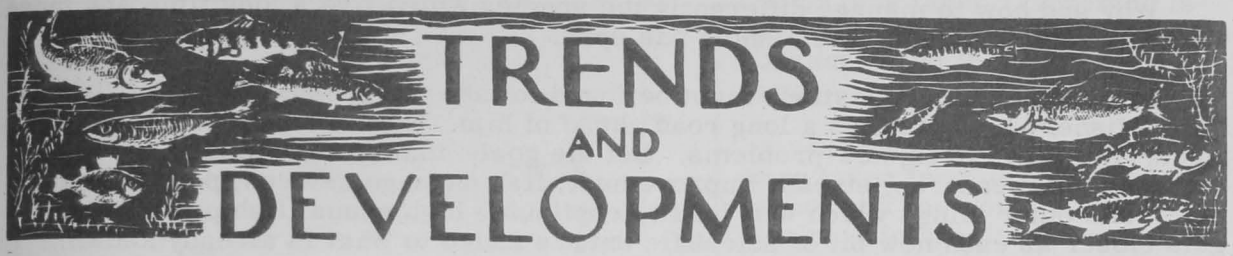



## Biologists Seek Answers to Many Fishery Research Problems

Even with the experience gained over unnumbered centuries in the age-old enterprise of fishing, man's best efforts to supply this nutritious protein food for modern markets are still based largely upon hope and guesswork and that's not an efficient or economical way to operate a business, the Interior Commissioner of Fish and Wildlife Service stated September 4.

To remedy the situation, research biologists of the United States Fish and Wildlife Service are seeking ways to take the guesswork out of fishing so that precious time and money are not lost seeking "the fish that isn't there."

Painstakingly--and that's the way research operates--the fishery biologists are seeking the secrets of the sea which bear upon where fish can be found, what makes them abundant and how they can be most efficiently harvested. More than 200 species of fish which are currently used for human food are involved in these studies which stretch from inland streams to mid-ocean.

From the layman's point of view, the Commissioner explains, the problem can be considered in two parts:

(1) Developing methods by which you can predict when and where you can find large numbers of the fish you want to harvest by understanding what is responsible for variations in the supply.

(2) Knowing the exact effects of various kinds of harvest.

The former will make it possible for the commercial fisherman to know exactly where to go to conduct the finny harvest and the latter the right way to conduct that harvest to maintain bountiful supplies. That will cut down his overhead, put more money in his pocket, and at the same time permit savings in the housewife's budget.

Many interesting things are involved in these studies, such as--

The ocean currents, water temperatures, chemical content of the water, etc., and their effect on food supplies for and the distribution of its various fish populations.

What influences favorable spawning conditions and causes good survival years; what stimulates growth rates; the causes for abundance of food; how the effects of disease and predation (natural enemies) are reduced.

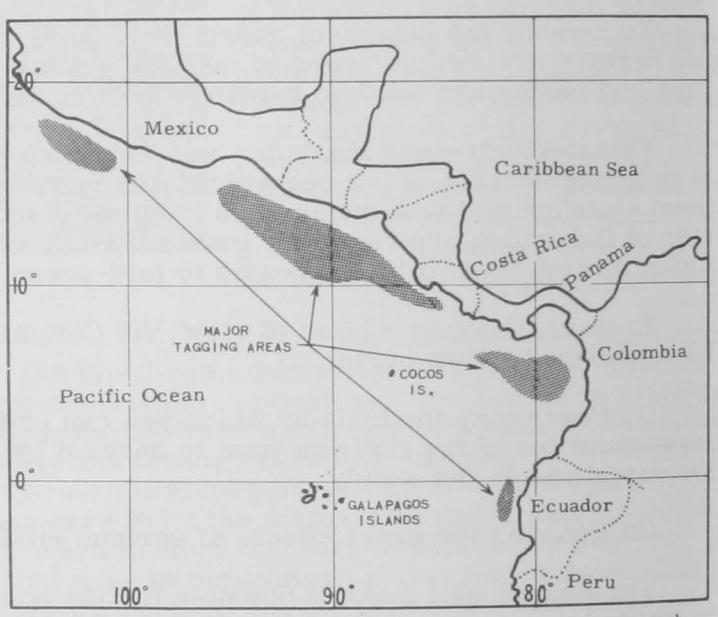
How do heredity and the particular water in which the fishes live affect their growth.

Why and how to manage differently the species which live a long time and those which grow rapidly and have a short life span.

Answers to these questions must be found to take the guesswork out of fishing. So the fishery biologist has a long road ahead of him. New answers bring new questions. New days bring new problems. But the goal--that of determining the proper management measures, stream improvement, fish passage devices, pollution abatement, and other things which will lead to continuing high annual fish production--gets closer as each new bit of scientific data is added to what is already known.

## California

YELLOWFIN AND SKIPJACK TUNA TAGGED BETWEEN SOUTHERN MEXICO AND ECUADOR (M/V Cape Falcon Cruise 57-C-3): A total of 490 yellowfin and 588 skipjack tuna were tagged and released during a tagging cruise (May 4-July 30, 1957) by the California Fish and Game Department biologists aboard the commercial tuna clipper Cape Falcon. Tagging was done with red and white type G or spaghetti tags to test recovery rate between the two colors. Collections of marine life from baiting and fishing areas were also collected during the cruise.



M/V CAPE FALCON CRUISE 57-C-3 (MAY 4 TO JULY 30, 1957).

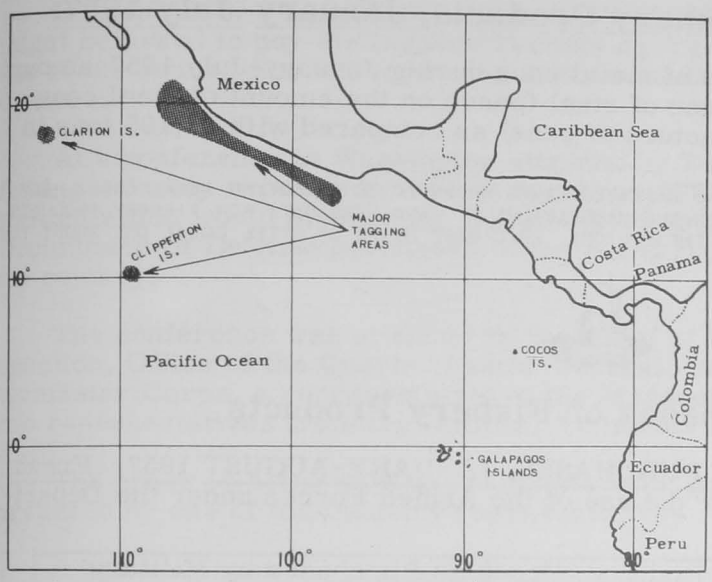
Tuna were tagged and released in the following areas; Southern Mexico: yellowfin, 9 white tags; Gulf of Tehuantepec: yellowfin, 13 white and 20 red tags; Central America: yellowfin, 57 white and 71 red tags; skipjack, 90 white and 85 red tags; Panama: yellowfin, 163 white and 154 red tags; skipjack, 90 white and 100 red tags; Northern Ecuador: skipjack, 10 white and 10 red tags; Gulf of Guayaquil: yellowfin, 2 white and 1 red tags; skipjack, 100 white and 101 red tags; Malpelo Island: skipjack, 2 white tags.

Weather conditions and water surface condition temperatures were recorded daily during the trip. The surface temperatures in the fishing areas ranged between 77° and 87.4° F.

* * * * *

YELLOWFIN TUNA TAGGED OFF COAST OF MEXICO (M/V Southern Pacific Cruise 57-C-4): A total of 624 yellowfin tuna were tagged by biologists of the California Department of Fish and Game during a fishing trip (May 13-July 11, 1957) of the California tuna clipper Southern Pacific. The yellowfin tuna tagging program was planned to test the effect of tag color on future recovery by alternating red, white, and blue tags by groups of ten. In addition collections were made of marine life at baiting and fishing stations.

Yellowfin tuna were tagged and released from the following areas: Northern Mexico (130 red, 125 white, and 35 blue tags), Southern Mexico (127 red, 116 white,




M/V SOUTHERN PACIFIC CRUISE 57-C-4 (MAY 13-JULY 11, 1957).

and 59 blue tags), Clipperton Island (10 red and 14 white tags), and Clarion Island (6 red and 2 blue tags).

Length-frequency samples were taken from three separate schools off the coast of Mexico. Marine-life specimens were collected from night light stations, bait-net hauls, and tuna stomachs. Weather conditions and water surface temperatures in the areas fished ranged from 75° F. to 87° F.

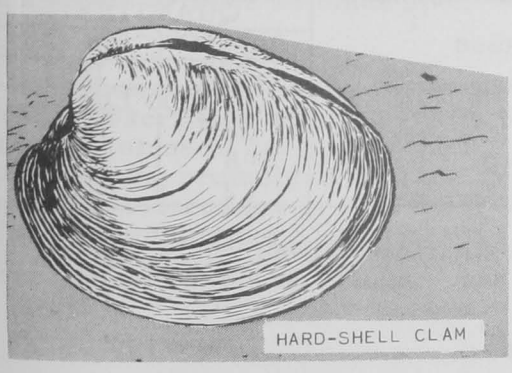
The yellowfin tagged were exceptionally large, ranging in size from 41-101 centimeters (16.1-39.8 inches), with the majority between 80-95 centimeters (31.5-37.4 inches).

A yellowfin tagged on March 8, 1957, 40 miles south of Acajutla, El Salvador, was recovered by a member of the tagging team on June 17--65 miles west by north of Acapulco, Mexico.

## Clams

STUDIES ON SALINITY TOLERANCE OF EARLY STAGES OF HARD CLAMS: A resume of the observations on the salinity tolerance of the eggs, larvae, and set of East Coast hard clams (Venus mercenaria) has been prepared by biologists of the U. S. Bureau of Commercial Fisheries' Marine Biological Laboratory at Milford, Conn., and released as part of that Laboratory's Bulletin No. 3 (August 22, 1957). Much of the information can be applied by biologists and members of the industry, who are planning, or are now engaged in, the use of small salt-water ponds for the culture of commercial hard clams.

Eggs: The optimum salinity for development of eggs of the hard clam was 26.0-27.0 parts per thousand (p.p.t.). The upper limit was 35.0 p.p.t., but less than one percent of the eggs developed at this salinity. Even at 32.5 p.p.t. only 30 to 50 percent of the eggs developed normally. The lower limit was 20.0 p.p.t. and 16 to 20 percent of the eggs developed normally at this salinity. At 22.5 p.p.t. approximately 80 percent of the eggs developed into normal straight-hinge larvae.


HARD-SHELL CLAM

Larvae: A salinity of 26.0-27.0 p.p.t., or higher, was also optimum for growth of clam larvae, with 20.0 p.p.t. the lower limit for practical culture work. Some larvae did reach metamorphosis at 17.5 p.p.t. but were so weakened and sluggish that they died during or immediately after setting.

Set: Small (1.8-3.6 millimeter or average of about 1/10-inch) juvenile clams survived for a month or more in salinities as low as 15.0 p.p.t., and larger juveniles (5.0-21.5 millimeter or about 1/5-4/5 of an inch) survived in salinities as low as 12.5 p.p.t. None of the juvenile clams survived at 10.0 p.p.t. or lower. We have not yet determined what effect lowered salinities may have on the growth of young clams.

Most of the above data was obtained using, as parents, hard clams from Long Island Sound that had developed gonads at a salinity of approximately 27.0 p.p.t. Additional experiments will be conducted using, as parents, clams kept at lower salinities for several weeks before spawning, and also clams from different areas.

As additional information becomes available, we may find that the recommendations based on the present experiments will need to be revised for clams from other areas and for clams that develop gonads at salinities lower than that of Long Island Sound.

## Cans--Shipments for Fishery Products, January-July 1957

Total shipments of metal cans during January-July 1957 amounted to 73,968 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 65,105 tons in January-July 1956.

NOTE: STATISTICS COVER ALL COMMERCIAL AND CAPTIVE PLANTS KNOWN TO BE PRODUCING METAL CANS. REPORTED IN BASE BOXES OF STEEL CONSUMED IN THE MANUFACTURE OF CANS, THE DATA FOR FISHERY PRODUCTS ARE CONVERTED TO TONS OF STEEL BY USING THE FACTOR: 23.0 BASE BOXES OF STEEL EQUAL ONE SHORT TON OF STEEL.

## Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-AUGUST 1957: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 2.1 million pounds (value $1.2 million) of fresh and frozen fishery products were purchased in August by the Military Subsistence Market Centers. This was lower than the purchases in July by 28.6 percent and 26.0 percent less than the purchases in the same month a year earlier. The value of the purchases this August was lower by 19.6 percent as compared with the previous month and lower by 14.6 percent from August a year earlier.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, August 1957 with Comparisons

| QUANTITY | | | | VALUE | | | |
|---|---|---|---|---|---|---|---|
| August | | Jan.-Aug. | | August | | Jan.-Aug. | |
| 1957 | 1956 | 1957 | 1956 | 1957 | 1956 | 1957 | 1956 |
| (1,000 Lbs.) | | | | ($1,000) | | | |
| 2,117 | 2,860 | 17,105 | 18,275 | 1,198 | 1,403 | 8,834 | 9,108 |

For the first eight months of 1957 purchases totaled 17.1 million pounds, valued at $8.8 million--a decrease of 6.4 percent in quantity and 3.0 percent in value as compared with the same period of 1956.

Prices paid for fresh and frozen fishery products by the Department of Defense in August averaged 56.6 cents a pound, 6.3 cents more than the 50.9 cents paid in July, and 7.5 cents higher than the 49.1 cents paid during August 1956.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, August 1957 with Comparisons

| Species | QUANTITY | |
|---|---|---|
| | August 1957 | Jan.-Aug. 1957 |
| | (1,000 Lbs.) | |
| Tuna | 26 | 1,476 |
| Salmon | 8 | 1,009 |
| Sardine | 2 | 108 |

Canned Fishery Products: Tuna was the principal canned fishery product purchased for the use of the Armed Forces during August.

NOTE: SOME LOCAL PURCHASES ARE NOT INCLUDED. ACTUAL TOTAL PURCHASES ARE HIGHER THAN INDICATED SINCE IT IS NOT POSSIBLE TO OBTAIN LOCAL PURCHASES.

* * * * *

INSPECTION CHARGE ON FISH PURCHASES PROPOSED: The fishing industry might be asked to pay the inspection costs on fresh and frozen fish purchased for the use of the Armed Forces by the Department of Defense Military Subsistence Market Centers.

At a conference in Washington attended by Defense Department officials and fishing industry representatives, it was brought out that an order has actually been written which would provide for the suppliers to pay the cost of inspection for all Department of Defense purchases of fresh and frozen fish and shellfish throughout the country.

The conference was attended by the Chief of the Office of Procurement and Inspection, Office of the Quartermaster General, four representatives from the Quartermaster Corps, a representative of the Massachusetts Fisheries Association, and two representatives from the National Fisheries Institute.

The order is being held up pending further study and a report which is being prepared by one of the industry representatives.

It has long been the practice for Army personnel to inspect fish when it is being processed, even though all of the fish inspected may not be purchased by them. There seems to be no equitable method by which inspection charges could be assessed on only that portion of fish purchased by the Defense Department. If charges were levied on all the fish inspected, the industry would find it impossible to pass inspection costs on to other customers.

* * * * *

FROZEN RAW BREADED SHRIMP INTERIM PURCHASE DESCRIPTION: An "Interim Quartermaster Corps Purchase Description for Shrimp, Frozen, Raw; Breaded" has been issued to temporarily serve the Military Subsistence Market Centers during the period in which certain comments on the proposed Federal Specification PP-S-315 ("Shrimp, Frozen, Raw; Breaded") can be resolved. A copy of the purchase description can be obtained from the Market Centers or from the Quartermaster Food and Container Institute for the Armed Forces, 1819 West Pershing Road, Chicago 9, Ill. The purchase description was prepared with the cooperation of technologists of the U. S. Bureau of Commercial Fisheries.

The purchase description is a modified version of the proposed Federal Specification PP-S-315 for the product. Revisions were made in the tolerance requirements for such items as black spot, sand veins, sizes, loose crumbs, coating breaks, and bacteria count.

Information obtained by the Armed Forces on procurement of the item using the purchase description will be used by the Bureau of Commercial Fisheries technological laboratories in developing the final version of the Federal specification. Other items affecting promulgation of the Federal specification involve application of the proposed standards for grades for frozen breaded shrimp and development of a method for determining the coating content of the frozen breaded shrimp.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, FEBRUARY 1957, P. 11.

## Fur Seals

PRIBILOF ISLANDS FUR-SEAL SKIN PRODUCTION, 1957: The annual sealing operations conducted by the U. S. Bureau of Commercial Fisheries on the Pribilof Islands in Alaska ended August 20, 1957, and netted 93,618 fur-seal skins.

The harvest last year amounted to 122,826 skins. From 1940 to 1956 the average annual yield was close to 65,000 skins.

The fur-seal industry of the Pribilof Islands has been operated by the United States Government since 1910. In 1911 an International Convention between the United States, Great Britain, Japan, and Russia to prohibit pelagic sealing--the killing of fur-seals at sea in the North Pacific--became effective.

SEAL PUPS IN TYPICAL CONCENTRATION OF LATE SUMMER ON POLOVINA ROOKERY, ALASKA.

This convention, which provided for the first time a sound basis for the management of the Alaska fur seals, remained in force for 30 years until terminated by Japan in October 1941. From 1942 the herd has been protected by a provisional agreement between Canada and the United States which reserved to Canada 20 percent of the skins taken each summer on the Pribilof Islands.

On February 9, 1957, a new interim North Pacific Fur-Seal Convention was concluded by Canada, Japan, the Union of Soviet Socialist Republics, and the United States, similar in form to the 1911 convention. The new convention provides that Canada and Japan each shall receive 15 percent of the seal skins taken commercially by the United States and by the U. S. S. R. On behalf of the United States, this convention was ratified by the Senate on August 8, 1957. Japan and Canada have already taken the required legislative action and Russia is expected to exchange ratifications soon.

Approximately 80 percent of the world's fur seals go to the Pribilof Islands each summer to breed. During the winter these seals range southward as far as southern California.

## Great Lakes Fish Landings Increased in 1956

The 1956 United States Great Lakes commercial catch of fishery products, exclusive of Lake St. Clair and the International Lakes, amounted to over 79 million pounds, according to preliminary data released by eight states bordering on the Great Lakes. This represents an increase of nearly 4 million pounds as compared with the 1955 catch of over 75 million pounds. Outstanding gains were made in the 1956 yellow perch and lake smelt catches which increased more than 4 and 2 million pounds, respectively, from the 1955 harvest. Small gains were made in yellow pike and sheepshead catches. Catches of all other species were lower than the previous year.

Seven principal species accounted for 84 percent of the 1956 United States Great Lakes catch. These were (in million pounds): lake herring (16.3), chubs (11.3), yellow perch (10.8), lake smelt (7.8), yellow pike (17.1), blue pike (6.9), carp(6.5).

The 1956 Lake Michigan yellow perch catch of 3.4 million pounds was only slightly less than in 1955. The 1956 Lake Erie catch of this species (7.1 million pounds) was greater by 4.6 million pounds as compared with the 2.4 million pounds landed the previous year. The yellow perch run from Lake Erie during the fall season was exceptionally heavy. Ohio's 1956 Lake Erie landings of this species during the four-month period August-November totaled 4.6 million pounds--a monthly average of 1.2 million pounds as compared with a monthly average of only 0.2 million pounds during the same period in 1955.

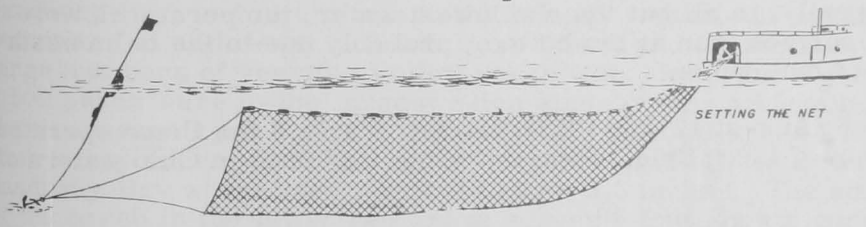
The 1956 United States Great Lakes whitefish and lake trout catches again declined from the previous year. Whitefish catches of 1.5 million pounds dropped 360,000 pounds below the previous year's catch, with Lake Michigan's catch only 57,000 pounds as against 375,000 pounds in 1955. The 1956 lake trout catch in Lake Superior amounted to 1.8 million pounds--300,000 pounds lower than in 1955, and one million pounds below the 1952 catch of 2.8 million pounds.

Lake Michigan was the leading producer in 1956 with a catch of 31 million pounds, followed by Lake Erie (30.7 million pounds), Lake Superior (13.6 million pounds), Lake Huron (3.6 million pounds), and Lake Ontario (0.2 million pounds).

## Great Lakes Fishery Investigations

OTTER-TRAWL AND GILL-NET FISHING IN LAKE ERIE CONTINUED: M/V "Cisco" Cruise 5 (July 23-August 6, 1957): Gill-net and otter-trawl fishing in the area of Lake Erie west of Lorain, Ohio, on the south and Point Pelee on the north were continued by the Great Lakes Fishery Investigations research vessel Cisco during cruise 5.

Gill nets (1-, 1½-, 2-, 2½-, 3-, and 4-inch mesh) were set with their float lines 6 to 9 feet beneath the surface in 6½ fathoms east of Kelly's Island, in 3 fathoms near the west shore of Pelee Island, and in 3 fathoms near the east shore of Pelee Island. Eleven walleyes represented the largest single catch of this species taken to date. Other species taken were: blue pike, gizzard shad, yellow perch, white bass, rock bass, and channel catfish.

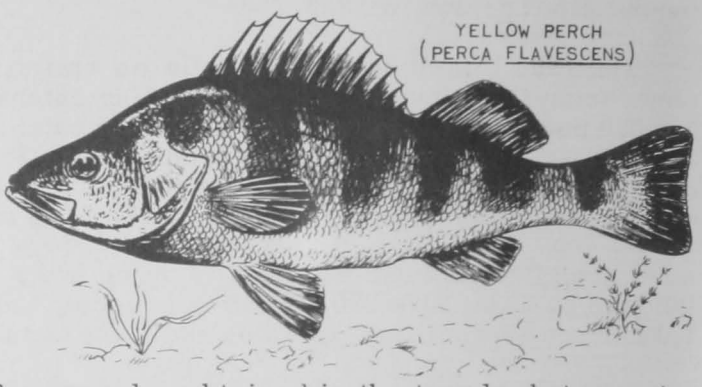



An oblique net set in the same area indicated that yellow perch were numerous 20 to 30 feet below the surface and sheepshead near the bottom. The gill nets set on the west side of Pelee Island took mostly sheepshead (37), with just a few walleyes, white bass, yellow perch, and one smallmouth bass. The net set on the east side of the Island, on the other hand, made a very large catch (354) of large yellow perch. There were 128 of this species in 100 feet of 2½-inch mesh, and 110 averaging 10.3 inches in 300 feet of 3-inch mesh. Other fish were 123 sheepshead and several walleyes, white bass, gizzard shad, and rock bass.

Trawling was conducted northwest of Pelee Island, at two places between this island and Point Pelee, northwest of Lorain, Ohio, and at 5 locations in the vicinity of the islands on the American side of the lake. Yellow perch and sheepshead made up the bulk of practically all hauls. Very few sheepshead, however, were caught south of Middle Sister Island, the westernmost area worked. Yellow perch and emerald shiners predominated in this area (a school of fish, almost certainly emerald

shiners, up to 30 feet thick was recorded on the fathogram here). Another unusual catch was made near shore just west of Lorain, where over 1,600 spottail shiners (36 pounds) were taken in one 15-minute tow of a relatively small trawl.

Some of the sheepshead caught this cruise appeared to have just completed spawning, but none were actually still in spawning condition. Other species taken in the trawls were walleye, blue pike (5), white bass, gizzard shad, channel catfish, carp, goldfish, white sucker, burbot (3), black crappie (1), stone cat (1), log-perch (2), trout-perch, alewife, silver chub, and smelt. Smelt in their second year of growth were much less abundant than previously, and older ones were very rare. Most of the smelt which were in the west end of the lake have presumably moved farther east to cooler water. Smelt fry, however, were fairly common in most areas trawled. Fry of white bass, walleye, sheepshead, yellow perch, and alewife were also obtained in the trawls, but except for perch and sheepshead fry caught in Sandusky Bay, none of these species were taken in abundance. Tiny fry, probably Cyprinids, were caught in large-mesh plankton nets. They seemed to concentrate near the surface even during daytime. Smelt fry were also taken in the plankton nets, but were near the bottom.


YELLOW PERCH
(PERCA FLAVESCENS)

Two of the Cisco's biological staff, using SCUBA equipment, examined a trawl in operation underwater. Poor visibility hampered observations, but it was determined that the trawl, which had a 39-foot headline and a 51-foot footline, was opening well and spread a maximum of 12 feet vertically from headline to footline.

Water temperatures were very warm in the western end of Lake Erie, averaging about 25° C. (77° F.) at the surface. The extremes were 23.2° C. (73.8° F.) and 27.8° C. (82.0° F.), Generally, in all but the shallowest water, temperatures were somewhat warmer at the surface than at the bottom, probably due to the calm weather which prevailed most of the cruise.

M/V "Cisco" Cruise 6 (August 12-26, 1957): During cruise 6 the Cisco operated mainly in the eastern basin of Lake Erie. Some trawling was done in Ohio waters of the central basin.

Experimental gill nets (2½-inch mesh) were set obliquely from top to bottom in 13 fathoms off Erie, Penn., and in 26 fathoms off Long Point, Ontario; a bull net (2½-inch mesh, 120 meshes deep, 300 feet long) was set with its float line 8 fathoms below the surface in 17 fathoms of water off Long Point; and experimental gangs with several mesh sizes were set on the bottom in 33 fathoms off Long Point and 1 fathom below the surface in 13 fathoms off Erie. All gill net catches except that of the bull net were light. The bull net took 218 smelt (mostly yearlings), 27 yellow perch, and one lake herring. The bottom net off Long Point caught 25 smelt, while the oblique net there caught 11 smelt and 6 perch. The midwater net off Erie contained only 2 smelt and 3 perch, but the catch in the oblique net was somewhat heavier: 91 smelt, mostly in the bottom half, 4 perch, and 1 sheepshead at midlevels, 2 blue pike in top half, and 1 lake herring and 1 burbot near the bottom.

Trawling operations were conducted in 4 areas off Erie; 2 areas off Long Point; off Dunkirk, N. Y.; and off Ashtabula, Fairport, and Cleveland, Ohio. Trawling was done in most of these areas during Cruises 2 and 4. Smelt, especially those in their second year, continue to be the dominant species in the east end of the lake. On six occasions more than 1,000 yearling smelt were caught in a 15-minute tow, with the

largest catch over 4,000. These one-year-olds appear to be fairly uniform in size over the entire eastern basin, averaging about 4.6 inches. Those taken off Cleveland, however, averaged about 5.0 inches. They were usually abundant near the bottom or just under the thermocline, at least during daylight hours. Trout-perch were also taken in especially large numbers. The largest catch in a 15-minute tow was 1,235. They were taken at depths as great as 15 fathoms. The only other species taken in numbers were yellow perch, sheepshead, and alewife fry. The latter species was taken only once in 9.5 fathoms off Dunkirk, and sheepshead were numerous in only one tow, in 9 fathoms off Cleveland. Perch were not abundant anywhere at depths greater than 10 fathoms. Other species caught in trawls included burbot, slimy muddler, carp (1), white sucker, spottail shiner, logperch, johnny darter, sand darter, and smallmouth bass fry (1). The latter 3 species were taken in only one tow, at 8 fathoms off Erie on a sand bottom.

Except for an area east and south of Long Point, most of the water in the eastern portion of the lake deeper than 9 fathoms is thermally stratified. Off Long Point, the hypolimnion is approximately as thick as in other places, but the drop in temperature with depth in the discontinuity layer is appreciably slower. This situation may be related to the strong currents common around Long Point. Surface temperatures varied little over the eastern end of Lake Erie, ranging mostly between 21° and 23° C. Extremes were 20.8° C. (69.4° F.) and 24.6° C. (76.3° F.)

During a night plankton study off Long Point several Mysis relicta were caught, the first of the season. They were taken in a half-meter large-mesh plankton net, and were found at 23 and 37 meters depth in water 62 meters deep.

M/V "Cisco" Cruise 7 (September 3-15, 1957): The Cisco operated in the extreme western end of Lake Erie, west of Lorain, Ohio, on the south and Point Pelee, Ontario, on the north during cruise 7. As compared to Cruise 5, this cruise was characterized by definitely larger catches of walleyes or yellow pike, sheepshead, yellow perch, channel catfish, and gizzard shad.

The bottom trawl was used off Lorain, just east of the Detroit River light, in Sandusky Bay, and in 6 areas in the Islands region. In addition, a midwater trawl was towed at night east of South Bass Island and off Sandusky, Ohio. Especially large numbers of yearling yellow perch were caught in some of the hauls. Over 1,500 perch were in the largest catch made during a 15-minute tow. These yellow perch averaged just under 6 inches in length in all areas fished except off Lorain, where they averaged slightly over 6 inches, and off the Detroit River light and in Sandusky Bay where they averaged about 5.3 inches. The appreciably smaller size of the perch in the latter two areas suggests that growth conditions for perch are not as good in the shallow inshore waters as in the open lake. Young-of-the-year perch, sheepshead, and white bass were taken regularly, occasionally in large numbers, at nearly all stations for the first time this year. It is believed that they had just recently moved out from the inshore waters and bays. They have shown a definite decrease in abundance in Sandusky Bay. Other species caught in the trawls include smelt (a few yearlings and fry), sturgeon (1-31 inches long, near the Detroit River light), white sucker, smallmouth bass (2), burbot (1), black crappie (1), white crappie (Sandusky Bay only), blue pike (1), brown bullhead, stonecat, silver chub, emerald shiner, spottail shiner, carp, goldfish (Sandusky Bay only), alewife (taken in large numbers only once, south of Middle Sister Island, where 1,188 fry were caught), log-perch, johnny darter, and trout-perch.

A few fry of white bass, gizzard shad, and alewife were taken in the midwater trawl near the surface just before dark. But adults of white bass, yellow perch, walleye, and channel catfish, as well as small alewives and gizzard shad were caught near the surface after dark.

Experimental nylon gill nets were set obliquely from top to bottom in 7 fathoms southeast of Kelly's Island and in 7 fathoms east of Pelee Island. The net off Kelly's Island had mostly perch and sheepshead in the bottom half and walleyes in the top half with a few channel catfish, gizzard shad, and white bass scattered throughout. Off Pelee Island the catch was mostly perch in the bottom half and walleye in the top half. Also off Kelly's Island a nylon gill net (300 feet each of 2-, 3-, and 4-inch mesh) was buoyed so that its float line was 4 feet beneath the surface. In this net were 41 channel catfish, 31 white bass, 26 gizzard shad, 18 walleyes, and one black crappie.

The water in western Lake Erie was homothermous in all areas visited during Cruise 7. Surface water temperatures were 1° to 5° C. cooler than during Cruise 5. The extremes were 19.6° C. (67.3° F.) and 23.2° C. (73.8° F.), but the temperatures ranged mostly between 21° and 22° C.

NOTE: SCIENTIFIC NAMES FOR SPECIES MENTIONED: WALLEYES (STIZOSTEDION VITREUM VITREUM), BLUE PIKE (STIZOSTEDION VITREUM GLAUCUM), GIZZARD SHAD (DOROSOMA CEPEDIANUM), YELLOW PERCH (PERCA FLAVESCENS), WHITE BASS (LEPIBEMA CHRYSOPS), ROCK BASS (AMBLOPLITES AUPESTRIS), CHANNEL CATFISH (ICTALURUS LACUSTRIS), SHEEPSHEAD (APLODINOTUS GRUNNIENS, SMALLMOUTH BASS (MICROPTERUS DOLOMIEUI), EMERALD SHINERS (NOTROPIS ATHERINOIDES), CARP (CYPRINUS CARPIO), GOLDFISH (CARASSIUS AURATUS), WHITE SUCKER (CATOSTOMUS COMMERSONI), BURBOT (LOTA LOTA), BLACK CRAPPIE (POMOXIS NIGRO-MACULATUS), STONE CAT (NOTURUS FLAVUS), LOG-PERCH (PERCINA CAPRODES), TROUT-PERCH (PERCOPSIS OMISCOMAYCUS), ALEWIFE (POMELOBUS PSEUDOHARENGUS), SILVER CHUB (HYBOPSIS STORERIANUS), SMELT (OSMERUS MORDAX), BROWN BULLHEAD (ICTALURUS NEBULOSUS), LAKE HERRING (LEUCICHTHYS ARTEDI), SLIMY MUDDLER (COTTUS COGNATUS), SPOTTAIL SHINER (NOTROPIS HUDSONIUS), JOHNNY DARTER (ETHEOSTOMA NIGRUM), SAND DARTER (AMMOCRYPTA PALLUCIDA), WHITE BASS (ROCCUS CHRYSOPS), STURGEON (ACIPENSER FULVESCENS), AND WHITE CRAPPIE (POMOXIS ANNULARIS).

* * * * *

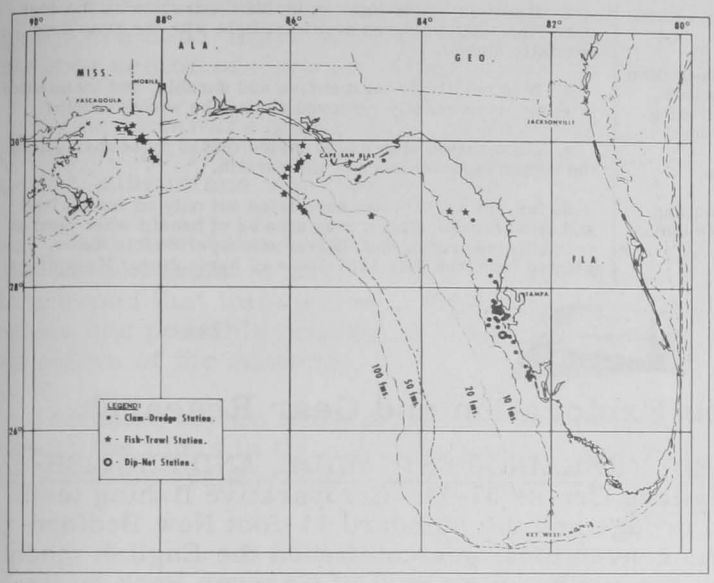
SEA LAMPREY CONTROL BY NEW CHEMICAL POSSIBLE: Emphasis on the control of the sea lamprey is being placed on chemical research, according to the Chief of the Great Lakes Fishery Investigations of the U. S. Bureau of Commercial Fisheries. Research on the chemical approach to lamprey control has been carried through a painstaking laboratory screening program and intensified testing in simulated stream environment in outdoor raceways under controlled conditions. This research disclosed a chemical compound which gives hope of success providing unforeseen problems are not encountered in actual stream experiments.

The chemical "Dowlap" was supplied by a Michigan chemical firm. Research demonstrated that the compound is lethal to lampreys in larval and adult stages at concentrations harmless to other desirable stream life. Dowlap is one of several compounds submitted by this firm, which has actively assisted in this research program.

## Gulf Exploratory Fishing Program

EXPLORATORY FISHING FOR HARD CLAMS AND FINFISH IN THE NORTHEASTERN GULF OF MEXICO (M/V Silver Bay Cruise 3): Light catches of hard clams (Venus mercenaria) and some fair catches of finfish were taken by the Bureau of Fisheries chartered exploratory fishing vessel Silver Bay during a 16-day cruise that ended on August 30, 1957. Sixty-two stations were occupied inside the 100-fathom curve along the coasts of Florida, Alabama, and Mississippi.

Thirty-eight drags with a modified 14-tooth clam dredge were made in the 3- to 5-fathom depth range between Cape St. George and Gasparilla Island. Hard clams were taken in all drags between Sand Key and Gasparilla Island off Fla., with the best fishing (300 clams, approximately 1 bushel per 30-minute tow) confined to the areas off Pass-a-grille and Venice, Fla. The catch was made up of 70 percent 2-




M/V SILVER BAY (CRUISE 3, AUGUST 14-29).

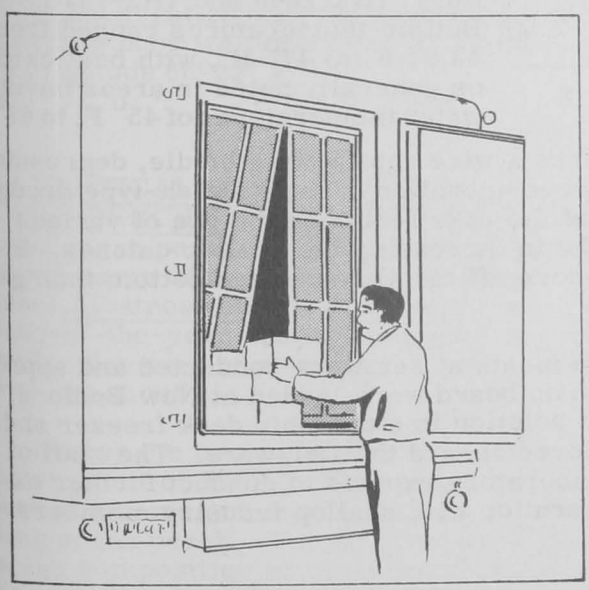
inch clams (littlenecks), with the remaining 30 percent ranging from 3 to 4 inches (cherrystones and chowders). Yield was approximately one gallon of clam meats per bushel. Preliminary examination indicates that these hard clams are comparable in quality to the east coast hard clam in taste, texture, and size, but considerable trouble was experienced in keeping the clams alive aboard the vessel.

During the latter part of the cruise, an attempt was made to sample the numerous surface and subsurface schools of sardinelike fish that were encountered between Horn Island and Tampa Bay. Twenty-four tows with a 54-foot otter-trawl (with liner) yielded primarily anchovies, chub mackerel, thread herring, bluefish, and round herring. Four tows made in 18-20 fathoms south of Petit Bois Island produced large croakers, spot, butterfish, and porgy, at the rate of about 2,000 pounds per hour tow.

## New Cold Curtain for Refrigerated Trucks

How do you keep a refrigerated truck from warming up during summer deliveries?

A new plastic curtain which, installed inside the rear-door opening, helps keep temperatures down, has been developed by transportation specialists of the Marketing Research division, Agricultural Marketing Service, U. S. Department of Agriculture. Trucks equipped with the new curtain average several degrees colder inside and do a better job of controlling frozen product temperatures.



This is not the first door curtain that has been tried out. For many years, truck owners and operators have experimented with various types of curtains. The problem has been to keep the frost from melting off the "cold plates" of the trucks and causing soggy packages and ruined labels.

The trouble largely results from the necessary opening and closing of the rear door during loading and unloading in hot weather. Even when drivers are careful to close the door immediately after removing each order, they often have the door open as much as 2 hours out of an 8-hour delivery day.

To maintain high quality in frozen foods, the truck temperature should be kept at zero degrees or lower. Fluctuations in air temperature also mean higher refrigeration costs.

Most of the previously tried canvas curtains have not been satisfactory on at least three counts: They did not permit entry of light inside the truck. They became wet and annoying to the driver during deliveries. And the wet canvas froze stiff during the night chilling process, making it hard for the driver to handle the curtain the next day.

Following a preliminary study of the problem in the summer of 1955, a number of experimental curtains were tested. Researchers sought the right combination of materials and design that would offer the least interference with the driver, yet be durable enough to withstand the stresses and strains of daily use.

These early tests led to the "window" type, 2-panel curtain made of 0.0075-inch thick clear polyester film, framed on all edges wtih 16-ounce neoprene-coated nylon to prevent tearing and lend stability.

Each panel is suspended at the top of the doorway with three double-eye harness snaps which provide a strong yet flexible support that allows the curtain to open and close easily. To prevent billowing and flapping as the truck door is opened and

closed, researchers put two pounds of lead shot in the bottom hem of each panel.

The new curtain was tested in actual commercial operation by private companies in Washington, D. C., and Baltimore, Md. Most of the drivers said they liked it, and cooperating truck owners are enthusiastic.

They see four major advantages in the new curtain:

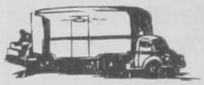
1. It is of definite help in maintaining lower product and air temperatures in refrigerated local delivery trucks during summer months.

2. It allows better lighting inside the truck with the door open than when using an artificial light with the rear door partially closed.

3. It is relatively inexpensive and durable, and installation is easy. It is readily removed during the winter months.

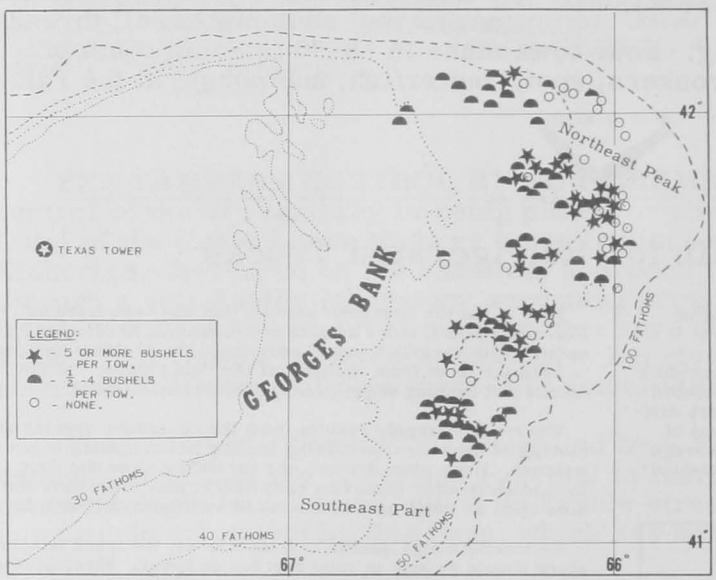
4. Elimination of dripping inside trucks more than offsets the minor inconvenience of the curtain.

So far, the curtain has been tried out only on frozen food and meat trucks. But it may also be of benefit when used on refrigerated trucks that deliver other perishable items. (Reprinted from the July 1957 issue of Agricultural Marketing.)



## North Atlantic Fisheries Exploration and Gear Research

SCALLOP GROUNDS SURVEYED, FREEZING TESTS MADE, AND ENGLISH-TYPE DREDGE TESTED (M/V Delaware Cruise 57-7): Comparative fishing tests between a new English-type scallop dredge and the standard 11-foot New Bedford-type scallop dredge revealed that the conventional gear outfished the English model 4 to 1. The tests were conducted on the northeastern part of Georges Bank by the Bureau of Commercial Fisheries exploratory fishing vessel Delaware during an August 7-22 cruise. In addition, the vessel's survey of grounds near the known scallop (Pecten grandis) fishing areas revealed that scallop populations were limited to 54 fathoms or less.




DELAWARE CRUISE 57-7, AUGUST 7-22, 1957.

The majority of 124 forty-minute tows produced from 1.5 to 8 bushels of commercial-size sea scallops, and catch locations and concentrations are indicated on the chart. The best single catch (14 bushels of medium-size scallops) was made at the loran bearing stations, 1H3-2346 and 1H2-1113. Bottom temperatures ranged from 43.9° F. to 47° F., with best catches generally noted in areas having water temperatures of 45° F. to 47° F.

The English-type scallop dredge features a wire rope towing bridle, depression plates, and a toothed rake. Efforts to improve operation of the English-type dredge, through minor adjustments in the spacing of the rake teeth and the use of various lengths of towing bridles, were unsuccessful in increasing the scallop catches. Indications are that this gear may perform more efficiently on softer bottom than generally prevails on Georges Bank.

Technological tests in freezing scallop meats at sea were conducted and approximately 600 pounds of scallop meats frozen on board were landed at New Bedford, Mass. Immersion freezing in glucose-salt solution in a portable deck freezer and dry frozen storage below decks were employed aboard the Delaware. The staff of the Bureau's East Boston Technological Laboratory expects to conduct further experiments on frozen scallop meats in cooperation with scallop industry members.

Weather conditions were generally favorable for the cruise. Several bluefin tuna were hand-lined, and large numbers of swordfish were sighted in the northeastern sector of Georges Bank.

The Delaware was due to depart on September 6 for the third tuna long-lining cruise of the 1957 season to explore the offshore areas of the Western North Atlantic for subsurface tuna resources.

Long-line tuna gear will be used in a wide survey in an offshore area from east of Georges Bank to south of Cape Hatteras out to the center of the Gulf Stream track. It is hoped that this cruise (57-8) will supply additional information on the seasonal habits and possible commercial concentrations of bluefin and other tunas in the oceanic area of the Atlantic.

Oceanographic and biological information as it pertains to the general distribution of the tunas in the offshore area will be collected in cooperation with the Woods Hole Oceanographic Institution.

## North Atlantic Fishery Investigations

SEA BOTTOM AND BOTTOM FAUNA SAMPLES COLLECTED (M/V Albatross III Cruise 101): A total of 540 substrate samples of sea bottom and 200 sea bottom fauna collections were made by the Bureau of Commercial Fisheries research vessel Albatross III during an August 21-30 cruise. The samples will be analyzed for particle size and amount of organic matter, as well as types of animal and plant life found on the sea floor.

The bottom samples were taken at $2\frac{1}{2}$-mile intervals along a 1,100-mile track extending from Great South Channel off Cape Cod, across Georges Bank, Eastern Channel between Georges and Browns Banks and Browns Bank. Only a few samples were taken in Eastern Channel and in the Southwestern part of Browns Bank.

Sampling devices used during the cruise were (1) the Smith spring-loaded bottom sampler, and (2) the Scoopfish underway bottom sampler.

In cooperation with the Woods Hole Oceanographic Institution, a temperature-recording buoy was anchored on the southeast part of Georges Bank (latitude 40°39' N. and longitude 66°32' W.).

* * * * *

VERTICAL DISTRIBUTION OF POST-LARVAL AND AGE COMPOSITION OF OCEAN PERCH STUDIED (M/V Albatross III Cruise 102): Large numbers of post-larval ocean perch were collected at several stations occupied in the western and central parts of the Gulf of Maine by the Bureau of Commercial Fisheries research vessel Albatross III during a September 5-11, 1957, cruise. It was noted that the young-of-the-year ocean perch have settled down into deeper water during the past month. Samples of young ocean perch indicated a growth of about $\frac{1}{2}$ centimeter in about one month.

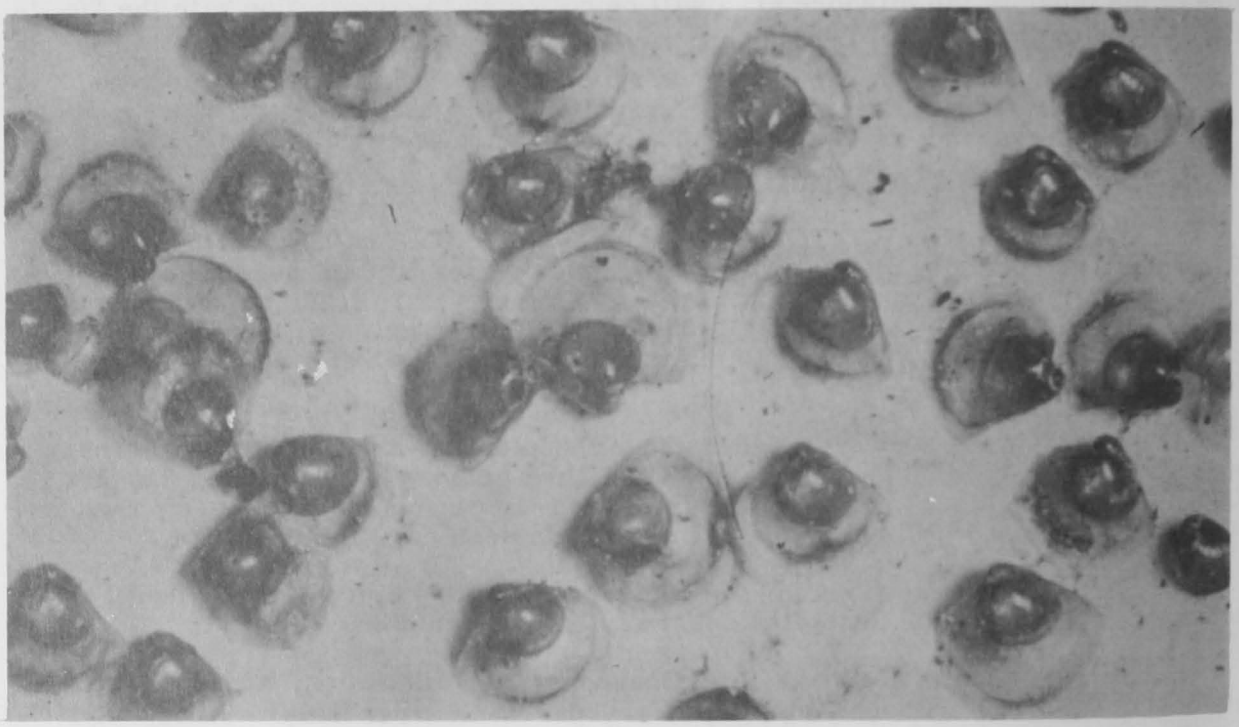
During the cruise a total of 81 otter-trawl tows were made at 11 stations in the western Gulf of Maine. Sixty-one tows were made with the Isaacs-Kidd midwater trawl at a series of depths to study the vertical distribution of this year's crop of young ocean perch. Twenty tows were made with a fine-mesh otter trawl to sample the age composition of ocean perch smaller than those taken by the commercial fisheries, or fish from one to nine years in age.

* * * * *

WHITING TAGGED BY SERVICE VESSEL (T-79 Cruise 16): Biologists of the Bureau of Commercial Fisheries Woods Hole Laboratory tagged 183 whiting during a September 16-20, 1957, cruise. The whiting were taken in 26 drags by otter-trawl two miles west of Race Point, Mass., on Stellwagen Bank just north of Race Point, and in Cape Cod Bay.

## Oysters

OPTIMUM AND MINIMUM SALINITY TOLERANCE THROUGH THE SETTING STAGE: A resume of the observations on the salinity tolerance of the eggs, larvae, and set of East Coast and Gulf oysters (Crassostrea virginica) has been prepared (Bulletin No. 3, August 22, 1957) by the biologists of the U. S. Bureau of Commer-



OYSTER LARVAE, HIGHLY MAGNIFIED.

cial Fisheries' Marine Biological Laboratory at Milford, Conn. Much of the information included in the resume can be applied by biologists and members of the industry, who are contemplating, or are now actually engaged in, the use of small salt-water ponds for the culture of commercial oysters.

Most of the data were obtained by using, as parents, oysters from Long Island Sound that had developed gonads at a salinity of approximately 27.0 parts per thousand (p.p.t.). Additional experiments are planned using, as parents, oysters kept at lower salinities for several weeks before spawning, and also oysters from different areas. It may be found after additional studies that the recommendations based on the present experiments will have to be revised for oysters from other areas and for oysters that develop gonads at salinities lower than those prevailing in Long Island Sound.

Eggs: The optimum salinity for development of the fertilized eggs of oysters that had developed gonads at 26.0-27.0 p.p.t., was 22.5 p.p.t. The percentage of eggs

that developed to the straight-hinge stage dropped off at lower salinities until at 15.0 p.p.t. only 50 to 60 percent developed normally. At 12.5 p.p.t almost none of the eggs developed into straight-hinge larvae. Therefore, in pond culture every effort should be made to keep the salinity as near to 22.5 p.p.t as possible over the spawning beds until after the major spawning has occurred. In any case it should not go below 17.5 p.p.t.

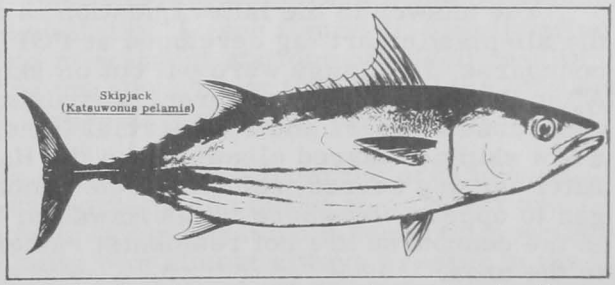
In recent experiments Maryland oysters that had developed gonads in their native habitat (salinity 8.74 p.p.t. at the time of collection) were spawned at salinities of 7.5, 10.0, and 15.0 p.p.t. Under these conditions some oyster eggs developed into normal larvae at 10.0 p.p.t., and at 7.5 p.p.t. larvae only slightly smaller than normal were produced. How well these larvae grow and whether they are of any value in obtaining a set has not yet been determined.

Larvae: When oysters that had developed gonads at a salinity of 26.0-27.0 p.p.t. were used as parents, the optimum salinity for growth of the larvae after they had reached the straight-hinge stage was 17.5 p.p.t. Good growth was obtained at a salinity of 15.0 p.p.t., but at 12.5 p.p.t. the rate of growth of larvae was appreciably slower, although they did grow to setting size, and set. At 10.0 p.p.t. the larvae grew very slowly and it is doubtful that any would reach setting stage at this salinity. The older the larvae were, however, the better they withstood a salinity of 10.0 p.p.t. Larvae that were reared almost to setting stage at our normal salinity continued to grow and set when placed in a salinity of 10.0 p.p.t. Every effort should be made, however, to keep the salinity as near to 17.5 p.p.t. as possible, as long as there are larvae in the water, and it should not be allowed to drop below 12.5 p.p.t.

Set: The optimum salinity for growth of recently set oyster spat was also 17.5 p.p.t. or higher. The growth rate of spat was markedly reduced at all salinities below 12.5 p.p.t. Although some growth occurred at a salinity of 5.0 p.p.t., mortality was high. At 2.5 p.p.t. recently-set oyster spat died within two weeks. It is recommended, therefore, that the salinity be kept above 12.5 p.p.t. even for growth of spat.

## Pacific Oceanic Fishery Investigations

DIRECT UNDERWATER OBSERVATION OF TUNA BEHAVIOR: Direct observation of tuna from beneath the sea surface is a project recently started by Pacific Oceanic Fishery Investigations. It has been recognized that development of more efficient methods to remove tuna from the sea must in part await a better understanding of tuna behavior. In order to get directly at this problem, POFI designed an observation "bucket" which is suspended from its research vessel Charles H. Gilbert about 8 feet below the surface of the sea near the stern of the vessel. An investigator climbs into the bucket, using an underwater breathing device, and sits in safety, if not comfort, while tuna are being chummed to the vessel. The present apparatus permits the investigator to remain underwater in the observation post at speeds up to about 6 knots. The whole project is still in the early stages of developing methods and techniques, but it appears to hold great promise. Underwater vision is good. In clear offshore water the observer can see for about 180 feet on a vertical and horizontal plane.




Numerous tuna schools were observed during preliminary trials with the appartus, and incidental to developing techniques it has been possible to make com-

parative observations on the behavior of tuna tagged by POFI dart tags and the type-G tags developed in California. It was found that almost invariably tuna tagged with the dart tag return to the school and, in most instances, recommence feeding on the chum thrown from the vessel. In contrast to this, skipjack tagged with "spaghetti" tags usually appear somewhat distressed and have not been seen to rejoin the parent school. Very likely this is related to the additional handling required and to the somewhat more severe wound caused by the spaghetti tag. Observations have dispelled one of the oldest myths in the Hawaiian tuna fishery, namely, that the local anchovy are successful tuna bait because when thrown in the water they return to the stern of the vessel, drawing the skipjack within fishing range. Quite the contrary, the Hawaiian anchovy, or "nehu," leave the vessel with all possible haste. This behavior pattern is followed when there are no skipjack in view and when there are skipjack actively feeding on them.

It appears that the scientists are now in possession of a tool which will describe in real terms what tuna are doing under the sea surface, thus freeing the biologist from inefficient and tiresome statistical approaches to such problems as the best tuna bait, the best way to use tuna bait, and the reaction of tuna to artificial stimuli. It is likely that a program based on this type of observation will be of eventual assistance in solving the tuna fisherman's problem of getting fish out of the sea more efficiently.

* * * * *

"SKIPJACK CONCOURSE" STUDIED OFF HAWAIIAN ISLANDS: An intensive study of a "skipjack concourse" off Lanai, in the Hawaiian Islands was begun in July 1957 by the Service's Pacific Oceanic Fisheries Investigations (POFI) research vessels. A "skipjack concourse" is a fixed spot where skipjack tuna regularly occur. They have long been recognized in various places in the Pacific, particularly by native fishermen, but this is the first time one has been subjected to scientific scrutiny. The basic purpose behind the study was to discover why skipjack regularly occur there and to apply this knowledge to the more important puzzle of open ocean skipjack distribution.

First it was necessary to delimit a concourse and ascertain its reliability with respect to skipjack occurrence. The Lanai concourse, first defined by a series of blind chumming stations, has been very faithful indeed. It was visited about 15 times during July, and skipjack were taken during each visit. The second obvious question involved the skipjack: were they a resident population, or were they transients attracted to the area because of its special virtues?

The answer to the latter question is already partly at hand through the use of the all-plastic dart tag developed at POFI. During the first intensive survey of the concourse, 1,600 tags were put out on skipjack ranging from 2 to 20 pounds in weight. After the close of this program, approximately 8 percent of all skipjack taken in the concourse by POFI and commercial fishermen bore a POFI tag. At the same time a few skipjack tagged elsewhere in the Hawaiian Islands were taken in the concourse. After tagging ceased, returns in the concourse fell off, but skipjack tagged there began to appear elsewhere in the Hawaiian Islands area. Thus it appears that skipjack in the concourse are not residents; rather, they are transients attracted temporarily to the area.

Why the skipjack are attracted isn't so easy to answer. The long process of developing and verifying hypotheses and applying them to the high seas situation was begun with an intensive survey of the environment in the concourse.

The results obtained from the new dart tag are especially gratifying. About 12 percent of the first 1,600 released off Lanai have been recovered. Some were retaken immediately after release, indicating that the fish are not unduly disturbed by

being tagged. Others taken a few days after tagging showed evidence of prompt healing, with formation of scar tissue around the dart head and the external wound. Finally, wounds on fish out 2 or 3 months are invariably healed in a manner suggesting that the tag will remain on the fish indefinitely.

* * * * *

AREA OF PERSISTENTLY OCCURRING SKIPJACK TUNA FOUND IN HAWAIIAN WATERS (M/V Charles H. Gilbert Cruise 34): An area of persistently occurring skipjack tuna was found off Cape Kaea, Lanai, during a June 21-August 21, 1957, cruise of the research vessel Charles H. Gilbert of the Bureau's Pacific Oceanic Fishery Investigations. To determine the distribution of skipjack in this area and the consistency of their appearance, a chumming pattern was developed and carried out during the cruise. At each station made in the vicinity of Cape Kaea bait fish

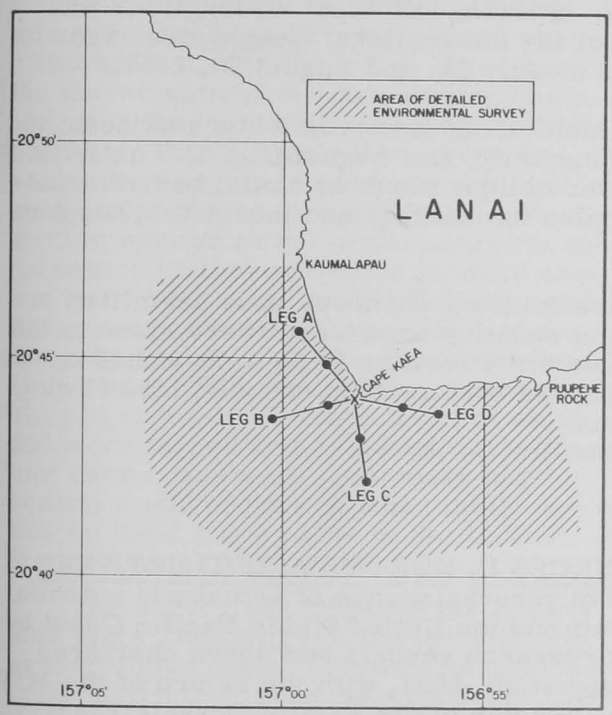



FIG. 1 - MONTHLY ENVIRONMENTAL SURVEY, JUNE, JULY 8, AND AUGUST 1957, CHARLES H. GILBERT, CRUISE 34.

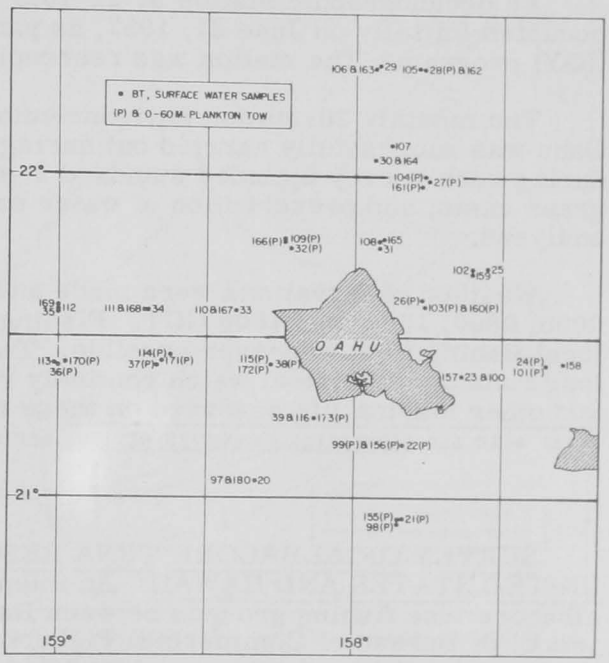



FIG. 2 - CHUMMING PATTERN OFF CAPE KAEA, LANAI, CHARLES H. GILBERT, CRUISE 34.

were chummed for a 10-minute period and a careful watch was made for surface signs of fish. Skipjack were always raised at station X (see figure 2), usually after only a few minutes of chumming. Chumming at adjacent stations provided results which varied from no fish being raised along the south coast (leg D) and the offshore waters (legs B and C), to fish being raised irregularly along the west coast (leg A).

Physical, chemical, and biological data were collected from the area around Cape Kaea to determine why fish occur in one locality and not in an adjacent one. In addition, a preliminary study was initiated on a temperature discontinuity which occurred east of Cape Kaea. This discontinuity was almost always present in the area and had a change in temperature of $1^{\circ}$ to $1.5^{\circ}$ F. in about a quarter-of-a-mile. Gross examination of the plankton hauls showed more plankton in the discontinuity area than to either side of it. A total of 2,416 skipjack were tagged with plastic tags (2,294 with dart tags and 122 with spaghetti-type tags) in the waters off Cape Kaea and to date there have been 212 recoveries.

Direct underwater observations of bait-fish behavior and skipjack fishing were made from a subsurface platform attached to the hull of the vessel by observers using a self-contained underwater breathing apparatus (SCUBA). The behavior of a variety of bait fish, among them the anchovy (Stolephorus purpureus), the Hawaiian silverside (Pranesus insularum) and tilapia (Tilapia mossambica) was carefully noted under both active fishing and nonfishing conditions. Under ideal weather conditions the maximum visibility was estimated to be 180 feet (based on Secchi-disc measurement). During one fishing operation the underwater observer estimated 1,000 skipjack and little tuna around the vessel.

The "Sea Scanar" was used to track a number of skipjack schools, one yellowfin school, and several aggregations of porpoises. In most cases the schools were slow moving and thus sonic contact up to several hours was possible. During the cruise a better understanding of the limitations of the instrument was also gained.

An oceanographic station at 21°10.3' N. latitude, 158°18.8' W. longitude was occupied initially on June 21, 1957, as part of the International Geophysical Year (IGY) program. The station was reoccupied on July 21, and August 20, 1957.

The monthly 20-station environmental monitoring survey in waters adjacent to Oahu was successfully carried out during June, July, and August (fig. 1). Activities during each survey included standard 1-meter oblique plankton hauls, bathythermograph casts, and preservation of water samples for salinity and inorganic phosphate analyses.

Weather observations were made and transmitted whenever time permitted at 0000, 0600, 1200, and 1800 GCT. Fishing and scouting broadcasts were made to the local fishing fleet whenever possible. Two or three trolling lines were fished on long runs and the wheel watch routinely recorded surface tuna schools, bird flocks, and other marine life observed on these runs.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, SEPTEMBER 1957, P. 46.

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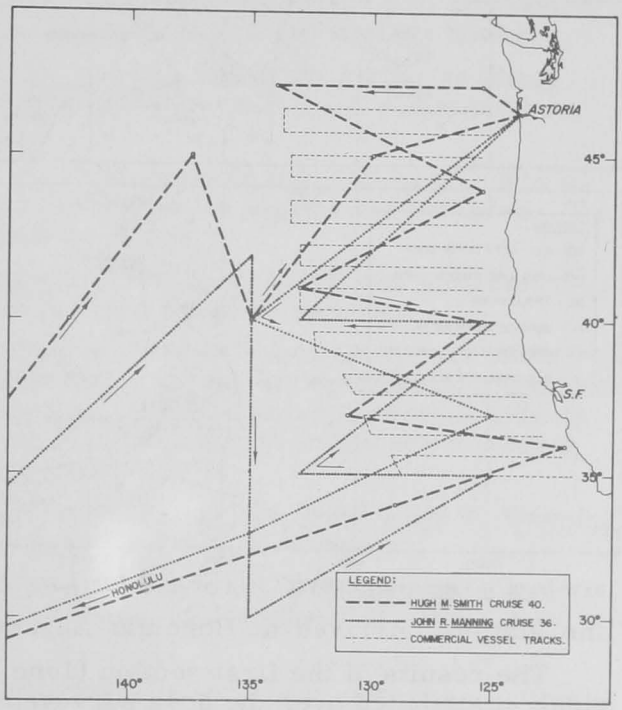
SURVEY OF ALBACORE TUNA RESOURCES IN NORTH PACIFIC BETWEEN UNITED STATES AND HAWAII: An intensive reconnaissance of actual and potential albacore tuna fishing grounds between Hawaii and the United States Pacific Coast by two U. S. Bureau of Commercial Fisheries research vessels and seven chartered commercial fishing boats was completed August 20, 1957, with the return of the M/V John R. Manning to its Honolulu base. The Director of the Pacific Oceanic Fishery Investigations (POFI) states the nine-vessel task force was the largest fleet ever marshalled for a simultaneous attack on the mysteries surrounding the movements of the albacore tuna into the summer fishing grounds of the eastern Pacific. The Northeastern Pacific Albacore Survey (NEPAS), took in a broad area extending north and east of Hawaii to the United States mainland, with intensive coverage of a 350-mile strip along the coast from the Columbia River to southern California. Albacore were found to be widely distributed within the survey area east of 145° W. longitude, with offshore concentrations 700-800 miles west of San Francisco and 500 miles off Eureka, Calif., and with inshore concentrations 100 miles off Pt. Arena and Cape Mendocino, Calif., 300 miles off Pt. Arguello, Calif., and 200 miles off Cape Blanco, Ore.

The fisheries agencies of California, Oregon, and Washington, operating through the Albacore Steering Committee of the Pacific Marine Fisheries Commission, cooperated in the program through assistance in planning the operation and by providing observers for some of the charted vessels.

The survey was carried out in two steps, the first being a preliminary reconnaissance by the research vessels John R. Manning and Hugh M. Smith between Ha-

waii and the United States coast. The John R. Manning, which sailed from Honolulu June 11, trolled and fished with gill nets for albacore in a zigzag pattern along the coast, while the Hugh M. Smith, sailing on July 1, followed up with a series of oceanographic stations in the same area to gather information on the temperature and other characteristics of the waters through which the albacore were migrating into the fishing grounds. Observations of albacore schools during this period were reported by radio from the Bureau's vessels for the information of commercial fishermen. This stage of the survey was completed July 16.

The second phase of the survey, carried out between July 22 and August 7, was a coordinated movement of the two research vessels and the seven commercial albacore boats from the coast out 350 miles and back, each vessel being assigned one of a number of parallel tracks evenly spaced down the coast. During this time the Hugh M. Smith acted as command ship for the force, directing the movements of the cooperating boats and receiving and collating their radio reports. This stage of the survey revealed that several of the inshore aggregations of albacore schools that were spotted earlier in the preliminary reconnaissance had become more concentrated and were beginning to offer fishing conditions suitable for commercial operation, particularly off Pt. Arena and Cape Mendocino. The survey fleet captured altogether 1,004 albacore tuna, of which 458 were tagged and released in the hope that recaptures during the main fishing season would provide further information on their movements in the United States coastal fishing grounds.



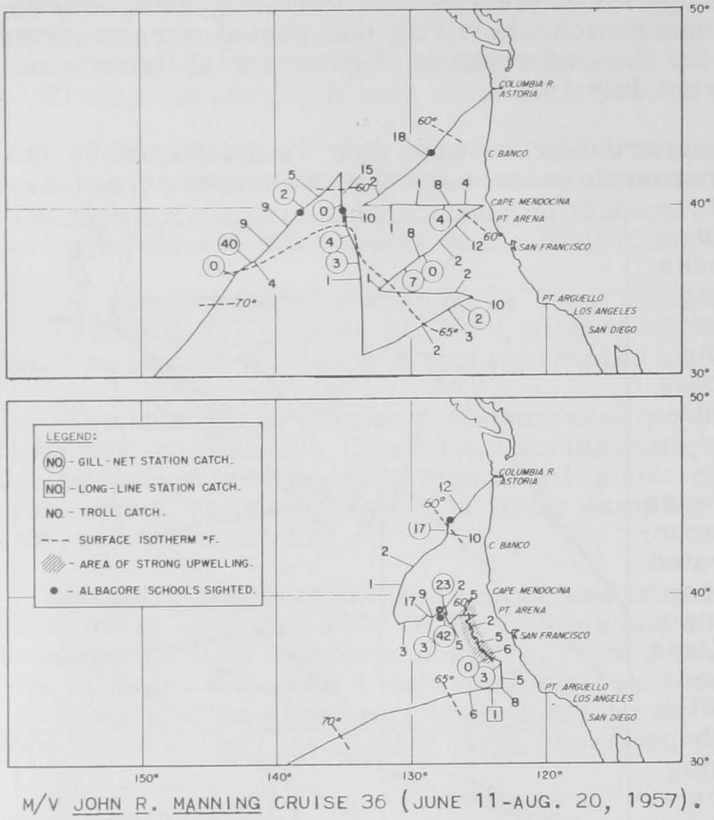

SURVEY OF ALBACORE TUNA RESOURCES IN NORTH PACIFIC.

The survey has added to the fishery biologists' knowledge of the broader migratory movements of the albacore, knowledge which they must have in order to understand the make-up of the albacore population in the North Pacific and to estimate the production that can be expected from that population. A byproduct of the scientific expedition has been the assistance given to the fishermen in probing the offshore albacore resources with the possibility of increasing the catch.

The albacore, which brings the highest price per ton of any tuna species and is the only one that can legally be labelled "white-meat tuna," supports major summer fisheries off Japan and off the United States west coast. In the past few years several recaptures by Japanese fishermen of albacore tagged and released off the United States coast, some 4,000 miles away, and the recent recapture on the United States west coast of an albacore tagged by a Bureau vessel working north of Hawaii have shown that some, at least, of the North Pacific albacore make oceanwide migrations, and the resource may turn out to be a truly international one, exploited by both the United States and Japan. At present, however, the great expanse of water between the Japanese and the United States albacore fishing grounds is, both scientifically and commercially, largely unexplored territory, and the ways of the albacore in this area are almost as little understood as their spawning and early life history. The results of Operation NEPAS, added to the information gathered on other North Pacific cruises of POFI research vessels, will contribute importantly to the clarification of the pattern of albacore distribution and migration.

* * * * *

SERVICE VESSEL TAKES PART IN NORTHEAST PACIFIC ALBACORE SURVEY (M/V John R. Manning Cruise 36): As part of a large-scale survey of albacore tuna resources between the Hawaiian Islands and the United States Pacific coast, the Pacific Oceanic Fishery Investigations research vessel John R. Manning concentrated on gill-net and long-line fishing for albacore. The cruise was conducted between June 11 and August 20, 1957.




M/V JOHN R. MANNING CRUISE 36 (JUNE 11-AUG. 20, 1957).

The vessel proceeded to 42° N. latitude, 135° W. longitude and fished 3 gill-net stations. Moved south roughly along 135° W., fishing 3 gill-net stations. Carried out 2 northeast tracks and 2 west tracks alternately; fished 4 gill-net stations. Arrived Astoria, Ore., July 16, refueled and departed July 22. Proceeded southwest to 41° N. latitude, 131° W. longitude and fished 1 gill-net station. Moved south making drops of scientific equipment to three chartered vessels employed in the Northeast Pacific Albacore Survey (NEPAS). Proceeded east along latitude 39° N. to longitude 125° W. Set 3 gill-net stations, one a 24-hour set. Continued southeast paralleling the coast crossing into and out of the band of upwelled water. Fished 2 gill-net stations. Continued south to to 34° 30' N. latitude and then southwest toward Honolulu fishing 1 long-line station. Arrived at Honolulu August 20, 1957.

The results of the first section (June 11-July 16) indicated that albacore were widely distributed over the area surveyed (see chart) as a reconnaissance to NEPAS, but that certain areas perhaps showed promising buildups or concentrations of albacore. Two offshore concentrations were located 800 and 500 miles west of San Francisco while inshore concentrations seemed evident 100 miles off Pt. Arena and Cape Mendocino, Calif., 300 miles off Pt. Arguello, Calif., and 200 miles off Cape Blanco, Ore. The first offshore concentration was not accompanied by a relative abundance of plankton and was located in an area where albacore are usually scarce later in the season. In contrast, the other concentrations were accompanied by a relative abundance of plankton and, with the exception of the fish 500 miles off San Francisco, were generally in areas where albacore are found consistently throughout the season.

Several commercial vessels responded to the John R. Manning's radioed catch reports and commercial fishing for albacore developed off Cape Blanco and Pt. Arena.

The second section of the cruise (July 22-August 20) was occupied primarily in checking concentrations uncovered during the first section and good catches made by the chartered NEPAS vessels. The results suggested that the concentrations around Cape Blanco and Pt. Arena noted by the John R. Manning had continued to build up. In addition the albacore appeared to have shifted in toward the coast.

Special attention was given to the edge of the band of upwelling shown in the chart. Several transects were made of this band and extra plankton, bathythermograph (BT), and photometer stations were undertaken. Gill-net sets were made in blue water west of the upwelling, within the upwelled water and to the east in the coastal water. Although the upwelled lower-temperature water was obviously very productive of plankton few albacore were taken there and albacore were more abundant in the blue water.

A 24-hour gill-net station was undertaken after 42 fish were captured in a set off Pt. Arena. The four subsequent 6-hour sets captured 23 albacore, 6 were captured during the 3 p.m. to 9 p.m. July 21, 1957, set and 17 on the following set between 9 p.m. to 3 a.m. Although it is believed that no albacore were taken during daylight hours, small schools each consisting of about 6 fish (jumpers) each were sighted during daylight hours 25 feet from the vessel just after setting the station that took 42 fish and 50 feet from the boat just before starting the 24-hour station.

The five baskets of long-line gear which were attached to the gill nets during each set throughout the cruise produced no albacore. Toward the end of the cruise the gill-net winch failed and a special 5-basket long-line station was substituted for the usual gill-net set. Each basket had 3 buoys (one in the center) and all hooks were baited with small herring. The set was made on troll-caught fish and lasted from 1:45 p.m. to 6 p.m. One albacore was taken on one of the shallow hooks.

Small herring was obtained at Astoria to use as dead chum during trolling. Some success was obtained since two albacore taken on troll lines contained this chum in their stomachs.

A total of 377 albacore were taken by the John R. Manning, 150 in gill nets, 226 on troll lines, and 1 on long line. A total of 105 fish were tagged and released. Total catch weight for the cruise was estimated at $2\frac{1}{4}$ tons.

Stomachs of 196 were examined during the cruise. An additional 43 stomachs, believed to contain food, were preserved as a representative sample.

Gross dissections of the pineal region of big-eyed and albacore tuna were made and photographs taken. Fifty-seven patches of skin above the pineal region were preserved, 46 in formalin and 11 in Bouin's solution. Approximately 50 percent were taken from gill-net fish. Nine albacore were injected with Bouin's solution in the pineal region and frozen. Another 6 were frozen without injection.

Fourteen albacore were placed in the bait-well holding tank of the John R. Manning. The longest survival period was 14 hours and some died within minutes.

Few sauries were seen during the cruise and only two trials with the small on-deck holding tank were carried out. Each was composed of about 2 dozen fish, which survived only 3 or 4 hours.

Various hydrographic and biological data were collected.

Standard wheel watches were kept for birds and fish schools along with a daily census of surface life. Life was particularly aboundant in areas of upwelling. Nine schools of fish were sighted during the cruise; 6 of these were albacore. Four were fished and albacore were taken; the other 2 were sighted while the John R. Manning was drifting.

* * * * *

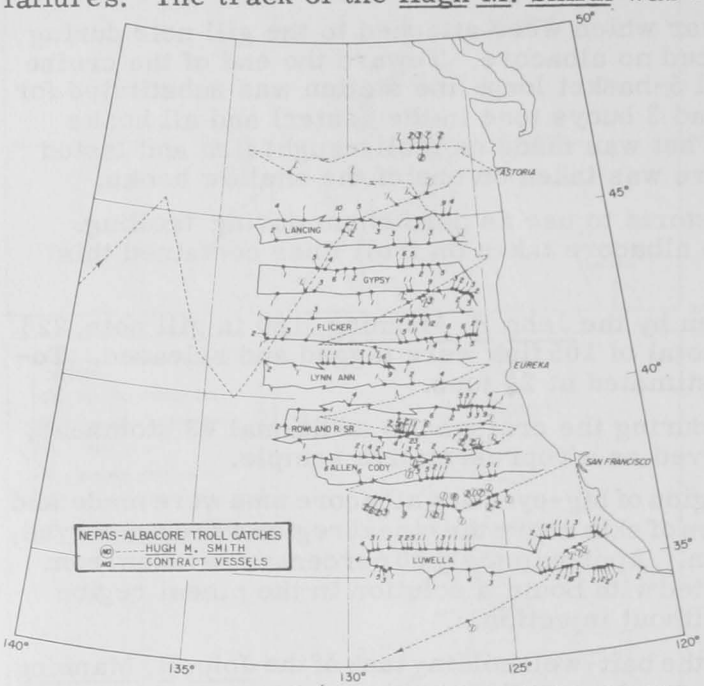
ANOTHER SERVICE VESSEL PARTICIPATED IN NORTHEAST PACIFIC ALBACORE SURVEY (M/V Hugh M. Smith Cruise 40): As her part of the concentrated large-scale survey of the northeast Pacific albacore tuna resources, the POFI research vessel Hugh M. Smith was primarily engaged in the collection of oceanographic data. She was also the command vessel of a fleet of a number of chartered trollers and the Service's research vessel John R. Manning.

The itinerary of the cruise was as follows: July 1, departed Pearl Harbor; July 2-8, ran a line of oceanographic stations between Oahu (Hawaii) and 38°35' N. latitude and 143°28' W. longitude; July 9-18, made a trolling and oceanographic survey of the area between 40°-46° N. latitude and 142°30' W. longitude and the United States Pacific coast; July 22-August 14 and August 26-28, acted as coordinating vessel for fleet operations and conducted a trolling and oceanographic survey of the area covered by the fleet; August 29-September 5, ran a line of oceanographic stations between 33°36' N. latitude, 126°30' W. longitude and Oahu. The periods July 18-21 and August 15-26 were spent in port.

July 22 to August 1 Hugh M. Smith acted as coordinating vessel of the NEPAS survey which was a study of the distribution and abundance of albacore in

the 350-mile zone off the west coast of the United States between 35°-47° N. latitude by nine contract vessels and the two participating vessels of the U. S. Bureau of Commercial Fisheries.

Seven of the nine contract vessels completed their assigned survey tracks and the other two were forced to withdraw because of storm damage and mechanical failures. The track of the Hugh M. Smith was readjusted to partially cover the areas missed by these vessels. For the tracks of the Hugh M. Smith and the contract vessels and the positions of their troll catches see chart.




HUGH M. SMITH CRUISE 40 (NORTHEASTERN PACIFIC ALBACORE SURVEY).

Each contract vessel trolled at speeds of 5-7 knots with a minimum of 6 lines. In order to obtain a continuous survey through each of their areas they hove-to at night. They took a total of 551 albacore of which 273 were tagged with California-type "G" tags and released. They also made daily Secchi disc observations of water transparency and made surface temperature observations at least every four hours when under way and at the position of each albacore catch. Several of the boats also maintained a complete log of birds, fish schools, and aquatic mammals sighted.

While the Hugh M. Smith was in waters having a surface temperature less than 66° F., that is on the run from 38°35' N. latitude, 143°28' W. longitude. to Astoria, while operating in the NEPAS survey area, and from Oakland to 33°36' N. latitude, 126°30' W. longitude, 5-6 lines were trolled during daylight hours at speeds of 6-6.5 knots. Over the remainder of the track two lines were trolled at 8-9 knots. While trolling at reduced speed, 112 albacore and 1 yellowfin were taken; at standard speed only 1 wahoo and 1 dolphin were caught. Seventy-one of the albacore and the yellowfin were tagged with either California-type "G" tags or POFI dart tags.

On the run from Hawaii to 38°35' N. latitude, 143°28' W. longitude, and from 33°36' N. latitude, 126°30' W. longitude and Hawaii, two 1,200-meter, 13-bottle oceanographic casts were made each day (total 28). Over the remainder of the track only one cast was made each day (total 42). Salininty samples from each bottle were returned to the laboratory and dissolved oxygen determinations were made aboard ship. Additional samples from the stations in the albacore waters were frozen for inorganic phosphate determinations.

Two bathythermograph casts were made at each oceanographic station; one before and one after the Nansen bottle casts. In waters having a surface temperature of 66° F. or less they were taken at not less than 15-mile intervals, whenever abrupt surface temperature changes occurred, and after albacore had been taken. Over the remainder of the track two BT's were taken between each oceanographic station. Surface salinity samples were taken at each off-station BT and while in albacore waters samples were frozen for inorganic phosphate analysis.

While in the NEPAS area Secchi disc and water color observations were made at approximately local noon each day and after a number of the albacore schools had

been worked. Over the rest of the track they were made after the 8 a.m. oceanographic station.

Fifteen-minute surface plankton tows with a 1-meter net were made at approximately local noon each day and after a number of albacore schools had been worked. At night 30-minute tows were made except in the NEPAS survey area. Here they were reduced to 15 minutes because of the large samples obtained and even then it was frequently not practical to preserve more than part of the sample. For example, a 20-25 liter sample was taken in the 15-minute tow at 37°09' N. latitude, 128°34' W. longitude and only two liters were preserved.

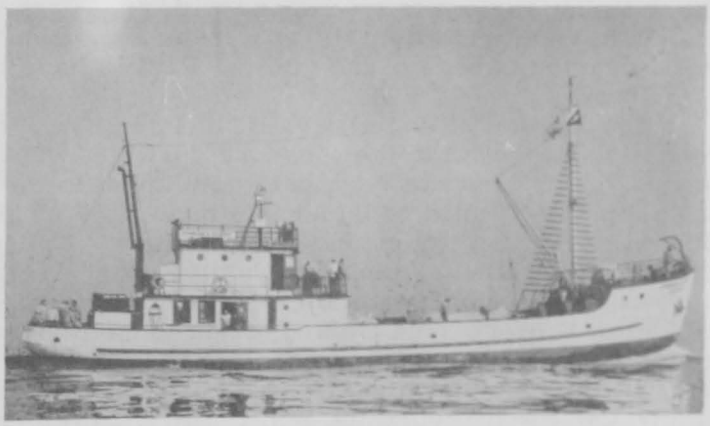
Pairs of 15-minute surface tows bracketing the 58°-60° F. isotherms were also made on all two legs. On one they were omitted because of rough weather, on the other they were omitted because of the dense schools of Velella.

Whenever the vessel hove-to at night an estimate of the number and size of the saury under the ship's lights were made every two hours.

* * * * *

MARQUESAN SARDINE INTRODUCTION IN HAWAIIAN WATERS SHOWS SIGNS OF SUCCESS: The capture of six large Marquesan sardines in Hawaiian waters on September 9 by two fishermen while fishing for moi near Barbers Point aroused the interest of the Service's Pacific Oceanic Fishery Investigations (POFI) and the Territorial Division of Fish and Game. The captures are the first concrete evidence that the newly-introduced species is surviving in Hawaiian waters.

The desirability of the species as skipjack (aku) bait was first established in the spring of 1954, when a Service research vessel Charles H. Gilbert surveyed the tuna baits of the Marquesas, Tuamotu, and Society islands. The sardine was found to be abundant in the Marquesas Islands, lying about 2,000 miles south and east of Hawaii. There, they generally occurred along sheltered sandy beaches.



THE SERVICE'S RESEARCH VESSEL CHARLES H. GILBERT.

After consultations initiated by the Territorial Division of Fish and Game, it was decided that on the basis of available evidence the sardine might do well in Hawaiian waters and would not be likely to compete with the valuable local nehu, the backbone of the Hawaiian tuna bait supply.

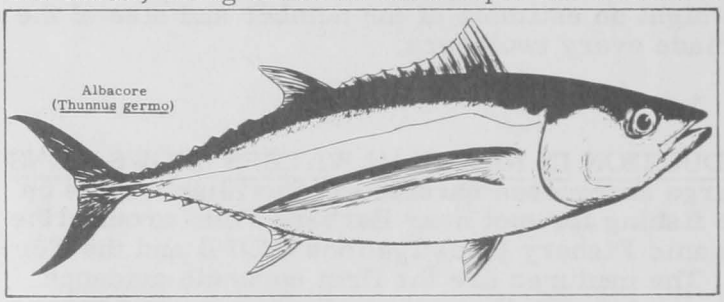
If the sardine was successful here, it might go a long way toward relieving the perennial short supply of tuna bait. Additional benefits might also accrue, for the sardine feeds on microscopic animals and therefore would serve as a means of converting microscopic food into something useful to valuable reef fishes such as the ulua. Accordingly, in late 1955 POFI instituted a program of introduction.

The first introduction was in January 1955, when about 8,000 were released off Barbers Point. Since then about 14,000 additional specimens have been released. Prior to the latest recovery there have been six reports of recapture of sardines in Hawaii. All of these were within a few days of planting, however, and most likely stemmed from the most recent releases.

By contrast, the September 9 recaptures were 6 months after the latest release (March 22). The specimens were about twice as heavy as the largest size planted, indicating that they grow well here. Even more significant, the females were approaching spawning, suggesting that conditions here are favorable to reproduction. Whether they will spawn and eventually contribute to the economy of Hawaii remains to be seen. Present indications are favorable.

* * * * *

SPAWNING ALBACORE TUNA SOUGHT OFF AMERICAN SAMOA: Persistent efforts of fishery scientists to seek out the spawning habits of the albacore tuna recently took POFI research biologist all the way to American Samoa in search of expectant females. According to the director of the Honolulu Research Laboratory of the Bureau of Commercial Fisheries, the albacore is one of the widest ranging of the tunas, being taken in the temperate waters of both the North and South Pacific as well as in the tropical areas between, but where it spawns and where its young develop is still a mystery to science. Comparatively small, as tunas go, the albacore is highly prized by canners because of the white color of its cooked meat. There are thriving fisheries for the surface-swimming schools of smaller albacore off the United States west coast and in the western Pacific off Japan, and production of the larger deep-swimming fish by Japanese long-line fishermen in tropical waters of the South Pacific has been increasing rapidly in recent years. Because of the great commercial value of the species, United States and foreign fishery scientists are intensively attacking the problems of its reproduction and early life history, but so far with little success. Albacore with ripe eggs are not taken in the major commercial fisheries, and attempts by Bureau research vessels to collect identifiable larvae in various areas of the central Pacific have met with no success.




The Bureau biologist's visit to American Samoa, from August 6 to 23, has extended the search for the albacore spawning grounds to a new area. A fleet of Japanese fishing boats is regularly delivering to the United States-operated cannery on the island of Tutuila considerable quantities of albacore, most of it caught south of Samoa in the vicinity of the Tonga Islands. These are all large deep-swimming fish taken on long lines, which are thought most likely to form the actively-reproducing part of the albacore population. Through the cooperation of cannery manager, arrangements were successfully made to have samples of albacore ovaries collected regularly, frozen, and forwarded to the Honolulu Laboratory for study. Two members of the cannery staff will collect specimens from seven fish out of each load delivered and will record the length and weight of the fish. It is estimated that the total number of fish sampled will be about 2,000 a year.

The biologist reported that the albacore examined by him during his stay in Samoa showed some indications of recent spawning activity, a sign that there is hope that actively-spawning fish may turn up at some season of the year in the Samoan landings. He also reported that he encountered a gratifying understanding of his mission and willingness to assist in its accomplishment on the part of industry and Government people in the South Pacific territory.

## Recording Prepared to Aid Fish Consumption

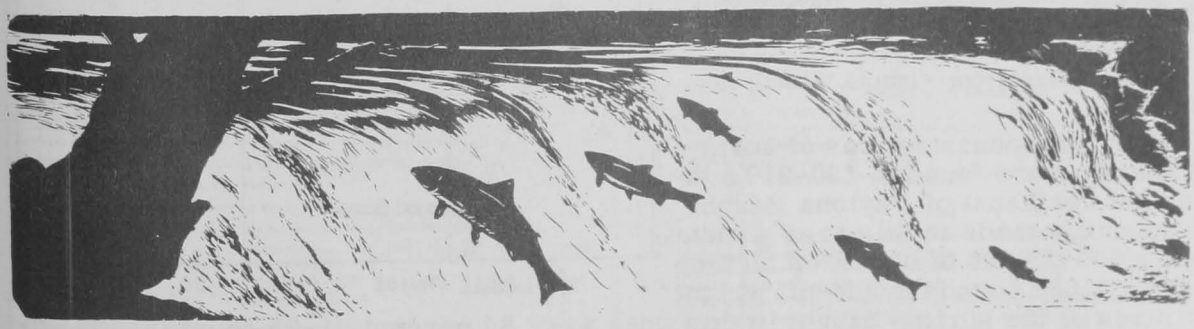
A recording containing public service announcements designed to increase the consumption of fish and shellfish and raise nutritional standards in the United States has been prepared by the U. S. Bureau of Commercial Fisheries. It was mailed to approximately 4,000 radio stations throughout the country, according to a September 9 news release.

Using as its central theme, "nutritional values of fish and shellfish," the 12-inch, 33⅓ r.p.m. recording contains 13 announcements ranging in time from 10 to 60 seconds. These deal with such subjects as the different varieties of shellfish, various forms in which fish can be purchased, "fish is good for weight watchers," the annual catch of edible fish, the ease of preparing and serving fish, various kinds of canned fish, and "every day is fish day."

Since September 18 to 28 was designated by the United States fishing industry as "National Fish Parade," a program in which the Federal Government participated, the Bureau of Commercial Fisheries requested the cooperation of radio stations throughout the country in making as much use as possible of the recording, particularly during that period, to encourage the greater use of all fishery products. This joint annual industry-Government sales promotion program was aimed at moving the summer's heavy production of fresh and frozen fish products into normal trade channels.

## Salmon

KING SALMON RUN IN COLUMBIA RIVER INCREASING: A continued increase in the size of the Columbia River summer king or chinook salmon run was reflected in figures released by the Oregon Fish Commission on September 19, 1957.



The total estimated summer run this year was 197,000 fish--the largest estimated summer king salmon run entering the Columbia River since 1939, according to the chief of Columbia River Investigations for the Oregon Fish Commission. The summer run passes Bonneville Dam during June and July, and has shown a general increase since 1945, when an estimated 53,000 summer king salmon entered the Columbia River.

According to the best available estimate, combined Oregon-Washington commercial catches of king salmon during June and July this year will exceed 1,100,000 pounds. This catch is the second best since 1944, exceeded only by the 1956 summer king salmon catch of 1,600,000 pounds. This year's catch represented about 31 percent of the total run that entered the river.

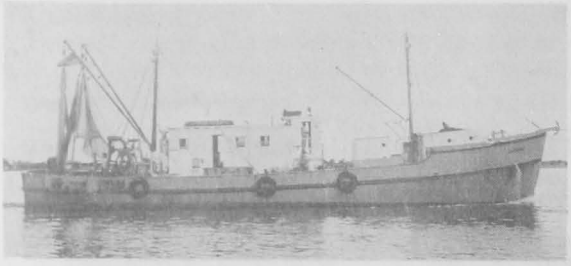
"Another significant factor in this year's increased king escapement was the almost total absence of a commercial fishery above Bonneville Dam," states the

biologist. The main Columbia River above Bonneville Dam was permanently closed to commercial fishing this year by the Oregon Fish Commission and the Washington Department of Fisheries as the result of completion of The Dalles Dam. Only a very limited fishery took place immediately below The Dalles Dam by Indians using dip nets.

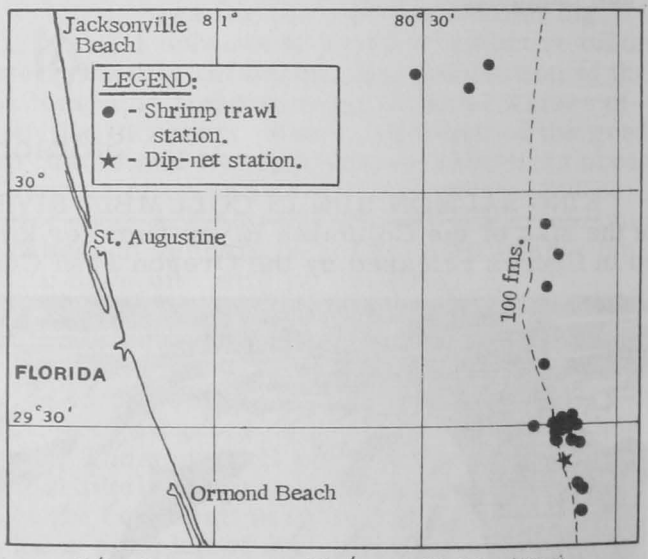
The blueback (sockeye) salmon run into the Columbia this year did not come up to expectations, but a preliminary reported catch of 255,000 pounds compares favorably with blueback catches in recent years. An estimated 156,000 blueback entered the river this year. Of this total, an escapement of 83,000 fish was counted over Bonneville Dam.

## South Atlantic Exploratory Fishery Program

DEEP-WATER SHRIMP EXPLORATIONS OFF NORTHERN FLORIDA (M/V Combat Cruise 12): Catches averaging 90-100 pounds heads-on shrimp per hour tow were caught off the northern coast of Florida by the Bureau of Commercial Fisheries chartered exploratory fishing vessel Combat during the month of August 1957. Twenty drags were made in depths of 150-230 fathoms, all but one of which yielded royal-red shrimp (Hymenopenoeus robustus). The catches per drag ranged between one and 460 pounds. The best single catch of 460 pounds was made in a three-hour tow using a 65-foot flat trawl with 5½-foot bracket doors.



THE SERVICE EXPLORATORY FISHING VESSEL, M/V COMBAT.




M/V COMBAT CRUISE 12 (AUG. 13-20, 1957).

The best concentrations of royal-red shrimp were found in 190-210 fathoms east northeast of Daytona Beach. The 11 drags made in this area yielded about 3,000 pounds of heads-on shrimp or about 1,669 pounds heads-off weight. The sizes of the shrimp caught in this area were 84 percent 21-25 count (heads off) and 16 percent 35 count and smaller.

Seven drags made in 20-125 fathoms caught only a few rock shrimp (Sicyonia brevirostris) in the 20-25 fathom part of the range.

## Standards

PACIFIC TROLL SALMON QUALITY IMPROVEMENT GUIDELINES AND STANDARD PROCEDURES: Quality improvement guidelines and standard procedures for handling fresh Pacific troll salmon were issued in July 1957 for day trollers, ice boats, and dealers. Designed to be posted on vessels and in processing plants, these quality guidelines and procedures are for use on a voluntary basis.

FIG. 1 - THIS POSTER IS GOLDENROD AND GIVES FRESH FISH QUALITY IMPROVEMENT GUIDELINES AND STANDARD PROCEDURES FOR USE BY WEST COAST TROLL SALMON DEALERS.

They were developed by the Technology Division of the National Fisheries Institute (N.F.I.) under the terms of its contract with the Bureau of Commercial Fisheries of the United States Fish and Wildlife Service, through discussions with groups which are interested in the problem of product quality improvement in the fishery industries. The contract is financed by funds provided by the Saltonstall-Kennedy Act of 1954.

This is the second in the series projected for each important phase of the fishing industry. The first set was issued early this year for the New England trawler fishery.

This is the initial application of this type of quality guidelines on the Pacific Coast. As developed and adopted, the guidelines for handling Pacific troll salmon consist in reality of three sets: one set designed for day trollers; the second for use by ice boats, and the third set for primary wholesalers.

To Be Posted in All Places of Business

**GUIDELINES AND STANDARD PROCEDURES FOR QUALITY IMPROVEMENT**

**for use on a voluntary basis by the**

**PACIFIC TROLL SALMON DEALERS**

(Prepared by members of the industry, the National Fisheries Institute Technology Division and the U. S. Bureau of Commercial Fisheries)

**Removal of Fish from Boats**

1. The dock area, hoisting box, grading tables, carts, dock buggies and skids must all be in a clean and sanitary condition before receiving fish.
2. Overloading handling and storage containers must be avoided at all times.
3. Fish must be handled carefully and moved under cover and out of the weather rapidly.
4. Fish that have been iced awaiting handling must be inspected periodically and re-iced as necessary.

**Plant Procedure**

1. Plenty of ice must be available at all times for uninterrupted operation.
2. Contents of each spill-box must be handled individually on grading table. Extreme care must be employed in transferring from grading table to buggy or cart.
3. Each fish must be examined at the heading table to make sure it is completely clean and free of all guts.
4. Fish in temporary storage must be belly iced and placed in ice bed not less than 3 inches thick. Each layer must be covered by not less than 2 inches of ice.
5. Overpacking must be avoided. Protect bottom layers from crushing. Fish must be top iced completely and covered with clean tarpaulin or other suitable cover.
6. Containers used for shipment of fresh fish must be clean and new.
7. Pack all fish belly up, fill each belly with ice, and fill box to the level of cover.

**Shipping**

1. Trucks or reefer cars must be precooled and refrigerated at all times.
2. All conveyances must have floor racks.
3. Boxes must lie flat at all times. Never stand on end or sides.
4. Except on short hauls, the boxes must be covered with enough ice to provide proper protection against possible breakdown or any other unforeseen delay.

**Sanitation**

1. Carts, boxes and conveyances of all kinds must be washed thoroughly, immediately after they become empty of fish.
2. Plant and equipment must be subject to constant washing down when plant is in operation.
3. Responsibility for plant cleanliness must be assigned specifically to a person or persons.
4. Clothing of all personnel must be kept in a clean condition consistent with the requirements demanded in handling food.
5. Soap or synthetic detergents and hypochlorite or other sanitizing agents must be used generously and regularly. Only clean water must be used for washing and rinsing.
6. Rodents, vermin, flies, etc., must be controlled. Hiring of exterminators (individuals or firms) might be necessary.

Note: These standard procedures are based in part on the "Operation Guidelines" developed by Eureka and Fort Bragg salmon dealers, California, September, 1956.

III—1M—July, 1957

To Be Posted at Sea and Ashore

**GUIDELINES AND STANDARD PROCEDURES FOR QUALITY IMPROVEMENT**

**for use on a voluntary basis by the**

**PACIFIC SALMON TROLLERS**

**DAY BOATS**

(Prepared by members of the industry, the National Fisheries Institute Technology Division and the U. S. Bureau of Commercial Fisheries)

**Handling of Catch**

1. Bring fish to boat side alive.
2. Stun fish to avoid deck thrashing and bruising — gaff fish in head only.
3. Gut, bleed, gill, and wash fish thoroughly.
4. Place clean wet sacks in carrying area.
5. Place salmon head to head on the wet sacks to avoid scaling and bruising.
6. Cover fish immediately with clean sacks and wet them down constantly. Cover checker or bin with insulated wooden cover.

**Unloading Catch**

1. Uncover and work one checker or bin at a time.
2. Handle fish carefully.
3. Do not overload landing box or basket.
4. Encourage careful handling by dock-handlers and graders.
5. Land mutilated or inferior fish separately.

**Sanitation**

1. Wash sacks immediately in clean water and thoroughly dry them before re-use. Replace old and worn sacks.
2. Wash and scrub checker boards and boxes.
3. Wash and scrub entire deck area immediately after the discharge of each trip.
4. Clean all working tools and gear thoroughly and put in proper places.
5. Pump and clean bilge thoroughly.
6. Use soap or synthetic detergents and hypochlorite or other sanitizing agents liberally in clean-up. Use only clean water for washing and rinsing.

Try ice on the next trip! It will assure landing of better quality fish. Ice is cheaper than fish.

Note: These standard procedures are based in part on the "Operation Guidelines" developed by salmon trollers of Eureka and Fort Bragg, July, 1956.

V—1M—July, 1957

To Be Posted at Sea and Ashore

**GUIDELINES AND STANDARD PROCEDURES FOR QUALITY IMPROVEMENT**

**for use on a voluntary basis by the**

**PACIFIC SALMON TROLLERS**

**ICE BOATS**

(Prepared by members of the industry, the National Fisheries Institute Technology Division and the U. S. Bureau of Commercial Fisheries)

**Handling of Catch**

1. Bring fish to boat side alive.
2. Stun fish to avoid deck thrashing and bruising.
3. Gaff fish in the head only.
4. Gut, bleed and gill fish immediately.
5. Wash fish thoroughly and put down out of the weather as quickly as possible.

**Icing**

1. Prepare smooth ice bed at least 6 inches deep. Allow no rough ice edges.
2. Place fish belly up in pen, leaving 6 inches for ice between fish, pen boards, and hull, and 3 inches for ice around each fish.
3. Fill belly cavity of each fish with fine ice.
4. Cover each layer of fish with at least 4 inches of ice and sprinkle with salt.
5. Check top ice layer periodically and re-ice when needed.
6. Remember: — Ice is cheaper than fish. Use plenty of it.

**Unloading Catch**

1. Uncover and work one bin of fish at a time.
2. Handle fish carefully.
3. Do not overload landing box or basket.
4. Encourage careful handling by dock handlers and graders.
5. Land mutilated or inferior fish separately.

**Sanitation**

1. Wash the hold completely after the discharge of each trip.
2. "Sweeten" hold by using approved sanitizing product or sprinkling with plenty of salt. Leave hatch covers open.
3. Wash and scrub pen boards as soon as they come out of hold. Discard worn pen boards immediately.
4. Wash gunny sacks immediately in clean water and dry them thoroughly before re-use.
5. Be sure adequate supply of tools and equipment are in a sanitary condition and in their proper place.
6. Check bilge constantly and keep level down.
7. Use soap or synthetic detergents and hypochlorite or other sanitizing agents liberally in clean-up. Use only clean water for washing and rinsing.

Note: These standard procedures are based in part on the "Operation Guidelines" developed by salmon trollers of Fort Bragg and Eureka, California, July, 1956.

IV—1M—July, 1957

FIG. 2 - THESE POSTERS ARE COLORED ORANGE AND GIVE QUALITY IMPROVEMENT GUIDELINES AND STANDARD PROCEDURES FOR USE BY SALMON DAY TROLLERS AND ICE BOATS.

As an important part of its contract, the N.F.I. Technology Division is preparing for distribution as supplementary information simplified versions of the extensive technical literature which has been developed by the U. S. Fish and Wildlife Service and other agencies in the fisheries research field. The expansion of the program will proceed as rapidly as is consistent with a thorough job at each stage. Appropriate rules will be developed for each of the other levels in the distribution chain. The basic guidelines will then be adapted to conform to the many varieties of fish found in our markets. Each set of guidelines will be prepared on a different colored background so that it may be easily identified as pertaining to a specific variety of fish, geographical area, or stage in the distribution chain.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, FEB. 1957, P. 30.

## United States Fishing Fleet[1/] Additions

JUNE 1957: A total of 77 vessels of 5 net tons and over were issued first documents as fishing craft during June 1957--12 less than in June 1956. The Pacific Coast and South Atlantic areas led with 19 each, followed by the Gulf area with 18, the Chesapeake area with 12, and the Alaska area with 5.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft, by Areas, June 1957

| Area | June | | Jan.-June | | Total |
|---|---|---|---|---|---|
| | 1957 | 1956 | 1957 | 1956 | 1956 |
| | (Number) | | | | |
| New England | 2 | 1 | 12 | 9 | 15 |
| Middle Atlantic | 1 | 2 | 15 | 15 | 26 |
| Chesapeake | 12 | 14 | 51 | 43 | 138 |
| South Atlantic | 19 | 25 | 55 | 49 | 119 |
| Gulf | 18 | 17 | 65 | 55 | 100 |
| Pacific | 19 | 25 | 65 | 48 | 76 |
| Great Lakes | 1 | - | 4 | 2 | 6 |
| Alaska | 5 | 5 | 27 | 27 | 40 |
| Hawaii | - | - | - | 1 | 1 |
| Total | 77 | 89 | 294 | 249 | 521 |

NOTE: VESSELS ASSIGNED TO THE VARIOUS SECTIONS ON THE BASIS OF THEIR HOME PORTS.

1/ INCLUDES BOTH COMMERCIAL FISHING AND SPORT FISHING CRAFT.

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

| Net Tons | Number |
|---|---|
| 5 to 9 | 35 |
| 10 to 19 | 13 |
| 20 to 29 | 8 |
| 30 to 39 | 16 |
| 40 to 49 | 2 |
| 50 to 59 | 1 |
| 100 to 109 | 1 |
| 330 to 339 | 1 |
| Total | 77 |

## United States Catch Declines Sharply in First Half of 1957

The United States and Alaska catch of fish and shellfish at mid-year was running considerably below a year ago. Fisheries which yielded slightly over 2 billion pounds of fish and shellfish in the early months of 1957 yielded 2.4 billion pounds during the same period in 1956.

Menhaden catches used almost entirely in the manufacture of fish meal and oil, showed the greatest decline. Catches during the first seven months of 1957 totaled 814 million pounds--328 million pounds less than in the same period during 1956.

Tuna and bonito catches on the Pacific Coast declined 31 million pounds; the Alaska salmon catch was off about 27 million pounds; receipts of ocean perch declined 17 million pounds.

Only three items showed marked increases in landings in the first six months of 1957 as compared with the same period last year--the herring catch in Maine (used largely for canning) was up 22 million pounds; herring catches in Alaska (used almost exclusively in the manufacture of meal and oil) were up 16 million pounds; and whiting landings in New England increased nearly 24 million pounds.

In 1956 United States and Alaskan fishermen landed a record catch of 5.2 billion pounds. It is evident that the 1957 catch will fall considerably short of this total.

United States Catch of Fishery Products, Various Periods, 1957 and 1956 1/

| Item | Period | 1957 | 1956 | Tot. 12 Mos. 1956 |
|---|---|---|---|---|
| | | .....(1,000 Lbs.) ..... | | |
| Maine | 6 mos. | 102,851 | 83,513 | 277,822 |
| Massachusetts: | | | | |
| Boston | 7 mos. | 83,857 | 91,271 | 147,402 |
| Gloucester | 7 " | 124,550 | 141,904 | 252,038 |
| New Bedford | 7 " | 54,535 | 50,357 | 87,965 |
| Provincetown | 7 " | 13,488 | 11,466 | 21,151 |
| Total | | 276,430 | 294,998 | 508,556 |
| Rhode Island 2/ | 6 mos. | 63,354 | 63,657 | 129,406 |
| New York 2/ | 6 " | 22,881 | 19,976 | 38,268 |
| New Jersey 2/ | 6 " | 26,866 | 25,873 | 46,097 |
| North Carolina 2/ | 6 " | 30,532 | 27,579 | 49,009 |
| Georgia | 6 " | 6,242 | 5,359 | 16,711 |
| Florida 2/ | 5 " | 55,146 | 56,282 | 142,493 |
| Alabama | 6 " | 4,962 | 4,198 | 12,320 |
| Mississippi 2/ | 5 " | 5,989 | 5,649 | 22,573 |
| Texas 2/ | 5 " | 16,313 | 14,743 | 61,993 |
| Ohio (Mar.-June) | 4 " | 16,258 | 15,567 | 24,928 |
| Oregon | 5 " | 17,921 | 19,359 | 59,256 |
| California: | | | | |
| Certain species 3/ | 6 mos. | 214,938 | 247,764 | 602,218 |
| Other | 4 " | 34,724 | 28,335 | 156,116 |
| Total California | | 249,662 | 276,099 | 758,334 |
| Rhode Island, Middle Atlantic, Chesapeake, South Atlantic, and Gulf States, menhaden | 7 mos. | 799,252 | 1,096,657 | 2,010,393 |
| Louisiana, shrimp (heads-on) | 4 mos. | 3,294 | 4,348 | 50,541 |
| Washington, halibut 4/ | 7 mos. | 11,399 | 9,176 | 16,604 |
| Alaska: | | | | |
| Halibut 4/ | 7 mos. | 17,330 | 16,296 | 24,864 |
| Herring | 7 " | 107,792 | 91,412 | 103,000 |
| Salmon | To Aug. 10 | 179,000 | 206,213 | 264,000 |
| Total of all above items | | 2,013,474 | 2,336,954 | 4,617,168 |
| Other | | 5/ | 5/ | 582,832 |
| Grand Total | | 2,013,474 | 2,336,954 | 5,200,900 |

1/ Preliminary.
2/ Excluding menhaden.
3/ Includes catch of the following: anchovies, jack and Pacific mackerel, tuna and bonito, and squid.
4/ Dressed weight.
5/ Not included.
Note: Round or "as caught" weight unless otherwise indicated.

United States Catch of Certain Species, Various Periods, 1957 and 1956 1/

| Item | Period | 1957 | 1956 | Tot. 12 Mos. 1956 |
|---|---|---|---|---|
| | | .....(1,000 Lbs.) ..... | | |
| Anchovies, Calif. | 6 mos. | 35,850 | 32,484 | 54,282 |
| Cod: | | | | |
| Maine | 6 mos. | 1,370 | 1,544 | 2,361 |
| Boston | 7 " | 12,378 | 12,079 | 17,518 |
| Gloucester | 7 " | 1,032 | 909 | 1,361 |
| Total cod | | 14,780 | 14,532 | 21,240 |
| Haddock: | | | | |
| Maine | 6 mos. | 2,210 | 2,477 | 4,340 |
| Boston | 7 " | 59,488 | 67,220 | 106,662 |
| Gloucester | 7 " | 4,980 | 6,293 | 8,774 |
| Total haddock | | 66,678 | 75,990 | 119,776 |
| Halibut: 2/ | | | | |
| Washington | 7 mos. | 11,399 | 9,176 | 16,604 |
| Alaska | 7 " | 17,330 | 16,296 | 24,864 |
| Total halibut | | 28,729 | 25,472 | 41,468 |
| Herring: | | | | |
| Maine | 6 mos. | 47,100 | 24,881 | 140,472 |
| Alaska | 7 " | 107,792 | 91,412 | 103,000 |
| Mackerel, Calif.: | | | | |
| Jack | 6 mos. | 35,772 | 35,206 | 76,784 |
| Pacific | 6 " | 8,410 | 8,592 | 45,766 |
| Menhaden | 7 mos. | 814,066 | 1,142,110 | 2,076,588 |
| Ocean perch: | | | | |
| Maine | 6 mos. | 27,920 | 32,580 | 64,967 |
| Boston | 7 " | 2,351 | 1,659 | 2,839 |
| Gloucester | 7 " | 35,250 | 48,304 | 83,303 |
| Total ocean perch | | 65,521 | 82,543 | 151,109 |
| Salmon, Alaska | To Aug. 10 | 179,000 | 206,213 | 264,000 |
| Scallops, sea, New Bedford | 7 mos. | 9,163 | 8,108 | 14,243 |
| Shrimp (heads-on) | 4 mos. | 32,581 | 31,616 | 183,862 |
| Squid, Calif. | 6 mos. | 2,348 | 7,692 | 15,790 |
| Tuna & bonito, Calif. | 6 mos. | 132,558 | 163,790 | 409,596 |
| Whiting: | | | | |
| Maine | 6 mos. | 7,610 | 4,559 | 14,835 |
| Boston | 7 " | 866 | 119 | 413 |
| Gloucester | 7 " | 46,135 | 25,787 | 46,432 |
| Total whiting | | 54,611 | 30,465 | 61,680 |
| Total of all above items | | 1,634,959 | 1,981,106 | 3,779,656 |
| Others 3/ not listed | | 378,515 | 355,848 | 1,420,344 |
| Grand Total | | 2,013,474 | 2,336,954 | 5,200,000 |

1/ Preliminary.
2/ Dressed weight.
3/ Partial data.
Note: Round or "as caught" weight unless otherwise indicated.

# U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JULY 1957: United States imports of edible fresh, frozen, and processed fish and shellfish in July 1957 were higher by 52.8 percent in quantity and 35.3 percent in value as compared with the previous month. Compared with July 1956, the imports for this July were up 25.1 percent in quantity and 17.4 percent in value. Imports in July this year were much higher for fish fillets and blocks, canned sardines and salmon, and swordfish as compared with the previous month. This July compared with the same month in 1956 showed that there were substantial gains in the imports of fillets and blocks, canned sardines, dressed salmon, and raw albacore tuna. These increases more than offset declines in the imports of shrimp, canned salmon, and raw tuna other than albacore.

United States Foreign Trade in Edible Fishery Products, July 1957 with Comparisons

| | Quantity | | | Value | | |
|---|---|---|---|---|---|---|
| | July | | Year | July | | Year |
| | 1957 | 1956 | 1956 | 1957 | 1956 | 1956 |
| | (Millions of Lbs.) | | | (Millions of $) | | |
| Imports: | | | | | | |
| Fish & shellfish: | | | | | | |
| Fresh, frozen & processed 1/ | 88.9 | 71.1 | 786.6 | 25.7 | 21.9 | 231.6 |
| Exports: | | | | | | |
| Fish & shellfish: | | | | | | |
| Fresh, frozen & processed 1/ | 3.9 | 5.9 | 82.8 | 1.0 | 1.3 | 19.2 |

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

Imports for July 1957 averaged 28.9 cents a pound as compared with 30.8 cents a pound for the same month of 1956.

Exports of processed edible fish and shellfish in July 1957 were lower by 44.2 percent in quantity and 23.1 percent in value as compared with the previous month. Compared with July 1956, exports this July were down 34.1 percent in quantity and 23.1 percent in value.

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FISHERY PRODUCTS IMPORTS AND EXPORTS, 1956: The value of United States foreign trade in fishery products in 1956 amounted to $320.7 million. This establishes an all-time high in the value of United States trade in these commodities. The value of this trade was 8 percent above that of 1955 and 22 percent greater than in 1952. The former high year was 1955 when the value amounted to $257.9 million.

Of the total foreign trade in fishery products in 1956, $281.2 million represented the value of products imported for consumption and approximately $39.5 million the value of exports. These and other related data can be found in Imports & Exports of Fishery Products, 1952-1956 Annual Summaries (C.F.S. No. 1595) recently released by the U. S. Bureau of Commercial Fisheries.

Imports of all types of aquatic items during 1956 accounted for 88 percent of the total while exports made up the remaining 12 percent of the value of the United States foreign trade in fishery products. Imports during 1956 were 9 percent above those of the previous year, while exports were 1 percent less.

During 1956, imports for consumption amounted to nearly 787.9 million pounds of edible fishery products valued at almost $233.2 million, while nonedible products were valued at about $48.0 million. Among the more important items received in this country during 1956 were frozen groundfish fillets and steaks (including blocks and slabs) and tuna.

Exports of edible fishery products totaled 101.9 million pounds valued at $22.9 million dollars, while nonedible products were valued at $16.6 million. Exports of

both canned salmon and sardines declined sharply in 1956. Canned salmon shipments of 5.2 million pounds were less than half as large as those of 1955. Canned sardines exports of 39.7 million pounds were down 15 percent.

These and other related data can be found in Imports & Exports of Fishery Products, 1952-1956 (C. F. S. No. 1595).

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GROUNDFISH FILLET IMPORTS, AUGUST 1957: During August 1957, imports of groundfish (including ocean perch) fillets and blocks amounted to 15.4 million pounds. Compared with the same month of last year, this represented an increase of 4.2 million pounds (38 percent). The increase this August over the same month in 1956 was primarily due to a 3.9-million-pound increase in imports from Canada.


Icelandic exports to the United States showed a gain of 130,000 pounds. Imports from Norway, the United Kingdom, and the Netherlands, compared with August 1956, registered a net increase of 431,000 pounds. Combined imports from Denmark and West Germany showed a net loss of 117,000 pounds. There were no imports of groundfish fillets from Miquelon and St. Pierre during August 1957 although 68,000 pounds were reported during the same month of last year.

Imports of groundfish and ocean perch fillets and blocks into the United States during the first eight months of 1957 totaled 97.4 million pounds--an increase of 3.5 million pounds (4 percent) as compared with the corresponding period of 1956. Canada led all other countries exporting fillets to this country with 73.0 million pounds. Iceland followed with 16.4 million pounds. The remaining 8.0 million pounds was shipped by Norway, Denmark, West Germany, the Netherlands, and United Kingdom, Greenland, France, and Miquelon and St. Pierre.

NOTE: SEE CHART 7 IN THIS ISSUE.

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IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA PROVISO: The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1957 at the 12½-percent rate of duty is limited to 44,528,533 pounds. Any imports in excess of that quantity will be dutiable at 25 percent ad valorem.

Imports under the quota from January 1-August 31, 1957, amounted to 27,259,296 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 17,269,237 pounds of the quota which may be imported during the balance of 1957 at the 12½-percent rate of duty.

## Virginia

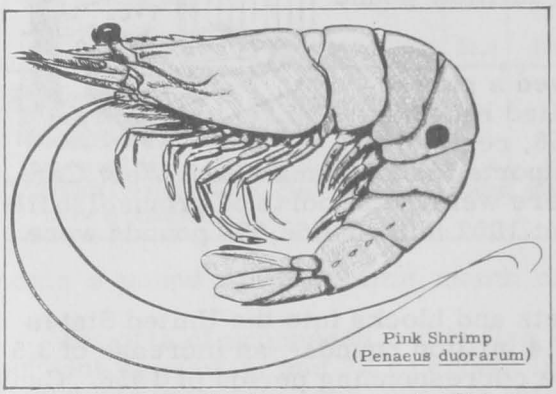
EELGRASS BEDS HAVEN FOR OYSTER DRILLS: The private life and habits of the oyster drill or screwborer (known to oystermen as "Public Enemy No. 1") have been studied daily by the Virginia Fisheries Laboratory this summer. Three of the Laboratory biologists report tremendous numbers of drills in eelgrass beds this year. The density of these pests is equivalent to 500 million per square mile in some places. Most of these drills were hatched in the summer of 1956.

One of the biologists states, "Eelgrass beds, the green underwater pastures of our coastal waters, seem to have all the features that drills need--surfaces for egg

attachment, food for young, and protection for all. One important problem now is to determine if these drills migrate from eelgrass beds to adjacent oyster grounds" (September 6, 1957, news release from Virginia Fisheries Laboratory).

## Washington

NEW FISHERY FOR SMALL SHRIMP: The catch of small pink shrimp landed at Westport, Wash., exceeded one million pounds in 1956. This shrimp fishery was established as the result of exploratory fishing surveys by the U. S. Fish and Wildlife vessel John N. Cobb in 1955 and 1956. Up to the present time, the market for the shrimp has been limited to the Pacific Coast. A Westport firm is processing the shrimp and a Seattle broker is handling the distribution.



Pink Shrimp
(Penaeus duorarum)

The shrimp are caught on grounds 4-28 miles off the Washington coast in about 60-85 fathoms.

Total landings through June 30, 1957, the Washington State Department of Fisheries reports, were 982,685 pounds, of which 448,905 pounds were landed in June alone. Individual fishing boats have been averaging about 11,000 pounds a day, but one vessel, Shirley Lee, brought in 64,000 pounds in one three-day trip in June.

Commercial processing became practical when the packers installed a Gulf Coast shrimp peeler. Green shrimp are put through the peeler for automatic peeling and removal of the sand vein.

These shrimp are then canned about 130 shrimp to a $4\frac{1}{2}$-ounce can. After heading, the shrimp are only about three-fourths of an inch long.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, JUNE 1956, P. 31; NOV. 1955, P. 35.

## Whaling

PACIFIC COAST WHALING INDUSTRY REVIVED: There has been a re-birth of the whaling industry on the United States Pacific Coast with reactivation of a whaling station in 1956 at Point San Pablo in San Francisco Bay. The operating company is primarily a producer of whale meat which is sold under a brand name. At the present time the ground whale meat is packed in 50-pound paper sacks and then frozen. The ground whale meat (which looks like hamburger) is fed under pressure out of a three-inch pipe, which is controlled by a valve, directly into the sacks which are on a scale, thereby insuring the proper weight. At the present time, all of the whale meat product is being used by mink farms, but expansion into the pet food market is being considered. According to a company spokesmen, they are having no marketing difficulties, but would like to have a more diversified operation.

The Point San Pablo plant is situated next door to a reduction plant where all of the whale that is not used for meat is processed into meal and oil. This reduction plant, which uses a dry rendering process, is believed to be the only such plant

of this type in the United States and the yield is reported to be better than in the more common reduction processes. The meal product produced is guaranteed to contain 68.5 percent protein, but will actually rate between 70-75 percent. The whaling company has been in operation for two years, but prior to the present reactivation of whaling activities, whale meat was imported from Canada for two years.

CUTTING MEAT FROM THE SHOULDERS AND RIBS OF A WHALE.

The whales are captured by a fleet of three catcher-boats, manned by a crew of five men each. They hunt daily, weather permitting, during the seasons which are: May 1 to October 31 on finback and humpback whales, and April 1 to November 30 on sperm whales. Their primary interest in sperm whales is the baleen or whalebone because the meat in the sperm whale is too oily for good quality edible meat.

The whaling grounds are offshore of the Farralon Islands, sometimes over a hundred miles at sea. The vessels are in constant communication with the plant so that production can be controlled to the plant capacity which is three whales daily. The vessels hunt and harpoon the whales, pump air into the carcass to keep the dead whale afloat, the flukes are secured to the boat by a chain, and the dead whales are towed to the plant. The catcher vessels are under a five-year contract to the company and receive payment for the whales based on their length. Crews are made up of a harpooner, engineer, cook, deckhand, and captain. They have an arrangement with the vessel owners for a percentage of the gross proceeds, based upon their individual job.

The humpback whales, which are their primary catch, average 43 feet in length and provide approximately 6-8 tons of whale meat and about 1,800 gallons of oil. The finback whales are slightly larger and produce 12-15 tons of meat. Only the loins are used for meat. There is some meat in the shoulder which could be utilized.

The 1957 catch to about the middle of July consisted of 80 humpback and 10 finback whales, and plans call for the processing of about 300 whales this season, weather and availability permitting. In 1956, 140 humpback and 64 fin whales were caught. Company spokesmen believe that a catch of 400 whales yearly would not deplete the population. The company spokesmen state that they are concerned with exploiting the whale population only to the extent that a sustained yield is possible.

As a source of edible meat during an emergency, this source at the present rate of production has a seasonal potential of 8 million pounds of meat and about 750,000 gallons of whale oil. Present facilities are not adequate to meet the standards for human consumption, due primarily to difficulties in maintaining quality after the whales are harpooned.

# Wholesale Prices, September 1957

GENERAL VIEW OF THE OLDER OF THE TWO MARKET SHEDS AFTER SELLING ACTIVITY IS ABOUT OVER IN FULTON FISH MARKET, NEW YORK CITY.

Wholesale price trends for fishery products were mixed during September, with some sharp increases in the fresh drawn, dressed, and whole finfish varieties and decreases in fresh and frozen shrimp and Maine sardines. The net result was an increase in the September 1957 over-all edible fish and shellfish (fresh, frozen, and canned) wholesale price index (120.0 of the 1947-49 average) of 3.4 percent as compared with the previous month and an increase of 5.0 percent over the same month in 1956.

From August to September prices increased (24.4 percent) rather sharply for all the items in the drawn, dressed, or whole finfish subgroup except for yellow pike prices at New York which dropped 3.8 percent. Increases of 37.5 percent for Pacific Coast halibut and 26.0 percent in king salmon prices were the result of a firmer market for halibut and salmon because supplies began to taper off. Increases in whitefish and lake trout prices were due to the excellent demand for these varieties during the Jewish holidays. The market for fresh large offshore drawn haddock at Boston was firm due to a healthy inventory situation for frozen haddock fillets and the usual drop in landings in the late summer and fall months. The September 1957 index for this subgroup was 6.0 percent above that for the same month in 1956, due primarily to higher prices for fresh salmon and all the freshwater species. But both halibut and fresh large drawn haddock prices this September were down 2.2 percent as compared with September a year ago.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, September 1957 With Comparisons

| Group, Subgroup, and Item Specification | Point of Pricing | Unit | Avg. Prices 1/ ($) | | Indexes (1947-49=100) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sept. 1957 | Aug. 1957 | Sept. 1957 | Aug. 1957 | July 1957 | Sept. 1956 |
| ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) | | | | | 120.0 | 1/116.0 | 119.9 | 114.3 |
| Fresh & Frozen Fishery Products: | | | | | 134.3 | 127.0 | 133.3 | 125.8 |
| Drawn, Dressed, or Whole Finfish: | | | | | 140.5 | 112.9 | 122.5 | 132.6 |
| Haddock, lge., offshore, drawn, fresh | Boston | lb. | .10 | .08 | 97.9 | 80.6 | 95.3 | 100.1 |
| Halibut, West., 20/80 lbs., drsd., fresh or froz. | New York | lb. | .44 | .32 | 136.1 | 99.0 | 114.5 | 139.2 |
| Salmon, king, lge. & med., drsd., fresh or froz. | New York | lb. | .75 | .60 | 168.5 | 133.7 | 140.5 | 151.7 |
| Whitefish, L. Superior, drawn, fresh | Chicago | lb. | .73 | .61 | 179.7 | 151.2 | 130.2 | 151.2 |
| Whitefish, L. Erie pound or gill net, rnd., fresh | New York | lb. | .97 | .80 | 195.1 | 161.8 | 111.2 | 149.6 |
| Lake trout, domestic, No. 1, drawn, fresh | Chicago | lb. | .67 | .61 | 137.3 | 125.0 | 125.0 | 117.8 |
| Yellow pike, L. Michigan & Huron, rnd., fresh | New York | lb. | .63 | .65 | 146.6 | 152.4 | 164.1 | 117.3 |
| Processed, Fresh (Fish & Shellfish): | | | | | 131.6 | 134.0 | 141.7 | 126.3 |
| Fillets, haddock, sml., skins on, 20-lb. tins | Boston | lb. | .34 | .31 | 115.7 | 103.8 | 100.4 | 97.0 |
| Shrimp, lge. (26-30 count), headless, fresh | New York | lb. | .77 | .85 | 120.9 | 133.5 | 150.1 | 113.0 |
| Oysters, shucked, standards | Norfolk | gal. | 6.00 | 5.75 | 148.5 | 142.3 | 142.3 | 148.5 |
| Processed, Frozen (Fish & Shellfish): | | | | | 116.9 | 131.3 | 129.0 | 102.9 |
| Fillets: Flounder, skinless, 1-lb. pkg. | Boston | lb. | .39 | .39 | 100.8 | 102.1 | 102.1 | 103.4 |
| Haddock, sml., skins on, 1-lb. pkg. | Boston | lb. | .30 | .29 | 92.6 | 91.0 | 83.2 | 86.3 |
| Ocean perch, skins on, 1-lb. pkg. | Boston | lb. | .27 | .27 | 108.8 | 108.8 | 108.8 | 110.8 |
| Shrimp, lge. (26-30 count), 5-lb. pkg. | Chicago | lb. | .79 | .97 | 121.9 | 148.9 | 149.3 | 99.2 |
| Canned Fishery Products: | | | | | 99.6 | 1/100.3 | 100.8 | 98.0 |
| Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. | Seattle | cs. | 22.65 | 22.65 | 120.0 | 120.0 | 120.0 | 120.0 |
| Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs. | Los Angeles | cs. | 11.20 | 11.20 | 80.8 | 80.8 | 80.8 | 76.4 |
| Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs. | Los Angeles | cs. | 9.00 | 9.00 | 105.0 | 105.0 | 105.0 | 87.5 |
| Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans cs. | New York | cs. | 6.59 | 1/7.045 | 70.1 | 1/75.0 | 79.3 | 81.9 |

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.

2/ Revised.

Fresh processed fish and shellfish prices in September this year were down 1.8 percent from August. Increases of 14.6 percent for fresh small haddock fillets and 4.4 percent for shucked oysters were more than offset by a seasonal decline of 9.4 percent in fresh shrimp prices. Comparing this September with the same month in 1956, the index for the subgroup increased 4.2 percent due to higher haddock fillet and fresh shrimp prices. Oysters were priced the same as in September 1956.

Wholesale prices for frozen processed fish and shellfish declined 11.0 percent from August to September 1957 because of a rather sharp seasonal drop in frozen brown shrimp prices at Chicago. Changes in frozen fillet prices were slight--flounder and haddock fillets prices were lower by only $\frac{1}{2}$ to 1 cent a pound. The September 1957 index for this subgroup was 13.6 percent higher than in the same month in 1956, due principally to higher frozen shrimp prices (up 22.9 percent) and higher frozen haddock fillet prices (up 7.3 percent). Both flounder and ocean perch fillet prices were down about 2 percent from September a year ago.

Canned fishery products prices in September this year were about unchanged from the previous month except for a further decline (6.5 percent) in the price at New York for canned Maine sardines. The canned salmon market continued firm due to a short pack both this year and last; canned tuna and California sardine prices were unchanged from August to September. Comparisons between this September with September a year ago show a firmer market for canned tuna, an unsettled market for canned California sardines (production was light for the first month of the open season in Southern California), a firm market for canned salmon, and a pronounced weakness in the market for Maine sardines.