0	4.5	3.0	5.4
11					4.0	4.1	2.8		3.7	4.2	3.0	4.8	3.6	3.9	3.0	5.7
12					4.0	4.2	3.0		4.2	4.6	3.1	4.8	3.5	4.1	3.1	5.5
13					4.7	4.1	3.0		4.3	4.3	3.0	4.9	3.5	4.8	3.2	5.4
14					5.1	4.3	3.2		4.1	4.3	3.0	4.9	3.4	4.2	3.2	5.6
15	4.6	4.9	2.3		4.5	4.3	2.5		4.2	4.4	3.1	4.9	3.5	4.0	3.1	5.6
16	5.0	4.8	2.5		4.5	3.6	2.9		5.3	4.4	2.9	5.1	3.6	4.0	3.2	5.6
17	5.0	4.8			5.0	4.4	3.2		4.5	4.4	3.3	5.0	3.4	4.1	3.1	5.7
18	5.0	4.9			4.9	4.3	3.1		5.1	4.7	3.1	4.9				
19	5.0	4.6	2.6		5.2	4.6	3.1		5.0	4.8	3.2	5.0				
20	5.2	4.7	2.5		5.2	4.4	2.6		4.8	5.0	3.0	4.7				
21	5.2	4.4	2.6		5.3	4.4	3.0		4.8	4.2	3.2	4.9				
22	4.8	4.7	2.5		5.6	4.5	3.1		4.7	4.1	3.0	4.7				
23	4.5	4.5	2.3		5.5	4.7	3.0		4.5	3.9	3.1	4.7				
24	4.5	4.2	2.3		5.1	4.3	3.0		4.5	4.2	3.1	4.7				
25					5.1	4.3	3.1		4.0	4.0	3.0	4.9				
26	4.7	4.3	2.7		5.0	4.7	3.2		4.2	4.2	3.0	5.0				
27					4.8	4.7	2.9		4.2	4.3	2.9	4.9				
28					4.8	4.5	2.8		4.7	4.6	3.2	5.0				
29		4.4	2.6		5.0	4.2	3.0		5.0	4.4	3.0	5.2				
30	5.0	4.4	2.9		5.1	4.4	3.0		5.0	4.7	3.0	5.0				
31	5.0	4.4	2.6						5.0	4.3	3.1	5.3				

1/ From samples of 100 fish.

A monthly summary of the catch per "tan" (one unit of gill net) of the Miyajima Maru fleet is shown in table 8. These figures must be considered only as rough indices of abundance due to variations in mesh size (which were not reported by catcher boats) and peculiarities in the reporting of effort statistics.

Personnel of the Nippon Suisan Co., Ltd. took average weights of salmon in the landings throughout the entire fishing period. These data are given in table 9. The average weights are based on samples of 100 fish of each species per day, specimens being selected at randon from the fish bins. Sampling was generally done at the close of the day's deck activities or after the last catcher boat of the day was unloaded.

CONCLUSION

The areas utilized by the 1954 Japanese high-seas salmon fleet were generally the same as those fished in 1952 and 1953. A comparison of certain pertinent features of the 1952, 1953, and 1954 high-seas salmon fisheries appears in table 10. In 1952 and 1953, three motherships participated in the fishery, and the entire catch was either frozen or salted. Four additional fleets entered the fishing in 1954, three of these equipped with canning facilities.

Table 10 - Comparison of Fishing Seasons, Facilities, and Performance of the Three Post-World War II Japanese High-Seas Salmon Expeditions

Item	1952	1953	1954
Fishing season (inclusive dates)	May 10-Aug. 10	May 10-Aug. 12	May 15-Aug. 23
Number of motherships	3	3	7
Processing facilities of motherships	Freezer & saltery	Freezer & saltery	Freezer, saltery, and two ships each with 2-line cannery, 1 ship with 1-line cannery.
Number of catcher boats[1/]	60	105	194
	(Number of Fish)		
Catch by Species:			
Red	737,489	1,553,107	3,817,159
Chum	638,571	2,707,363	9,375,620
Pink	701,157	3,064,439	5,802,196
Silver	1,365	430,611	1,398,066
King	24,205	8,053	75,107
Total	2,102,787	7,763,573	20,468,148
Catch target	1,800,000	5,487,000	14,072,440
Number over target	302,787	2,276,573	6,395,708

1/ Approximate number.

The number of catcher boats was increased from about 60 in 1952 to about 105 in 1953. In both these years, gear with "rami" (China grass) webbing was used, with each catcher setting about 100 to 150 units of gear. With the increase in catcher boats, the 1953 fleet took 7,763,573 salmon, an increase of 5,660,786 fish from the initial year's (1952) operation. In 1954 the number of catcher boats was increased by about 90 over the previous year and 134 over 1952.

The number of units set per day per catcher boat in 1954 was almost twice that of the preceding two years. Webbing was changed from "rami" to "Amilon," the latter reportedly more efficient in catching fish. This increase in effort and change in webbing resulted in a total catch in 1954 of 20,468,148 salmon; which exceeded total salmon landings of 1952 and 1953 by 18,365,361 and 12,704,575, respectively. Sev-

veral factors may have contributed to the progressive increase in salmon landings in the three successive years:

1. Increase may reflect to some degree an increase in abundance of salmon in the areas fished by the fleets. However, accurate estimates of abundance cannot be made using data at hand.

2. Increased proficiency in fishing methods, improved gear, and further knowledge of the fishing area undoubtedly contributed to better performance by the fleets. Modification and improvement of gear is reportedly a factor.

3. The most obvious factor, however, seems to be the progressive increase in effort in the form of more catcher boats and more gear set by each catcher boat.

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FROZEN FOOD OUTLOOK FOR 1955

A good indication of the outlook for frozen food sales in 1955 is available to members of the fishing industry as a result of a recent nation-wide symposium of leaders in the frozen food field. The January 1955 Quick Frozen Foods carries articles by leaders in the field, which should be of interest and value to the fisheries trade.

Some of the titles include:

Bright but Watch Storm Warnings
Big Future for Prepared Foods
Warehouses Set to Meet Frozen Food Growth
Frozen Food Industry Faces a Good Year
Bright Year for Frozen Food Seen by Brokers
All Factors Point to Big Year
Bigger Volume Ahead at Better Profit
Frozen Seafoods Set for Record Year
Year of Rugged Normalcy is Ahead
Locker Plant Sales to Swing up
Frozen Foods Can't Miss in '55: Sales Bound to Rise
Quality is Keystone of Volume Growth
Growth to Lag Behind Potential
Better Prices, Good Market in 1955
Size of Record Year up to Packers
Quality is Decisive Factor for '55
Pack and Sales to Hit New High Records
Sales Outlook Tremendous for 1955
Quality, Prices, Keys to 1955 Growth
Plenty of Business to Go Around
Selling Effort Will Build Volume
Quality Biggest Factor in 1955
Closer Cooperation Will Help All
Frozen Foods Outlook Sound and Favorable
New Users to Make '55 Greatest Frozen Food Year
Price Stability is Big Challenge
Frozen on Way to 10% of All Food Sales

FREEZING AND COLD STORAGE OF PACIFIC NORTHWEST FISH AND SHELLFISH

Part IV - Storage Characteristics of Four Species of Salmonidae

By M. Heerdt* and M. E. Stansby**

ABSTRACT

In storage at 0° to 16° F., steelhead trout steaks wrapped in cellophane were slightly rancid after about 90 days; pink salmon, chum salmon, and silver salmon steaks wrapped in cellophane were slightly rancid after 180 days. Silver salmon steaks wrapped in aluminum foil and stored at 0° to 16° F. gave no indication of rancidity even after 270 days.

INTRODUCTION

The changes in color and flavor of pink salmon, chum salmon, and silver salmon fillets that had been wrapped in moisture-vaporproof cellophane and held in frozen storage were studied in 1942 by Stansby and Harrison. A similar study of pink salmon steaks was made by Bucher in 1944.

As a continuation of the work of Stansby and Harrison and of Bucher, this paper reports on a study made to determine the frozen-storage characteristics--changes in odor, flavor, color, and texture--(1) of steaks of steelhead trout (Salmo gairdnerii gairdnerii), pink salmon (Oncorhynchus gorbuscha), chum salmon (Oncorhynchus keta), and silver salmon (Oncorhynchus kisutch) wrapped in moisture-vaporproof cellophane, and (2) of silver salmon steaks wrapped in aluminum foil.

SOURCE AND HISTORY OF THE SAMPLES

The fish used in these studies were obtained at the peak of their respective runs from lots that were typical of the species with respect to size and maturity. All of the fish were of first quality and were obtained fresh.

Steelhead Trout: The steelhead trout were caught in the Columbia River above Astoria, dressed heads on aboard the vessel, and iced ashore on the day of capture. They were purchased on the following day, iced at Astoria for transit, and re-iced in transit at Aberdeen. Two days elapsed from the time the fish were caught until they were processed and put into the Seattle freezer.

Pink Salmon: The pink salmon were part of a lot of purse seine-caught fish obtained near Kanaka Bay, San Juan Islands, Washington. They were shipped in the round to Seattle in ice, unloaded, and re-iced on shore. They were about three days out of the water before being processed and put into the freezer.

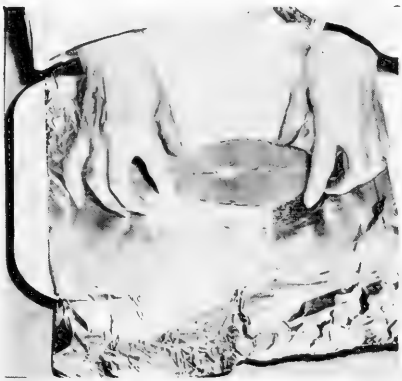

Figure 1 - Placing the salmon steak on the foil.

Chum Salmon: The chum salmon were taken in a gill net, probably from the mouth of the Nisqually River near Oympia, Washington, dressed heads off aboard the vessel, and trucked to Seattle un-iced on the day of capture. These chum salmon were sexually mature. One day elapsed from the time they were caught until they were processed and put into the freezer.

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Silver Salmon: The silver salmon were caught by trolling and were then dressed heads on, without gills, and stored in ice. They were about two days out of water before being processed and put into the freezer.

PREPARATION OF SAMPLES FOR STORAGE

General Procedure: In the preparation of the samples for storage, the fish were dressed, washed, and steaked.

Two series of samples were then packaged. The first, a test series, was put up to show how long the fish would keep if prepared, packaged, and stored commercially as steaks. The second, a control series, was prepared under special conditions that were thought would maintain original quality for the duration of the test period. The purpose of the control series was to provide a standard against which any loss of quality in the test series could be measured.

Dressing and Cutting the Fish for Test Samples: Fins, tails, heads, and viscera, if still present at the time of purchase, were removed, and the fish were then washed thoroughly and cut crosswise into $\frac{3}{4}$-inch-thick steaks.

Dressing and Cutting the Fish for Controls: Fish for the control samples were dressed and cut exactly as for the test samples, with the exception that the steaks were reduced in size when necessary to fit flat in a one-half pound can.

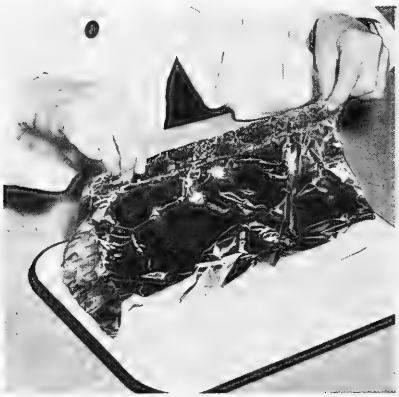

Figure 2 - Starting the drugstore fold.

Preparation of Test Samples for Storage: When the test series were planned, consideration was given to the fact that the storage life of a particular species of fish depends greatly upon the methods of preparation, packaging, and storage used. Fish can be held for a long time with minimum loss of quality if, for example, the individual fish are frozen in a block of ice and stored at a very low temperature. However, such a method is obviously not practical. What is needed is information on how long the fish will keep if prepared, packaged, and stored by ordinary commercial methods. For this reason, a practical low-cost commercial method in common use was employed, as follows: The test samples (individual steaks) of steelhead trout, pink salmon, chum salmon, and silver salmon were wrapped tightly in a single sheet of moisture-vaporproof cellophane to exclude air. The drugstore fold was used to close the cellophane around the steaks. The wrapped steaks were then placed two-layers deep in two-piece folding waxed cartons $2\frac{1}{4} \times 7\frac{3}{4} \times 10\frac{1}{4}$ inches in size. Other test samples (individual steaks) of silver salmon were wrapped tightly in heavy aluminum foil in exactly the same manner as the samples that were wrapped in cellophane (figures 1, 2, and 3). The cartons, when filled and closed, were frozen overnight in rapidly moving air at -20° F.

Preparation of Control Samples for Storage: Because fresh fish for use as controls would not be available throughout the test period, it was necessary to use frozen controls. In the present study, the controls were prepared by one of the most effective methods available for preserving frozen fish: that is, they were vacuum-packed in hermetically sealed cans prior to being frozen. Although not always commercially practical, this method has been used by frozen-food laboratories to

prolong the time over which experimental samples will retain their original fresh qualities.

The control samples (steaks) were packed two deep in one-half pound flat cans. These cans were then hermetically sealed under 15 inches of vacuum, frozen overnight in rapidly moving air at -20° F., and finally transferred to solid fiberboard cases, which were placed in frozen storage.

STORAGE CONDITIONS

As frozen-storage facilities were not available at the laboratory, commercial facilities were used. The temperature of storage ranged from 6° to 16° F.

ORGANOLEPTIC EXAMINATION

Objective chemical and physical tests have not proved entirely successful in the determination of frozen-fish quality; organoleptic factors of palatability and appearance are usually considered better criteria. All of the samples were therefore examined organoleptically by a test panel for changes in odor, flavor, texture, and color. In each test, this panel was made up of at least eight people experienced in making organoleptic determinations. The samples were examined after 0, 90, 180, and 270 days of storage.

Figure 3 - Finishing the drugstore fold.

General Preparation of Fish for Organoleptic Examination: At each examination, about 4 pounds of cellophane- or foil-wrapped test samples and 8 cans of vacuum-packed control samples were used. All samples were thawed at room temperature in moving air from an electric fan.

Salting and Baking: Both the thawed test samples and the thawed control samples were immersed in a 6-percent salt solution for 5 minutes to bring out the natural flavor of the fish. Upon being removed from the solution, the samples were drained, baked for 20 minutes on cooky sheets in an oven set at 350° F., and immediately served to the test panel.

Organoleptic Test: After observing color changes, if any, and noting odor, flavor, and texture, each panel member rated the test sample and the control sample using the symbols VG for very good (highest quality), G for good (some loss of original quality but no indication of rancidity), F for fair (slightly rancid), P for poor (moderately rancid and barely edible), and U for unacceptable (very rancid). Numerical values of 4, 3, 2, 1, and 0 were assigned to VG, G, F, P, and U, respectively. The average of the resulting scores gave a single final numerical score that could be changed back to the equivalent alphabetical rating.

RESULTS AND DISCUSSION

The results of the organoleptic examinations appear in table 1.

Of the species studied, steelhead trout had the shortest storage life. Steaks cut from them and wrapped in cellophane were slightly rancid after 90 days of storage.

In contrast, pink, chum, and silver salmon steaks wrapped in cellophane were without any indication of rancidity after 90 days of storage and were only slightly rancid after 180 days. These data thus classify the storage life of frozen pink salmon, which is known to be relatively short, with that of chum and silver salmon. However, the data do not show exactly when within the 90-to-180-day period that each of the 3 different species actually became slightly rancid. For this reason, it is not possible to say that all 3 species have equal storage qualities.

Table 1 - Effect of Time in Frozen Storage and Method of Packaging on the Quality of Steaks from Four Species of Salmonidae

Time in Frozen Storage at 6° to 16° F.	Quality Rating 1/								
	Steelhead Trout		Pink Salmon		Chum Salmon		Silver Salmon		
	Cellophane	Tin	Cellophane	Tin	Cellophane	Tin	Cellophane	Foil	Tin
Days									
0	VG	VG	VG	VG	G	G	VG	VG	VG
90	F	G	G	VG	G	G	G	G	VG
180	F	G	F	G	F	G	F	G	VG
270	F	G	P	G	F	G	F	G	VG

1/ VG = Very good (highest quality)
G = Good (some loss of original quality but no indication of rancidity)
F = Fair (slightly rancid)
P = Poor (moderately rancid and barely edible)
U = Unacceptable (very rancid)

Silver salmon steaks packaged in heavy aluminum foil had the longest storage life: they showed no rancidity even after 270 days.

Control Samples: Of the four species of fish packed as controls, only the chum salmon and silver salmon remained unchanged for the entire 270 days. The steelhead trout declined from very good at the beginning to good after 90 days, and the pink salmon declined from very good at the beginning to good after 180 days.

SUMMARY

1. Steaks cut from fresh steelhead trout, pink salmon, chum salmon, and silver salmon and then wrapped in cellophane and stored at 6° to 16° F. for 270 days had below average 1/ frozen-storage characteristics:

a. The steelhead trout steaks were slightly rancid after 90 days and remained slightly rancid for the rest of the storage period.

b. The pink salmon steaks were slightly rancid after 180 days and moderately rancid after 270 days.

c. The chum salmon and the silver salmon steaks were slightly rancid after 180 days and remained slightly rancid for the rest of the storage period.

2. Steaks cut from silver salmon, wrapped in aluminum foil, and stored at 6° to 16° F. for 270 days had above average storage characteristics. These steaks showed no rancidity even at the end of the storage period.

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1944. Storage Tests on Frozen Pink Salmon, Fishery Market News, vol. 6, no. 11, November, pp. 2-4

Stansby, Maurice E. and Harrison, Roger W.
1942. Preliminary Investigation of Methods for Freezing and Storing Fillets of Some Pacific Northwest Fish. U. S. Fish and Wildlife Service, Special Scientific Report No. 15.

1/ Fish with average frozen storage characteristics can be stored for 6 months without showing any rancidity.

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SPECIAL FISHERIES BULLETIN

MARKETING

Department of the Interior Fish and Wildlife Service

FISHERY PRODUCTS

will be

PLENTIFUL DURING LENT

February 23 - April 9

Government encourages use of Fish & Shellfish

THE UNITED STATES DEPARTMENT OF INTERIOR IS ENCOURAGING THE GREATER USE OF ALL FISH AND SHELLFISH, PARTICULARLY THE FOLLOWING ITEMS WHICH THE DEPARTMENT OF AGRICULTURE LISTS AS PLENTIFUL FOODS DURING FEBRUARY AND MARCH:

FROZEN HADDOCK FILLETS
FROZEN HALIBUT
CANNED TUNA
FRESH AND FROZEN SHRIMP

DETERMINATION OF COOK DRIP IN PACIFIC OCEAN PERCH (SEBASTODES ALUTUS) AND PACIFIC OYSTERS (OSTREA GIGAS) BY USE OF A NEW METHOD

INTRODUCTION

One of the characteristic changes that animal-protein tissues exhibit when they leave the natural or living state is the loss of ability to hold all of the water that is present in the living tissue. An example of the resulting fluid exudation from meat, of considerable practical importance, is that which occurs during the thawing of frozen meat, fish, and seafood. For instance, frozen oysters show a considerable loss of fluid when they are thawed.

In the food industry, it is customary to refer to the fluid that exudes from protein tissues as "drip." If the drip separates without the aid of any external force except gravity, it is called "free drip." If pressure is applied to the tissue, the expressed fluid is called "press drip." Similarly, if the tissue is heated, the fluid that collects is termed "cook drip."

Over a period of several years the Seattle Fishery Technological Laboratory has conducted experimental work on drip in fish and seafoods. One of the main objects of this work has been to establish a reliable method for determining cook drip. The importance of such a method lies in the fact that, through its use, one can study the influence of such factors as freshness, cold-storage time, and prethawing on the amount of cook drip produced from fresh and frozen fish and shellfish. Eventually, when more is known about the factors affecting drip production, it may be possible to develop ways of handling foods so as to minimize losses from this source. Moreover, infomation about drip production may lead to a better understanding of the changes taking place in the cellular proteins that make up the primary structure of fish.

In the establishment of the method for determining cooked drip, the following principles were considered:

(1) The method must give reproducible results.

(2) The cooking procedure used should be similar to one used in actual practice.

(3) The cooking should be done in a medium maintained at constant temperature.

(4) The fresh, frozen, and thawed samples should all be cooked to the same internal temperature.

This paper describes the method developed at the Seattle Laboratory for the determination of cook drip. Also given are the results obtained by use of the method on oyster and Pacific ocean perch samples.

METHOD FOR DETERMINATION OF COOK DRIP IN FISH AND SHELLFISH

The samples are placed in flat half-pound tins containing small wire racks made from $\frac{1}{2}$-inch mesh screen. (These racks support the samples above the bottom of the can.)

In the case of fish, the samples of fillets are cut crosswise into pieces approximately 1-inch long. These cross-section cuts are then packed two or three to a can. In the case of a seafood such as oysters, two or three whole specimens, depending on size, are packed per can. The cans are weighed before and after the samples are added so that the weight of the sample in each can is known.

Lids that have a $1\frac{3}{8}$-inch hole cut in them are then seamed onto the cans, and a No. 8 2-hole rubber stopper is tightly fitted in the hole in the lid. A thermometer is run through one hole of the stopper so that its bulb is completely immersed in the sample. An 8-inch length of glass tubing is placed in the other hole to prevent evaporative losses and to maintain atmospheric pressure within the can during the cooking process.1/

The weight of the can plus contents is obtained, and the sample is then cooked by immersing the can in boiling water until the internal temperature of the sample reaches 150° F.2/ After the cooking is completed, the can is cooled in cold water and then opened. The cook drip that has collected in the bottom of the can is drained off. The weight of the can plus contents is then taken. From the loss in weight of the sample, the percentage of cook drip is calculated. Six replicate determinations are usually run in each test.

APPLICATION OF THE METHOD AND DISCUSSION OF THE RESULTS

The method was used to determine the amount of cook drip in one lot of frozen Pacific ocean perch samples, half of which were prethawed prior to being cooked

Table 1 - Comparison of the Amounts of Cook Drip from Samples of Frozen Rockfish Fillets Cooked Without Being Prethawed and Cooked After Being Thawed

Sample	Drip from Fillets Cooked Without Being Prethawed	Sample	Drip from Fillets Cooked After Being Prethawed 1/
Number	Percent	Number	Percent
1	29.7	7	25.5
2	30.9	8	25.9
3	33.7	9	25.3
4	29.9	10	25.1
5	29.7	11	25.4
6	30.5	12	25.2
Mean Value	30.7	Mean Value	25.4
Standard Deviation	1.4	Standard Deviation	0.3

1/ The fillets did not yield a measurable amount of thaw drip.

and half of which were not. The results (table 1) indicate that the method has a satisfactory degree of precision.

The purpose of this work was to find out how the amount of cook drip obtained from frozen fish cooked without prethawing compares with that obtained from fro-

1/ If the amount of free drip from the sample is to be determined, the stopper is removed from the can after the necessary drainage time has elapsed. The fluid that has collected below the wire rack is removed through a pipet. The percentage of free drip can be computed from the difference in the weight before and after the removal of the drip.

2/ A temperature of 150° F. is chosen because it is considered to produce the proper degree of heat treatment for adequate cooking of the fish.

zen fish cooked after prethawing. It was found that, with the particular sample of rockfish fillets used, the prethawing resulted in 5 percent less cook drip (table 1).

Table 2 - Amounts of Cook Drip from Samples of Medium Pacific Oysters Held in Storage at 34° F.

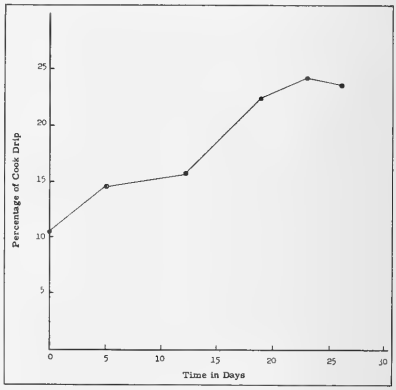
Storage Time	Cook Drip
Days	Percent
0	1/ 10.3 (10.5)
5	14.7
12	16.1
19	22.7
21	(23.3)
23	24.4
26	23.7

1/ The cook-drip values in brackets were obtained on medium Pacific oysters from a different source and during another season of the year.

One explanation of this finding can be deduced from the ice-crystal theory that has been advanced by a number of workers. This theory suggests that ice crystals are formed within the cells in frozen foods and that the size of the crystals depends on the temperature and quickness with which the foods are frozen. It follows that, during thawing, the water from the ice crystals may be partially reabsorbed or fixed by the cellular proteins. However, if thawing takes place during cooking, then the proteins may be denatured before much reabsorption of water can take place. As a result, more water would be liberated.

A number of experiments were also carried out to study the effects of freshness and of cold-storage time on the amount of cook drip produced by medium Pacific oysters.

In the first experiment, oysters were taken directly from the shell and stored at 34° F. Samples were removed after 0, 5, 12, 19, 23, and 26 days. After 12 days the samples started to develop a characteristic sour odor. The amounts of cook drip obtained in this experiment are given in table 2 and in graph 1.



As can be seen from the data, there was a sharp increase in the amount of cook drip produced by these oysters after 12 to 19 days in refrigerated storage. This time interval corresponds closely to that at which the sour spoilage odor developed. It is an interesting but unconfirmed indication that there may be a relationship between this type of spoilage and high levels of cook drip.

The study on fresh oysters indicates that it may be possible to estimate the age of a commercial pack of oysters by the cook-drip method. Thus, the method may be of value for quality-control purposes. It was observed, however, that if the oysters were excessively broken or ruptured, the cook-drip values showed a considerable increase. Consequently, if cook drip was used for oyster-freshness evaluation, it shoud be used primarily with whole oysters, or a correction factor should be worked out for the presence of cut, broken, or ruptured oysters.

In a second series of experiments on Pacific oysters of medium size, the samples were canned and placed in storage at 0° F. within 5 hours after being shucked. Samples were removed after 36 hours' storage and every week therafter for 4 weeks. The determination of cook drip was carried out on the samples without prethawing. The results show that the amount of cook drip from freshly shucked and frozen oysters increased very sharply from 10 percent in the fresh oysters (table 2) to 22 percent in oysters after 36 hours in frozen storage (table 3). The cook drip then increased slightly to 24 percent after one week in frozen storage and remained constant for the remainder of the month. From these tests it appears that cook-drip

loss from frozen oysters is correlated with some change that occurs very rapidly after the oysters have been frozen. An explanation may lie in the fact that the principal tissue protein, myosin, is quickly denatured by freezing, as has been repeatedly shown by other workers.

Table 3 - Amounts of Cook Drip from Samples of Frozen Medium Pacific Oysters Cooked Without Pre-Thawing After Storage at 0° F. for Different Lengths of Time

Storage Time	Cook Drip
	Percent
36 hrs.	22.1
1 week	24.5
2 weeks	24.1
3 "	24.6
4 "	23.8

A somewhat different experiment on medium-sized Pacific oysters was designed to test the effect of freezing live oysters-in-the-shell on the amount of cook drip produced. The oysters were frozen 10 to a lot and then double-wrapped in kraft freezer paper. The packages were removed after 6 months' storage in still air at 0° F., and the oysters were thawed overnight in a cold room at 34° F. They were then shucked, and the cook-drip value, which was determined as previously described, was found to be 15 percent. There was some dehydration, but it could probably be prevented by better packaging. (This work suggests that frozen oysters-in-the-shell might have possibilities as a specialty product if, with additional experimental work, a satisfactory technique were developed.)

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TECHNICAL NOTE NO. 31 - WEIGHT RANGE, PROXIMATE COMPOSITION, AND THIAMINASE CONTENT OF FISH TAKEN IN SHALLOW-WATER TRAWLING IN NORTHERN GULF OF MEXICO

INTRODUCTION

A few years ago a plant was opened in Pascagoula, Miss., for the production of canned cat food. At that time it was planned to utilize the small fish taken in shrimp-trawling operations. These fish are the so-called shrimp-trawl trash fish, which are otherwise discarded overboard and wasted.

The cat food proved to be a popular product. The size of the plant was expanded, and another cat-food plant was built in the area. It was soon found that the shrimp-trawl trash fish was too irregular a source and of insufficient volume to supply the expanded demand. At the present time the fish are therefore being supplied by a separate trawl fishery conducted by perhaps 20 to 40 vessels, mostly small former shrimp trawlers but including some larger vessels from as far away as Gloucester, Mass. Most of the fishing is conducted near port, and the trips are usually short, not more than two days. Nonetheless, with the high air and water temperatures of the Gulf, it is necessary to ice the fish fairly heavily.

A considerable number of species are found in the catch. Skates, crabs, and shell are culled out on the boat deck and discarded. The few fish of marketable size and desired species as well as the few shrimp taken are removed and sold sep-

arately. A second more careful cull takes place in the canning plant as the catch is washed and carried up a mesh conveyor belt.

There is little published information on the species most prevalent in the catch and on whether they show any pattern of seasonal variation; even less is known of their chemical composition, including their thiaminase content. Requests for information of this kind have been received, since a possible market for the fish might exist in the North Central states. Fur farmers in that area are finding it increasingly difficult to obtain the horse meat which has been the staple animal mink-food in past years, and supplies of fresh-water fish are inadequate and expensive. The following work was therefore undertaken primarily to furnish data needed in the utilization of the fish for fur-animal feed.

EXPERIMENTAL

The proximate composition and weight range was determined for one lot composed of 10 species of Gulf trawl fish taken in March 1954.[1/] A second lot was caught at a depth of 18 fathoms in May 1954 and comprised 19 species, some of which make up a very minor portion of the normal catch. Nine species of the first lot were also found in the second. In both lots, the croaker was the most common species, making up about 75 percent of the catch. Spot, scup (porgy), sea robin, and sea catfish made up much of the remaining 25 percent. However, a breakdown of any given lot according to percentage by weight of each species is of little significance, owing to the variability in the number of minor species from one trawl to the next.

Data on the second lot of Gulf trawl fish are given in table 1. All of the fish sampled were quite small, most weighing less than 3 ounces and none weighing as

Table 1 - Data on Shallow-Water-Trawl Fish of Northern Gulf of Mexico Caught in May 1954

Common Name	Scientific Name	Number of Fish in Sample	Weight of Fish (Grams)			Proximate Composition (Percent)				Thiaminase[1/]
			Minimum	Average	Maximum	Moisture	Protein	Fat	Ash	
Butterfish	Poronotus triacanthus	44	38	54	76	73.4	16.8	8.0	2.7	Low level
Croaker	Micropogon undulatus	33	47	71	91	76.6	15.8	3.2	6.2	None
Flatfish	Pleuronectidae spp.	43	20	58	303	76.2	18.4	1.4	4.6	Not tested
Hake	Urophycis spp.	39	20	40	167	80.8	16.2	0.8	3.9	None
Lizardfish	Snyodus foetens	25	41	117	207	77.5	18.6	0.8	3.9	None
Moray eel	Gymnothorax ocellatus	4	140	162	185	79.6	17.3	1.5	3.1	High level
Policefish	Anchoa hepsetus	119	12	15	20	78.1	17.4	2.6	2.9	Not tested
Scup (porgy)	Stenotomus aculeatus	42	23	54	122	70.6	17.8	3.1	8.9	None
Razor belly	Harengula pensacolae	41	28	53	73	67.8	20.0	7.1	6.4	High level
Sea bass	Centropristes ocyurus	11	17	29	43	76.3	17.3	1.5	5.8	Not tested
Sea catfish	Galeichthys felis	30	57	79	190	72.7	17.4	4.3	6.4	None
Sea robin	Prionotus spp.	35	36	67	307	77.0	16.4	1.2	6.2	None
Sergeant major	Nautopaedium porosissimum	34	14	28	49	81.2	14.6	2.1	2.5	Not tested
Silver eel or cutlassfish	Trichiurus lepturus	45	18	56	82	78.8	16.8	3.6	2.3	None
Snapper (Pensacola red)	Lutianus blackfordi	9	20	32	58	77.4	17.6	1.0	5.4	Not tested
Spadefish	Chaetodipterus faber	3	58	76	100	73.8	16.8	6.2	3.2	Not tested
Spot	Leiostomus xanthurus	27	73	90	112	72.0	16.5	8.3	3.9	None
Squid	Loligo brevis	26	15	41	76	84.0	13.5	1.5	1.0	None
White trout	Cynscion avenarius	26	77	109	154	79.3	16.4	1.8	2.7	None

1/ The thiaminase assays were made by Food Research Laboratories, Inc., Long Island City, N. Y.

much as a pound. (There are 454 grams in a pound; 28 grams in an ounce). All analyses were carried out on a ground composite of the whole raw fish, since whole or ground raw fish is the form usually fed to fur animals.

Protein content of this lot of fish ranged from 13.5 percent (squid) to 20.0 percent (razor belly). The oil content was quite variable ranging from 0.8 percent (hake and lizardfish) to 8.3 percent (spot). Eleven of the species contained less than 3 percent oil, 4 species from 3 to 5 percent, and only 4 species contained more than 5 percent. The ash content was also variable, depending mainly on the ratio of bony skeleton to meat, and ranged from 1.0 percent (squid) to 8.9 percent (scup).

Thirteen of the species obtained in the second lot of trawl fish were assayed for the enzyme called thiaminase. Knowledge of the presence of thiaminase is important

1/ These data were reported in Commercial Fisheries Review, vol. 16, no. 6, June 1954.

because an appreciable amount of this enzyme in a small proportion of the fish in a mixed lot can destroy thiamine present in species of fish not containing the enzyme if the fish are ground or eaten together. Similarly, thiaminase may also destroy the thiamine in other constituents in the diet. It should be emphasized, however, that thiaminase is destroyed by heat, so that none would be found in canned cat food, which is thoroughly heat processed.

The thiaminase assay involves the use of two aliquots of the fish. One aliquot is left fresh; the other is heat treated in order to destroy any thiaminase present. One hundred micrograms of thiamine is then added to both aliquots, and after a short period of incubation, the thiamine content in each aliquot is determined. If both assay the same, the fish contains no thiaminase; but if reduced amounts of thiamine are recovered from the uncooked aliquot, low levels of thiaminase are present, and if no thiamine is recovered, high levels are present. As can be seen in table 1, a high level of thiaminase was found in the razor belly and moray eel. These species should therefore be culled out if the catch is to be used as fur-animal feed.

ACKNOWLEDGMENT

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Hugo W. Nilson, Pharmacologist,
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BROILED HALIBUT STEAKS

Halibut steaks may be cooked in many different ways, including the following favorite of U. S. Fish and Wildlife Service home economists.

2 pounds halibut steaks
1 teaspoon salt
Dash pepper
$\frac{1}{4}$ cup butter or other fat, melted

Cut fish into serving-size portions. Sprinkle both sides with salt and pepper. Place fish on a preheated greased broiler pan about two inches from the heat and brush with butter. Broil 5 to 8 minutes or until slightly brown. Baste with butter and turn carefully. Brush other side with butter and broil 5 to 8 minutes more or until fish flakes easily when tested with a fork. Garnish and serve immediately. Serves 6.

Additions to the U. S. Fleet of Fishing Vessels

A total of 23 vessels of 5 net tons and over received their first documents as fishing craft during December 1954--34 less than in December 1953. California led with 5 vessels, followed by South Carolina and Florida west coast with 3 vessels each.

Vessels Obtaining Their First Documents as Fishing Craft, December 1954 and Comparisons

Section	December		Total			
	1954	1953	1954	1953	1952	1951
			(Number)			
New England	1	1	23	20	30	36
Middle Atlantic	-	-	15	19	26	34
Chesapeake	2	7	93	83	65	36
South Atlantic	5	16	119	116	89	118
Gulf	7	28	313	264	161	173
Pacific	6	4	117	164	203	284
Great Lakes	1	-	6	7	13	25
Alaska	1	1	27	53	88	71
Hawaii	-	-	1	3	-	3
Puerto Rico	-	-	2	-	-	-
Unknown	-	-	1	-	-	-
Total	23	57	717	729	675	780

Note: Vessels assigned to the various sections on the basis of their home port.

Vessels Obtaining First Documents as Fishing Craft 1937-54

Year	Number	Year	Number
1954	717	1945	741
1953	729	1944	635
1952	675	1943	358
1951	780	1942	358
1950	812	1941	354
1949	1,002	1940	320
1948	1,184	1939	357
1947	1,300	1938*	376
1946	1,085	1937	335

* Partly estimated

During 1954 a total of 717 vessels were documented for the first time as fishing vessels, compared with 729 vessels during 1953. Of the total vessels documented in 1954, 465 were built in 1954, 85 in 1953, and the remainder (167) in years prior to 1953.

American Samoa

GOVERNOR BELIEVES TUNA INDUSTRY PROSPECTS BRIGHT: The Pago Pago, American Samoa, tuna industry, although still in the experimental stage, shows every prospect of future success, says Governor Lowe of American Samoa. It has definitely been proved that the fish are there in large quantities--for part of the year, anyway. And the Japanese have proved that they could be caught. However, they are still uncertain as to the year-round availability of fish.

The cannery at American Samoa has, so far, been unable to maintain capacity production because supplies of tuna have been irregular--often days went by before a fishing boat arrived with a full load. Additional freezer space is badly needed at the cannery, but this should be available before long. Already an ice plant and a little extra freezer space have been provided.

Lowe said there was no activity at the cannery for about two months in late 1954. When their contracts with the cannery expired in September 1954, Japanese fishermen returned home. New vessels were expected in Samoa about the end of November 1954. Several of these vessels were severely damaged or sunk in typhoons in waters off Japan, but these would be replaced.

About 1,000 metric tons of tuna were processed since the cannery began operations. In addition, 500 tons of frozen tuna were shipped to the United States in March 1954.

The cannery has not yet signed a long-term lease with the United States Government, Lowe said. Their present lease expires at the end of 1955, but it was expected that they would then renew it on a long-term basis. Under the present contract the company is obliged to instruct local Samoan fishermen in the long-line technique--the only method which has proved commercially successful in the South Pacific. But that program has yet to be implemented, reports the December 1954 Pacific Islands Monthly, a South Seas magazine.

* * * * *

HAROLD GATTY COMMENTS ON TUNA CANNERY OPERATIONS: Harold Gatty, who brought about the first organized tuna fishing industry in the South Pacific, made some interesting comments on recent developments in that industry, according to the November 1954 Pacific Islands Monthly, an Australian magazine of the South Sea Islands.

The United States firm operating the tuna cannery at Pago Pago, American Samoa, by using Japanese fishermen and a special technique, is getting huge quantities of tuna for the Pago Pago cannery. This is regarded by Mr. Gatty with satisfaction--it proves that his theories and calculations (that the South Pacific carries large quantities of edible fish) were correct.

"The tuna of the Pacific Ocean is going to be one of the most important factors in the feeding of the future world," he said, "and the most important and valuable kind of tuna is the albacore. Wherever in the world--especially in the Pacific--the water temperature is about 64°-66° F., the sea, from the surface right down to 200 fathoms or more, is thick with albacore tuna. You can get them over a very wide area--from New Zealand and the Chathams, through the Kermacdecs, for example, right up to the equator.

"The Japanese last August (1954) fishing... just east of the Solomons took 2,200 tons of albacore. Few people realize the enormous quantities of this excellent food that are available to any people, once they acquire the knowledge of how to catch it.

"The Japanese work on the basis that they will average from 4 to 5 fish per 100 baited hooks. They select their area; starting in the early morning they put out some 20 miles of lines, carrying thousands of hooks; and they begin to pick the lines up in the afternoon.

"The Americans have found some areas around Christmas Island where the average per 100 hooks is 12 fish--that is literally a harvest of the sea.

"The thing goes down to basic economics. The Japanese put about 35 men on each small vessel. Most of the heavy work is by hand--there are few mechanical aids in putting out and hauling in those miles of lines. There is very limited accommodation for the men--not enough bunks--and they have no fixed wage. They are paid on results. Their average pay, last season, was about US$9 per month. All fish canned in Pago Pago (an American Territory) is free of local tax and, being of American origin, the food enters the United States without tax penalty. The enterprise we tried to found in Fiji had none of those advantages."

He thought that if tuna fishing flourishes in the future it would be due to mechanization. Two American tuna-fishing boats, working out of Hawaii, had each a crew of only 6 men--the little vessels were mechanized to do the work done on other boats by 35 Japanese.

Gatty believes that the Japanese will be the first to exploit this great wealth of fish food. Before World War II there were 7 million Japanese fishermen--because of the crowded character of their small country, they simply had to go out and get what they could out of the sea.

California

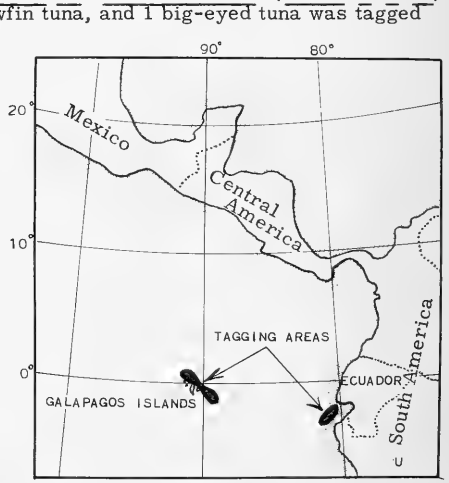
CANNED TUNA PACK SETS RECORD IN 1954: An estimated pack of about 9,250,000 cases of canned tuna were processed in California canneries during 1954. This breaks all previous records for tuna receipts and case pack. As compared with the previous record year of 1953 when 8,278,700 standard cases (48 No. ½ cans) were packed in California, the 1954 pack indicates an increase of 972,000 cases, or 12 percent.

Total fresh and frozen tuna receipts by California canners of approximately 206,000 tons also set a new record, and represented an increase of approximately 15,000 tons, or 8 percent, as compared with the previous record receipts established in 1950 when 191,500 tons of tuna were received in California for processing.

Imports of frozen tuna into California from foreign countries during 1954 accounted for about 45,000 tons of the total receipts as compared with 1950 imports of only 8,200 tons.

* * * * *

TUNA TAGGED OFF SOUTH AMERICA BY "MAYFLOWER" (Cruise C-4-54): A total of 1,035 skipjack tuna, 48 yellowfin tuna, and 1 big-eyed tuna was tagged and released on a 2-months' cruise off South America by the commercial tuna clipper Mayflower in cooperation with the California Department of Fish and Game. The vessel which sailed from San Diego, Calif., on October 23, 1954, and returned to that port December 29, 1954, cruised off the coasts of Peru, Ecuador, and near the Galapagos Islands.



Mayflower tuna tagging Cruise C-4-54, Oct.23-Dec.29,1954.

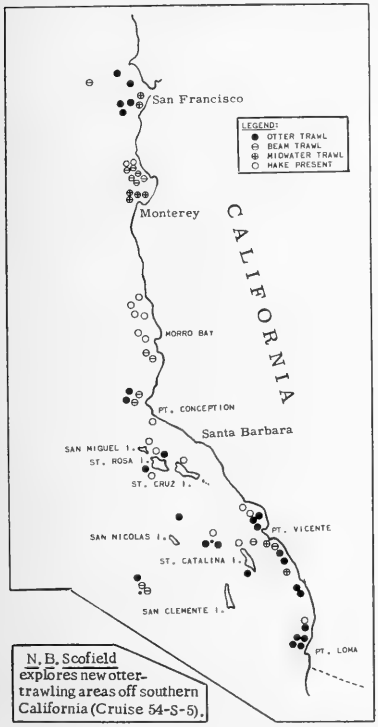
All tags used were "type G." Owing to rough seas encountered on the trip, only two night light stations were occupied. Most of the collections of fish specimens were made from bait-net sets.

Most of the trip was spent at Peru Bank. At the outset fishing was good but rough seas made tagging operations very difficult. The first week all tagging was done on top of the bait boxes. This was a slow process and was abandoned after the sea calmed down a bit. The tagging cradle was then hung from the starboard side of the bait box at about waist height. This proved to be a good plan as tagging could be done in all but the very worst weather. The first 122 fish were tagged with a hollow tip needle,

thereafter a solid tip was used. The degree of bleeding from the tag wound decreased with the change to the latter type needle.

* * * * *

NEW OTTER-TRAWLING AREAS EXPLORED OFF SOUTHERN CALIFORNIA BY "N. B. SCOFIELD" Cruise 54-S-5). None of the southern California areas scouted by the California Department of Fish and Game's research vessel N. B. Scofield on a 5-weeks' cruise ending November 14, 1954, were found suitable for commercial otter trawling. Inshore areas of proven productivity were intentionally avoided on this cruise which was made (1) to explore the area for concentrations of Pacific hake or bottomfish in commercial quantities; (2) to try out two sizes of midwater trawls. Although the coast of California from San Francisco south to the Mexican border was explored, particular emphasis was placed on the portion south of Point Conception and around the Channel Islands.



N. B. Scofield explores new otter-trawling areas off southern California (Cruise 54-S-5).

Two sizes of midwater trawls were tested and they appeared to be effective in murky water; however, there is some doubt as to their effectiveness on large or active fish.

A total of 68 drags were made of which 13 caught Pacific hake. In general, Pacific hake appeared scattered throughout the area scouted but not in commercial concentrations in any one area. Many areas that appeared workable on the charts and also gave good fathometer profiles were unfishable. Even smooth bottoms did not produce fish in commercial quantities.

Work was first started in shallow areas off Point Reyes to make sure the gear was operating properly. Then a drag was made in water over a mile deep 20 miles off the Farallon Islands to test some new equipment. The area off Pedro Point was fished with the small midwater trawl in the hope of collecting some small salmon which were known to be present. This net has a square mouth 25 feet on each side. Small herring were the only fish taken with this net. This gear appeared to be effective in murky water.

Continuing down the coast several drags were made off Point Montara and Ano Nuevo. The small midwater trawl was again tried off Monterey; the large midwater trawl also was used off Monterey. The mouth of this net is 35 feet square.

After working the area off Point Conception, the larger flats around the islands off the coast of southern California were scouted. The coast was worked from San Diego north to San Pedro. The large midwater trawl was tried near San Pedro but was not effective as the water was quite clear. In the area off the west end of Catalina Island and toward San Pedro several drags were made that brought up asphalt in considerable quantity. This material ranged from stony to almost fluid.

Cans--Shipments for Fishery Products, January-November 1954

Total shipments of metal cans for fish and sea food during January-November 1954 amounted to 102,533 short tons of steel (based on the amount of steel consumed in the manufacture of cans). Compared to 99,973 short tons in the same period a year ago. Larger packs of canned tuna and pilchards in 1954 accounted for the increased shipments for that year.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY DEPARTMENT OF DEFENSE, DECEMBER 1954: For the military feeding of the U.S. Army, Navy, Marine Corps, and Air Force, the Army Quartermaster Corps in December 1954 purchased fresh and frozen fishery products amounting to 2,006,014 pounds, valued at $814,866 (see table).

Purchases of Fresh and Frozen Fishery Products by Department of the Army
(December and the 12 months of 1954)

QUANTITY				VALUE			
December		Jan.-Dec.		December		Jan.-Dec.	
1954	1953	1954	1953	1954	1953	1954	1953
Lbs.	Lbs.	Lbs.	Lbs.	$	$	$	$
2,006,014	1,361,536	25,290,351	26,769,073	814,866	601,920	10,394,794	11,857,012

This was a decrease of 13.6 percent in quantity and 12.9 percent in value as compared with November, but greater by 47.3 and 35.4 percent, respectively, than purchases in December 1953.

Army Quartermaster Corps purchases of fresh and frozen fishery products during the 12 months of 1954 totaled 25,290,351 pounds (valued at $10,394,794), 5.5 percent lower in quantity and 12.3 percent less in value as compared with the 12 months in 1953.

Prices paid for fresh and frozen fishery products by the Quartermaster Corps in December averaged 40.6 cents per pound as compared with 40.3 cents in November and 44.2 cents per pound in December 1953. The average price for the 12 months of 1954 was 41.1 cents as compared with 44.3 cents in 1953 and 46.6 cents per pound in 1952.

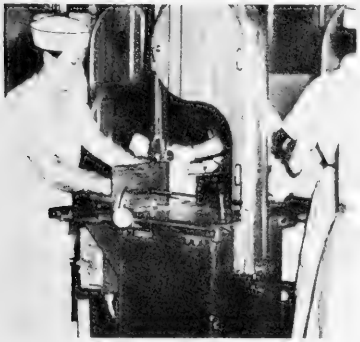
In addition to the purchases of fresh and frozen fishery products indicated, the Armed Forces generally make some local purchases which are not included in the figures given above. Therefore, actual purchases are somewhat higher than indicated, but it is not possible to obtain data on the local purchases made by military installations throughout the country.

Fish-Stick Output High in 1954

United States production of fish sticks, the popular new breaded food item, totaled 50.1 million pounds in 1954 as compared with 7.5 million pounds in 1953, the U. S. Fish and Wildlife Service revealed February 10 (see table).

Acclaimed as a revitalizer of the commercial fishing industry, fish sticks brought a gross income of nearly $40 million to retailers in 1954, with proportionate revenue to all segments of the industry concerned with the production, distribution, and marketing of this unique commodity.

Monthly production of fish sticks reached a high of 5.6 million pounds in October 1954. This compares with 1.4 million pounds in the same month of 1953 when volume output first began. Production for the last quarter of 1954 came to 15.4 million pounds as against 5.3 million pounds for the same quarter of 1953. The first, second, and third quarters of 1954 showed outputs of 10 million pounds, 12.2 million pounds, and 12.6 million pounds, respectively.



Stainless steel power cutters used for cutting fillet blocks and slabs into fish sticks.

U. S. Fish-Stick Production, 1954 and 1953

Month	1954			1953
	Cooked	Uncooked	Total	Total Cooked and Uncooked
	(Pounds)			
January	2,433,500	337,100	2,770,600	115,000
February	2,856,400	323,200	3,179,600	133,000
March	3,561,700	441,800	4,003,500	148,000
April	3,361,900	452,600	3,814,500	34,900
May	3,467,000	447,700	3,914,700	21,800
June	4,084,100	363,200	4,447,300	30,800
July	3,464,500	411,200	3,875,700	416,600
August	4,003,200	400,100	4,403,300	454,400
September	3,801,200	509,900	4,311,100	809,500
October	4,736,400	882,200	5,618,600	1,434,900
November	3,969,700	824,200	4,793,900	1,901,800
December	4,201,900	753,400	4,955,300	2,001,200
Total	43,941,500	6,146,600	50,088,100	7,501,900

Fish sticks are uniformly shaped pieces of fish dipped in batter, breaded, frozen, and distributed in consumer-sized packages. Similar to french-fried potatoes in appearance, they are marketed in cooked and uncooked form. Production of cooked sticks in 1954 came to 43.9 million pounds and uncooked sticks to 6.1 million pounds. Cooked sticks, which have been deep-fat fried before freezing, are oven-heated by the consumer for serving. Uncooked sticks are designed for those housewives and chefs who prefer to do the frying themselves.

Both imported and domestic fish go into the production of fish sticks. Cod (mostly imported) is the principal species, but haddock, ocean perch, and a few others are also used.

Fishery Products Marketing Prospects for 1955 and Review for 1954

PROSPECTS FOR 1955: Prospects for the first 4 to 5 months in 1955 are that United States civilian per-capita consumption of fishery products will be at least equal to the rate of a year earlier. Larger stocks of the canned and frozen products were available for distribution during the winter when commercial landings were seasonally light, and imports probably as large as in early 1954. Retail prices of fishery products in the next few months are expected to average a little lower than a year ago, reflecting in part the heavier supplies.

REVIEW FOR 1954: United States civilian consumption of fishery products per person in 1954 was about the same as a year earlier. Total supplies were somewhat larger than in 1953, especially after midyear when the heavier 1954 packs of some canned fish started moving to market in volume. Prices of fishery products in general averaged approximately the same as in 1953, judging from the Bureau of Labor Statistics wholesale price index.

Landings of edible fish and shellfish in 1954 were somewhat larger than in the preceding year, with part of the increase comprised of those fish which are processed and subsequently marketed in the canned or frozen forms. The total volume of fishery products frozen commercially in the United States and Alaska amounted to 303 million pounds, 10 percent greater than in 1953. Also, fairly large pack increases in 1954 were reported for canned tuna, Maine sardines, and Pacific sardines (pilchards). These increases much more than offset declines from 1953 for canned mackerel and anchovies.

Stocks of fishery products at the end of 1954 were somewhat larger than at the beginning of the year. For the canned products this was largely the result of a heavier total pack than in 1953. The 10-percent larger stocks of frozen fishery products on January 1, 1955, than a year earlier resulted from larger United States production and record imports of frozen cod, haddock, and ocean perch fillets and blocks. Frozen fillet blocks are the raw material for fish sticks, which have become increasingly popular in the domestic market in the past two years.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U.S. Department of Agriculture, in cooperation with the U.S. Fish and Wildlife Service, and published in the former agency's February 10, 1955, release of The National Food Situation (NFS-71).

Florida

UNIVERSITY OF MIAMI OFFERS GRADUATE FISHERY COURSES: The Department of Marine Science of the University of Miami offers courses leading to a Master's degree with specialization in marine biology, oceanography, and fisheries. Rising interest in the various aspects of the science of the oceans has made it impossible to meet the demand for trained marine biologists, oceanographers, and fishery biologists.

Interested students with a Bachelor's degree in zoology, physics, chemistry, or related sciences should contact the Department of Marine Science, University of Miami, Coral Gables, Fla., for further information.

The research counterpart of the Department of Marine Science is the Marine Laboratory of the University of Miami. A wide variety of research projects, both in "pure" and "applied" science, are conducted under the supervision of the faculty members who give the academic courses. This combination of research and teaching is believed to benefit both. The research projects are supported by a wide variety of agencies and individuals--government, industry, and private. Students are frequently offered the opportunity to take part in research projects, increasing the value of their professional training. Part-time jobs and other financial assistance are available to qualified students.

Gear Research and Development

SOUND GEAR AND UNDERWATER TELEVISION TO BE TESTED ON SHRIMP BY "POMPANO": Field tests with experimental sound gear to determine the prac-

cability of detection and location of shrimp by means of passive listening devices will be made by the Service's gear research vessel Pompano on a two-months' cruise which began in January 1955. Underwater television equipment will be used in conjunction with the underwater sound gear in an attempt to learn more of the behavior of shrimp in their natural habitat. Attempts will also be made to observe and photograph shrimping gear in operation.

The Pompano departed Miami on January 12 on an extended gear-research cruise to the Key West area. The vessel will be berthed at the U. S. Naval Station in Key West and make a series of trips to adjacent shrimping grounds. Scheduled field operations will extend to March 1955, when the Pompano will return to Miami.

Maine

TIGHTER SARDINE INSPECTION LAWS PROPOSED: Legislation to drastically strengthen Maine's inspection and quality control of Maine sardines was filed by Senator J. H. Wyman in the State Senate on February 11, 1955.

The Senator, who is also a sardine-cannery operator, said that his bill incorporated the results of nine months of extensive research, financed and supervised by the Maine Sardine Tax Committee, and that it had been unanimously approved by the industry at a series of recent meetings, according to a February 11 release from the Maine Sardine Industry.

"This legislation is one of the broadest forward steps ever taken by a major industry in this State and should eventually provide a much better utilization of one of our great natural resources with resultant stabilization of employment and profit for all concerned," he stated.

The bill greatly increases the authority of Maine's Commissioner of Agriculture, through his inspection division, to set up and enforce standards of quality and grades for the $2\frac{1}{2}$ to 3 million cases of sardines packed annually in the State. It also provides for better State supervision of conditions in the plants, fish handling, and other factors involved in the packing operation, and would create a seven-man industry advisory committee to periodically consult with the Commissioner on administration of the law.

Another bill, simultaneously filed by the same Senator, would require that all sardine cans containing only four fish be plainly labeled accordingly, and he stated that this also had the full backing of the industry.

The Maine Agriculture Commissioner said that his Department was heartily in accord with "this progressive legislation" and would support it in every way possible. Sardine inspection, a responsibility of the Maine Agriculture Department, is financed by a three-cents-per-case assessment on all packers and involves an expenditure of approximately $90,000 a year.

The Senator said that research on the quality-control program was started by the Tax Committee in March 1954, through a subcommittee. The U. S. Fish and Wildlife Service was engaged to conduct the technical phases of the work and it assigned canning experts to the job on a full-time basis, with headquarters at Boothbay Harbor.

Commenting on the legislation, the Tax Committee Chairman said that such action would mean a more uniform and improved product which the industry needed in order to maintain a favorable position in today's highly competitive food market.

Maryland

YORK RIVER SHAD CATCH, 1954: A recent survey of the York River and its tributaries determined that about 176,000 shad (over 500,000 pounds) were caught during the spring of 1954. This valuable catch is from a water area of about 50 square miles, reports the Service's Fishery Marketing Specialist in the Chesapeake Bay area.

* * * * *

CHINCOTEAGUE BAY WINTER CRAB FISHERY: Chincoteague Bay has the only winter crab fishery in Maryland, and it operates from December 1 until March 15. The fishery is not a large one and normally consists of only about 35 boats. It is based primarily on the capture of mature female blue crabs which have assembled in schools for the winter and have become inactive on the bottom in the deeper parts of the Bay. The male crabs remain scattered and apparently stay up in the creeks and so are not frequently caught in the winter. The "crab dredge," the gear used in this industry, is pulled by power boat but hauled in by hand. During the first several winters of the newly-formed industry the crabbers made a fairly good income from this fishery, but during the last two years, because the price of crabs has remained low, many watermen have stopped crabbing. The catch is usually about 3-4 barrels of crabs per boat and if the price is low the overhead expenses take the profit out of the operation, reports the January 1955 Maryland Tidewater News of the Department of Research and Education.

An interesting sidelight of the Chincoteague Bay hard-shell clam fishery is that a sizable part of the catch is made through the operations of the crab dredge boats. Most boats are now trying to catch clams rather than crabs, although the dredging license is issued only for crabbing. This is quite legal since the law at present does not mention the capture of clams by dredge. The clams are worth more than the crabs to the watermen and they naturally work where clams are abundant, disregarding the availability or scarcity of crabs.

The winter crab industry during the past two years has been worth about $20,000 per winter, exclusive of the summer crab fishery which is more valuable. The price is low because of the competition with Virginia and North Carolina crabs which are trucked into the State during the winter months. During the last two winters the weather has been so warm that, according to watermen who have had a poor season, the crabs have continued to be active during the winter. Crabs are not easily caught by dredge when they are active.

The average size of the Chincoteague Bay crab is small, compared with crabs from other areas, which has resulted in a marketing problem. This tends to keep the price down except when crabs are unavailable from other areas. At times the percentage of adult female crabs under legal size runs as high as 60 percent of the total caught in certain parts of the Bay. This, of course, creates a culling problem and requires a great deal of extra work and time.

The frequent occurrence of the small crabs in the commercial catches, unfortunately, poses an enforcement problem to administrative agencies. The laws governing the capture of crabs in Chincoteague Bay are based on the average size of crabs from the Chesapeake Bay. In the latter area, adult female crabs rarely run over four percent illegal crabs; consequently, a waterman would not be expected to have illegal crabs in his possession in excess of five percent, a level which might be overlooked by even the most conscientious crabber. On the other hand, in Chincoteague Bay the illegal mature female crabs average 17 percent throughout the season, placing a laborious culling problem upon the individual watermen.

Studies have shown that the Chincoteague blue crab is probably a genetically-stunted race. The return of all small mature crabs, male or female, lends itself

to the danger of "down-breeding." This means that the average size of adult crabs will become even smaller in the future, if the pronounced selective catch of the larger legal-sized crabs is intensified and prolonged. This is a well-known and observable phenomenon in livestock breeding. It would be unthinkable to continue this practice if it were known that a race of smaller crabs could result in Chincoteague Bay. As yet there is no information that indicates such a trend, and to demonstrate the phenomenon would require many years of experimentation.

Missouri

COMMERCIAL FISHERIES, 1953: In 1953, 74 Missouri residents purchased wholesale fish dealer permits. In addition, 25 nonresidents purchased permits to buy and sell fish in Missouri, according to a recent report from the Missouri Conservation Commission.

According to their 1953 reports to the Conservation Commission, the resident dealers handled about 9.8 million pounds of marine and fresh-water fish, 80,296 pounds of shrimp, 29,449 pounds of frogs, 4,175 pounds of oysters, 2,874 pounds of scallops, and 98 pounds of lobsters. Other species handled included white bass, buffalofish, carp, bullhead, chubs, crappie, walleye, paddlefish, sunfish, trout, lake trout, drum, ocean catfish, flounder, haddock, halibut, Florida mullet, ocean perch, pollock, salmon, red snapper, sole, and whiting. Marine and game fishes were obtained from sources outside the State.

Whiting was popular among some Missouri fish customers. The resident dealers reported handling about 5.8 million pounds in 1953. The largest amounts were handled in St. Louis and Kansas City. Buffalofish and carp were also popular--about 1.2 million pounds of buffalofish and 0.8 million pounds of carp were handled by the dealers.

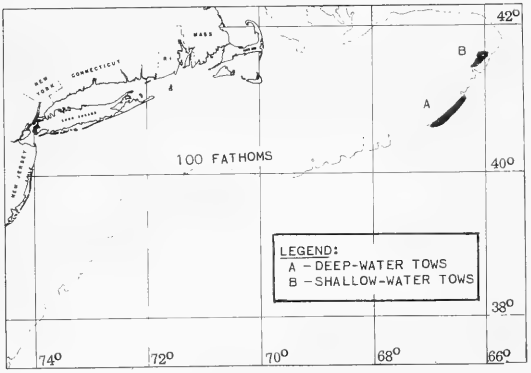
Apparently Missouri commercial fishermen provided only a small amount of the fish handled by the Missouri fish dealers. In 1953 only about 7 percent of the 2.6 million pounds of river fish handled were obtained from sources in the State. According to information derived from the monthly reports of commercial fishermen to the Commission, the total harvest of commercial fishes in Missouri amounted to about 384,322 pounds in 1953. About 198,685 pounds were taken from the Mississippi River and about 184,160 pounds from the Missouri River. Only about 1,477 pounds were reported from Missouri's waters of the St. Francis River. Carp led all other species in Missouri's commercial fish harvest. Buffalofish, flathead catfish, and drum followed in that order. Other species taken by Missouri commercial fishermen included blue catfish, paddlefish, garfish, channel catfish, quillback, sucker, sturgeon, dogfish, bullhead, and eel.

Missouri commercial fishermen are permitted to use seines, trammel nets, hoop nets, and lines in waters in which commercial fishing is allowed. These waters include the Mississippi River, the Missouri River, and that part of the St. Francis which forms the boundary between Missouri and Arkansas. About 48 percent of the 1953 harvest was taken in hoop nets. Trammel nets took about 39 percent of the harvest, seines about 7 percent, and lines about 6 percent.

--Herbert J. Fisher, Biologist,
Missouri Conservation Commission.

New England Exploratory Fishery Program

"DELAWARE" CATCHES MOSTLY HAKE IN DEEP-WATER TRAWLING ON GEORGES BANK (Cruise 2): A total of 17,000 pounds, mostly hake, was caught in six tows by the Service's exploratory fishing vessel Delaware in deep-water trawling on Georges Bank during a nine-day cruise completed at East Boston January 28. Total catch for the six deep-water tows included red hake 10,500 pounds, white hake 1,700 pounds, blue hake 300 pounds, lobsters 1,200 pounds, ocean perch 700 pounds, haddock 100 pounds, and dogfish 2,500 pounds. The most promising results were noted during tows 5 and 6 at location 40°35'-40°39' N. latitude, 66°49'-67°02' W. longitude, in depths from 170 to over 250 fathoms, which produced a catch of white hake (1,700 pounds), lobsters (1,300 pounds), ocean perch (700 pounds), and haddock (50 pounds).



Deep-water otter-trawl fishing on southeast Georges Bank by Delaware (Cruise 2). Dark area marks approximate location of trawling operations.

This was the second trip of a survey to determine the distribution and abundance of commercially-valuable species in the deep waters of the Georges Bank continental slope.

The Delaware fished with a standard No. 41 otter trawl and completed 21 tows in the area between 40° and 41° N. latitude and 65° and 67° W. longitude. Limitations of the trawl-winch equipment prevented extensive coverage of the deeper areas. During the initial part of the trip 6 tows were made at depths between 130 and over 250 fathoms located between 40°37'-41°07' N. latitude and 66°21'-67°00' W. longitude. (Area "A" on chart.)

Fishing operations carried out in depths from 45-70 fathoms (area "B" on chart) resulted in a total catch of 15,200 pounds. Dogfish comprised the major portion of the catch in 3 of the 15 tows completed in shoaler water. Best catches, in the shoal-water area, were made in depths from 56-70 fathoms at 41°32'-41°36' N. latitude, 65°57'-66°06' W. longitude, where 3 consecutive sets produced a total of 4,000 pounds of haddock and haddock scrod.

The trawl nets were not damaged by underwater obstructions throughout the trip. Eight lobsters were turned over to the State of Massachusetts for tagging and release.

The Delaware sailed February 4, 1955, on Cruise 3, which has as its objective: (1) to determine the present abundance of shrimp in the areas of the Gulf of Maine which supported a winter fishery in the years 1941-48, and which subsequently became unproductive; (2) to explore suitable bottoms between these areas. The standard No. 41 trawl net with a $2\frac{1}{2}$" cotton liner in the cod end will be used on this cruise.

Oregon

STEELHEAD TROUT TAGGED AT McNARY DAM: Some of the mystery of steelhead trout migration in upper Columbia River tributaries may be cleared up by a tagging operation conducted by the Oregon Fish Commission early in February 1955 at McNary Dam.

Through cooperation of the Army Corps of Engineers, Fish Commission biologists were able to tag 464 adult steelhead trout which apparently had taken up residence in the upper pools of the Washington shore fishway at McNary Dam. In all, 684 of the fish were removed from the fishway which had been partially drained for maintenance and repair work.

Tipoff that steelhead trout would probably be in the Washington fishway came in January when 1,571 "homesteading" fish were found in the Oregon shore ladder when it was dewatered for an annual check. Why some of the upriver-bound steelhead trout decided to hide out in fishladders is not definitely known, according to the Fish Commission biologist in charge of Columbia River investigations. He said steelhead trout have also been found in Bonneville Dam fishways during annual maintenance checks.

The Oregon biologist now hopes that recoveries of the McNary-tagged steelhead trout will be reported in order to clear up some of the questions concerning their migration above McNary which have puzzled fisheries workers. The opportunity to tag a large number of fish in a short period of time fits in well with an over-all study of Columbia River steelhead trout migration which the Fish Commission has undertaken, the Biologist stated.

Pacific Salmon Investigations

OIL POLLUTION STUDIED BY SERVICE'S SEATTLE BIOLOGICAL LABORATORY: The possibility of polluted waters at Lutak Inlet near Haines, Alaska, has prompted the Service's biological laboratory at Seattle, Wash., to begin a limited investigation to determine the toxicity of petroleum products to fish life. The source of the possible pollution is a group of jet-fuel and Diesel-fuel storage tanks at the Inlet. When these tanks are flushed out some of the petroleum products enter Inlet waters, giving rise to a need for definite knowledge on the effect of these products on salmon and other marine resources in the area.

Using silver salmon fingerlings as test fish, the laboratory has tested automobile gasoline, jet-aviation fuel, Diesel-truck oil, and sludge oil. Automobile gasoline and jet-aviation fuel have proved more lethal to the fingerlings than the other two products: surface films of automobile gasoline and jet-aviation fuel were lethal at 5,000 and 10,000 parts per million, respectively, and agitated solutions of the two products at 100 and 500 parts per million. Tests with surface films of Diesel oil and sludge oil proved lethal at 20,000 and 100,000 parts per million, respectively, and agitated solutions of Diesel oil at 5,000 parts per million. Fingerlings tested with agitated solutions of sludge oil were greatly distressed but not killed.

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FERTILIZATION INCREASES SIZE OF DOWNSTREAM RED SALMON MIGRANTS AT BARE AND KARLUK LAKES: There is considerable evidence that experimental fertilization of Bare Lake on Kodiak Island with sodium nitrate and super phosphate

is increasing the size of the downstream red salmon migrants, reports the Service's Branch of Fishery Biology. Table 1 shows the number, age, composition, and mean

Table 1 - Downstream Migration of Red (Sockeye) Salmon at Bare Lake, 1950-54

Year	Migrants	Age Composition		Mean Length	Mean Weight
	No. of Fish	2-Year Old	3-Year Old	Mm.	Gms.
		% of Total			
1954	12,195	86	14	93.7	8.21
1953	5,058	32	68	90.2	6.54
1952	8,620	39	60	79.1	4.46
1951	4,503	23	76	81.8	4.81
1950	10,199	67	33	72.8	3.31

length and weight of the migrants for the past five years.

Table 2 indicates how fertilization is affecting survival of the young red salmon. Survival measurements in years in which the lake is not fertilized will be available later for comparison purposes.

Table 2 - Survival of Red (Sockeye) Salmon at Bare Lake, 1950-54

Brood Year	Egg Deposition 1/	Survival to Seaward of Migrant Stage	Fresh-water Survival
	No.	No.	%
1952	744,000	15,000 2/	2.0
1951	77,000	3,282	4.3
1950	670,000	6,806	1.0

1/ Based on number of females in the escapement, their mean size, and the egg retention after spawning.
2/ Partly estimated.

At Karluk Lake the fresh-water survival of red salmon is usually less than 1 percent; however, downstream migrants are larger than those at Bare Lake and their ocean survival will be better. It is estimated that the ocean survival of Karluk migrants is 3 to 4 times higher than migrants of Bare Lake. Consequently, it may be assumed that a fresh-water survival as at Bare Lake of over 2 percent, if put into effect at Karluk, would result in a higher rate of fish production there.

Processed Fishery Products Output Increased in 1954

The pack of canned fish and shellfish in the United States and Alaska in 1954 totaled about 860 million pounds as compared with 792 million pounds in 1953, Secretary of the Interior McKay revealed February 7. The 1954 pack was the third largest in history, exceeded only by the 1941 and 1950 outputs of 881 million and 965 million pounds, respectively, according to statistics compiled by the Fish and Wildlife Service.

The largest individual increase was in the Pacific sardine pack which came to 60 million pounds as against 3 million pounds in 1953. The 57-million-pound gain was due to a return of this species to southern California waters after a virtual absence in recent years.

Production of canned tuna set an all-time record of 209 million pounds in 1954 as compared with 189 million pounds in the previous year. The 20-million-pound increase was due to a larger domestic catch and heavier imports of frozen tuna from Japan and Peru.

The canned salmon pack in 1954 was 194 million pounds, a gain of about three percent over 1953. Bolstering the output were a 23-million pound pack of sockeye salmon in the Puget Sound area (the largest since 1913) and a 28-million-pound pack of chum salmon in southeastern Alaska (as compared to 20 million pounds in 1953).

Production of canned Maine sardines in 1954 came to about 61 million pounds--eight percent more than in the previous year. Canned oysters showed about the same pack as in 1953 when approximately 6.8 million pounds were produced. Reports from the Pacific Northwest revealed heavy canning of oyster stew in that section, with a 1954 pack of more than 4.8 million pounds as compared with 3.4 million pounds in 1953.

United States cold-storage plants froze 303 million pounds of fish and shellfish in 1954--27.6 million pounds over the previous year.

Domestic production of groundfish and ocean perch fillets in 1954 totaled 126 million pounds as compared with 112 million pounds in 1953. Production of fish sticks, manufactured chiefly from imported cod fillets, came to more than 50 million pounds as compared with 7.5 million pounds in 1953 when this commodity was first introduced.

Preliminary figures on fishery byproducts show that fish-meal and fish-oil production in 1954 was about the same as in 1953 when 239,000 tons of meal and 20.3 million gallons of oil were produced. As in 1953, menhaden accounted for more than 70 percent of the meal and 85 percent of the oil.

Railway Express to Cancel Minimum Charge Increase of Return Empty Insulated Containers

The Railway Express Agency agreed in late January to withdraw the increase (from $1.80 to $2.30) in the minimum charge per shipment on return empty insulated containers described in Item 923 of the Express Classification. The Agency had earlier announced the increase to be effective February 12, 1955, in Supplement 23 to the Express Classification, but promised to cancel this increase on the return empty insulated containers (Can-Pro and Shamrock) as soon as possible. The minimum charges on all other return empty containers was increased to $2.30 per shipment effective February 12, 1955.

Saltonstall-Kennedy Act Fisheries Projects

FISHERY BYPRODUCTS TO BE STUDIED BY FISH AND WILDLIFE SERVICE: The allocation of $273,000 for a research program aimed at improving markets for fish meals and fish oils was announced January 26 by Secretary of the Interior McKay. These markets now handle approximately one-fourth of the total domestic commercial fish production each year. The Fish and Wildlife Service will make the study under the Saltonstall-Kennedy Act, P. L. 466. The program calls for development of a quality index for fish meals; the devising of new industrial uses for fish oils; and biological studies of menhaden, chiefly used in meal and oil production.

An allocation of $65,000 for the fish-meal project has been made for the remainder of the fiscal year ending June 30, 1955. Fish meal is used as feed for poultry, swine, dairy animals, and domestic pets, and the quality index will be used to show the nutritive worth of the byproduct. The index will be used at processing plants and distribution points.

Fishing-industry scientists, feed manufacturers, agricultural colleges, and consultant laboratories will participate with the Service on the project, with most of the laboratory work being done by Service personnel. Testing by controlled feeding will be handled by universities and similar institutions on a contract basis. The project, which will supplement work being done by the Service under its annual appropriation for "investigation of resources," is expected to continue in fiscal years 1956 and 1957.

The program's fish-oil research, for which $170,000 has been earmarked for the balance of fiscal year 1955, is necessitated by a surplus of domestic fats and oils coupled with the fact that fish oils, though having special qualities, appear to be used interchangeably with other oils. Studies of potential uses peculiar to fish oils are expected to enable producers to seek new markets where competition is based on merit rather than price. The work of the Service will consist of outlining the studies, negotiating contracts, supervising contract work, evaluating results, and disseminating the findings to industry for commercial application. Major studies will be made by universities and other nonprofit institutions on a contract basis. The project supplements work being done by the Service under its annual appropriation for investigations of resources. It is expected to continue into fiscal years 1956 and 1957.

The biological-research phase of the program, for which $38,000 has been set aside for the remainder of fiscal year 1955, will feature life-history studies of menhaden. Most of the work will be done by the Service at Beaufort, N. C., where a fully-equipped laboratory is maintained. Intensive sampling will be done to develop information on age and growth rates. This information will be used to determine whether the menhaden range is inhabited by separate groups of this species or one large, freely-mixing population. Age analysis will furnish an insight into the success of yearly broods and reveal prospects for future abundance. As the project progresses, related studies on spawning areas, spawning periods, and nursery grounds will be made. The project is expected to continue in fiscal 1956.

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SERVICE REACTIVATES RESEARCH VESSEL "ALBATROSS III:" The Service's biological research vessel Albatross III was returned to full operation in January 1955 with funds provided by the Saltonstall-Kennedy Act, P.L. 466 (83rd Congress). Based at Woods Hole, Mass., the vessel will be in year-round operation for at least three years.

On its initial trip (cruise 56) since its reactivation, the Albatross III sailed from Woods Hole on February 1 and conducted a groundfish survey on Georges Bank. The vessel returned to port February 13. Operations were limited by severe winter weather but they were successful so far as weather permitted.

Whiting were most abundant in the South Channel area from 40-120 fathoms. Cod and haddock were abundant in the northerly sections of the Bank. The best catch of haddock, about 800 pounds, was made in 21 fathoms on Eastern Edge of Georges Shoals. Cod were mostly of steak size. No scrod cod were caught. Small haddock, 1- to 2-year old fish, were not found in any quantity. Ocean perch were taken only on the Georges side of the South Channel in 100 fathoms. Haddock stomachs were collected for food studies at most stations. Maturity information was collected for haddock. Ovaries were preserved for fecundity studies. Blood was collected for serological analyses in racial studies.

One-half hour tows with a No. 36 trawl were made at 49 stations in 20-120 fathoms over various parts of the Bank. Bathythermograph casts were made at all stations. This is the first of a continuing series of quarterly surveys planned for the next three years.

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SERVICE REACTIVATES RESEARCH VESSEL "BLACK DOUGLAS:" The Fish and Wildlife Service's research vessel Black Douglas departed San Francisco on February 10 for San Diego, her new home port, to take part in the South Pacific fishery investigations. An allocation of funds under the terms of the Saltonstall-Kennedy Act, P. L. 466 (83rd Congress), allows the Service to operate the Black Douglas again. This vessel had been inactive for two years.

En route to San Diego the vessel dropped drift bottles at selected localities to obtain information on direction and speed of ocean currents off the California coast. This work is part of the California Cooperative Oceanic Fisheries Investigations, a joint study of the sardine, jack mackerel, anchovy, and other fishes being made by the U. S. Fish and Wildlife Service, Scripps Institution of Oceanography, California Department of Fish and Game, Hopkins Marine Station, and the California Academy of Sciences.

Skiffs used for Shrimp Fishing in Inside Waters of Gulf of Mexico

In the last two years a new type of skiff is being built in Gulf of Mexico shipyards for shrimp fishing in inside waters. These skiffs, used principally in the Lafitte-Barataria area of Louisiana, vary in size from 20 to 26 feet in length (mostly 22-24 feet), have a beam of from 6 to 8 or 9 feet, and a draft of 18 to 24 inches. A very few may have cabins or half cabins built on them. Most of these skiffs are powered by 85 or 115 hp. marine gasoline engines. While trawling the engines reportedly burn from 25 to 35 gallons of gasoline a day.

A side view of the new type of skiff used for shrimp fishing in the inside waters of the Gulf of Mexico. Note sorting platform in place near bow.

Designed principally for shrimp fishing in the inside waters of the Gulf of Mexico, these boats are considered quite efficient for this purpose. Generally they pull a 30- to 40-foot shrimp trawl. However, they are used for other than shrimp fishing also: crab fishing (running lines), hand-line fishing, as well as a speedy means of transportation to and from fishing and hunting camps located in the lowland marshland areas. Although the majority of these skiffs are owned by regular commercial fishermen, casual and sport fishermen have also invested in this type of craft.

When trawling gear is used by the skiffs, it is handled entirely by hand. The platform at the stern has enough space for playing out the trawl as well as hauling it aboard. After the net is pulled aboard, the cod end containing the catch remains in the water. The cod end with the catch is moved forward where a small frame extending over the side of the boat suffices to hold open the bag for brailing out the catch.

Stern view of shrimp skiff showing shrimp trawl spread for drying. Note overhang of platform used to shoot and haul in the net.

With some exceptions, the crew consists generally of one man. This was particularly true the spring and summer of 1954. In 1953 when shrimp prices were higher than in 1954, the skiffs were operated by two men or a man and a boy.

The cruising speed of the skiffs is from 18 to 22 miles per hour, with a maximum speed of 30 miles per hour. The cruising range depends upon the gasoline capacity of the craft which varies from 30 to 60 gallons. At cruising speed, approximately 4 gallons of gasoline per hour is used; trawling fuel consumption is 3 gallons and less per hour. At high or maximum speed, 5 gallons or more of fuel are consumed per hour. None of these skiffs operate out of a fishing port where the distance to the fishing grounds is much over 30 miles away.

Another view of the shrimp skiff showing the small frame on the port side next to the seat. This frame is used on a number of boats. Inserted in the two holes are two small pieces of wood or planks (2-2½ feet long) extending out over the water to support the cod end with the catch and hold it open so that the catch may be brailed out with a small hand net.

Cypress is used in the hull construction of practically all of the shrimp skiffs.

The development of this type of craft has been a gradual process over a period of years--from the old flat-bottom type of boat toward the design of the larger shrimp trawlers but with the trend toward use of lighter wood in the construction.

During the last few years, the construction of the type of skiff described has been accelerated, and construction is continuing at a fairly rapid rate. Changes in design are gradually being incorporated in the new ones. All skiffs are now being built with a flare and "V" bottom toward the bow, and include a keel which is sufficient for protection of the bottom as well as reinforcement. The trend seems to be towards larger craft of this type. There are several in service with a length of 28 feet. One about 30 feet long was reported under construction in the summer of 1954, and there are reports of building even larger ones. The inclusion of a hold

for icing shrimp is under consideration. There is at least one skiff completely enclosed with deck and cabin. Actually if the size continues to increase, the term "skiff" as applied to these craft will not be applicable.

A view of the bow of a shrimp skiff showing the sorting platform in place.

Stern view of a shrimp skiff showing a portion of the otter boards and shrimp trawl hanging on "T" upright.

Despite lower shrimp prices in 1954, a few owners of the old type of inside trawler are changing over to the use of skiffs. Many shrimp fishermen operating solely in inland waters are of the opinion that these skiffs are superior to the older inside trawlers in all respects: (1) maneuverability, (2) speed, and (3) overall efficiency and economical operation, including manpower, maintenance, and repairs.

An estimate indicates that there are from 200 to 300 skiffs of this type operating out of the Lafitte-Barataria area.

--S. C. Denham, Fishery Marketing Specialist,
In Charge New Orleans Market News Service,
Branch of Commercial Fisheries,
U. S. Fish and Wildlife Service,
New Orleans, La.

South Pacific Fishery Investigations

SARDINES RETURN IN 1954/55: Approximately 65,000 tons of sardines have been taken in southern California waters in the 1954/55 season--over 20 times as many as in the 1953/54 season. Widespread and abundant sardine spawning off southern California in the spring of 1954 heralded this return; more than 30 times as many eggs were spawned in 1954 than in the same area in 1953.

The egg and larvae surveys provide a preliminary estimate of 115,000 billion eggs spawned off southern California in 1954. This indicates that approximately 2.3 billion (230,000 tons) sardines spawned in this area, according to the Fish and Wildlife Service's Southern Pacific Fishery Investigations.

The southern California area is one of two main sardine-spawning centers; the other center lies off central Lower California. Estimates of the numbers of eggs spawned in this southern center in 1954 are not complete; however, spawning was as great as, or greater than, in 1953, when approximately 8.8 billion sardines spawned.

The sardine reappearance off southern California in 1954 was associated with an earlier warming of these waters than in 1952 and 1953. Whether a cause and effect relationship exists is unknown, but the occurrence of such contrasting conditions in 1953 and 1954 affords opportunity to test many hypotheses advanced about sardine movements.

That sardines move north from Mexican waters to make major contributions to the California fishery has long been known. Therefore, the increased abundance of sardines in 1954 is not new but is the resumption of a pattern that had been interrupted for at least two years. Probably the most important single bit of information to be found in the 1954 observations is that sardine spawning off southern California does not depend on local fish but can result from fish moving in from the south.

The location and numbers of sardine eggs spawned in the spring and summer of 1955 will be observed from month to month in an effort to predict the location and numbers of fish during the fall and winter.

Other participants in the California Cooperative Oceanic Fisheries Investigations are Scripps Institution of Oceanography of the University of California, Bureau of Marine Fisheries of the California Department of Fish and Game, Hopkins Marine Station of Stanford University, and California Academy of Sciences. The Marine Research Committee is coordinating the research.

U. S. Commercial Fisheries Catch Increased in 1954

Commercial fishermen in the United States and Alaska caught about 4,700 million pounds of fish and shellfish during 1954. The 1953 catch of 4,450 million pounds was thus exceeded by 250 million pounds, or about six percent, according to statistics compiled by the U. S. Fish and Wildlife Service.

Food fish showed more spectacular gains in 1954 than the species used for fish meal and fish oils, in contrast to the reverse situation in 1953. Food-fish items with large increases were tuna, sardines, Maine herring, haddock, and ocean perch.

San Pedro, Calif., led the food-fish ports with a 1954 catch of about 381 million pounds. Gloucester, Mass., was second with 221 million pounds; followed by Boston, Mass., 151 million pounds; San Diego, Calif., 130 million pounds; and New Bedford, Mass., 72 million pounds.

From the standpoint of ex-vessel value, San Pedro again led all other food-fish ports with landings worth $37 million. San Diego's catch was valued at 21.0 million while the Massachusetts landings in Boston, New Bedford, and Gloucester were worth $11.3 million, $9.4 million, and $7.9 million, respectively.

The chief meal-and-oil species, menhaden, set a new record for the fourth consecutive year with total 1954 landings of 1,750 million pounds.

Although the catch of albacore tuna off Washington and Oregon was an almost complete failure, the national catch of all tuna species amounted to about 322 million pounds as compared with 305 million pounds in 1953.

Pacific sardines, which for many years yielded annual catches of more than one billion pounds but then virtually disappeared as a commercial item, staged a comeback in 1954 with landings of 132 million pounds as against less than 10 million pounds in the previous year.

Maine produced a 1954 catch of about 102 million pounds of herring--used chiefly in the canning of sardines--as compared with 120 million pounds in the previous year. Landings of haddock in Maine and Massachusetts of approximately 156 million pounds were 16 million pounds more than in 1953. Ocean perch landed in these two States amounted to about 179 pounds as against 154 million pounds in 1953.

The total shrimp catch for 1954 of about 235 million pounds was roughly the same as in 1953. In recent years the annual catch of this species has been valued at more than $50 million ex-vessel, making shrimp the most valuable item taken by domestic fishermen.

Salmon landings increased about 7 million pounds--landings totaled 320 million pounds as compared with 313 million pounds in 1953. The increase was due chiefly to outstanding catches of sockeye salmon from the Pacific Northwest's Fraser River and chum salmon in southeastern Alaska waters. The large catches of these species more than compensated for the normal absence of pink salmon from Puget Sound which occurs during even-numbered years.

Pacific Coast halibut landed by United States and Canadian fishermen amounted to about 70 million pounds--an all-time record--as compared with 60 million pounds in 1953. Steady increases during the last 30 years have resulted from conservation efforts by the Pacific Halibut Commission, established by the United States and Canada in 1924.

Decreases were recorded for anchovies and mackerels in California. Due mainly to lack of an export market, the anchovy catch dropped from 85 million pounds in 1953 to about 37 million pounds in 1954. A scarcity of Pacific and jack mackerel resulted in a decline in landings of these species from 63 million pounds in 1953 to about 35 million pounds in 1954.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, NOVEMBER 1954: United States imports of fresh, frozen, and processed edible fish and shellfish in November 1954 amounted to 62.6 million pounds (valued at $16.4 million), according to a Department of Commerce summary tabulation (see table). This was a decrease of 8 percent in quantity and 4 percent in value as compared with October imports of 67.7 million pounds (valued at $17.1 million). Compared with a year earlier, November imports were up 3 percent in quantity and 1 percent in value.

Exports of processed edible fish and shellfish (excluding fresh and frozen) in November 1954 totaled 5.8 million pounds (valued at $1.4 million)--a decrease of

15 percent in quantity and 39 percent in value as compared with October exports of 6.8 million pounds (valued at $2.3 million). November exports were up 125 per-

United States Foreign Trade in Edible Fishery Products, November 1954 with Comparisons

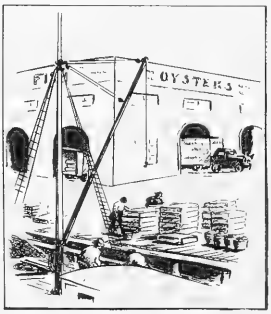
	Nov. 1954		Nov. 1953		Year 1953	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 Lbs.	Million $	1,000 Lbs.	Million $	1,000 Lbs.	Million $
Imports:						
Fish & shellfish: fresh, frozen & processed 1/	62,614	16.4	60,899	16.3	724,656	193.2
Exports:						
Fish & shellfish: processed 1/ only (excluding fresh and frozen)	5,766	1.4	2,558	0.9	58,920	14.4

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

cent in quantity and 56 percent in value as compared with a year earlier.

* * * * *

IMPORTS OF GROUNDFISH FILLETS AT ALL-TIME HIGH IN 1954: United States imports of groundfish (cod, haddock, hake, pollock, cusk, and ocean perch) fillets in 1954 totaled 135.7 million pounds, 26 percent above the previous record year of 1952 when 108.0 million pounds were imported (see table). The 1954 imports were 48 percent greater than the 91.6 million pounds received in 1953. Use of imported fillet blocks and slabs (principally cod) for the manufacture of fish sticks accounted for the record increase of frozen groundfish fillets.



Canada again led as the largest foreign supplier of groundfish fillets in 1954, shipping 63 percent of the total; followed by Iceland who supplied 27 percent. All countries supplying these fillets shipped more to the United States in 1954 than in 1953.

The quota of groundfish (including ocean perch) fillets permitted to enter the United States in 1954 at the reduced rate of $1\frac{7}{8}$ cents

United States Imports of Groundfish (Including Ocean Perch) Fillets, 1950-54

Country	1954 1/	1953	1952	1951	1950
			(Pounds)		
Canada	85,997,560	59,672,557	56,695,714	57,695,407	51,067,779
Norway	4,660,118	3,956,095	8,666,999	3,912,309	2,080,376
Denmark	2,715,085	256,482	2,358,741	244,295	595,256
Iceland	37,039,659	25,410,418	35,733,748	24,162,173	12,529,576
United Kingdom	170,436	138,560	1,645,175	279,049	93,858
West Germany	3,589,171	1,532,100	1,433,954	406,670	91
France	511,059	232,270	-	-	-
Netherlands	388,575	270,761	1,325,250	263,719	11,475
Other Countries	595,813	147,956	144,550	133,550	239,756
Total	135,667,476	91,617,197	108,004,127	87,097,172	66,618,167

1/ Preliminary.

per pound was 33,950,386 pounds. Imports in excess of the quota entered at a duty of 2½ cents per pound. The reduced-rate quota in 1953 was 33,866,287 pounds. The 1955 quota is 35,432,624.

Utah

FISH-MEAL PLANT POSSIBILITY STUDIED: Researchers at the Utah Agricultural Experiment Station are exploring the possibilities of a fish-meal plant to make fish meal from carp, reports Feedstuffs (February 5, 1955).

It is estimated that Utah has 100,000 acres of warm water, and scientists say carp will produce more protein per acre than any other form of life. Also, they say, studies show carp meal prepared from local fish is equal to herring meal and better than menhaden and tuna meals.

Wholesale Prices, January 1955

Fresh fish and shellfish landings continued seasonally light in January 1955, the demand for most fishery products was good, and wholesale prices were higher than

Table 1 - Wolesale Average Prices and Indexes for Edible Fish and Shellfish, January 1955 and Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices1/ ($)		Indexes (1947-49=100)			
			Jan. 1955	Dec. 1954	Jan. 1955	Dec. 1954	Nov. 1954	Jan. 1954
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					108.9	100.5	102.8	114.0
Fresh & Frozen Fishery Products:					117.7	102.9	106.8	125.6
Drawn, Dressed, or Whole Finfish:					129.7	107.4	115.6	131.3
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.16	.10	159.3	97.3	114.8	170.1
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.28	.28	85.6	87.7	93.4	95.9
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.56	.58	125.6	129.2	127.5	109.0
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.51	.44	125.2	109.1	154.9	150.0
Whitefish, L. Erie pound or gill net,rnd., fresh	New York	lb.	.71	.57	143.5	114.2	115.2	131.5
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.51	.63	103.5	129.1	128.1	124.0
Yellow pike, L. Michigan&Huron, rnd.,fresh	New York	lb.	.50	.39	117.3	90.3	82.1	117.2
Processed, Fresh (Fish & Shellfish):					107.8	101.3	99.5	123.4
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.45	.27	153.1	91.9	105.5	139.5
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.53	.53	83.8	84.2	77.4	114.2
Oysters, shucked, standards	Norfolk	gal.	5.00	5.00	123.7	123.7	123.7	129.9
Processed, Frozen (Fish & Shellfish):					89.2	89.2	88.9	108.7
Fillets: Flounder (yellowtail), skinless, 1-lb. pkg.	Boston	lb.	.38	.38	98.2	98.2	98.2	108.7
Haddock, sml.,skins on, 1-lb. pkg.	Boston	lb.	.29	.29	90.2	90.2	91.0	102.0
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.28	.28	111.8	111.8	109.8	110.7
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.47	.47	72.5	72.5	72.5	110.3
Canned Fishery Products:					96.8	96.8	96.8	96.9
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	case	19.70	19.70	104.4	104.4	104.4	93.9
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	case	12.90	12.90	93.0	93.0	93.0	102.4
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	case	6.70	6.70	71.3	71.3	71.3	87.3

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

in December 1954 but lower than a year earlier. The over-all edible fish and shellfish (fresh, frozen, and canned) wholesale index for January 1955 was 108.9 percent of the 1947-49 average (see table)--8.4 percent higher than in December 1954, but 4.4 percent lower than in January 1954, the Bureau of Labor Statistics of the Department of Labor reports.

Higher prices for large offshore haddock at Boston in January caused the drawn, dressed, or whole finfish subgroup index to rise 20.8 percent above the previous month. But January 1955 prices were 1.2 percent below a year earlier. Ex-vessel prices for haddock at Boston rose 63.7 percent from December to January. (In December haddock supplies were exceptionally large and prices were unseasonally low.) Prices for Western halibut and salmon at New York City dropped slightly from December to January, while there was a mixed trend for fresh-water fish prices at New York City and Chicago. When compared with a year earlier, lower prices prevailed for haddock, halibut, whitefish, and lake trout at Chicago, but prices for the other items were higher.

In the fresh processed fish and shellfish subgroup, January prices were up (6.4 percent) due to a large increase in haddock fillet prices and in spite of a slight drop in shrimp prices. Oyster prices remained stable. Compared to January 1954, haddock fillet prices were up, while prices for shrimp and oysters were down.

There were no changes from December to January in prices for frozen processed fish and shellfish. However, there were some marked decreases from January 1954 (the index for the subgroup was down 18.9 percent)--prices for shrimp and fillets of flounder and haddock dropped substantially and ocean perch fillet prices were down slightly.

Prices for canned fishery products were also steady from December to January and the index for the subgroup remained at 96.8 percent of the 1947-49 average. When compared with January 1954, there was a mixed trend in the individual items--prices of salmon were higher while those for tuna and sardines were lower.

NEW SWEDISH METHOD FOR PROCESSING CANS

It is reported that a method of processing cans, which uses hot air instead of steam or water, has been developed in Sweden. A machine for the continuous processing of 10,000 14-ounce cans per hour has been constructed. By this method it is stated that the cans are subjected to a shorter heating time and receive less rough treatment, and the over-all quality of the product is better. Some of the fruits and beans canned by this method are reported to have tasted quite "fresh." The machine is a precision instrument and the heating time can be controlled accurately. Only one operator is required as the machine is automatic.

--Goteborgs Handels-och Sjofarts-tidning, March 25, 1954.

International

YUGOSLAVIA AND ITALY TO SETTLE FISHING DISPUTE

Italy and Yugoslavia commenced negotiations in December 1954 to solve the $2\frac{1}{2}$-year old Adriatic fishing dispute, reports the December 17, 1954, issue of The Fishing News, a British fishery paper.

Between the summer of 1952, when a former fishing agreement lapsed, and the Trieste settlement in October 1954, Italian fishing craft and Yugoslav patrol boats had frequent brushes off the eastern Adriatic rich fishing grounds. In 1953 and the first half of 1954 the Yugoslavs seized over 50 Italian fishing craft alleged to have been in Yugoslav waters, which they claim extend for 10 miles from their coast.

The Italian trade Minister said the negotiations would also include a new trade agreement.

LATIN AMERICA

COOPERATIVE MARINE BIOLOGICAL RESEARCH PLANNED: A group of Latin American specialists in marine biology met in Concepcion, Chile, September 15-17, 1954, in order to study the possibility of establishing an international network of marine biological laboratories in Latin America, and other ways of facilitating the collaboration in this field among the Latin American countries. The meeting was convoked by the Unesco Science Co-operation Office for Latin America and was a sequel to the recommendations for setting up international and regional laboratories made at a meeting held in Montevideo in 1952 upon the initiative of the Unesco Office. The scientists attending the meeting were from Argentina, Brazil, Chile, Cuba, Mexico, Peru, Venezuela, and Uruguay. The Regional Office in Santiago, Chile, of the United Nations Food and Agriculture Organization collaborated in arranging the meeting.

After studying the present situation of research in marine biology in Latin America and its future possibilities, the delegates entered on an extensive discussion about the possibilities and ways of establishing an international network of laboratories. It was unanimously decided to create immediately under the auspices of the Unesco Science Co-operation Office a Latin American Committee to coordinate and facilitate the research work in marine biology. The Committee would remain in office until a permanent organization had been set up. The meeting requested the Unesco Office to prepare a draft convention for an international network of laboratories and convoke a meeting of official delegates in order to establish the corresponding organization, according to the November 27, 1954, issue of Nature, a British scientific journal.

The meeting also studied what other steps could be taken immediately pending the realization of the more far-reaching recommendations, in order to promote research in marine biology, and advised the Unesco Office that two training courses on the methodology of marine biology research and a symposum on plankton should be organized in 1955. It was also recommended that the Marine Biology Journal,

issued by the Montemar Station in Chile, should be widened in scope with a Latin American editorial board.

The Brazilian representatives to the meeting have been duly authorized by the Governor of the State of Sao Paulo to put at the disposal of the Unesco Science Cooperation Office for international research work the complete network of marine biological laboratories and stations and research vessels of the State of Sao Paulo. This offer will make it possible to initiate shortly international research and training programs in marine biology under the auspices of the Unesco Office.

PACIFIC SCIENCE ASSOCIATION

USE OF METEOROLOGICAL OBSERVATION SYSTEMS TO FORESEE FISHERY FLUCTUATIONS IN PACIFIC OCEAN: A plan to study the use of established systems of meteorological observation to foresee fishery fluctuations in the eastern, northern, and tropical Pacific Ocean was the subject for discussion at an informal conference of the Pacific Science Association held at the Scripps Institution of Oceanography in California on November 2 and 5, 1954. The meeting was held to see what could be done to coordinate the efforts of institutions engaged in oceanographic and fishery research in a large-scale long-term program to discover the meteorological and oceanographic causes of the major fishery fluctuations.

Tentative plans include:

1. Norpac: A summer synoptic oceanographic survey of the North Pacific, north of approximately 20° N. latitude, previously projected for 1954 but cancelled owing to physical inability of some of the organizations to participate, was now considered feasible for August 1955. With possible participation from Far Eastern organizations it might be extended to the Asian coast.

2. Eastropic: A southern counterpart of Norpac will be planned for October-November 1955. It is considered that completion of the synoptic studies based on "Shellback" (Scripps Institution of Oceanography, May-August 1952) and on "Mid-Pacific Oceanography" (Pacific Oceanic Fishery Investigations, January 1950-August 1952) will have provided a general understanding of the gross oceanographic features of this area so that Eastropic can advance to a special type of observation designed to give detailed descriptions of current interface phenomena, and to elucidate causes of changes in location and intensity of circulatory features. Coverage is to extend from Baja California to Peru and westward along the equatorial current system to 160° W. longitude.

Eastropic, in addition to the value it would have of itself, would be invaluable preparation for operations in the Geophysical Year. Members of the group will be keeping the Geophysical Year in mind in their planning and it will be a major agenda item for the next annual meeting of this group.

3. Time Series: Ultimate success in relating meteorological, oceanographic, and fishery phenomena will depend on adequate systems observing key events in each field. In meteorology the intensity of the observation in the eastern tropical Pacific is far below that necessary for good description and prediction of events. Since the tuna fleet operates in the area, their participation in reporting weather would greatly augment the intensity in this crucial area.

In oceanography the paramount problem is knowing what kind of continuing information would be useful. Norpac and Eastropic should advance the solution of this problem. The tide-gauge program and the Cabot-type operation planned for the Geophysical Year should advance it further. The group considered it desirable to look forward to tide-gauge operation continuously beyond the Geophysical Year.

In fisheries, difficulties exist in relating the fluctuations in time, place, and rate of capture to oceanographic events for want of sufficient knowledge on the reactions of fishes to physical, chemical, and biological elements in their environment. Laboratory experiments and intensive field observations on reactions are by their nature undertakings by individual institutions, but ready exchange of information on methods and results would facilitate progress.

Organization: It was proposed for further consideration that the various oceanographic and fishery research groups join themselves in a major group, to be known as the Eastern Pacific Oceanic Council, for the purpose of furthering oceanographic and biological investigations in the eastern Pacific for the benefit of fisheries. The functions of the Council, which would be a completely informal group with no official domestic or international governmental status, would be to assist in coordinated planning and execution of work at sea and to exchange information on research program results.

Participation: Persons from the following institutions participated in the November conference: Peruvian Hydrographic Office; Inter-American Tropical Tuna Commission; Scripps Institution of Oceanography; American Tunaboat Association; California Department of Fish and Game; South Pacific Fishery Investigations, U. S. Fish and Wildlife Service; Stanford University; California Academy of Sciences; Pacific Marine Fisheries Commission; Oregon Fish Commission; University of Washington, School of Fisheries and Department of Oceanography; Pacific Biological Station, Nanaimo, and Pacific Oceanographic Group, Nanaimo; University of Hawaii; Pacific Oceanic Fishery Investigations, U. S. Fish and Wildlife Service; Office of Naval Research, Geophysics Branch; Branch of Fishery Biology, U. S. Fish and Wildlife Service; State Department; George Vanderbilt Foundation.

TERRITORIAL WATERS

BRITISH PROTEST PERUVIAN 200-MILE CLAIMS: The British Government was questioned in the House of Commons on December 20, 1954, concerning its representations to Peru as a result of the latter's claims to a territorial waters limit of 200 miles, states a December 23, 1954, U. S. Embassy dispatch from London. The Secretary of State for Foreign Affairs replied:

". . .Her Majesty's Government do not admit the claim of the Peruvian Government to 200 miles of territorial waters or indeed to anything outside the normal 3-mile limit. The Peruvian Government were so informed in Notes delivered on 6th February, 1948; 15th October, 1952; 21st August, 1953; and 31st August, 1954. In these Notes it was stated that H. M. Government cannot recognize that British nationals and British vessels are subject to any form of control or restriction imposed by the Peruvian Government outside a 3-mile limit."

The Secretary of State for Foreign Affairs was also asked how many cases have been brought to his notice of countries making abnormal claims over the waters around their coasts, and he answered:

"Chile, Peru, Ecuador and El Salvador have claimed territorial waters of 200 miles in breadth. Argentina, Costa Rica, Honduras, South Korea, Nicaragua and Panama have made unspecified claims to waters lying above the Continental Shelf.

"Twenty-two other countries in Latin America, the Middle East and Europe have made claims to territorial waters of a breadth between three and twelve miles. The most recent note from the British Goverment (August 31, 1954) is as follows:

BRITISH EMBASSY, LIMA.
August 31, 1954

ATTITUDE OF HER MAJESTY'S GOVERNMENT TOWARDS THE DECLARATION OF THE MARITIME ZONE OF THE SANTIAGO CONFERENCE OF 1952.

Your Excellency,

With reference to Mr. Donnelly's Note No. 11 of the 6th of February, 1948, and Sir Oswald Scott's Notes No. 113 of the 15th of October, 1952, and No. 32 of the 21st of August, 1953, relating to territorial waters and the Continental Shelf, I have the honour to invite your attention to Supreme Resolution No. 179 of the 11th of April, 1953, in which the Peruvian Government approved the Declaration on the Maritime Zone signed at Santiago de Chile on the 18th of August, 1952, on the occasion of the first conference on the exploitation and preservation of the maritime riches of the South Pacific.

In this declaration the Governments of Peru, Chile and Ecuador purport to claim exclusive sovereignty and jurisdiction over the sea which washes the coasts of their respective countries up to a distance of 200 sea miles, in which exclusive sovereignty and jurisdiction they also include exclusive sovereignty and jurisdiction over the soil and subsoil in the maritime zone or area defined. The declaration further purports to make provision for the regulation of fishing and whaling in the maritime zone.

Her Majesty's Government regret that they cannot recognize the validity of these claims, and wish to remind the Government of Peru of the attitude of Her Majesty's Government concerning territorial waters, sovereignty over areas of the sea bed and sub-soil and the regulation of fishing.

Her Majesty's Government do not in principle recognize claims to a greater limit of territorial waters than three miles from low watermark, or, in the case of bays and estuaries, from a closing line drawn at the first point where they narrow to ten miles in width. Her Majesty's Government regard all sea areas outside these limits as part of the High Seas, on which (apart from exceptions not here material) vessels are subject solely to the jurisdiction and control of the State of their flag, and would therefore be unable to admit the claim of the Government of Peru to exercise jurisdiction and control in these areas over any vessels other than Peruvian vessels.

Her Majesty's Government, while not opposed in principle to claims for the exercise of sovereignty over the seabed contiguous to the coast of Peru, are unable to accept the claims set forth in the declaration of August 18, 1952, which purports to define the Continental Shelf as extending to the unprecedented distance of 200 nautical miles from the coast of Peru without regard to the depth of the sea. Her Majesty's Government would refer in this context to the article on the Continental Shelf adopted by the International Law Commission at its fifth session. Article I states that the term "Continental Shelf" as used in the Articles refers to the seabed and subsoil of the submarine areas contiguous to the coast, but outside the area of the territorial sea, to a depth of 200 metres. Article III states that the rights of the coastal state over the Continental Shelf do not affect the legal status of the superjacent waters as high seas. Article VI, section 1, states that the exploration of the Continental Shelf and the exploitation of its natural resources must not result in any unjustifiable interference with navigation, fishing, or fish production. In the opinion of Her Majesty's Government these articles are in general accordance with accepted principles of International Law.

Her Majesty's Government also recognize that the conservation of natural resources in the high seas outside territorial waters may be a legitimate interest of the coastal State; but this is only on condition that Conservation is effected by agreement with those States to whose nationals the conservation measures are to be applied. Her Majesty's Government note however with regret that the declaration of August 18, 1952, claims to establish conservation over the high seas in concert only with the Governments of Chile and Ecuador, without any such agreement with the other governments which may be concerned. Her Majesty's Government are therefore obliged to place firmly on record with the Government of Peru that, until an agreement has been reached to which Her Majesty's Government are a party they do not recognize, and will not consider their nationals as being subject to, any measures of restriction or control over the high seas outside territorial waters as recognized by Her Majesty's Government which the Government of Peru may see fit to promulgate in pursuance of the declaration.

I avail myself of this opportunity to renew to Your Excellency the assurance of my highest consideration.

(SIGNED) W. H. MONTAGU-POLLOCK.

His Excellency Dr. D. David Aguilar Cornejo,
Minister of Foregin Affairs, LIMA.

TRADE AGREEMENTS

ITALIAN-IRANIAN AGREEMENT INCLUDES FISHERY ITEMS: Representatives of Iran and Italy in Tehran on September 15, 1954, signed a new list of goods (including fishery products and fishing twine) to be exchanged under the provisions of the Trade and Payments Agreement of 1952 which remains in effect, according to a U. S. Embassy dispatch (November 18, 1954) from Tehran. Under the agreement Italy will export to Iran fishing twine. Iran will ship to Italy the following fishery items: caviar valued at US$30,000 (with Government authorization); mother-of-pearl, shells, and raw shells, $60,000; smoked salmon and fish flours with no values specified.

UNITED NATIONS

EXPERTS MEET TO ARRANGE INTERNATIONAL FISHERIES CONSERVATION: A group of experts appointed to advise the Secretary-General of the United Nations on the preparation of a technical conference on the conservation of fisheries and other resources of the sea met at United Nations Headquarters in New York City on January 10-13, 1955.

The advisory group, composed of 8 experts and 2 observers, discussed the agenda and other technical problems connected with the convening of the conference, officially titled, "International Technical Conference on the Conservation of the Living Resources of the Sea," which will meet in Rome in April 1955. The Secretary-General will now invite all United Nations members as well as member states of the specialized agencies to participate in the conference.

The results of the Rome conference, under the terms of General Assembly resolutions adopted during its ninth session, will be referred to the International Law Commission. The International Law Commission has had under study the wider problems relating to the high seas and territorial waters, etc., and the Assembly considered that the problem of the resources of the sea is linked to their solution. All U. N. member states and member states of the specialized agencies are invited to participate in the forthcoming conference.

The advisory group, presided over by Dr. Ansgar Rosenborg, Acting Director of the U. N. Division of Economic Development, was composed of the following experts:

Professor Umberto d'Ancona (Italy), Chairman, General Fisheries Council for the Mediterranean, Rome;
Dr. Nestore Bernardo Cacciapuoti (Italy), Deputy-Director, Natural Sciences Department, UNESCO, Paris;
Dr. Donovan B. Finn (Canada), Director, Fisheries Division, FAO, Rome;
Dr. Arni Fridriksson (Denmark), Secretary-General, Permanent International Council for the Exploration of the Sea, Charlottenlund Slot, Denmark;
Dr. John L. Kask (Canada), Chairman of the Fisheries Re-Research Board of Canada, Ottawa;
Dr. Cecil Miles (United Kingdom), Secretary, Indo-Pacific Fisheries Council, Bangkok;
Milner B. Shaefer (United States), Director of Investigations, Inter-American Tropical Tuna Commission, La Jolla, California;
Dr. Enrique del Solar (Peru), Sociedad Nacional de Pescaria, Ministry of Foreign Affairs, Lima, Peru.

The two observers participating were:

William C. Herrington (United States), Special Assistant for Fisheries and Wildlife to the Under-Secretary of State, Department of State, Washington, D. C.;
W. Vincent J. Evans (United Kingdom), Legal Adviser to the United Kingdom Delegation to the United Nations New York.

WHALING

ICELAND AND JAPAN OBJECT TO BAN ON BLUE WHALE: In an effort to prevent extinction, the International Whaling Commission at its last meeting at Tokyo in July 1954 recommended the total prohibition of the taking of blue whales in the North Atlantic and North Pacific oceans for a period of five years. That recommendation was made because of the depleted numbers of the mammal through the heavy toll taken over the years, according to The Fishing News (November 19, 1954), a British fishery magazine.

According to a press notice issued by the International Whaling Commission, both Iceland and Japan object to this proposed control. In the case of Japan they have intimated that while rejecting the prohibition they will take voluntary steps to conserve whaling resources in the North Pacific area.

The three main Japanese whaling companies have agreed to send only one fleet to that area in 1955 although two operated there in 1954.

In the case of Iceland, no reason has been given for its refusal to cooperate in the conservation of the blue whale.

Under the procedural rules of the International Whaling Commission, the prohibition recommended would have become operative in the absence of objections after a period of 90 days of notice given which was due to end at midnight, November 7, 1954.

Because these two objections have been received, another 90 days' notice is required during which the other parties interested in conservation (who have not objected to the control) may consider their course of action. The other parties in the North Atlantic area are Norway, Faroe Islands (Denmark), West Greenland (Denmark), Newfoundland (Canada), and Great Britain.

The blue whale, the largest of all whales and the most gigantic land or sea animal known to have lived or to be living, is threatened with total extinction. It can obtain a length of about 100 feet, but its average size is between 80 and 85 feet. A good specimen yields from 100 to 120 barrels of oil.

The North Atlantic catch of blue whales in 1954 was Iceland 5, Norway 7, Faroes 2, West Greenland 1, Newfoundland and Great Britain none. The total catch in the area was thus only 15 blue whales. At that rate the species is obviously in grave danger of extinction.

The Japanese catch in the North Pacific of blue whales in 1954 was 22. It was 47 the year before, 7 in 1950, and 14 in 1949.

Algeria

FISH AND SHELLFISH SUPPLY AND CONSUMPTION, 1953: Algerian production of fish and shellfish in 1953 totaled 233,000 metric tons, total imports amounted to 63,000 tons, and exports 70,000 tons. This made a total of 226,000 tons available for human consumption, a U. S. consular dispatch (November 17, 1954) states.

Australia

DYNAMITE INEFFECTIVE IN REPELLING SHARKS: When carbide and gelignite charges were used to repel sharks at Point Cloates whaling station (Western Australia), the sharks were hardly affected, and the experiments proved a failure, says the Australian Fisheries Newsletter.

Charges of gelignite consisting of four 8-inch plugs with a 16-second fuse were used. When the first charge was thrown into the water about 20-feet from the whales, which many sharks were attacking, sharks near the charge were able to swim away before it exploded. Some continued to feed off the whales and none seemed to suffer any effects from the blast.

When a second charge was exploded close to five sharks, one was blown over on its back but quickly recovered and swam away. The other four were not affected. All the shark repellants so far tried at the station have proved ineffective.

Benelux Countries

FISHERY PRODUCTS SUPPLY AND CONSUMPTION, 1953/54: Total production of fresh and canned fishery products (including mussels and oysters) in Belgium and Luxembourg during 1953/54 (August-July) amounted to 66,000 metric tons, according to a November 16 U. S. Embassy dispatch from Brussels. In the same period net imports of fishery products totaled 52,000 metric tons. The consumption of fishery products during the period was estimated at 118,000 metric tons. Estimates for the year 1954/55 place production of fresh and canned fishery products at 63,000 metric tons, net imports 48,000 tons, and total consumption 111,000 tons.

Net imports of fish oil into the Benelux countries in 1953/54 totaled 18,000 metric tons. Since about 3,000 tons were for nonfood use, consumption for food amounted to 15,000 tons. Net fish oil imports for 1954/55 are estimated at 14,000 tons.

Brazil

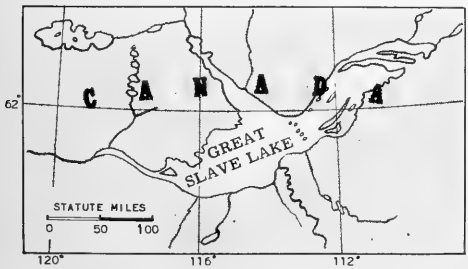
FISHERY PRODUCTS SUPPLY AND TRENDS, 1954: The estimated Brazilian fish catch in 1954 amounted to about 200,000 metric tons as compared with 190,000 tons in 1953 and 174,630 tons in 1952. Total Brazilian imports of fishery products in 1954 were estimated at 25,000 metric tons, while imports in 1953 amounted to 22,527 tons and in 1952 totaled 49,193 tons.

Fish is available in Brazil mainly in sea ports or in rivers near the source of the catch. There is little freezing or canning and present transportation and storage facilities are inadequate for proper handling. Fish catches nevertheless have been increasing. Fish is not commonly a part of the poor man's diet as prices are very high, usually considerably higher than meat.

The Klein-Saks mission had several recommendations to make on Brazil's fishing industry, such as introducing salting and drying procedures for greater fish utilization in the interior, building freezer warehouses to preserve large catches, research and mapping to locate fishery resources, and eliminating the present 8 percent marketing tax.

Brazil imported 22,500 tons of dried fish in 1953 and would probably import at least this quantity in 1954. Dried-fish imports are less of an exchange problem since imports can be made from European countries in trade-agreement currencies.

Canada



GREAT SLAVE LAKE CATCH SHOULD CONTINUE LARGE: Great Slave Lake in Canada's Northwest Territories will continue for years to come to yield an enormous annual catch of about 9 million pounds of fresh-water fish in the opinion of Canadian fishery scientists. This lake covers an area of 11,070 square miles and is the deepest lake on the North American continent. It is also the continent's largest producer of lake trout and whitefish

combined. The report states that the lake is unique in that it supports the only known large fresh-water commercial fishery studied from its inception and regulated according to scientific findings. Commercial fishing opened on the Lake in 1945 and most of the catch finds its way into United States markets, according to a recent release from the Canadian Department of Fisheries.

The Director of the Central Fisheries Research Station, Winnipeg, reported to the annual meeting in Ottawa of the Fisheries Research Board of Canada that Great Slave Lake is not being overfished at the present rate of exploitation.

Ceylon

JAPANESE LONG-LINE VESSEL MAKES GOOD TUNA AND COD CATCH OFF CEYLON: A Japanese-operated long-line vessel in the first experimental trip off Ceylon caught 14 metric tons of fish, mainly large tuna and cod, according to the November 19 issue of The Fishing News, a British fishery magazine. The vessel used 35 miles of long lines and covered 550 miles in 10 days. Fishing was done on alternate days, allowing time for the crew to dress and preserve the fish on ice.

This test cruise is part of a joint Japanese-Ceylonese research program conducted by a Japanese research team which is concentrating on tuna fishing. Experiments in various aspects of fishing such as wind velocity, water currents, and tides have been made. If the survey proves favorable, a Japanese firm will be allowed to set up a fish-canning factory in partnership with Ceylonese interests. The necessary permission has already been granted by the Ceylonese Government. Ceylonese fishermen will be trained to operate the fishery.

The corporation intends to can fish, maké maldive, and dry fish, and establish a boat-building yard. One of the Ceylonese promoters stated that he was in touch with U. S. interests to supply yellowfin tuna to the United States market.

Note: See Commercial Fisheries Review, December 1954, p. 56.

Chile

FIVE FISHING VESSELS BOUGHT FROM SPAIN: Chile has acquired from Spain five small fishing vessels for service on the Chilean coast, according to a Chilean press report. These vessels, which were expected to arrive in Chile early in December 1954, are equipped with 250-hp. motors, have a storage capacity of 60 metric tons, and accommodations for 10 men. Cost of each vessel is estimated at 10 million pesos (US$50,000), reports the December 25, 1954, Foreign Trade, a Canadian Government publication.

Colombia

FISHERY PRODUCTS SUPPLY AND CONSUMPTION, 1953-54: Total production of fishery products in Colombia during 1954 was estimated at 15,000 metric tons and imports amounted to 2,500 tons, making a total of 17,500 tons available for food. There were no exports of fishery products in 1954. In addition, Colombia imported 500 tons of marine oils for ultimate consumption in food, according to a November 29, 1954, U. S. Embassy dispatch from Bogota.

Colombian production of fishery products in 1953 totaled 15,000 tons and imports amounted to 2,100 tons; the total supply available for food was 17,100 tons. Marine oil imports in 1953 totaled 500 tons.

Costa Rica

STATUS OF THE FISHERIES: Although Costa Rican waters abound with fish, domestic consumption of fresh fish is small and canned fish is largely imported. Tuna is the most valuable commercial fish, and is the only variety which figures largely in exports. However, the tuna are caught, processed, and shipped abroad by North American companies. Fisheries byproducts, such as fertilizer, would be useful to the country but are not available in sufficient quantity, according to a recent U. S. Department of Commerce economic report on Costa Rica.

A rough estimate of the value of the salt-water fishing industry to Costa Rica in 1949, including boat licenses, export taxes, contract payment on export of frozen tuna, and miscellaneous items, amounted to nearly US$79,000, approximately 15 percent of the recorded value of fish exports. The total revenue derived by Costa Rica from fisheries in 1949, both salt water and fresh, including items for export and domestic consumption, was about US$300,000.

One of the unfavorable aspects of the 1953 economy was the increasing decline of the fishing industry in Puntarenas. Restocking of the Gulf of Nicoya with bait fish appeared by the end of 1953 to have been a success, but it remained to be seen whether the United States tuna fleet would resume putting into Puntarenas in anything like its former numbers. Deliveries of the small fleet of Costa Rican tuna boats to Puntarenas' small cannery were insignificant, and local shrimp boats seemed unable to locate or exploit any sizable banks. At the end of 1953 the Ministry of Agriculture was debating measures to stimulate and expand Pacific Coast fishing.

The following figures point to the decline in Costa Rica exports of fishery products since 1948:

	1951	1948
Tuna:		
Frozen	US$19,498	US$676,665
Canned	11,677	131,395
Shark livers	15,057	42,753
Fish livers	1/	11,728
Live turtles	12,135	4,126
Total exports	58,367	866,667

1/ Data are not available.
Source: Direccion General de Estadistica; Estadistica de Commerico Exterior, 1948 and 1951.

Costa Rican exports of frozen and canned tuna to the United States in 1951 totaled 3.0 million pounds as compared with the 1949 total of 9.0 million pounds.

Denmark

FISHERY PRODUCTS SUPPLY AND CONSUMPTION, 1953/54: Total production of fishery products in Denmark during 1953/54 (August-July) amounted to 351,400 metric tons, an increase of 20 percent as compared with the previous year. All of this

increase was in fish for reduction, a November 12, 1954, U. S. Embassy dispatch from Copenhagen points out. Danish imports of fishery products in 1953/54 totaled 32,200 metric tons, bringing the total supply available during the year to 383,600 metric tons. Stocks on hand at the beginning and end of the period are not available but usually are very small and fluctuate very little.

Danish fishery products (except canned) used for domestic consumption during 1953/54 totaled 50,000 metric tons, and fish used for canning amounted to 30,000 tons. Fish reduced to fish meal and oil totaled 199,200 tons; while the remainder of the supply (104,400 tons) was exported in 1953/54.

Estimates for the Danish fish supply in 1954/55 are: production (minus waste) 325,000 metric tons, imports 30,000 tons, and exports 95,000 tons.

Egypt

SPONGE FISHERY PRODUCTION, 1954: Production of sponges during the 1954 Egyptian sponge-fishing season totaled 36,987 pounds, reports a U. S. consular dispatch (November 27) from Alexandria. The concessionnaire had expected a yield of about 55,000 pounds. Owing to the delay alleged to have been caused by indecision

Egyptian Sponge Production by Types and Grades, 1954

Type	1st Grade	2nd Grade	3rd Grade	Total
	(In Pounds)			
Honeycomb	12,100	6,050	3,025	21,175
Turkey cup	6,875	2,475	1,650	11,000
Zimoca (zimouha)	3,025	1,375	412	4,812
Total	22,000	9,900	5,087	36,987

of the Egyptian authorities in negotiating the concession, actual fishing operations were retarded, and the Greek fishermen available when the concessions were granted were less capable than the average Dodecanesian sponge fishermen. It is said that the best fishermen operated in waters off the Libyan coast (40 boats) since their permits were granted very early in the year.

The Egyptian Government granted 16 sponge-fishing permits at £E1,000 each (US$2,880) for a total of £E16,000 (US$46,080).

Finland

FISHERY PRODUCTS SUPPLY AND UTILIZATION, 1953/54: Total Finnish production of fishery products in 1953 amounted to 61,400 metric tons round weight--comprised of a salt-water catch of 42,500 tons in home waters and 1,200 tons in Icelandic waters, and a fresh-water catch of 17,500 tons. Finnish imports of fishery products (product weight) in 1953/54 (August-July) totaled 12,200 tons, and the stocks on hand August 1, 1953, were 300 tons, according to a November 23, 1954, U. S. Embassy dispatch from Helsinki. The total supply of fishery products available during 1953/54 was estimated at 73,900 tons.

The utilization of the 1953/54 supply included 56,100 metric tons consumed as food, 3,500 tons for fish meal, 14,000 tons lost in processing, and a 300-ton supply on hand at the end of the period (July 31, 1954).

Production of fishery products in Finland during 1954/55 is estimated at 60,000 metric tons. Estimates of utilization are: human consumption 56,000 tons, fish meal 3,500 tons, loss in processing 14,000 tons, and carryover at the end of the year 300 tons.

Formosa (Taiwan)

REVIEW OF THE FISHERIES, 1954: Production, January-October: Total production of fishery products in Formosa (Taiwan) during the first 10 months of 1954 amounted to 131,384 metric tons. Of this, offshore fisheries accounted for 22,901 tons, inshore fisheries 35,558 tons, coastal fisheries 39,647 tons, and fish culture 33,278 tons. The Formosan fisheries production goal for 1954 was 140,000 metric tons. The Formosan fisheries production of 130,593 tons in 1953 established a new record in volume, surpassing the previous record of 119,520 tons in 1940 which was during the Japanese administration.

Formosan-built trawlers. To increase the fish catch of the island, the United States Foreign Operation Administration has earmarked funds for construction of 30 ocean-going fishing vessels.

Mechanization of Small Fishing Craft: Some 7,500 sampans and 14,000 bamboo rafts are engaged in coastal fishing in Formosa. A program is now under way to install Diesel engines of 4 to 6 horsepower on the sampans. Low interest loans are provided by the Fisheries Bureau and the Joint Commission on Rural Reconstruction to the fishermen for procuring the engines (mostly made in Japan). Up to the end of 1954, a little over 100 sampans were thus mechanized. The result has been very satisfactory. In some localities the fishermen on mechanized sampans are making $2\frac{1}{2}$ times as much money as the fishermen on sampans without engines.

New Research Vessel: Construction of the 100-ton research vessel M/V Hai Ching in Japan was completed, and the vessel was brought to Formosa in April 1954. The Hai Ching belongs to the Taiwan Fisheries Research Institute, and is equipped with mechanical refrigeration, fish finder, direction finder, radiotelephone, etc. It has already made two fishing trips to the fishing grounds north of Formosa and one trip to the South China Sea. Exploratory fishing was the main purpose of these trips.

--T. P. Chen,
Joint Commission on Rural Reconstruction
Taipei, Taiwan

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FISHERIES OUTLOOK: Significant increases in fisheries production have been achieved in Formosa during recent years, reports a November 19, 1954, U. S. Embassy dispatch from Taipei.

The Government's Four-Year Plan (1953-56) includes provisions for the increase and improvement in all the pertinent aspects of the industry including boats, equipment, shore facilities, refrigeration, and fish-pond culture. The policies of the Agricultural Four-Year Plan as they affect fisheries are:

1. To utilize fully the amount of United States aid funds available in constructing fishing vessels and shore installments, with the objective of turning the prevailing restricted fishery production, consisting chiefly of coastal fishery and fish culture, into broadened and full-scale production, including deep-sea, inshore, and coastal fisheries and fish culture.

2. To increase the supply of fish locally for the purpose of improving the diet of the military and civilian population and to save the current disbursements of foreign exchange on the import of dried cuttlefish and salted fish.

3. To carry on the construction of fishing harbors and shore installations in order to afford better facilities and opportunities for fishermen.

Fish auction at Fisheries Rehabilitation Administration fish market in Keelung, Formosa.

It is estimated that the funds required for the fisheries programs will total NT$46.0 million (US$336,000) in fiscal year 1955, and NT$41.3 million (US$550,000) in fiscal year 1956.

Formosan Fisheries Production Goals, 1955-56

Fishery	1955	1956
	(Metric Tons)	
Deep sea	39,000	45,000
Inshore	42,000	44,000
Coastal	42,500	43,000
Fish culture	36,500	38,000
Total	160,000	170,000

Formosan fisheries production goal for 1955 is set at 160,000 metric tons and for 1956 at 170,000 tons (see table):

The total value of Formosan sea products imports in fiscal year 1955 is estimated at US$4.0 million and in 1956 at US$5.0 million. The value of fish-meal imports during the same years is estimated at US$3.0 million and US$5.0 million, respectively.

The value of Formosan exports of sea products in fiscal year 1955 and 1956 are estimated at US$350,000. The value of fish-liver oil exports for fiscal years 1955 and 1956 are estimated at US$100,000 for each year.

France

FISHERY PRODUCTS SUPPLY AND CONSUMPTION, 1953/54: Total French production of sea fish (excluding salted cod production of 50,000 tons) in 1953/54 (July-June) was estimated at 327,000 metric tons and shellfish at 10,000 tons. Imports exceeded exports of sea fish by 17,000 tons, shellfish by 1,390 tons, and canned fish and shellfish by 25,174 tons; but exports exceeded imports of salted, dried, and smoked sea fish by 23,327 tons. The net import trade balance for all fishery products was 20,237 tons. Per-capita consumption of all fishery products in 1953/54 was estimated at 21.3 pounds.

During 1952/53, French production of sea fish (excluding salted cod) totaled 315,000 metric tons and shellfish 14,000 tons. Imports exceeded exports of sea

fish by 13,124 tons, shellfish by 3,514 tons, and canned fish and shellfish by 25,676 tons; but exports exceeded imports of salted, dried, and smoked sea fish by 12,690 tons. The net import trade balance for fishery products was 29,624 tons. Per-capita consumption of all fishery products in 1952/53 amounted to 23.8 pounds, somewhat higher than the consumption of 21.3 pounds the previous year and the prewar consumption of 22.9 pounds.

French Morocco

SARDINE FISHERY TRENDS, OCTOBER-DECEMBER 1954: Production: The French Moroccan sardine fishing fleet had poor success during the last quarter of 1954, reports a December 28, 1954, U. S. consular dispatch from Casablanca. Catches were particularly light during the fall months, and the quality was mediocre. According to reliable information, the total French Moroccan sardine catch at the end of September 1954 was 54,000 metric tons, compared to 84,000 tons at the end of September 1953. The industrial fishing ports of Agadir and Safi were at a particular disadvantage because of the fishing situation; the former port reported sardine catches through early October 1954 of 25,000 metric tons, compared to nearly 40,000 metric tons at the same time in 1953.

Typical sardine vessel used for purse seining by Moroccan fishermen.

One-third of the Agadir fleet was reported to be covered with provisional seizures for debts totaling over 100 million francs (US$286,000). A similar situation existed at Safi where the debts of the fleet owners were even higher.

The sardine schools appeared to have partially abandoned the southern Moroccan coast, since relatively better catches were frequently made farther north near Mogador and Mazagan, but even in these ports the season was not encouraging.

Canning: The sardine and tuna catches delivered to French Moroccan canneries have been of mediocre quality and insufficient quantity to permit the industry to produce and export under normal conditions, hence, the income of this industry for 1954 was considerably reduced. Nevertheless, owing to the reorganizational agreements which entered into effect in July 1952 and will continue through mid-1955, the industry appears to be as prepared as possible to withstand present difficulties. With a view to the renewal of these measures and agreements governing the formation of canners associations and their continuation in effect during another five years at least, the Director of Commerce in June 1954 issued a decision designed to modify these relationships and to give them a more solid juridical framework. The principal provisions of this decision are:

(1) The 600,000-case duty-free import contingent for the French metropolitan market for 1955/56 will be distributed among producers on the basis of their average exports during the period June 1949 through June 1953;

(2) A right of examination is assured to the federation of canners and the Protectorate administration to insure that agreed minimum export prices are respected by shippers;

(3) Each producer must fill an assigned annual quota of sales outside the Franc zone; if he succeeds in selling more than his quota his portion of the French contingent will be increased proportionately (to a maximum of 8 percent) or reduced (to a maximum of 5 percent) in the event of failure to fill the quota;

(4) Injustices which have resulted from the distribution of the French contingent according to the system in effect since 1952 will be remedied by distributing 5 percent of the 1955/56 contingent among producers thus disadvantaged.

During September 1954 another governmental measure appeared which affected the fish-canning industry. The Office Cherifien de Controle et d'Exportation, the official agency controlling the standard of foodstuff exports, decided that henceforth canned fish exports will be classified and shipped according to quality and grade in accordance with the preferences and standards of the various foreign markets for which they are destined. Thus a particular foreign customer will be more likely to receive the quality and size of sardine which best suit his taste, and to find this product preserved in the oil or sauce of his preference.

Exports: Total French Moroccan exports of canned fish during the first nine months of 1954 amounted to 22,096 metric tons, nearly 25 percent lower than the 29,396 tons exported in the corresponding period of 1953, according to official statistics. This development was due to the absence of stocks from other years combined with the consequences of a poor fishing season in French Morocco and a favorable fishing and canning season in Portugal. The local industry was preoccupied in obtaining sufficient good-quality fish to supply existing markets, hence it appeared unlikely that efforts to develop foreign markets could again be made before the beginning of the 1955 fishing season.

Published reports covering the first six months of the year showed more specifically that French Morocco had exported 528,000 cases of sardines--270,000 fewer than in the first half of 1953--while Portugal exported some 777,000 cases, or 113,000 cases more than in 1953. French Moroccan producers sold 136,000 fewer cases of sardines to Indochina, 104,000 fewer cases to metropolitan France, and fewer cases to the United States. Exports to Great Britain, on the other hand, reportedly rose to 27,000 cases during the first six months, compared to less than 1,000 cases in the corresponding period of 1953, following the placing of this commodity under the Open General License regulations in that country.

German Federal Republic

WHITE FISH LANDINGS BY ICELANDIC VESSELS PLANNED TO STABILIZE MARKET: In an attempt to counteract severe fluctuations in the domestic fish market, the West German Federal Government has been endeavoring to adapt fish supply to actual demand through a bilateral trade agreement concluded with Iceland in July 1954. This agreement provides for increased and better-timed landings of white fish[1/] by Icelandic vessels, a November 10 U.S. consular report from Bremen states.

1/The term white fish covers all species of marine fish, except herring and shellfish.

White fish comprises about 50 percent of all sea fish consumed in West Germany. The bulk of all white fish consumed in West Germany is caught by German fishermen. Imports from other countries of this type of fish play a minor role in quantity, but they are important as a stabilizing factor on the German market. Landings of white fish by German vessels during the past 3 years averaged 270,000 metric tons as compared with annual imports from other countries of 13,500 tons, equal to 5 percent of the total white-fish supply. In the past 3 years Iceland has supplied between 50-57 percent of these imports. Other important fishery products import items in 1953 were: fresh herring and sprats 54,500 tons, pickled herring 10,280 tons, fish preserves 14,896 tons.

During the first seven months of the year landings of white fish by German vessels are plentiful. However, from about the beginning of August until the end of December, when a large part of the German trawler fleet catches herring only, there is a noticeable lack of white fish, invariably resulting in steep price increases. According to the trade, these fluctuations in supply and price have had a tendency to scare consumers away from the fish shops, a condition running directly counter to the endeavors being made both by the fish trade and the Government to promote fish consumption.

In order to deal with the problems involved in bringing about a uniform supply of fish to the German market, a committee was formed several years ago consisting of representatives of the fishing trade--producers, processors, and distributors--under the chairmanship of an official of the Fish Section in the Foreign Trade Division of the Federal Food Ministry. This committee worked out plans under which only a certain percentage of the trawler fleet should be diverted from the white fish trade for the catching of herring. But even under this plan, which has more or less been adhered to by the fishing companies, the supply of white fish was found to be inadequate. As a result, during the second half of each year fish processors and traders are usually clamoring for additional imports of white fish from other countries to offset the temporary shortage in domestic landings and to stabilize prices. Of all European fish-producing countries, Iceland seems to be the only potential additional supplier of white fish.

In past trade agreements between Iceland and the West German Federal Republic, ample provisions had been made for the importation of Icelandic white fish. Unfortunately, these quotas have never been utilized in full by the Icelandic producers principally because of low returns received. Reportedly, Icelandic fish landings in West German ports have not always met the quality standards and much was sold to fish-meal factories. Icelandic producers thus received less for their fish in German auctions. This discouraged them from landing more fish in West German ports. There have also been complaints that Icelandic trawlers received discriminating treatment in German ports as they were not unloaded until all German trawlers in port were unloaded first; further that discharging fees for Icelandic catches were 50 percent higher than for comparable German landings, and that the auction fee was $4\frac{1}{2}$ percent instead of the 4 percent charged for auctioning German-caught fish. On the other hand, German fishery officials have stated that the Icelandic supplies very often arrived at inopportune times, when ample supplies were arriving by German trawlers.

To overcome all these difficulties, an agreement worked out between Iceland and the West German Federal Republic was added in the form of an additional protocol to the trade agreement between the two countries which became effective July 1, 1954. In accordance with this agreement, steps have been taken by the authorities in Germany to avoid any discriminatory treatment of Icelandic fishing vessels or catches. The German Committee for Market Supply regularly issues recommendations as to when and what quantities of Icelandic fish are needed to fill the gap in the German white fish catch. The Icelandic vessels have agreed to follow these recommendations. In both countries a central authority has been instituted, whose func-

tion is to properly time the arrival of Icelandic fish catches in German ports, since experience has shown that the arrival of too many trawlers at one time and the resultant acute oversupply tends to depress prices considerably. Icelandic fishermen agreed to a stricter adherence to German quality standards for edible fish.

During September and October 1954 landings of Icelandic white fish in West German ports totaled 5,301 metric tons as compared with 2,897 tons and 4,546 tons for the same month in 1953 and 1952, respectively.

It was reported that in November 1954 there was expected to be a further increase in landings of Icelandic fish. In the recent trade agreement the West German Government has declared its preparedness to license imports of Icelandic white fish up to DM7.5 million (US$1.8 million). The same amount was stipulated for 1952 and 1953, but in each year white fish supplies from Iceland did not exceed DM2.8 million (US$670,000). Icelandic supplies in 1954 through October were valued at approximately DM2.5 million (US$600,000). It had not been possible, though, to determine yet whether Iceland would ship fish up to the full quota in 1954. The Federal Food Ministry indicated that it would not come as a surprise if Iceland were unable to supply the full amount, since that country has entered into contracts with Soviet Russia and the Eastern Zone of Germany for large supplies of sea fish after its fish exports to Great Britain collapsed over the disagreement about the Icelandic fishing zones.

* * * * *

MARKETING PLAN TO CONTROL FISH CATCH AND IMPORTS: A law recently passed in Germany authorizes the Federal Minister for Food and Agriculture to set up annually a supply plan determining the quantities of fish available from domestic deep-sea fishing and the quantities to be imported. The new law (Gesetz ueber den Verkehr mit Fischen und Fisch aren, Fischgesetz--Law on the Marketing of Fish and Fish Products--Document No. 213) also provides for the establishment of an advisory board of representatives from the Federal Government, the Laender concerned, the fishing industry, and the consumers. The advisory board would assist the Minister in implementing the marketing law, states a January 6, 1955, U. S. consular dispatch from Bonn.

Greece

FISHERY PRODUCTS PRODUCTION AND SUPPLY, 1954/55: Greek production of fishery products in 1954/55 (July-June) will total 60,000 metric tons (including salted, dried, and canned fish converted to landed weight). Greek imports of fishery products during the fiscal year are expected to exceed exports by 25,100 metric tons. The total available supply of fishery products during 1954/55 will amount to 85,100 tons, reports a U. S. Embassy dispatch (November 25, 1954) from Athens.

For the year 1953/54 the Greek supply of fishery products was estimated at 77,600 metric tons, consisting of a production of 60,000 metric tons and an excess of imports over exports of 22,600 metric tons.

Annual per-capita consumption of fishery products (landed weight) is expected to increase from 9.4 kilograms (20.7 pounds) for fiscal year 1953/54 to 10.2 kilograms (22.4 pounds) for fiscal year 1954/55.

Preliminary statistics for calendar year 1954 show a production of fishery products (including salted, dried, and canned fish converted to landed weight) of 60,000 metric tons, compared to 55,000 tons in 1953 and the prewar 1935-38 average of 35,000 tons.

Iceland

FISHERIES FUND ACT REVISION: A Fisheries Fund for loans to assist in the promotion and development of the fishing industry in Iceland (Act No. 34) was passed in 1943. Objections developed to Act No. 34, principally on the basis that it did not provide sufficient funds, and on April 12, 1954, two Althing resolutions were passed concerning revision of the Act. As a result, the Minister of Fisheries appointed a committee to present new legislation for consideration in the next session of the Althing, a December 17 U. S. Legation dispatch from Reykjavik points out.

The bill developed by this committee was presented to the Althing on November 1 and completed its first reading on November 5, 1954. Due to the powerful governmental support behind the bill it is expected to be passed in substantially the form as presented. Final action is expected in February or March 1955.

The principal provisions of the bill are as follows:

The purpose of the Fisheries Fund of Iceland is to aid Iceland's fishing industry, particularly the motorboat industry, with favorable capital loans. The source of income for the Fund is export fees on fishing products amounting to about IKr. 7 million (US$429,000) per annum and the interest received on loans granted by the Fund. The Fund is permitted to borrow capital for its operation and the State Treasury is authorized to guarantee loans of as much as IKr. 50 million (US$3.1 million) for this purpose, an increase from the IKr. 4 million (US$245,000) provided under the previous bill.

The Fund shall grant loans only to:

(a) Fishing vessels, including open motorboats; vessels under 200 tons shall have priority.

(b) Processing plants for sea products and other projects which improve conditions for fisheries and utilization of sea products. The loans shall be only against first mortgages and may amount to as much as two-thirds of the cost or assessed price of new fishing vessels and three-fifths of the price of new fish-processing plants and other real estate for the fishing industry. Loans for fishing vessels built locally may amount to as much as three-fourths of the cost or assessed price. The maximum loan from the Fund is IKr. 1,250,000 (US$766,000) for fishing vessels and IKr. 600,000 (US$37,000) for real estate; the maximum loan period is 20 years. Interest shall be at 4 percent on loans for vessels and 6 percent on other loans, payable in advance. Interest on defaulted payments is $\frac{3}{4}$ percent for each month overdue. The normal interest rate in Iceland is 7 percent.

The remainder of the bill gives details concerning the internal operations of the Fund and the method of collection of amounts overdue. The Fisheries Fund is to be an independent institution under the supervision of the Minister in charge of Fisheries. The Fisheries Bank of Iceland, Ltd., Reykjavik, is to manage the Fund's administration and operation.

The following is a statement of the estimated operations of the Fund during 1955:

		IKr.	US$
Estimated loans as of January 1, 1955	-	60,000,000	3,700,000
Loans promised but not granted as of January 1, 1955	-	10,000,000	600,000
Additional loans during 1955:			
Renewal of motorboat fleet	-	17,000,000	1,100,000
Purchase of engines	-	7,000,000	400,000
Fishermen's sheds and processing buildings	-	4,000,000	200,000
Total Additional Loans	-	28,000,000	1,700,000
Grand Total	-	98,000,000	6,000,000
Less installments $\frac{1}{20}$ of IKr. 60,000,000	-	3,000,000	200,000
Net credit extended on December 31, 1955	-	95,000,000	5,800,000

It is estimated that over a period of five years total loans will increase to IKr. 180 million (US$11.0 million). In addition, the fisheries loan department of the National Bank of Iceland has about IKr.70 million (US$4.4 million) out on loan. The capital of the fisheries loan department was originally IKr.100 million (US$6.1 million), principally for the purchase of new trawlers. It is proposed that the capital of the fisheries loan department be increased again to that amount and consideration be given to combining the Fisheries Fund and the fisheries loan department of the National Bank of Iceland.

At the end of September 1954 funds totaling IKr.55 million (US$3.4 million) were out on loan and another IKr.8.5 million (US$520,000) was promised for fishing vessels under construction. Additional applications had been submitted for 12 fishing vessels to be constructed in Iceland and 26 fishing vessels to be built abroad. The total loan requirement for these vessels is estimated at IKr.25-27 million (US$1.5-1.7 million). Additional applications under preparation were for 35 vessels, valued at approximately IKr.25 million (US$1.5 million). It is estimated that the annual construction of new motorboats will total about 1,000 tons requiring new loans of IKr.17 million (US$1.1 million) a year.

Loans for new motors to recondition the existing fleet are estimated to total about IKr.7 million (US$400,000) annually, based on the experience of previous years.

The financing of fishermen's sheds is a new field of operation for the Fund. These sheds are needed for the motorboat fleet at its base of operation and are used for storing fishing gear and for baiting the lines on shore. The number of such sheds is inadequate in many places.

Considerable funds are needed for the construction of processing buildings--freezing plants and buildings for processing salted fish and stockfish. The construction of fish-processing plants has not kept pace with the demand. The need for processing plants has increased because the catch has been increasing and, due to the British landing ban on fresh fish on ice, a large percentage of Iceland's fish is now being processed instead of exported as caught.

The total need for new loans is felt to be beyond the capacity of the Fisheries Fund so an agreement has been made between the Fund and the Development Bank of Iceland providing for the Bank, as funds become available, to grant loans for the construction and improvement of larger fish-processing plants and freezing plants. Smaller construction will be financed by the Fisheries Fund.

The Icelandic Government has given a high priority to the expansion of activities of the Fisheries Fund in order to give maximum support to the fishing industry which is basic to the economy of Iceland.

India

STATUS OF FISHERIES DEVELOPMENT: By means of several Government-sponsored projects, the Government of India is attempting to enlarge the surprisingly small contribution which fish is making to the national diet. Consumption of fish in India has been roughly estimated at 1 million metric tons, which is the equivalent of only about 3 calories per capita per day, despite the fact that India is almost entirely surrounded by water. The value of the total catch of fresh-water fish in 1950/51 has been estimated to be about Rs.160 million (US$33 million) and of sea fish Rs.120 million (US$25 million). In addition, Rs.66 million (US$14 million) has been nationally estimated as the value of fish caught by persons other than fisher-

men. Annual imports, mostly from Pakistan, are worth about Rs. 16 million (US$3 million). These values are extremely small in relation to the estimated value of India's agricultural production, namely, Rs. 49 billion (US$10 billion) in 1950/51. They are also small in comparison with meat production valued at Rs. 800 million (US$167 million) despite the fact that many Indians who have scruples against eating meat will eat fish, a January 10, 1955, U. S. Embassy dispatch from New Delhi points out.

According to the Five Year Plan Progress Report for 1953/54, Rs. 51.4 million (US$10.7 million) were provided for fishery development by the states and by the Center, but only about 25 percent had been spent in the first three years of the Plan. For developing inland fisheries, a vast number of fry and fingerlings have been stocked in the waters of Madras, Bombay, Bihar, and Orissa. For developing marine fishing, boats are being equipped with engines in Bombay, Madras, and Travancore-Cochin. The Deep Sea Fishing Station at Bombay is operating two cutters and two boats for charting 12,000 square miles within the 40-fathom line of the Bombay and Saurashtra coasts. These vessels landed 410 tons of fish in 1953/54, which is about double the quantity landed in 1951/52. Exploratory fishing is also being carried out by the West Bengal Government with two cutters which landed 363 tons in 1953/54 as compared with less than 200 tons in 1950/51. A Japanese trawler has undertaken commercial fishing operations on the West Coast. Services of Japanese and Norwegian experts have been obtained under the U. S. Technical Aid Program and the Norwegian Aid Program.

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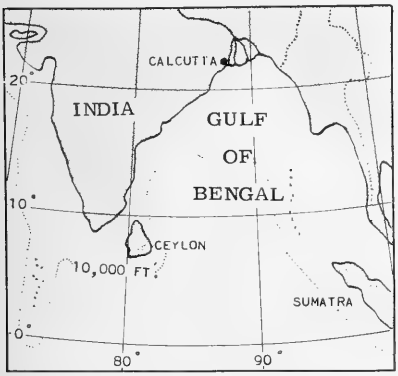
FISHERIES DEVELOPMENTS IN WEST BENGAL: Next to rice, fish is the staple food of the Bengli of West Bengal, India. With the loss of extensive inland fishing grounds in East Pakistan upon Partition, the supply of fish to the Calcutta market dropped considerably. It is estimated that of the total supply of 96 metric tons of fresh fish received daily in Calcutta, 61 tons formerly came from the fisheries of East Pakistan. At the same time Calcutta's food problem was complicated by the influx of a large number of refugees who streamed into West Bengal from East Pakistan. The Government of West Bengal is presently sponsoring a number of research schemes, all designed to increase the yield of fish both from fresh water and salt water, states a U. S. consular dispatch from Calcutta.



Deep-Sea Fishing: Various studies have been made of the waters of the Bay of Bengal. In 1950 two Danish trawlers, the Skaneklit and the Christian Schroder were purchased and came, under their own power, to Calcutta. Renamed the Sazarika and Baruna, respectively, they left on their first exploratory trips on December 26, 1950. Up to December 1953 these vessels made 50 exploratory trips and brought 2.1 million pounds of fish to the Calcutta market. They located 12 potential fishing grounds, found that the period from November to March is the best fishing season, located plentiful supplies of six different kinds of fish--pomfret, mackerel, shrimp or prawn, chanda, bholla and phasa--and found that the haddock trawl net gives the best results in quality and quantity of catch. In addition, the Danish experts who accompanied the trawlers to India trained 16 Indian crewmen, 2 engineer mates, and 2 pilots, and also trained 12 local fishermen in the technique of making different type nets for deep-water fishing.

Encouraged by the results of their research the West Bengal Government has ordered three additional bull trawlers under the technical assistance program.

Marketing of the Catch: From the start of the program until 1952 many difficulties were encountered in marketing the catch brought to Calcutta by the trawlers. In March 1952 an agent was appointed for marketing all catches. He is responsible for lifting all catches within a stipulated time, transporting and storing them at his own cost, and for selling them in Calcutta and other markets, both wholesale and retail. Present prices at which the agent buys the catch are Rs.52½ per maund (13.5 U.S. cents per pound) for quality fish; Rs.10 to Rs.24½ (2.6-6.2 U. S. cents per pound) for small fish, according to class; and Rs.6½ (1.6 U.S. cents) for sharks, rays, and other coarse fish.

Shark-Liver Oil Production: In 1950 there was also started a program for the production of shark-liver oil, fish meal, and processed fish, and the utilization of fish byproducts. Since that time 20,667 pounds of shark-liver oil, 121,070 pounds of fish meal, and 15,111 pounds of processed fish have been produced. Fresh fish netted while fishing for sharks in the amount of 126,000 pounds has also been sold.

Shark livers are used in the production of vitamins which are usually sold to hospitals while the meat of the shark is used in the production of fish meal.

Fish Hatcheries: Fish hatcheries have been established in various rural areas of the State. Since 1950 such hatcheries have raised and sold 38.4 million fry and fingerlings to private stockers and pisciculturists. It is expected that more than 823,000 pounds of fish of marketable size will be produced from these fry and fingerlings.

Research regarding the mortality of spawn, fry, and fingerlings in transit has been productive. From a mortality rate during transit of from 60-70 percent, the rate has been reduced to as low as 0.5 percent in some cases. Average mortality for fish shipped in special containers under oxygen pressure is not more than 1 or 2 percent.

Beel (Lake) Development: Many beels and other large water areas had been neglected for many decades. To renovate such areas for the production of fresh-water fish, loans, repayable over a number of years at 6¼ percent interest, were provided to their owners. Approximately 2,000 metric tons of fish have been secured from the beels since 1950.

The progress of the beel improvement scheme has been much slower than expected. It was found that many of the beels were held on short-term lease and the lessees had no authority to carry out capital improvements. Others were held by antagonistic cosharer owners who could not be persuaded to join together to develop their beels.

Steps have been taken to eradicate floating, submerged, and rooted vegetation. It has been found that floating vegetation, like water hyacinth, can be eliminated by the spraying of chemicals. Mechanical devices for cutting rooted vegetation have also been evolved. Research has also been undertaken to determine the optimum chemical and biological conditions for maximum production of fresh-water fish. As a result it has been possible to advise growers regarding food deficiencies in their beels and to suggest proper methods of fertilization in order to increase production.

Tank Fisheries: The Indian landscape is dotted with tanks which resemble the small ponds now found on so many farms in the United States. Two types of loans have been made available to owners of tanks.

To stock tanks which are otherwise in good condition, a short-term loan is granted. A loan of Rs. 210 per acre, at 6¼-percent interest, repayable in two years, can be granted provided the owner carries out his restocking program under the technical supervision of officers of the Department of Fisheries. Since 1950 tanks aggregating 8,665 acres have been stocked. The total amount of loans advanced is Rs. 1,157,280 (US$241,000).

To renovate derelict tanks, longer term loans can be advanced. Such loans are limited to Rs. 525 (US$109) per water acre, at 6¼-percent interest, repayment to be made in from 5 to 8 years. Since 1950, under this scheme, 1,902 acres have been improved. Loans advanced amount to Rs. 585,398 (US$122,000).

Government Aid to Fishermen: Since the majority of fishermen were too poor to buy boats or yarn for nets, the Government supplied them with boats and yarn at 50 percent of the cost price. Since 1950, 344 boats and 297.5 bales of yarn have been distributed in addition to 5,720 bales of yarn supplied at cost price. The Government is now considering reducing this subsidy from 50 percent to 25 percent.

Foreign Assistance: The Food and Agricultural Organization of the United Nations (FAO) assigned a Fishing Officer and a Fishing Engineer to West Bengal for one year, the former to advise on the development of inland fresh-water fisheries and the eradication of water hyacinth and the latter to advise on the development of estuarine areas. In addition, FAO fellowship holders have been brought to West Bengal for training.

Japan

BRITISH NAVY TO PROTECT JAPANESE VESSELS FISHING UNDER BRITISH FLAG IN WESTERN PACIFIC: The British Royal Navy is to protect five Japanese fishing fleets manned by Japanese crews during operations off the Siberian coast in 1955, a member of the Japanese Lower House, told Reuter, a British news service. He said this was "explicitly provided for" in a contract with a British firm whereby the Japanese fishing fleets will sail under the British flag.

A Japanese fishing company signed the contract on November 25, 1954, with the British firm.

The object of the contract was to get around a Japanese Government restriction on fishing in North Pacific waters off the Siberian coast, where scores of Japanese fishing boats have been seized since the war for allegedly trespassing in Soviet waters, he said.

The British firm will supply five motherships, all more than 8,000 tons, and will have representatives on board each one. The Japanese company will provide 150 catcher vessels, 4,000 crewmen, and all equipment, reports the December 10, 1954, issue of The Fishing News, a British fishery paper.

The Japanese House Member said the Japanese firm hoped to net a catch worth approximately 4,000 million yen (US$11 million), about equal to Japan's entire annual fishing catch in the North Pacific at present.

The area to be fished includes the rich salmon and crab fishing grounds lost by Japan at the end of World War II.

Note: See Commercial Fisheries Review, October 1954, p. 50.

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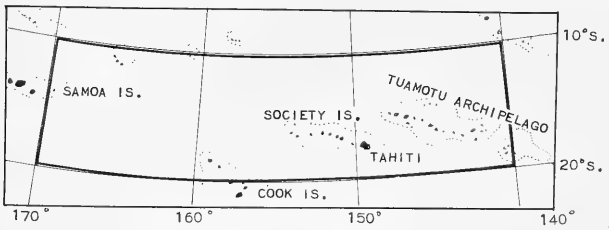
NEW FISHING GROUNDS TO BE EXPLORED: A four-year survey plan to develop new fishing grounds has been drafted by the Fisheries Board of the Japanese Ministry of Agriculture and Forestry. The survey is to begin next fiscal year. The Kyoda news agency reported on October 4, 1954. The Board is requesting 880 million yen (US$2.4 million) to cover the expenses of the first year's survey, which will have as its objective the discovery of new fishing grounds to replace the tuna grounds near the Marshall Islands made dangerous by thermonuclear tests.



Dark lines indicate areas for Japanese survey to develop new fishing grounds.

The surveys planned for the first year will center on the Society Islands (Tahiti) and will cover the area between 10° and 20° S. latitude and 140° and 170° W. longitude. It is also planned to conduct a survey in the Indian Ocean south of India between 10° N. and 10° S. latitude and between 70° and 80° E. longitude, according to the December 1954 Fisheries Newsletter, an Australian fishery magazine.

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NORTH PACIFIC SALMON AND CRAB EXPEDITIONS, 1955: Plans for Japanese salmon, trout, and crab fishing in North Pacific waters for the 1955 season were announced recently by the Japanese Fisheries Agency, according to a January 10 dispatch from the U. S. Embassy in Tokyo. The salmon-trout fishing fleets in Aleutian waters will be markedly increased above the 1954 expeditions and special exploratory fleets will be sent into the Okhotsk Sea.

The salmon-trout fleets will consist of 11 motherships, 284 fishing boats, and 50 survey boats. These fleets compare with 7 motherships and 160 fishing boats employed in 1954. The Japanese Fisheries Agency also states that the fleets will be permitted to fish 20 miles off the Kamchatka coast, where in 1954 a 30-mile limit was imposed. The increases in both fleets and fishing area are anticipated to produce a catch of 40 million fish, or about double the 1954 catch. All motherships in the 1955 fleets are to be equipped with canning facilities.

In addition to these fleets, four expeditions, characterized as "exploratory," are authorized to enter the Sea of Okhotsk for the first time since World War II. These fleets will consist of 2 motherships, 50 fishing vessels, and 8 survey vessels for exploratory salmon and trout fishing; and 2 motherships for exploratory crab expeditions.

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PEARL-SHELL FISHING EXPEDITION RETURNS FROM ARAFURA SEA: The 25 vessels of the second Japanese postwar Arafura Sea pearl-shell fishing expedition returned to Kushimoto, Wakayama Prefecture, on October 29, 1954, with 955 metric tons of mother-of-pearl, after a six months' absence. The catch, which is valued at ¥400 million (US$1.1 million), is approximately equal to the 1953 catch.

The Arafura Sea is Japan's only source of the high-grade mother-of-pearl shell at present, reports the November 10 U. S. consular dispatch from Kobe.

According to trade sources, the bulk of this material is destined for the United States. Of the 1953 yield only 10 percent of the total, the poorest in quality, was retained for use by the domestic button manufacturers, while the rest was sent to the United States in raw form. Furthermore, most of the mother-of-pearl buttons produced were exported to the United States.

The activities of this fleet has led to a controversy between Australia and Japan over the rights of Japanese fishermen in Australian continental-shelf waters. According to the press, the Japanese cabinet has just allocated ¥80 million (US$222,000) to meet the costs of presenting Japan's position before the International Court of Justice at The Hague. Much interest is said to be shown in this case for any decision taken may very well set a precedent for other disputes involving territorial rights to the continental shelf.

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AGAR-AGAR EXPORT TRADE DECLINES: The Japanese export trade in agar-agar has shown a marked decline in late 1954 due to a shortage in supply and to a price rise not matched in other producing countries. Three-quarters of all Japanese exports of this material are shipped from the port of Kobe.

This product finds a worldwide market, reports a December 16 U. S. consular dispatch from Kobe. Japan's principal customers in recent years have been Malaya, Singapore, United States, United Kingdom, and France. In 1953 export sales totaled about US$3 million. Before World War II Japan was the principal supplier to world markets. Since the war Japan has faced growing competition as many countries have developed their own production of this material, often, ironically enough, with the assistance of Japanese technical experts.

Japan is not self-sufficient in the sea weed used in the making of agar-agar, but has always relied on foreign sources to a certain extent. With the development of national agar-agar production by many countries, the sources of sea weed have been increasingly limited, and Japan can no longer depend upon foreign sea weed to make up deficits in domestic supply.

Due to unusual ocean currents in 1954, sea weed was scarce off the Japanese islands. Because of this scarcity, and the resulting higher price, the Japanese traders find themselves with less to sell and at prices substantially above the world level of US$1.40 per pound. The current export price of the Japanese product should be, in view of production costs, about US$1.80 per pound. In order to make possible the exportation of this product, the Government some weeks ago permitted the traders to link profitable imports of sugar to export sales of agar-agar. Virtually all recent exports of this product have been affected through the workings of this agar-agar sugar link arrangement.

Mexico

EXPORT DUTIES ON SHRIMP AND FILLETS: A decree, published in the Diario Oficial of August 2, 1954, by the Mexican Government, ordered that frozen shrimp exports be taxed at 30 centavos per 100 kilos (1.1 U. S. cent per pound) plus 5 percent of the value, states a November 3 U. S. consular dispatch from Merida.

On October 14, 1954, the Diario Oficial published decrees, effective that date, which established a 5-percent ad-valorem export duty on fish fillets, and set an official value of 3.20 pesos (11.6 U. S. cents per pound) on fillets.

Netherlands

NEW-STYLE TRAWLER: The construction of a new-style large trawler was commenced in a Netherlands shipyard in November 1954. The trawler will have a length of 141 feet (187 feet between the sounding lines), a width of 25½ feet, a draught of 13 feet, and a bobbed hull to keep the stem higher above the water in stormy weather so as to be less liable to ship heavy seas. The three-legged mast will be a considerable improvement. The crew's quarters, consisting of two cabins for six men, will be located aft.

Fishing can only be done over starboard on modern cutters. The cabins can be reached both via starboard and port, while the engineroom can also be entered from two sides. The vessel will be equipped with a 800 hp. engine, with a 2 to 1 reduction, providing for the use of a large propeller with increased propulsion power, reports the December 1954 Holland Fish Trade, a Netherlands fishery magazine.

Norway

WINTER HERRING FISHERIES HAMPERED BY BAD WEATHER: The Norwegian 1955 daily winter herring catch in January rarely totaled more than 1,000 metric tons as compared with daily landings of about 3,500 metric tons during January 1954. During mid-January 1955 the annual winter herring fisheries off Norway's west coast were frequently interrupted by bad weather. Day after day strong winds made it virtually impossible for the fleet of about 2,200 fishing vessels to leave port. Meanwhile, some 25,000 fishermen mended nets or walked the streets of Aalesund, impatiently waiting for their chance.

The fishing vessels were not idle all the time. At every let up they set off in search of the elusive herring. Drift netters faired best, it seems. For the 450-odd purse seiners, however, the catch was disappointing. The herring were so deep that they were beyond reach. Often, too, valuable gear was lost or ripped in heavy seas, reports the Norwegian Information Service in a January 27 bulletin.

When the shoals eventually break through the cold-water barrier to approach the coast, Norway's newest floating herring-oil factory, the S. S. Haeringur, will be on hand to do business. Recently renovated, the former Icelandic vessel has a daily production capacity of over 800 tons and a storage capacity of 2,000 tons.

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FISHERIES PRODUCTION, 1954: Norwegian fisheries in 1954 established an all-time record in both volume and value as total production reached 4.1 billion pounds, valued at 545.6 million kroner (US$76.3 million) ex-vessel. This compared with the 1953 production of 3.1 billion pounds, valued at 486 million kroner (US$68.0 million), and the 1952 totals of 3.7 billion pounds and 523.1 million kroner (US$73.2 million). However, there were wide fluctuations within the various fisheries in 1954--the important winter herring catch far exceeded any previous year, while the catch of most other fisheries (particularly cod and brisling sardine) fell far below 1953.

The Norwegian 1954 winter herring catch totaled 2.4 billion pounds, valued at 201.2 million kroner (US$28.1 million), 23 percent above the previous record of 2.0 billion pounds in 1951. The combined catch of herring and brisling sardines in 1954 totaled 3.2 billion pounds, valued at 276.2 million kroner (US$38.6 million)--about 78 percent of the volume of the entire catch. The total production of cod and byproducts of cod in 1954 amounted to 402.3 million pounds, valued at 126.9 million kroner (US$17.7 billion), as compared with 472.3 million pounds and 150 million kroner (US$21.0 million) in 1953 which was a below-average year.

The value of Norwegian exports of fishery products in 1954 exceeded 900 million kroner (US$126 million), an increase of 200 million kroner (US$28 million) as compared with 1953. Exports of canned fishery products (mostly herring and brisling sardines) in 1954 totaled a little over 70.6 million pounds, valued at about 150 million kroner (US$21.0 million), as compared with 58.7 million pounds, valued at 119.6 million kroner (US$16.7 million) in 1953, and 76.1 million pounds, valued at 145.6 million kroner (US$20.4 million) in 1951 (the record postwar year).

Norwegian whaling was especially successful in 1954 when the pelagic expeditions and shore station in the Antarctic produced 1.0 million barrels of whale and sperm oil worth at least 233 million kroner (US$32.6 million) as compared with only .8 million barrels in 1953. All the 1954 whale oil was sold, most of it in foreign trade, reports a January 6, 1955, U. S. Embassy dispatch from Oslo.

A repetition of herring catches as rich as last year's cannot be counted on, according to reliable reports.

Peru

FISHERIES FACILITIES BY PORTS: Chimbote: This port which lies 250 miles north of Lima has 4 canneries (two of which have reduction plants and refrigerated storage) and also 2 reduction plants not run by the canneries. Two of the 4 canneries were not operating in mid-1954, according to a report of a trip made from Lima to the Ecuadorian border by an employee of the Foreign Operations Administration Fisheries Mission in Peru.

One of the three canneries operating packs about 600 cases (48 No. $\frac{1}{2}$ flat cans) of bonito daily under wholesalers' labels. Fish is purchased from fishing boats but it does not have a reduction plant or refrigerated storage. The second packs an average of 500 cases daily, but only one of its two lines were in operation. This cannery also has a reduction plant and refrigerated storage. The third cannery owns its fishing boats and has a reduction plant and refrigerated storage, but it was not operating in mid-1954. A fourth plant also was not operating.

May to September is the off-season for bonito. During this period canneries were paying up to 48 soles (US$2.50) per dozen bonito of about 7.7 pounds each.

One of the two reduction plants has a flame drier and a capacity of 150 tons of fish daily. The plant is operating considerably below capacity and besides processing cannery waste buys sardines and anchovies for reduction. The second of the two reduction plants has the latest German machinery and a steam drier. Its capacity is 50 to 60 metric tons of fish daily. This plant buys sardines and anchovies for reduction and also processes cannery waste because it does not own enough boats to supply the plant.

Pimentel: No fish production at this port and a cannery nearby has been closed for most of the past five years.

Paita: This port has two tuna canneries (both closed) and two freezers. One of the freezing and packing plants has a storage capacity of 1,000 metric tons and a freezing capacity of 60 tons daily. Frozen swordfish in one-pound packages was being packed by this plant, but since swordfish was scarce in mid-1954, the plant distributed fresh fish for local consumption.

The other freezing plant is located near Tierra Colorada (a small bay about four miles from Paita). This freezer has a storage capacity of 1,000 metric tons and can freeze 60 tons of fish daily. Four to five tuna clippers land their catch at this plant for freezing. A company freezership transports the frozen tuna (mostly yellowfin) to the United States.

Sechura Area: There are a number of fishing villages located along about 20 miles of desert coast. Fresh water is supplied in drums. Only 18- to 24-foot sailboats operate out of these villages. Hand lines or trolling is the principal method of fishing, except for a few beach seines used for sharks, rays, and turtles. The fish are sun-dried and sometimes lightly salted. Transportation to market is the chief problem along with the lack of fresh water. Since there are no roads, trucks drive across the desert. Chief products are dried shark, guitarfish, other rays, grouper, corbina, cojinova, king mackerel, mullet, and barracuda.

Costante: About 200 fishermen operate from this port.

Parachique: About 300 fishermen operate from this port.

Matacaballo: About 325 fishermen and 70 fishing boats operate from this port. Also, there are two small boat-building yards located here.

Mancora: This is the chief fishing port for yellowfin tuna, skipjack, and swordfish. It is an open roadstead without docks or landing facilities. Although several companies are based here, only one company has any type of shore installations, including a freezer. The frozen storage capacity of the freezer is between 600 and 1,000 metric tons. There are generally three or four freezerships operating offshore of this port, but they follow the fishing boats.

Caleta Cruz: This is the present center of the shrimp-fishing fleet. The number of boats operating varies from 25 to 35. Most of these vessels (30 to 40 feet in length) are equipped with 20-foot beam trawls, but a few have 35- to 40-foot otter trawls. Shrimp is fished in 4 to 5 fathoms of water 24 hours a day, and the average catch is 125 pounds of jumbo shrimp (15 count, heads off). The shrimp are iced and taken to Mancora for packaging and freezing in 5-pound packages.

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FISHERY PRODUCTS SUPPLY AND CONSUMPTION, 1953-55: Total production of fishery products in Peru during 1953 amounted to 60,000 metric tons, while imports totaled 400 tons and exports 30,000 tons. The available supply of fishery products in that year was 30,400 tons, all of which was utilized for food, according to a November 17, 1954, U. S. Embassy dispatch from Lima.

The 1954 Peruvian fishery products production was estimated at 64,500 metric tons, imports at 500 tons, and exports at 32,250 tons. The available supply of 32,750 tons was expected to be consumed as food.

For 1955 the Peruvian fishery products supply and consumption are estimated as follows: production 68,000 metric tons, imports 600 tons, exports 34,000 tons, available supply (for food) 34,600 tons.

Portugal

FISHERY PRODUCTS SUPPLY AND DISPOSITION: Fresh and Canned Fish, 1953 and 1954: Total Portuguese production of fresh and canned fish in 1953 amounted to 217,646 metric tons; supply on hand on January 1 totaled 400 tons; there were no imports of fresh and canned fish; the total supply available amounted to 218,046 tons in 1953. Of this, 172,646 tons were consumed as fresh fish, 44,000 tons canned (almost 90 percent of this is exported), and 1,000 tons exported. Portuguese stocks of fresh and canned fish on hand at the end of 1953 totaled 400 tons.

For 1954, Portuguese production of fresh and canned fish was estimated at 240,000 metric tons, and there were no imports. It was estimated that 175,000 tons were consumed fresh, 64,000 tons canned, while exports amounted to 1,000 tons. Stocks on hand at the beginning and end of the year were the same--400 tons.

Unloading frozen spiny lobster tails from refrigerated truck in Lisbon for shipment to United States.

Salted Cod, 1953/54 and 1954/55: Portuguese production of salted cod in 1953/54 (July-June) totaled 45,119 metric tons (product weight), imports amounted to 19,419 tons, and there were 3,000 tons on hand at the beginning of the period--the total available supply was 67,528 tons. A total of 61,528 tons of salted cod was consumed in Portugal in the period, and the remainder--6,000 tons--was on hand at the end of the period.

In 1954/55 (July-June), Portuguese production of salted cod was estimated at 48,000 metric tons, imports at 15,000 tons, which added to 6,000 tons on hand at the beginning of the period, makes a total supply of 69,000 tons available. Of this, 63,000 tons were consumed in Portugal, and the balance--6,000 tons--was on hand at the end of the period.

Spain

REVIEW OF THE FISHERIES, 1953: A general scarcity of sardines and cod, high operating costs, antiquated fishing vessels, and shortages in certain lines of ship fittings continued to hamper the Spanish fishing industry in 1953. Nevertheless, the 1953 total catch of 632,998 metric tons was nearly 4 percent greater than the 610,229 tons registered in 1952 and almost 15 percent above the 10-year average of 551,344 tons for the years 1943-52.

Government loans to the fishing industry through the Caja Central de Credito Maritimo dropped by almost 47 percent from 36.7 million pesetas (US$16.8 million) in 1952 to 19.6 million pesetas (US$8.9 million) in 1953.

Other than for a promised reduction in price for certain grades of coal for fishing vessels, there was little prospect of immediate improvement in the distressed condition of the industry. Fuel oil and tinplate remained under strict control and fishing gear was under a system of voluntary rationing at the end of the year, states a December 20 U. S. Embassy dispatch from Madrid.

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VIGO FISH-CANNING TRENDS, OCTOBER 1954: Fish-canning plants in the Vigo area purchased during October 3.8 million pounds of fish for processing (mainly albacore tuna, alcrique, and jurel). Sardines, while available in small quantities, sold at prices almost prohibitive for fish canning. October purchases compare to 6.9 million pounds in September and 6.2 million pounds in October 1953. The decrease in fish purchases for canning was due to the end of the albacore tuna season. The other two varieties (jurel and alcrique) are packed only for domestic consumption, and the industry is reluctant to use the scant canning supplies for packing lower-priced species.

Now that plans to relieve the shortages of tinplate and other basic canning materials seem to be on the way and the Spanish Government has revised exchange rates for exports which, from the packers' viewpoint, are still insufficiently remunerative to permit competition in foreign markets, the industry is looking ahead with mild optimism. They believe that if desirable varieties become available in sufficient quantities, production can be stepped up with a consequent reduction in the market price of the finished product.

Tunisia

FISHERY PRODUCTS EXPORTS TO UNITED STATES, 1954: Tunisian exports of fishery products and byproducts to the United States in 1954 totaled 289,000 lbs.,

A Tunisian sponge-fishing boat at Djerba.

valued at US$120,774, as compared with 1953 exports of 196,000 lbs, valued at US$94,273 (see table). Cuttlefish bone was the leading item in value, followed by

Fig. 2 - Sorting sponges according to size at Sfax, Tunisia.

Fig. 3 - Sponges packed for shipment at Sfax, Tunisia.

snails and sponges, according to a U. S. consular dispatch (January 3, 1954) from Tunis.

Tunisian Fishery Products Exports to United States, 1953-54

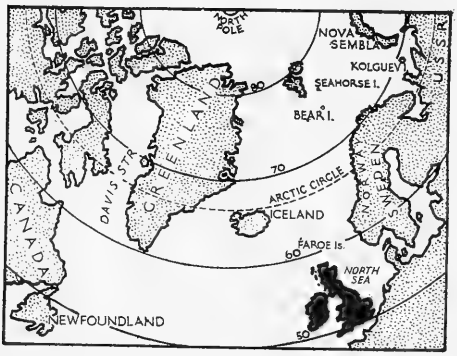
Item	1954		1953	
	Quantity	Value	Quantity	Value
	Lbs.	US$	Lbs.	US$
Sponges	4,000	24,936	5,000	36,333
Cuttlefish bone	110,000	68,861	82,000	28,415
Snails	175,000	26,977	104,000	27,275
Octupus, dried	-	-	5,000	2,250
Total	289,000	120,774	196,000	94,273

United Kingdom

PROBLEMS OF FISHING TRAWLERS: The British people are eating less fish, according to the London press (Financial Times, November 23, 1954). The latest figure (for 1953) shows that an average of 18.7 pounds per person was consumed, compared with 28.7 pounds for 1948, the peak year of the postwar boom in fish eating. In the summer of 1953 the trawler owners laid up 20 percent of their distant-water fleet, but even so 18,000 tons of edible fish remained unsold throughout the summer. Between April and July 1954 a quarter of the fleet was laid up. The fishmongers, however, maintain that the tide in their fortunes has turned and that consumption in 1954 was not less than 1953, and may have been slightly higher--perhaps the first fruits of the £80,000 (US$224,000) a year advertising campaign carried out by the White Fish Authority, and the £120,000 (US$336,000) campaign of the distant-water section of the British Trawlers Federation.

But this declining consumption is only one of the problems the trawlermen are facing. Increasing costs are their biggest difficulty. A catch on the average has to

be one-quarter larger than prewar for the owner merely to break even, and almost one-third larger for him to obtain a comparable rate of profit. Replacement costs have doubled over the last five years, and have increased nearly five times over the prewar figure: the distant-water trawlers at present under construction will cost nearly £200,000 (US$560,000) each to put to sea and between £250 and £300 (US$700-840) a day to operate. Fuel costs have quadrupled since 1938 and now account for approximately 25 percent of gross earnings compared with 20 percent in 1938.



Distant-water trawlers operate on grounds stretching from the Davis Straits and Newfoundland in the west, Bear Island in the north, and Nova Sembla in the east. Middle-water trawlers fish the west coasts of Scotland and Ireland, the Faroes, and the Norwegian coast. Near-water trawlers operate off the shores of the British Isles.

Labor shortages also constitute a problem. Trawler captains can earn £3,000 (US$8,400) a year and the crew members about £20 (US$56) a week, but there is a decline in the newcomers entering the trade. As yet this is causing only occasional delays at certain ports, notably along the northeast coast and at Grimsby, but the problem would seem to be merely postponed. For one thing trawling is an extremely hazardous occupation--indeed, it has the highest casualty rate of any trade in the United Kingdom--and, moreover, it is seasonal. The men need to have an alternative occupation during the summer laying-up months. The main difficulty at present is finding crews for the older vessels, which cannot offer the living conditions of their modern sisterships and--more important--because they do not possess the best equipment they will provide lower earnings to be shared among the crew.

It is this question of aging vessels that is the core of the trawler problems. The distant fleet is relatively modern and well equipped--more than one-third of the fleet has been built since World War II, when many of the trawlers were requisitioned by the Navy and lost in action and the owners compensated.

On the other hand only about 10 percent of the middle- and near-water trawlers has been built since 1945. The fish-eating boom in the immediate postwar years was satisfied in a large part from the middle and near waters. The five-year relief from fishing in the waters affected by the war permitted the numbers of fish to increase enormously. In these conditions fishing was never easier. There was no need to rebuild, and the old ships were adequate.

With 18 nations operating, however, the North Sea quickly became overfished; the trawlers could not get sufficient fish to fill their capacity. As the trips necessarily became longer, costs rose and the quality of the fish fell--a reason for the declining consumption, since there has always been a ready market for good-quality fish. Thus the owners could not build new and better-equipped vessels.

The onus of supplying the already declining fish palates of the public fell on the distant-water fleet, who at present are catching nearly half the fish eaten in the country. The costs of the distant-water trawler, however, are more than twice those of a North Sea trawler. An average voyage can range in length from 1,700 miles (Iceland) to 2,800 miles (Spitzbergen), taking 20-28 days, two-thirds of which are usually spent reaching and returning from the fishing grounds. Fish, moreover, quickly deteriorates and as yet deep freezing is in its infancy. The installa-

tion of such equipment reduces holding capacity and increases costs further. The problem is only partly solved by increasing the speed of the vessels--now at 12-13 knots, compared with the prewar speed of 9-12 knots.

For the present the trawler owners have reverted to the prewar practice of shelving the fish (placing it in layers between ice on boards of wood or aluminium alloy) instead of the immediate postwar usage of merely storing in holds with consequent diminution of quality. The main solution lies in freezing the first catches at least.

Nevertheless the number of new near- and middle-water trawlers under construction or on order--50 in all--far exceeds the figures for any year since the immediate postwar period when the fleet was increased by the conversion of many naval ships, and before that since 1929-30. The new ships are expected to cost nearly £5 million (US$14 million) while the estimate for an additional 15 distant-water vessels is in the neighborhood of £3 million (US$8.4 million). This increase in construction is largely the result of the power given to the White Fish Authority in August 1953 to make grants as well as loans towards the cost of vessels and engines. In many cases applicants have only to provide 15 percent of the cost of a vessel from their own resources.

In the long run the significant factor in the prosperity of the trawling industry is the public taste for fish. Since the abolition of price controls, quality has been the determining factor in the market for fish. The consumer, however, is only slowly beginning to appreciate frozen fish, despite its lower price. On the other hand one of the results of the declining consumption is the country's diminishing dependence on foreign landings--they dropped from 11 percent of total landings in 1952 to 8 percent in 1953, which was the estimate for 1954, also.

In reply to charges of unduly high prices, the trawler owners point out that, although near- and middle-water fish is subsidized, deep-water fish is not, and it is competing with subsidized foods. Moreover they maintain that a penny (1 U. S. cent) reduction per pound would cost £4.5 million (US$12.6 million), which is more than the total net profits of the trawler owners and the fish wholesalers in the whole country.

* * * * *

FAMILY EXPENDITURES FOR FISHERY PRODUCTS, 1951/52: British expenditures for fishery products in the period from the fourth quarter of 1951 to the fourth quarter of 1952 averaged 12.22 pence (14.3 U. S. cents) per head per week as compared with 60.14 pence (70.4 U. S. cents) for rationed and all other meat and bacon. Adult households consumed more than three times as much fish per head as those with four or more children, while the difference for prepared fish was less, reports The Fishing News (December 10, 1954), a British fishery periodical.

"This may be partly a reflection of children's tastes," says the annual report of the National Food Survey Committee, Domestic Food Consumption and Expenditure, 1952.

The survey, previously confined to urban working class households and special samples, was extended in 1950 to provide a national sample of household budgets, and in 1952 it was possible to obtain a more representative sample of about 3,000 households per quarter.

Expenditure on most foods increased during 1952, mainly because of rising prices, but expenditure on fish tended to fall, no doubt because of improved meat supplies.

Consumption of fresh, processed, and prepared fish in 1952 averaged 7.52 ounces per head per week, and there was 6 percent less fish consumed in the fourth quarter of 1952 compared with the same quarter in 1951. Consumption showed a seasonal decline from 8.1 ounces at the beginning of the year to under 7 ounces in the third quarter, recovering to 7.6 ounces at the end. This was, however, still half an ounce lower than in the last quarter of the previous year, which suggests a downward tendency. The drop was chiefly in white fish of the cheaper types, such as cod.

Prices remained fairly steady for this type of fish, so that the reason for the drop was probably the increased availability of meat.

Fat fish--mainly herring--showed a seasonal fall in the spring and summer, but consumption at the end of the year was slightly higher than at the beginning. "It might have been expected that the improved meat supplies would have had more effect on fish consumption, but the impact was lessened by the reduction in supplies of cheese and the seasonal decline in eggs."

An analysis of household expenditure on individual foods gives a weekly expenditure on fish of an adult couple as 36.8d. (43.1 U.S. cents), and of each child 0.5d. (0.6 U.S. cents). The increase in expenidture for fish was only 1 percent "possibly because children have a greater preference for other protein foods," the report adds.

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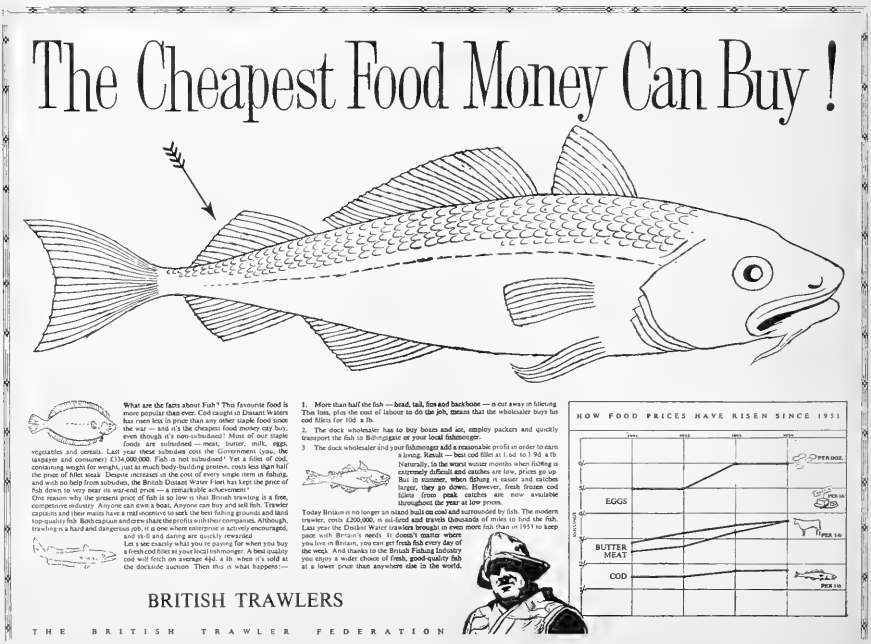
TRAWLER OWNERS EXPAND COD ADVERTISING PROGRAM: The expansion of an advertising program by the British trawler owners associated with the British



Type of advertising copy used in British magazines and newspapers.

Trawlers Federation has been approved. The principal aim of the campaign to be initiated will be to increase public interest in cod. A levy of a halfpenny on every stone (4 U. S. cents per 100 pounds) of deep-water fish landed is to be imposed. This is expected to provide a sum from which £100,000 (US$280,000) will be found for advertising purposes.

One statement published credits an official of the Association with saying that because of a mistaken idea that cod was an inferior fish, much had been left unsold.

"This mistaken view," he said, "is held not only by housewives but by inland merchants and fish friers. The friers will not look at cod for their business because they say customers demand either haddock or skate."

The coming campaign will cost double what has been spent in any previous year, reports the November 19, 1954, issue of The Fishing News, a British fishery paper.

Venezuela

SEVERAL SARDINE CANNERIES CLOSE DOWN: Several Venezuelan sardine canneries have been closed down due to the lack of local and foreign markets, according to the President of the Fish Canners' Association. In general, the canneries are operating at 30 percent of capacity, a January 12 U. S. Embassy dispatch from Caracas points out.

The President of the Association pointed out that this is a chronic condition because of the small local market which, though it may be increased a little, can never absorb the potential canned fish production. The only long-term solution of this condition, in his opinion, is foreign markets--some form of fish dollar, either a differential exchange, or an export subsidy.

* * * * *

FOREIGN-FLAG FISHING IN GULF OF VENEZUELA: Although Venezuela claims 3 miles for territorial waters, and 12 miles for vigilance, security, and protection of national interest, the complete extent of Venezuela's interests in the waters of the Gulf of Venezuela has never been fully defined and declared, according to the legal adviser of the Venezuelan Foreign Office.

New legislation governing the commercial fisheries off the Venezuelan coast is expected to be enacted under the provision of the 1953 Venezuelan Constitution for jurisdiction over waters of the continental shelf.

Venezuela and Colombia have in the past discussed and expect in the future to reach some bilateral agreement as to the jurisdiction of the two countries over the Gulf of Venezuela. According to the legal adviser the Colombians have indicated a desire to extend jurisdiction somewhat north of a line drawn across the Gulf from the northern point of the Goajira Peninsula to the northern point of the Paraguana Peninsula, probably eventually to be determined, taking into consideration the depths of the waters north of such a line. The primary interest of both Governments lies in possible submarine oil deposits, but the legal adviser felt that such an agreement between the two countries might well provide for control of fisheries also, a December 14 U. S. Embassy dispatch from Caracas points out.

Although, in the absence of legislation under the Continental-Shelf provision of the 1953 Constitution and in the absence of an agreement with Colombia, Venezuelan legislation only stipulates the 3- and 12-mile zones of jurisdiction, the legal adviser express-

ed the opinion that Venezuela's position as to the status of the waters of the Gulf of Venezuela should be recognized as at present indefinite. He indicated, for example, that any attempt by foreign-flag vessels to undertake large-scale commercial fishing operations in the Gulf would be accorded the most serious scrutiny of the Venezuelan Government, and probably would be opposed by both Venezuela and Colombia.

* * * * *

PRICES FOR 1955 PEARL CROP: The Managing Director of the Banco Agricola y Pecuario, which has supported floor prices for pearls, informed the press on January 11 that the bank will not attempt to support the prices for the 1955 pearl crop as the bottom has dropped out of the pearl market.

On the bank's 1954 stock, he stated that only 400,000 karats of small-shot-size pearls were sold, 100,000 karats of rounds, and 50,000 karats of barroques. The bank still held 300,000 karats of barroques and 30,000 karats of unclassified pearls. When these have been disposed of the bank will be out of the pearl business, states a January 11, 1955, U. S. Embassy dispatch from Caracas.

A representative left for Mexico on January 6, 1955, to hunt a market for the Venezuelan pearls. The 1955 season began on January 3, 1955, and it is estimated this year's harvest will be worth Bs. 5,000,000 (US$1,500,000). Despite the devalued Mexican money, it was believed that country offered good prospects for marketing Venezuelan pearls. Some inquiries have been received from India and buyers from there were expected later in the season. The pearl season in Venezuela is from January 1 to April 30, 1955.

SPARE COPIES OF 1947 COMMERCIAL FISHERIES REVIEW AVAILABLE

The Service has available for distribution spare copies of the 1947 issues (volume 9) of Commercial Fisheries Review.

Issues are available for each month (Nos. 3 through 12) except January and February (Nos. 1 & 2). Listed below is one of the articles appearing in each issue:

MAR. 1947 - "METHODS OF NET MENDING--NEW ENGLAND"
APR. 1947 - "NUTRITIVE VALUE OF BAKED CROAKER"
MAY 1947 - "NEW TYPE THERMOCOUPLE SEAL FOR TIN CONTAINERS"
JUNE 1947 - "CORRELATION OF pH AND QUALITY OF SHUCKED PACIFIC OYSTERS"
JULY 1947 - "NUTRITIVE VALUE FOR GROWTH OF SOME FISH PROTEINS"
AUG. 1947 - "SOME STUDIES ON THE FEEDING VALUE OF FISH MEALS"
OCT. 1947 - "BACTERIAL POPULATION OF BRINING TANKS IN FISH FILLETING PLANTS"
NOV. 1947 - "NOTES ON FREEZING SHRIMP"
DEC. 1947 - "THE CHESAPEAKE BAY CRAB INDUSTRY"

For these spare copies write the Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Washington 25, D. C. Single issues or a complete set of Nos. 3 through 12 may be requested. Requests will be filled as received until supplies are exhausted.

FEDERAL ACTIONS

Department of Commerce

BUREAU OF THE CENSUS

EXPORT COMMODITY CLASSIFICATION FOR FISH STICKS AND SOLE:

Sole, frozen cooked fish sticks, and fried fish sticks are additional items which have been added to the applicable statistical export commodity classifications (Schedule B) by the Bureau of the Census, according to the January 1955 Foreign Trade Statistics Notes from that agency. These listings are included in Collectors' Bulletin 11 which gives new items to be added to those already shown within the numbered classification in the printed Schedule B.

Schedule B Commodity No.	Commodity Description	Listings to be Inserted
007109	Fish, fresh or frozen, whether or not whole, however packed (including fillets): Other	Sole.
008990	Fish, shellfish, and other marine animal products, prepared or preserved, n. e. c.	Cooked fish sticks, frozen. Fish sticks, fried.
081990	Fish oils and fish liver oils, n. e. c.	Pollock liver oil.

Department of Defense

SARDINES EXEMPTED FROM "BUY AMERICAN ACT:"

Sardines and bulk agar are included in a new list recently issued by the Department of Defense of supplies and materials to be procured for public use without regard to the so-called Buy American Act. The list is part of an amendment to the Armed Services Procurement Regulations, governing purchases for the armed services. The items on the list are substantially the same as those listed in 1950.

Department of Health, Education, and Welfare

PUBLIC HEALTH SERVICE

SHELLFISH CERTIFICATION LIMITATIONS PROPOSED:

A proposal for limiting the scope of the shellfish certification program was announced by the Public Health Service Shellfish Sanitation Section. It was stated that this plan will not be adopted as Service policy until it is acceptable to the majority of the states.

The need to limit the shellfish certification program stems from personnel and financial limitations of both the states and the Public Health Service; from statutory responsibilities of other governmental food control agencies; and from the lack of epidemological evidence indicating a need for extending the certification program to cover such prepared shellfish products.

The plan is as follows:

A. Redefine shellfish as "All fresh or frozen oysters, clams, or mussels either shucked or in the shell."

B. Limit the certification program to the fresh and frozen product and not include processed shellfish foods such as frozen oyster stew, frozen clam chowder, frozen clam cakes, sea food dinners containing oysters, crab cakes, scallops, fish fillets, and other prepared shellfish products except that frozen breaded shellfish may be included in the certification program at the option of each state.

Under this limitation the Public Health Service would, where requested, and provided the state has a rigid system of inspection and control, include the state certified shellfish breaders on the list of certified shippers. However, if a state does not want to extend its certification program to breading plants, the Public Health Service would make no deductions from the state's shellfish sanitation rating because of the omission

If a dealer in such a state is both a shucker-packer and a breader, his name and certificate number would be listed as a shucker-packer; however, he could not use his certificate number on packages of breaded shellfish. (The indication of state certification on containers of breaded frozen shellfish should not create a consumer impression that the product is packed under continuous inspection of either state or Federal inspection such as would be provided under the Seafood Inspection Service as authorized by the Food, Drug and Cosmetic Act.)

C. Make no further extension of the shellfish certification program to encompass other processed shellfish products unless there is sufficient public-health justification for such an extension.

D. Urge each state to require that only certified shellfish be used in prepared shellfish products.

White House

UNIFORM STANDARDS SET FOR BIDS UNDER "BUY AMERICAN ACT:"

The President on December 17, 1954, issued an Executive Order establishing uniform standards and procedures to be applied in administering the Buy American Act. The order is designed to bring about the greatest possible uniformity among executive agencies applying the basic legislation, reports the December 27, 1954, Foreign Commerce Weekly, a Department of Commerce publication.

The Buy American Act, which became law in 1933, provides that preference in the award of Government contracts shall be given to domestic suppliers, as against foreign suppliers, unless the domestic supplier's bid or offered price is unreasonable or the award to him would be inconsistent with the public interest.

Two methods are provided in the order for determining whether the domestic supplier's bid or offered price is unreasonable. The head of each agency will select the method better suited to the procurement procedures of his agency.

Under the first method the bid or offered price of a domestic supplier will be deemed unreasonable if it is greater than 106 percent of the bid or offered price of the foreign bidder--including applicable duty and costs incurred after arrival in the United States.

Under the alternative method the domestic price will be deemed unreasonable if it exceeds the sum of: (1) The foreign bid or offered price--including applicable duty and costs incurred after arrival in the United States--and (2) 10 percent of such bid exclusive of such duty and costs. When the price amounts to less than $25,000, in the interest of administrative simplicity, only the applicable duty need be excluded from the bid or offered price in making a determination under this second method.

Previously a difference of 25 percent between foreign and domestic bids frequently was required.

The order provides exceptions permitting agency heads to retain their authority or responsibility to place a fair proportion of their total purchases with small business concerns, and to reject any bid or offer for security reasons or because it would be in the national interest to do so.

The order also permits rejection of a foreign bid or offer in any situation in which the domestic low bidder would produce substantially all of the materials in areas of substantial unemployment as determined by the Secretary of Labor after a determination by the President that such preference would be in the national interest. In issuing the Executive Order the President announced that he had made a determination that it is at this time in

the national interest to give a preference to U. S. low bidders who will produce substantially all of the materials contracted for in labor surplus areas.

Wherever the head of an executive agency proposing to purchase domestic materials determines that a greater differential than that provided in the order is not unreasonable or is not inconsistent with the public interest, he is authorized to do so by the order and thereafter to submit a written report of the facts in the case to the President.

Eighty-Fourth Congress

(First Session)

FEBRUARY 1955:

Listed below are public bills and resolutions introduced and referred to committees or passed by the Eighty-Fourth Congress (First Session) and signed by the President that directly or indirectly affect the fisheries and allied industries. Public bills and resolutions are shown in this section when introduced and, if passed, when signed by the President; but also shown from month to month are the more pertinent reports, hearings, or chamber actions on some of the bills.

ALASKA NET REGULATIONS: On February 8 Senate Subcommittee on Merchant Marine and Fisheries, in executive session, ordered favorably reported with amendments, S. 456, relating to the regulation of fishing nets in Alaska waters. On February 9 Senate Committee on Interstate and Foreign Commerce, in executive session, ordered the bill with amendments favorably reported.

Regulations of Nets in Alaskan Waters, Senate Report 32 (Feb. 11, 1955, 84th Congress, 1st Session), 3 pp. printed. The report points out that S. 456, as introduced and amended, would amend section 3 of the act entitled "An act for the protection and regulation of the fisheries of Alaska," approved June 26, 1906, as amended, to except set gill nets, stake gill nets, and anchored gill nets from the regulations of the Fish and Wildlife Service, covering the placing of fixed-gear fishing appliances. The bill is intended merely to preserve the status quo in this important phase of the salmon industry, by eliminating the necessity for a drastic revision in regulations which have been in effect for the past 25 years. The report also discusses the history of the bill, amendments, and changes in existing law.

House Committee on Merchant Marine and Fisheries on February 17 ordered reported to the House H. R. 249, relating to the regulation of fish nets in Alaska waters (H. Rept. 85).

Relating to the Regulation of Nets in Alaska Waters, House Report No. 85 (March 2, 1955, 84th Congress, 1st Session), 4 pp., printed. The report points out the purpose of the bill as amended is to continue the authority of the Fish and Wildlife Service of the Department of the Interior to regulate the use of gill nets in the salmon fisheries of Alaska. The necessity for the bill arises from a recent court decision in Alaska which classified gill nets as fixed fishing appliances, the location of which is specified by law. For the past 25 years the Fish and Wildlife Service has treated gill nets as a type of fishing gear subject to its regulation and has made regulations governing their use based upon the particular conservation needs of each area. In the absence of this bill, gill nets as well as salmon traps would be governed by the law covering the latter. Not only would this require a prompt and drastic revision of the rules of the Service but it would work hardship on various groups of fishermen without any compensating advantage.

Senate on February 21 passed with committee amendments S. 456, relating to the regulation of fishing nets in Alaska waters.

ALASKA AND HAWAII STATUS: H. J. Res. 213 (Hosmer), introduced February 14. Joint resolution authorizing the Territory of Hawaii to be incorporated in the State of California; and authorizing the Territory of Alaska to be incorporated in the State of Washington; to the Committee on Interior and Insular Affairs.

CHEMICAL ADDITIVES IN FOODS: H. R. 4099 (Priest), introduced February 16. A bill to protect the public health by amending the Federal Food, Drug, and Cosmetic Act to prohibit the use in food of new chemical additives which have not been adequately tested to establish their safety; to the Committee on Interstate and Foreign Commerce.

Also H. R. 4100 (O'Hara of Minnesota) and H. R. 4475 (Delaney), similar to H. R. 4099.

GREAT LAKES FISHERIES TREATY: Senate on February 9 adopted an order directing the Secretary of the Senate to return to the President, as requested by him on January 26, 1955, convention between the United States and Canada respecting Great Lakes Fisheries; signed at Washington on April 2, 1946.

HAWAII-ALASKA STATEHOOD: House Committee on Interior and Insular Affairs on February 16 ordered reported favorably to the House, with amendments, H. R. 2535, relating to admission of Alaska and Hawaii into the Union. The committee vote to report the bill was 19 in favor, 6 against, and 1 present.

MARKETING FACILITIES IMPROVEMENT: S. 1075 (Humphrey), introduced February 15. A bill to encourage the improvement and development of marketing facilities for handling perishable agricultural commodities; to the Committee on Agriculture and Forestry. In part the bill provides:

". . .Sec. 3. It is the purpose of this Act to facilitate, encourage, and assist municipalities and political subdivisions of States, public agencies, and instrumentalities

of one or more States or municipalities, public corporations, and boards, and private enterprise in the creation and development of modern and efficient public wholesale markets for the handling of perishable agricultural commodities in areas where such markets are found to be needed and where Federal assistance is requested and authorized as prescribed in this Act, to the end that unnecessary costs and burdens attendant with the marketing of perishable agricultural commodities caused by inadequate or obsolete facilities may be eliminated and that the spread between the amount received by producers and the amount paid by consumers may be reduced.

Sec. 4. For the purposes of this act--. . .

"(c) 'Perishable agricultural commodities' means agricultural commodities and products thereof, consisting principally of fresh fruits and vegetables, handled alone or in combination with poultry, eggs, meats, seafood, and dairy products. . . ."

Also H. R. 4054 (Cooley) and H. R. 4167 (Anfuso) similar to S. 1075.

MINIMUM WAGE INCREASE: H. R. 3424 (Davidson), introduced February 2. A bill to amend the Fair Labor Standards Act of 1938 to establish a $1.25 minimum hourly wage, and for other purposes; to the Committee on Education and Labor.

Also similar to H. R. 3424 were H. R. 3496 (Zelenko), introduced February 2; H. R. 3797 (Radwan) introduced February 8; and H. R. 4062 (Doyle), H. R. 4122 (Fogarty), introduced February 16.

TARIFF RATES ADJUSTMENT: H. R. 3800 (Scudder), introduced February 8. A bill to amend the Tariff Act of 1930 so as to provide a permanent procedure for adjustment of tariff rates on a selective basis, to regulate the flow of imported articles on a basis of fair competition with domestic articles, and for other purposes; to the Committee on Ways and Means. .

TRADE AGREEMENTS EXTENSION: H. R. 1. House Committee on Ways and Means on February 10 voted (20 to 5) to report to the House H. R. 1, to extend until June 30, 1958, the authority of the President to enter into trade agreements. The Commitee was granted permission to file by midnight February 14 a report on the bill. (H. Rept. 50.)

Amendments adopted to the bill include:

(1) To make it clear that provisions of existing law such as section 22 of the Agricultural Adjustment Act will prevail despite any provision in a trade agreement.

(2) The enactment of this Act shall not be construed to determine or indicate the approval or disapproval by the Congress of organizational provisions of any foreign trade agreements entered into under this section. The purpose of this amendment is to make it clear that the enactment of this legislation will not imply congressional approval or disapproval of the organizational provisions of GATT (General Agreement on Tariffs and Trade).

(3) Provides for the withdrawal of most favored nation treatment from any nation that discriminates against the United States with respect to trade matters.

(4) Strike from the bill the provisions authorizing the reduction of tariffs irrespective of the fact that such action is not designed to carry out any foreign trade agreement on articles being imported into the United States in negligible quantities.

Trade Agreements Extension Act of 1955, House Report No. 50 (Feb. 14, 1955, 84th Congress, 1st Session), 86 pp., printed. The report points out the principal features of H. R. 1, explains them, and discusses the history of the legislation, the need, and changes in existing law. A technical analysis of the bill is also included. Appendix A presents criticisms of trade-agreements program; Appendix B presents the testimony of Executive Department, business, industry, agricultural groups, labor, public-interest groups, and press in support of the bill; Appendix C discusses the accomplishments of the trade-agreements program and gives the United States exports of products subject to trade agreement concessions; and Appendix D describes how a trade agreement is made. The report states that the principal features of H. R. 1 are:

". . .The purpose of H. R. 1 is to continue to June 30, 1958, the authority of the President to enter into trade agreements. The present authority (extended by Public Law 464, 83rd Cong.) terminates on June 12, 1955. In addition to the extension of the trade-agreements authority, the principal features of H. R. 1 are as follows:

"1. The President would be authorized to negotiate tariff reductions by any 1 of 3 alternative methods, which may not be used cumulatively.

"(a) The first method authorizes the President to reduce by a total of 15 percent tariff rates existing on July 1, 1955, in stages of not more than 5 percent in each of the 3 years of the authority;

"(b) An alternative authority to that provided in (a) above is the authorization to reduce tariffs by 50 percent of the rate prevailing on January 1, 1945, but only in the case of those products normally not imported or normally imported in negligible quantities;

"(c) As a third alternative the President is authorized to negotiate reductions in those rates which are higher than 50 percent of the value of an import to a rate equivalent to 50 percent.

"2. In the case of the announced trade agreement involving Japan, the bill authorizes the same decreases in rates of duty (i. e., 50 percent of the rate existing on January 1, 1945) as are authorized under existing law, even though the agreement is entered into after June 12, 1955.

"3. The reduction authority referred to in paragraphs 1 and 2 above is subject to the peril-point and escape-clause procedures as contained in present law.

"4. The President is required to avoid to the maximum extent he deems practicable the subdivision of existing tariff classification categories to prevent undue complication of the present tariff structure.

"5. The President would be required to submit to Congress an annual report on the trade-agreements program. This report is to contain, among other things, information on modification of trade agreements, including a report on the incorporation of escape clauses in existing agreements and information relating to agreements entered into. . . ."

House on February 18 passed by roll call vote, H. R. 1, to extend the authority of the President to enter into trade agreements under section 350 of the Tariff Act of 1930, as

amended. Prior to its passage a motion to recommit the bill with instructions to incorporate an amendment designed to strengthen the escape-clause provision was rejected. Several committee amendments were adopted.

TRADE AGREEMENTS EFFECT ON LABOR: H. R. 4304 (Roosevelt), introduced February 23. A bill to require an annual report by the President on the effect of the Trade Agreements Act on labor, employment, and industrial activity. To the Committee on Ways and Means.

WATER POLLUTION CONTROL: S. 890 (Martin of Penn., Chavez, Duff, Knowland, Kuchel) introduced February 1. A bill to extend and strengthen the Water Pollution Control Act; to the Committee on Public Works.

Also S. 932 (Neely) introduced February 8, H. R. 3426 (Dondero) introduced February 2, and H. R. 4010 (Mollohan) introduced February 14--all similar to S. 890

WATER POLLUTION PREVENTION: H. R. 3547 (Byrnes of Wisconsin), introduced February 3. A bill to encourage the prevention of air and water pollution by allowing the cost of treatment works for the abatement of air and stream pollution to be amortized at an accelerated rate for income-tax purposes; to the Committee on Ways and Means.

Also H. R. 3548 (Abbitt), H. R. 3549 (Bentley), H. R. 3550 (Ford), H. R. 3551 (Hinshaw), H. R. 3552 (Jackson), H. R. 3553 (Lipscomb), H. R. 3554 (Pillion), H. R. 3555 (Ray), H. R. 3556 (Simpson of Penn.), all introduced February 3; H. R. 3662 (Dondero), introduced February 7; H. R. 3906 (Laird), introduced February 10; and S. 917 (Martin of Penn., Duff, Capehart, Knowland, Kuchel, Potter, and Wiley), introduced February 4 -- all similar to H. R. 3547.

WEATHER STATION IN GULF OF MEXICO: H. R. 4473 (Colmer), introduced February 28. A bill to provide that one floating ocean station shall be maintained at all times in the Gulf of Mexico to provide storm warnings for States bordering on the Gulf of Mexico; to the Committee on Merchant Marine and Fisheries.

SPARE COPIES OF 1948 COMMERCIAL FISHERIES REVIEW AVAILABLE

The Service has available for distribution spare copies of the 1948 issues (volume 10) of Commercial Fisheries Review.

Listed below are some of the articles appearing in the various issues:

JAN. 1948 - "TECHNOLOGICAL STUDIES OF THE STARFISH," PART 1 (PARTS II, III, IV, V, AND VI, APPEAR IN THE FEB., MARCH, MAY, JUNE, AND JULY ISSUES, RESPECTIVELY)
FEB. 1948 - "EXPERIMENTAL FISHING FOR RED SNAPPER, PART I - THE USE OF HOOP NETS"
MAR. 1948 - "EXPERIMENTAL FISHING FOR RED SNAPPER, PART II - THE USE OF MECHANICAL REELS"
APR. 1948 - "THIAMINASE IN FISHERY PRODUCTS"
MAY 1948 - "COORDINATED PLANS FOR MANAGEMENT OF THE FISHERIES OF THE PACIFIC COAST"
JUNE 1948 - "KITE RIGS FOR OTTER TRAWL GEAR"
JULY 1948 - "FISHERIES REVIEW--GULF STATES, 1947"
AUG. 1948 - "THE FISHERIES AND FISHERIES RESOURCES OF MEXICO"
SEPT. 1948 - "SANITARY CONTROL PRACTICES FOR THE OYSTER INDUSTRY"
OCT. 1948 - "FAT IN FISH MEAL"
NOV. 1948 - "PRELIMINARY STUDY OF TOTAL BACTERIAL PLATE COUNT METHOD FOR FISHERY PRODUCTS"
DEC. 1948 - "UNITED STATES POLICY WITH REGARD TO HIGH SEAS FISHERIES"

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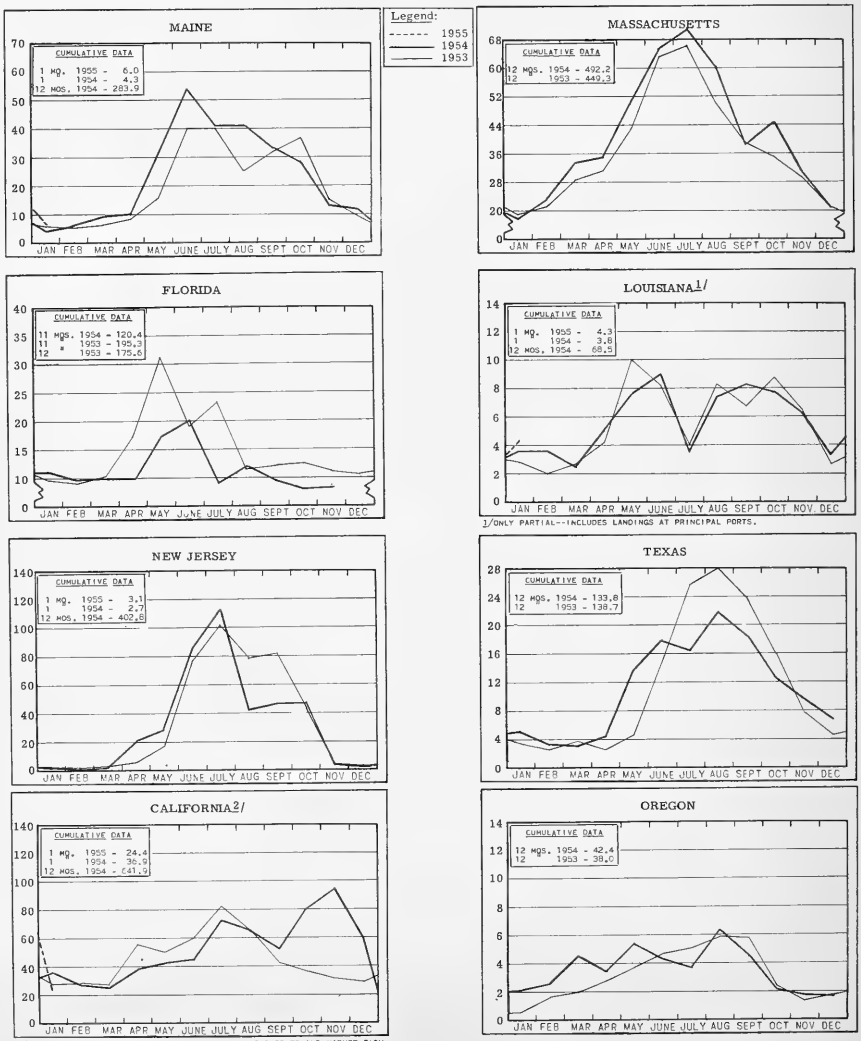
CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

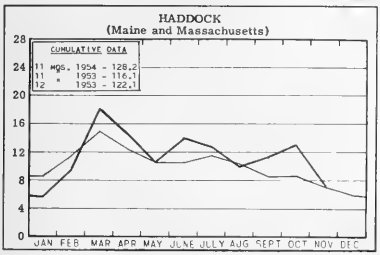


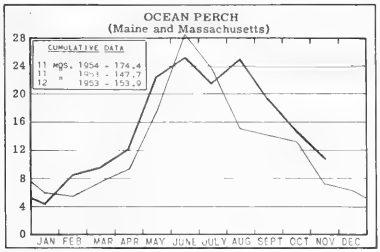
1/ONLY PARTIAL--INCLUDES LANDINGS AT PRINCIPAL PORTS.

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

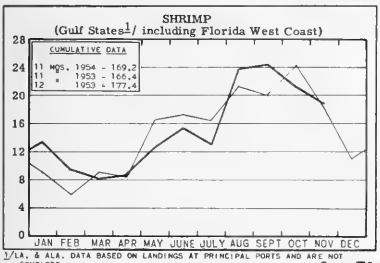
CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

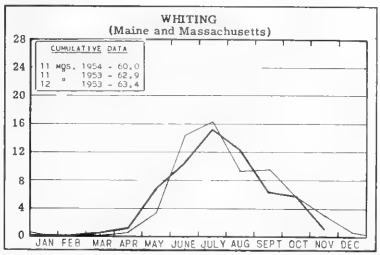




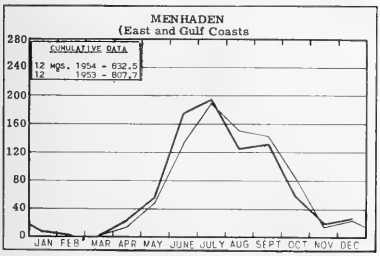
In Millions of Pounds

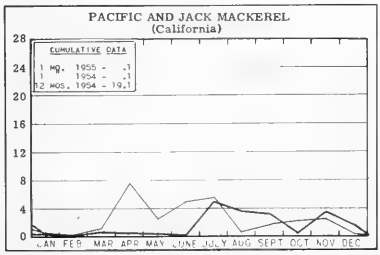


1/ LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

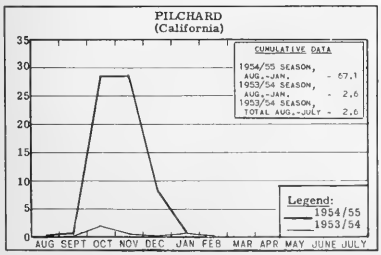


In Thousands of Tons





In Thousands of Tons



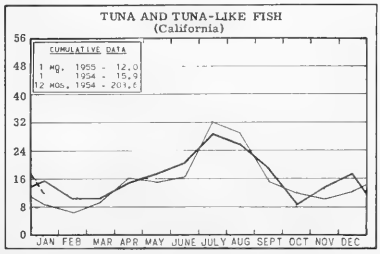
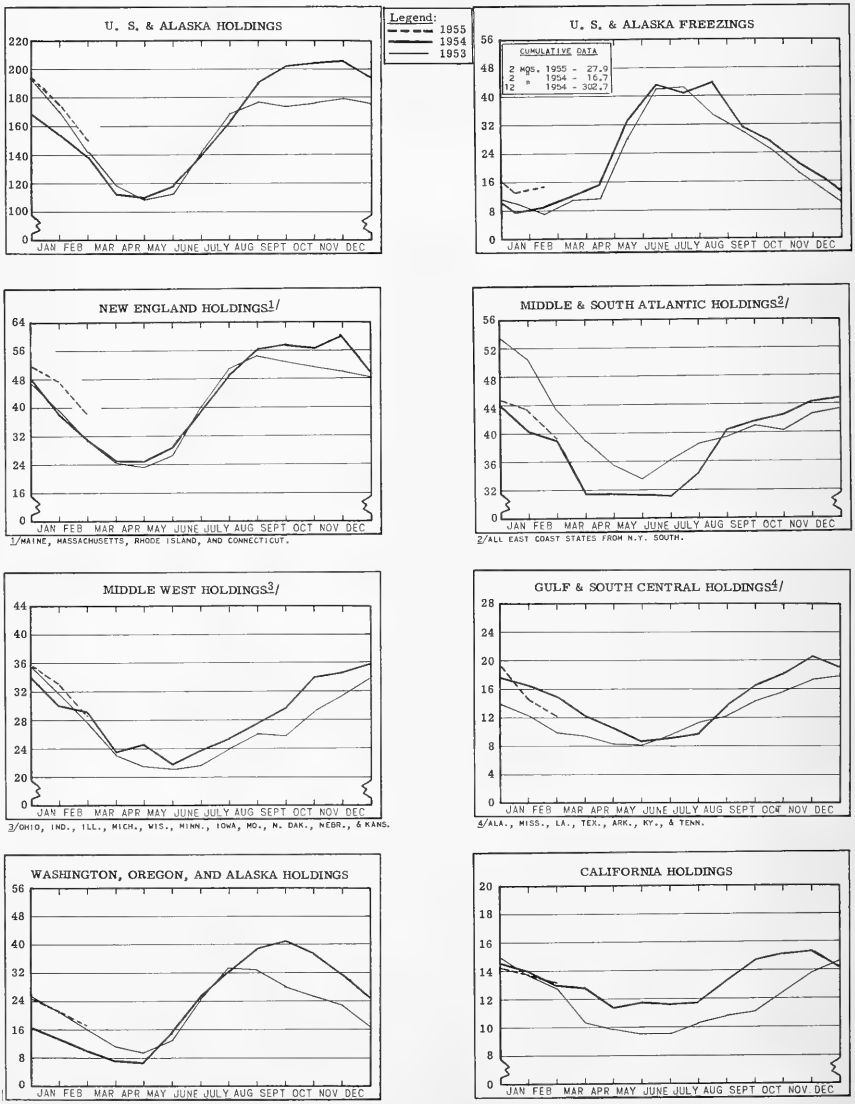


CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds



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

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

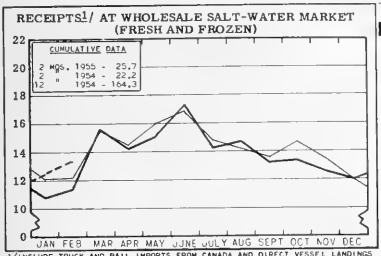
3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR., & KANS.

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

*Excludes salted, cured, and smoked products.

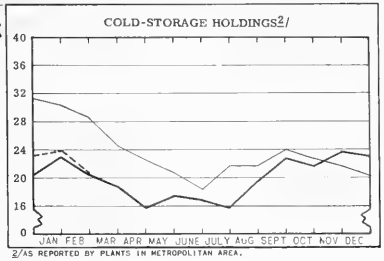
CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pound

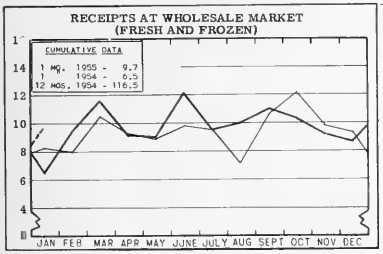


1/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

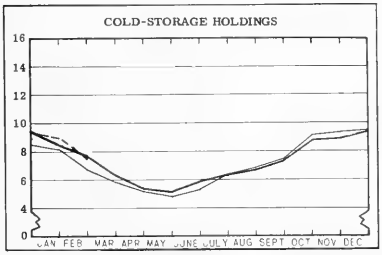
NEW YORK CITY



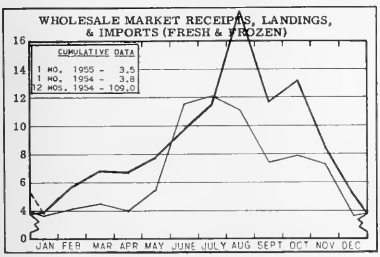
2/AS REPORTED BY PLANTS IN METROPOLITAN AREA.



CHICAGO



SEATTLE



Legend:
1955
1954
1953

BOSTON

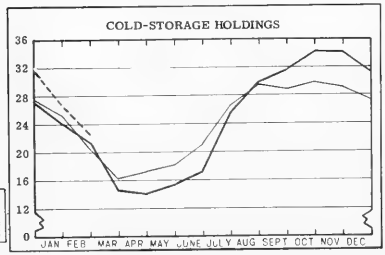
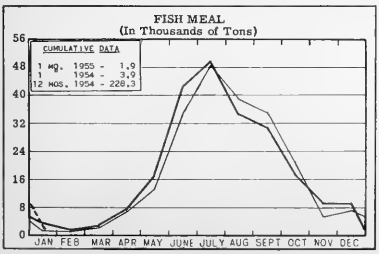


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA



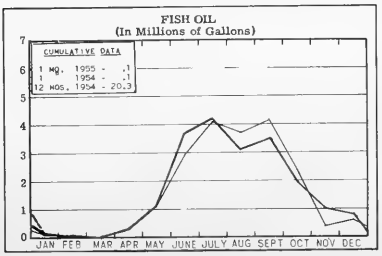
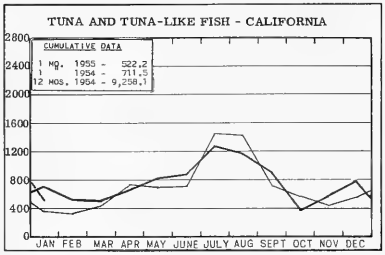
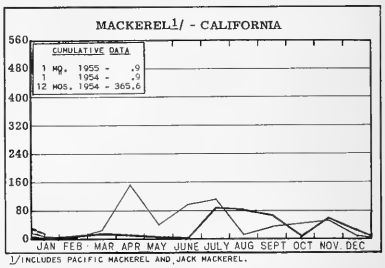


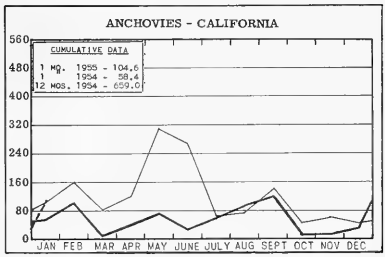
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

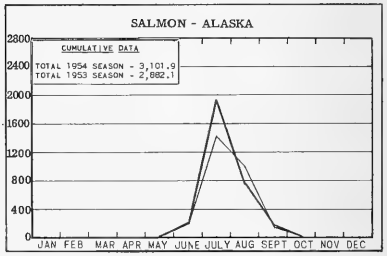
In Thousands of Standard Cases

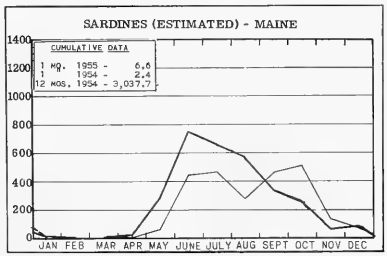




1/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.

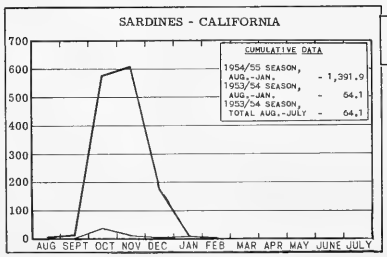






STANDARD CASES

Variety	No. Cans	Can Designation	Net Wgt.
SARDINES	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA	48	No. ½ tuna	6 & 7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
SALMON	48	1-pound tall	16 oz.
ANCHOVIES	48	½ lb.	8 oz.



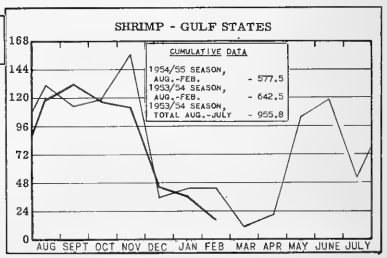
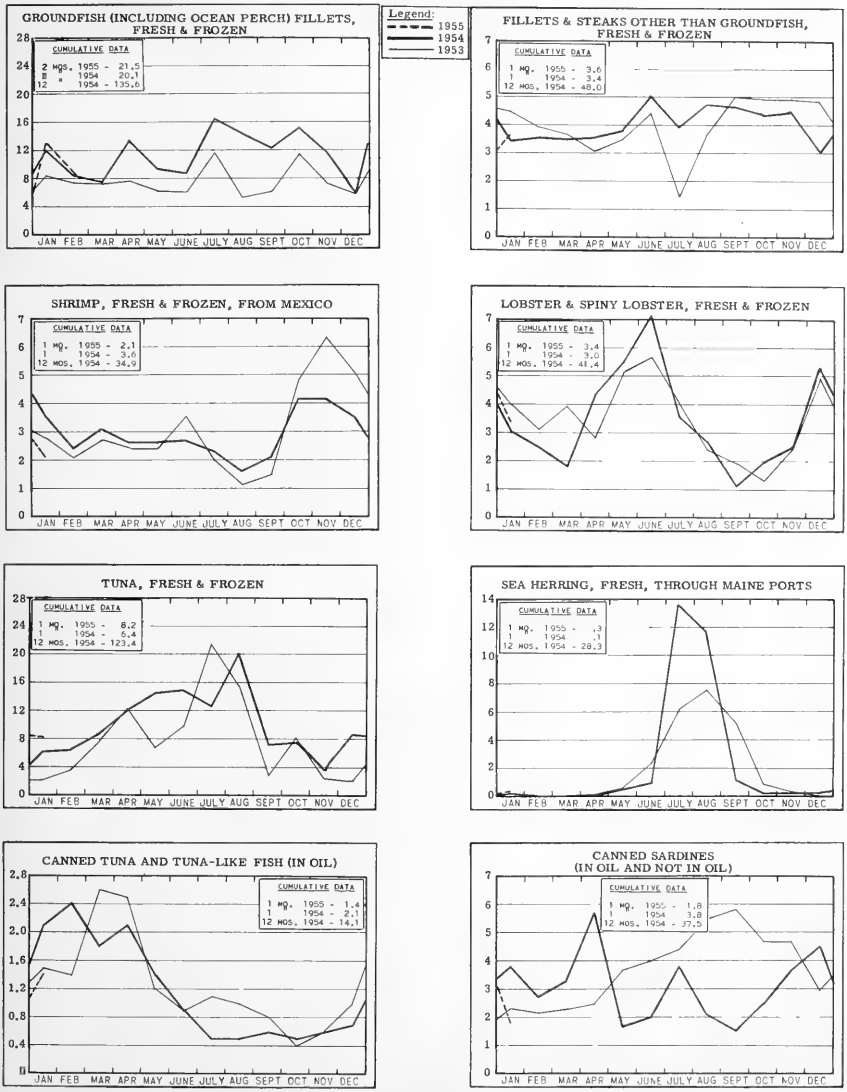


CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds



FISH AND WILDLIFE SERVICE PUBLICATIONS

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

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number — Title

CFS-1060 - Florida Landings, August 1954, 3 pp.
CFS-1069 - Fish Meal and Oil, October 1954, 2 pp.
CFS-1074 - Rhode Island Landings, July 1954, 3 pp.
CFS-1075 - Florida Landings, Sept. 1954, 6 pp.
CFS-1076 - New York Landings, Oct. 1954, 4 pp.
CFS-1077 - Frozen Fish Report, November 1954, 8 pp.
CFS-1078 - Maine Landings, October 1954, 4 pp.
CFS-1079 - Fish Meal and Oil, November 1954, 2 pp.
CFS-1080 - Florida Landings, October 1954, 6 pp.
CFS-1081 - Florida Landings, November 1954, 6 pp.
CFS-1082 - New Jersey Landings, October 1954, 2 pp.
CFS-1084 - Alabama Landings, October 1954, 2 pp.
CFS-1086 - New Jersey Landings, November 1954, 2 pp.
CFS-1089 - Maine Landings, November 1954, 4 pp.
FL -336w - Quarterly Outlook for Marketing Fishery Products, Jan.-March 1955, 32 pp.
FL -421 - United States Foreign Trade in Edible Fishery Products, 1949-1953, 44 pp.
Sep. No. 392 - Use of an Electrical and Guiding Device in Experiments with a "Fish Pump."
Sep. No. 393 - Vitamin Content of Fishery Byproducts. Part 2 - Vitamin B_{12} in Pacific Sardine (Sardinops caeruela) Organs and Riboflavin, Nicotinic Acid, and Vitamen B_{12} in Albacore Tuna (Germo alalunga) Organs.
Sep. No. 394 - Keeping Quality of Chilled Dungeness Crab Meat in Hermetically-Sealed Metal Containers.
Study of Pharmaceutical and Other Industrial Products from Salmon Eggs.
Metabolism Trial to Determine Comparative Nutritive Value of Fish and Meat.
Interim Federal Specifications for Shrimp Issued.

THE FOLLOWING SERVICE PUBLICATION IS AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

Gulf States Production of Fishery Products for Selected Areas, 1953, by S. C. Denham, 40 pp., processed, December 1954. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 314 Custom House, New Orleans 16, La.) This report consists of two parts. In Part I the author discusses the trends and conditions in the Gulf Coast Fisheries in 1953 and gives a resume of the individual fisheries. For the shrimp fishery a detailed account is given of the general conditions, total landings, composition of the landings by species, data on cold-storage freezings and holdings, ex-vessel prices at certain areas in Louisiana and Texas, and the canned shrimp pack. Production and market conditions for the oyster, blue crab, and finfish fisheries are included in the summary, as well as the significant developments in these fisheries. Part II contains statistical tables on total landings by areas and species by months; by individual area and species by months; crab meat production by areas and months; fishery imports at New Orleans and Morgan City, La., and at Port Isabel and Brownsville, Tex.; monthly LCL express shipments from New Orleans by months and by destination; weekly canned oyster and shrimp packs; and a summary table of Gulf shrimp landings for selected areas. Tables showing the monthly wholesale price range of fishery products sold on the New Orleans French Market, fishery products market classifications in the Gulf area, and the monthly fishery production index for selected Gulf States areas are also included. These are the areas covered by the report: Apalachicola, Fla.; Mobile and Bayou LaBatre, Ala.; Pascagoula and Biloxi, Miss.; New Orleans and Lower Mississippi River, Golden Meadow, Houma, Chauvin, Dulac, Morgan City, Berwick, and Patterson, La.; Galveston, Freeport, Port Lavaca, Palacios, Aransas Pass, Rockport, Port Isabel, and Brownsville, Tex.

MISCELLANEOUS PUBLICATIONS

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

(British Columbia) Provincial Department of Fisheries Report (with appendices) for the Year

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

Ended December 31st, 1953, 110 pp., illus., printed. Provincial Department of Fisheries, Victoria, B. C., 1953. The first part of this report is devoted to an analysis of British Columbia's 1953 production and value of fishery products, the canned salmon pack, and a review of the salmon canning industry. Also discussed are the other canning industries (pilchard, herring, tuna, and shellfish), the production of processed fish (mild-cured salmon, dry-salted salmon, dry-salted herring, and pickled herring), the halibut fishery, fish oil and fish meal, net fishing in nontidal waters, value of Canadian fisheries and the standing of the provinces for 1952, and species and value of fish caught in British Columbia. A report on the herring investigation and the 1953 report of the biologist on the oyster and clam investigations are included. The second section consists of these articles: "Contributions to the Life-History of the Sockeye Salmon (No. 39), by D. R. Foskett;" "Results of Investigation of the Herring Populations on the West Coast and Lower East Coast of Vancouver Island in 1953-54," by F. H. C. Taylor and D. N. Outram; "Report of the International Pacific Halibut Commission;" "Report of the International Pacific Salmon Fisheries Commission for 1953;" "Salmon-Spawning Report, British Columbia, 1953." The report concludes with detailed statistical tables on the British Columbia fisheries.

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 5, no. 1, 122 pp., illus., printed in Japanese with summaries in English. Hakodate, Japan, May 1954. Contains among others the following scientific papers: "A Report on Prevention of Fishing Gear from Being Washed Away by Means of Radar Watching;" "Studies on the fixed nets in Funka Bay. III--on the dimensions of principal parts;" "Studies on the Fishery of Mackerel by Purse Seines in the Sea near Hokkaido. II--Construction and operation of the purse seines and the aguri nets (mackerel ring nets);" "Studies on Components in Dry Distillation Products in Some Fish-Scrap (1);" "Studies on Mechanisms of Manufacturing Algin. Part V--Amended theory on mechanisms of manufacturing algin;" "Studies on the Coli-Group Distributed in Marine Foods. II--Enterococci in squid (Ommastrephes sloani Pacificus) caught in the sea near Hakodate;" "Fatty Acid Constituents of Squid Oil;" and "Studies on the Nutritive Value and Absorption Coefficient of 'Surme-Ika' (Ommastrephes sloani Pacificus) Protein."

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 5, no. 2, 98 pp., illus., printed in Japanese with summaries in English. Hakodate, Japan, August 1954. Contains among others the following scientific papers: "Fundamental Studies on Spherical Glass Floats for Fishing Nets. (3) On the point at which floats are broken by external water pressure;" "Chemical Studies on Marine Algae. IX--Histidine, arginine, and lysine contents in various species of marine algae;" "Studies on the Mechanism of Nitrogen Assimilation in Marine Algae. IV--On the optimum temperature of the nitrate reductase in some species of marine algae;" "Studies on the Mechanism of Nitrogen Assimilation in Marine Algae. V--On the hydrogen donator of nitrate reductase;" "Bacteriological studies on Canned Crab. III--Bacteriological studies on the swelling of canned crab (3);" "Bacteriological Studies on Canned Crab. II--Bacteriological studies on the swelling of canned crab (2);" "Bacteriological Studies on Canned Crab. IV--The relation between the degree of sterilization and the concentration of the bacterial spore suspension which was isolated from 'swelled canned crab';" "Studies on the Manufacture of Canned Mackerel. Part VII--The relation between the freshness degree of raw mackerel meat and the quality of canned boiled mackerel;" and "The Relation Between the Freshness Degree of Raw Saury (Cololabis saira 'Brevoort') and the Qualities of Canned Boiled Saury and of Canned Tomato-Sauced Saury."

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 5, no. 3, 89 pp., illus., printed in Japanese with summaries in English. Hakodate, Japan, November 1954. Contains among others the following scientific papers: "Chemical Studies on Atka Mackerel Meat;" "Studies on the Decomposition of Atka Mackerel (Pleurogrammus ozonus, 'Hokke' in Japanese) Meat. I--On the velocity of bacterial decomposition of Atka mackerel meat and the limit of freshness of the meat as the raw material;" "Studies on Bacterial Contamination and Disinfection in Canneries. I--Bacterial contamination in canneries." "Studies on Bacterial Contamination and Disinfection in Canneries. II--Disinfective effect of sodium hypochlorite in canneries;" and "Estimation of the Radius of Gyration of Fishing Boats."

Bulletin of Hokkaido Regional Fisheries Research Laboratory, No. 11, December 1954, 154 pp., illus., printed in Japanese with summaries in English. Hokkaido Regional Fisheries Research Laboratory, Yoichi, Hokkaido, Japan. Contains a number of papers, including the following: "Marking Experiments of Young Herring (Clupea pallasii), 1954," by Heihachi Kondo and Nobuyuki Nakayama; "Studies on Freshness Determination of Fish Meat by Resazurin Test," by Tsutomu Uno and Toshio Tokunaga; "Studies on the Preservation of Fish-Cakes--III. Effect of the survived microorganisms on the spoilage of fish-cake," by Motonobu Yokoseki, Hiroshi Oshima, and Masatoki Sasajima; "Studies of Manufacturing Process for the Oil from Fish Liver," by Katsutoshi Miwa, Toru Iwadare, and Shigeshi Komaki; "Preliminary Report on the Quality of Oil Obtained by Autolysis of Arrow-toothed Halibut (Atheresthes evermanni JORDAN et STARKS), by Shigeshi Komaki, Toru Iwadare, and Katsutoshi Mima; "Biochemical Studies on squid--II. On the protein components of its meat (2)," by Kunitsugu Kitabayashi.

(Canada) Fisheries Statistics of Canada, 1953 (Quebec), 8 pp., printed, French and English, 25 Canadian cents. Dominion Bureau of Statistics, Ottawa, Canada, 1954. Consists of tables giving the production and landed and marketed values of the principal species of fish and shellfish landed in Quebec in 1951-53; quantity and value of manufactured fishery products for 1952-53; vessels used in the sea fisheries,

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capital equipment in the primary fisheries operations; and the number of persons engaged in the fisheries.

(Canada) Journal of the Fisheries Research Board of Canada, vol. XII, no. 1, illus., printed, January 1955. Fisheries Research Board of Canada, Ottawa, Canada. Contains, among others, the following articles: "Distribution, Age and Growth of Eastern Pacific Albacore (Thunnus alalunga Gmelin)," by J. M. Partlo; "Histological Studies on Albacore (Thunnus alalunga) Gonads from the Eastern Pacific," by J. M. Partlo; "The Artificial Drying of Lightly Salted Codfish," by R. Legendre; "Electrophoretic Studies of Proteins Extractable from Postrigor Cod at Low Ionic Strength," by J. R. Dingle, D. E. Eagles, and J. M. Neelin; "Economic Factors in Catch Fluctuations," by H. Scott Gordon; "The Resistance to Salt Water Corrosion of Various Types of Metal Wire Used in the Tagging of Flatfish," by C. R. Forrester and K. S. Ketchen.

Chemical Nature of the Shark Fin Fiber, by Yasuhiko Tsuchiya and Tadasi Nomura, 11 pp., illus., printed in English. (Reprinted from the Tohoku Journal of Agricultural Research, vol. 4, no. 1, October 1953) Department of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan.

A Chemical Study on Jellied Meat of Swordfish, by Yasuhiko Tsuchiya and Yoshio Tatsukawa, 6 pp. illus., printed in English. (Reprinted from the Tohoku Journal of Agricultural Research, vol.4, no. 3-4, March 1954.) Department of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan.

"An Expanding Norwegian Industry (The Herring Meal and Herring Oil Industry)," article, Norwegian Joint Stock Banks Financial Review, vol. 29, no. 3 (July) 1954, pp. 1-4, printed in English. Norwegian Bankers Bureau of Statistics and Information, Oslo, Norway. Presents a brief historical sketch of the development of the Norwegian herring meal and oil industry. This article is a resume of a Norwegian-language book (En industri av verdensformat; Utviklingen av sildolje-og sildemelindustrien i Norge) which was recently published by A. Garnaes' Boktrykkeri, Bergen.

Federal Aid in Fish and Wildlife Restoration (Annual Reports of the Dingell-Johnson and Pittman-Robertson Programs for the Fiscal Year Ending June 30, 1954), 108 pp., illus., printed. Published by the Wildlife Management Institute Wire Building, Washington 5, D. C., and the Sport Fishing Institute, Bond Building, Washington 5, D. C.

Fish Conservation Highlights of 1954, bulletin no. 38, 110 pp., illus., printed. Sport Fishing Institute, Bond Building, Washington 5, D. C., January 1955. Includes a discussion of the age-old problem, sports fishing vs. commercial fishing.

Fish Processing and Associated Industries of Møre og Romsdal County, by Lawrence M. Sommers, 26 pp., illus., printed. (Reprinted from Norsk Geografisk Tideskrift, vol. XIII, no. 3-8, 1951-52, pp. 240-265.) Michigan State College, East Lansing, Michigan, 1953. The main body of this article concerns the importance of fish processing and associated industries to Norway's Møre og Romsdal County. A series of maps and explanations are presented of the distributional patterns of population, fishermen, and fishing vessels which are basic to the understanding of the location and significance of fish-processing industries in Møre og Romsdal. This article also discusses the fresh and frozen, salted, and smoked fish industries, the drying of klipfish, canning of fish, processing of herring oil and herring meal, and production of fish-liver oils, fish meal, guano, and glue.

The Fisherman's Handbook-1955, 512 pp., illus., printed, $1.25. Fisherman Press Inc., Oxford, Ohio, 1955. This is a complete reference book for sport fishermen. It is well indexed for ready use which is an essential for a volume containing the mass of information found in this publication. Special sections are devoted to a complete treatment of boats, motors, reels, rods, lines, lures, description of fish, baits, methods of fishing, places, and charts. The handbook is very well illustrated and most fishermen will consider the glossary of terms a real find. There is also a description of the top-ranking fishing spots throughout the country, as well as information and charts on other fishing locations in each state. In summary, it is a book that will fit admirably into any sport fisherman's tackle box, and for the beginner it will give him something more to lean on than fisherman's luck. For the commercial fisherman who is using any type of gear similar to the Angler's equipment, or who is interested in description of various species of fish, this book might well serve as a handy reference.

--R. T. Whiteleather

The Fishes of the Tidewater Section of the Pamunkey River, Virginia, by Edward C. Raney and William H. Massmann (contribution no. 48 from the Virginia Fisheries Laboratory, Gloucester Point, Va.) 9 pp., illus., printed. (Reprinted from Journal of the Washington Academy of Sciences, vol. 43, no. 12, December 1953.)

"Fishing and Fish Culture in Brackish-Water Lagoons," by Umberto D'Ancona, article, FAO Fisheries Bulletin, vol. VII, no. 4 (October-December 1954), pp. 147-72, illus., printed. Food and Agriculture Organization of the United Nations, Rome, Italy.

Green Meat of Swordfish, by Yasuhiko Tsuchiya and Yoshio Tatsukawa, 5 pp., illus., printed in English. (Reprinted from the Tohoku Journal of Agricultural Research, vol. 4, no. 2, February 1954.) Department of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan.

International Commission for the Northwest Atlantic Fisheries Annual Proceedings, vol. 4 for the year 1953-54, 104 pp., illus., printed. International Commission for the Northwest

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

Atlantic Fisheries, Halifax, N. S., Canada, 1954. This bulletin presents the administrative report of the Commission for the year ending June 30, 1954, including financial statements; a report to the Fourth Annual Meeting of the Commission, June 14-18, 1954; summaries of research during 1953 broken down by country, and a compilation of research reports by subareas; scientific papers specially prepared for the June 1954 Annual Meeting; and a list of scientists and laboratories engaged in the various branches of the Commission's work.

Marine Fishes in Fresh and Brackish Waters of Virginia Rivers, by William H. Massman (contribution no. 47 from the Virginia Fisheries Laboratory, Gloucester Point, Va.) 4 pp., illus., printed. (Reprinted from Ecology, vol. 35, no. 1, January 1954.)

(Colony of Mauritius) Annual Report of the Fisheries Branch, 1953, No. 21 of 1954, 34 pp., and graphs and appendices, processed. Fisheries Branch, Supplies Control Department, Colony of Mauritius. Contains a brief summary of the fisheries activities in Mauritius in 1953; tables showing the total catch by species, average catch per day, catch by area, and catch by type of gear. The appendices include a daily log of the Silverlord on Nazareth Bank during 1952/53, and a list of the fishes of Mauritius.

A New Color Test for the Measurement of Freshness of Fish by Volatile Bases Estimation, by Yasuhiko Tsuchiya and Mitsu Kayama, 10 pp., printed in English. (Reprinted from the Tokyo Journal of Agricultural Research, vol. 5, no. 1, September 1954.) Department of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan.

Norwegian American Commerce, vol. 18, no. 1, 100 pp., January 1955. The Norwegian American Chamber of Commerce, Inc., 290 Madison Ave., New York 17, N. Y. This is a special issue titled "Presenting. . .Industries of Norway." Includes reviews of the important industries of Norway. Articles on fisheries industries cover: "Fisheries and Whaling," pp. 58-59, and "The Herring and Whaling Industries," pp. 60-63. These articles review briefly the more important fishing industries and include some of the latest statistical data available; and "Canning Industry," p. 65, gives a brief summary of the Norwegian sardine canning industry.

Relative Abundance of Young Fishes in Virginia Estuaries, by William H. Massmann (Contribution no. 46, Virginia Fisheries Laboratory, Gloucester Point, Va.), 11 pp., illus., printed. (Reprinted from Transactions of the Eighteenth North American Wildlife Conference, March 9, and 11, 1953; published by the Wildlife Management Institute, Wire Building, Washington 5, D. C.)

Resources of South Carolina, Bulletin No. 22, 172 pp., illus., printed. State Development Board, Columbia, S. C., January 15, 1955. Discusses the resources of South Carolina, including its marine fisheries. The fisheries section of the report gives 1950 statistics in most cases and describes mullet, sea bass, shad, menhaden, oyster, clam, crab, and shrimp fisheries. Sport fishing also is discussed.

Studies on the Production of Underwater Sound by North Atlantic Coastal Fishes, by Marie Poland Fish, Alton S. Kelsey, Jr., and William H. Mowbray, Technical Report 1, Office of Naval Research Contract Four-396(02), 24 pp., printed. (Reprinted from Sears Foundation Journal, Mar. Res.) Narragansett Marine Laboratory, University of Rhode Island, Kingston, R. I., Dec. 1952. Previous studies suggest that at least 42 families of Pacific Ocean fishes are potential sources of underwater sound. The present investigation has undertaken to ascertain experimentally which North Atlantic coastal species fit into that category and what stimuli are involved in sound production among fishes. Apparatus, test, and analysis procedures are described. Recorded for 26 species are "biological" sound, the mechanism responsible for sound production, the frequency range, the principal frequency components, and a description of each sound. Relationship is noted between origin of sound and its frequency characteristics. The majority of species tested have principal frequencies between 75 and 300 cps; none exhibited sounds lower than 20 cps, and with 3 exceptions, none produced sounds higher than 1600; stridulatory sounds of triggerfish, filefish, and burrfish reached the 2400-4800 cps octave. With the available filter system, nothing could be measured faithfully above that band. Noise of "mechanical" origin was recorded for 22 additional species. No sound was observed during routine testing of 6 species. This paper is based on research conducted under contract with the Office of Naval Research.

"Submarine Photography in Puget Sound," article, Science, vol. 120, no. 3119, October 8, 1954, pp. 579-580, illus., printed, single copy 25 cents. Science, 1515 Massachusetts Ave. N. W., Washington 5, D. C.

"Trout Rushed From 'Farm' to Freezer to Package in Top-Quality Fish Operation," by Philip D. Shea, article, Food Engineering, vol. 27, no. 1 (January 1955), pp. 80-81, illus., printed, single copy 35¢. Food Engineering, 330 W. 42nd St., New York 36, N. Y. Describes the operations of a rainbow trout producer and merchandiser in Buhl, Idaho. The company raises the rainbow trout, then grades, dresses, sharp freezes, and packages it in retail and institutional sizes.

Whaling--Amendments to the Schedule to the International Whaling Convention Signed at Washington December 2, 1946, Treaties and other International Act Series 2868, Department of State Publication 5318, 5 pp., printed, 5 cents. For sale by Superintendent of Documents, Washington 25, D. C., 1954. Presents the amendments adopted at the Fifth Annual Meeting of the International Whaling Commission, London, England, June 1953, and which entered into force October 8, 1953.

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"Whaling Season Short but Good," article, Norwegian Joint Stock Banks Financial Review, vol. 29, no. 3 (July) 1954, pp. 4-5, printed in English. Norwegian Bankers Bureau of Statistics and Information, Oslo, Norway. This is a brief summary of the results of the 1953/54 international Antarctic whaling season. Price trends in the whale-oil industry are discussed.

SHRIMP SPOILAGE POINT DETERMINED BY ULTRAVIOLET LIGHT

It is possible to determine, by means of ultraviolet light, the point at which shrimp reach the spoiling stage. The core of a shrimp starts giving off a white fluorescence from 48 to 72 hours before it is possible to detect any other signs of spoilage. At this time, the shrimp are in good condition and perfectly safe to eat. The fluorescence begins with a small trace towards the head and increases as time passes. Spoiling can thus be determined far enough in advance to make it unnecessary for any packer to purchase shrimp that will spoil before processing. The equipment is said to cost less than $40.

--Food Field Reporter, Dec. 14, 1953.

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

Compositors--Jean Zalevsky, Alma Greene, and Helen Joswick

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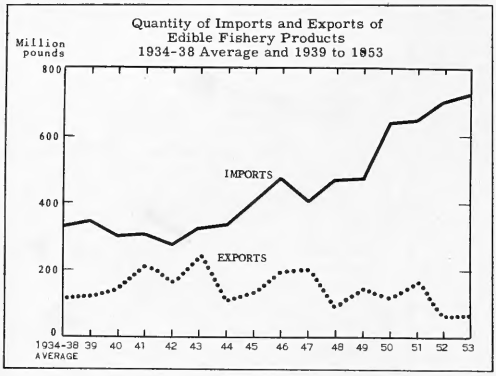
CONTENTS, CONTINUED

INT.-DUP. SEC., WASH., D.C. 77722

UNITED STATES FOREIGN TRADE IN EDIBLE FISHERY PRODUCTS, 1949-53

An analysis of the United States foreign trade in edible fishery products from 1949 through 1953 is presented in the Fishery Leaflet 421, United States Foreign Trade in Edible Fishery Products, 1949-53. Included are tables and charts showing the quantity, types of products, value, and origin or destination of the principal fishery products in the foreign trade of the United States.

Definite changes are shown in the pattern of United States foreign trade in edible fishery products during the postwar period, 1949-53. Since 1949 the volume of imports has increased rapidly, reaching record levels in 1953. Exports which were at a relatively high level in 1949, dropped to a record low in 1953, substantially below the levels of the depression years 1932 and 1933.



Imports of edible fishery products in 1953 were more than double the quantity of the annual average of such imports during the prewar period 1934-38. Among the major items showing substantial increases over the prewar average were fresh and frozen tuna, canned tuna and tunalike fish, and fresh and frozen fillets. Exports of edible fishery products in 1953 were 29 percent below their prewar average in quantity. Canned salmon and sardine exports were the principal items accounting for this decline.

United States imports of edible fishery products during 1953 totaled $195 million, foreign value, or almost 7 times the value of the 1934-38 average. The value of exports of edible fishery products in 1953 was 28.6 percent above the prewar average.

The importance of United States foreign trade in fishery products to the domestic fishery economy can perhaps be more readily grasped by a comparison with the domestic catch. The United States and Alaska fisheries produced in 1953 a catch of about 2.6 billion pounds, round weight, of fish for edible purposes. Imports of fishery products in 1953, when converted to a round weight equivalent, represented a catch of more than $1\frac{1}{4}$ billion pounds, or equivalent to 49 percent of the domestic catch used for edible purposes. Stated in yet another way, the 1953 imports represent about one-third of total United States consumption of edible fishery products.

Foreign markets for United States fishery products have provided important outlets. Export markets have required up to 14 percent of the domestic catch of fish used for edible purposes. In 1953 about 5 percent of the United States catch used for edible purposes was exported or went into the manufacture of edible fishery products ultimately sold abroad.

The major competitors for the United States domestic trade in fishery products are Canada, Norway, Iceland, Mexico, Japan, Portugal, Peru, and the Union of South Africa.

Fishery Leaflet 421 may be obtained free from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.