# TRENDS AND DEVELOPMENTS

## Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 13--
SOVIET TRAWLERS OBSERVED
IN GULF OF ALASKA:

On May 5, 1962, two Soviet trawlers were observed by the U. S. Bureau of Commercial Fisheries research vessel John N. Cobb on the Albatross Gully grounds (vicinity of 57°59' N. latitude, 149°51' W. longitude) in the Gulf of Alaska (fig. 1). These grounds are heavy producers of halibut for the United States and Canadian long-line fleets. They also yielded up to ten metric tons of Pacific ocean perch (Sebastodes alutus) per hour of Soviet exploratory trawling in 1960 (Moiseev and Paraketsov 1961). The Albatross Gully grounds, along with grounds south of Unimak Island and southwest of the Shumagin Islands, are considered likely areas for expansion of the Soviet's Pacific ocean perch trawl fishery.

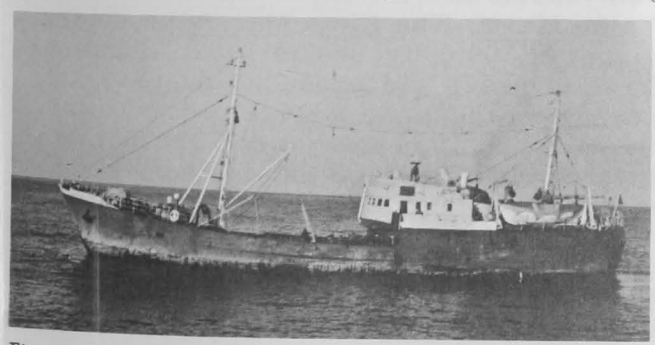

Fig. 1 - One of two similar Soviet trawlers encountered May 5, 1962, by M/V John N. Cobb in the Gulf of Alaska.

The Soviet vessels observed from the John N. Cobb were identical side trawlers with estimated lengths of 160 to 170 feet. They bore identification numbers SRT-R-9162 and SRT-R-9165. Twenty-two crew members (including one woman) were observed on deck of one vessel when first contact was made.

Otter boards used by the Soviet trawlers were oval-shaped and were used to spread a large trawl net of synthetic construction

Fig. 2 - Soviet trawler hauling net containing an estimated 15,000 pounds of Pacific ocean perch.

which appeared to be rigged to fish just above the bottom (fig. 2). The net may have been a bottom herring trawl of the type reported adopted for Pacific ocean perch fishing in the Gulf of Alaska (Lubimova 1961). An estimated 80 to 100 metal floats were observed attached to the headrope of the net and there were about 12 droppers, each about one-fathom long, spaced along the footrope of the net. One "sash weight" estimated to weigh about 40 pounds was attached to the end of each dropper. When the sash weights contact the bottom, the reduced weight on the footrope apparently allows the net to raise enough to clear small obstructions. The wings and intermediate section of the net appeared to be of double mesh construction. No gilled fish were seen in two catches observed at close range.

A tracing of the net used by one of the Soviet trawlers was obtained on the John N. Cobb's white-line echo-sounder (fig. 3). The tracing clearly shows the trawl warps and outline of the trawl while it was fishing at a

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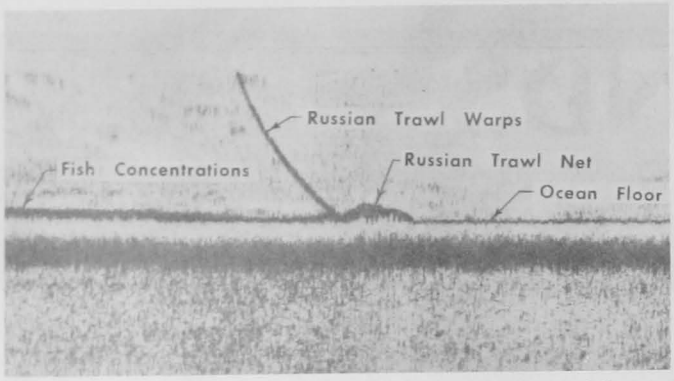


Fig. 3 - Echo tracing obtained from M/V John N. Cobb of Soviet trawl warps and net at depth of 120 fathoms.

depth of 120 fathoms. The proportion of the vertical scale on the echo-sounder tracing occupied by the net indicates the net's headrope was from 25 to 30 feet above the ocean bottom.

An estimated 15,000 pounds of Pacific ocean perch were caught in the haul from which the echo tracing was obtained. A subsequent haul, when the net apparently snagged on a bottom obstruction, yielded an estimated 3,000 pounds of Pacific ocean perch. Both catches were dumped directly into the vessel's hold, which prevented accurate observation of the species caught. However, no species other than Pacific ocean perch could be seen in the net while it was alongside the vessel or when the catches were lifted aboard.

A great deal of echo-sounding was done by the Soviet trawlers prior to actual setting of their nets. This apparently was necessary to determine the type of bottom and to locate schools of Pacific ocean perch. The two trawlers coordinated their echo-sounding and trawling for maximum efficiency of operations.

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## Alaska

### SOVIET AND JAPANESE FISHING OFF ALASKA, JUNE 1962:

Soviet and Japanese fishing efforts in the Bering Sea and Gulf of Alaska remain high. In the Bering Sea, fishing concentrations appear to have shifted westward, except for the king crab mothership operations of both nations. At last report, the Japanese king crab mothership Tokei Maru was operating just north of Cold Bay. The Soviet king crab vessel Andrey Zakharov was last reported just off Port Moller.

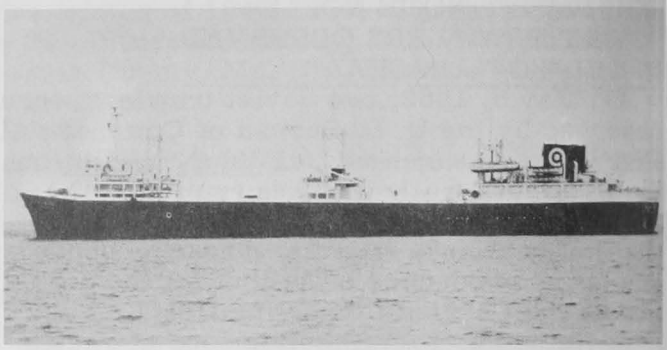

Fig. 1 - Russian king crab factoryship Andrey Zakharov, operating in Bering Sea, July 5, 1961.

Two Japanese shrimp factory vessels were working northwest of the Pribilof Islands at approximately 58° N. 170° W. The two vessels are the Einin Maru and the Kaiko Maru. The Einin Maru's production target is 300,000 cases for 1962. As of June 15 this vessel had produced over 100,000 cases. At the present rate of production, the factoryship is expected to reach its target. She has been on the fishing grounds since May 1 and has been producing an average of 2,500 to 3,000 cases of shrimp a day. The Kaiko Maru is known to be taking large quantities of shrimp also; however, neither her production target nor her fishing success is known.

Fig. 2 - Japanese shrimp factoryship Einin Maru, Bering Sea, June 27, 1961.

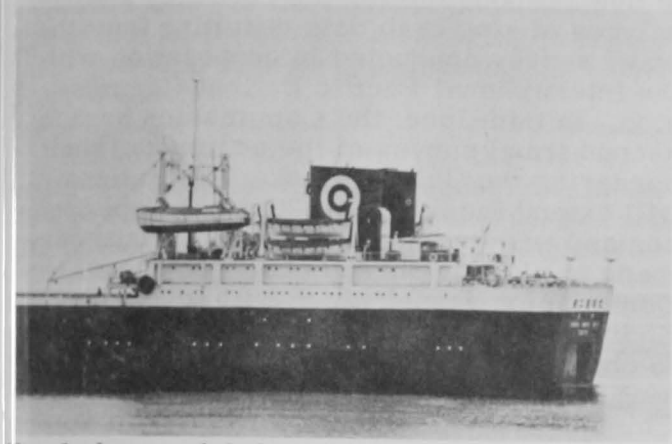

Fig. 3 - Japanese whale factoryship Tonan Maru, operating in Bering Sea, July 11, 1961.

Both Japanese and Russian whaling vessels have been reported in considerable numbers along the Aleutian Chain. Most of the activity has been centered around the Amchitka Pass and Rat Islands. The Japanese in particular seem to be having good success this year. Twice they have been observed to find and take a complete school of whales.

Japanese motherships fishing for salmon have not fished in the Bering Sea but have remained south of the Aleutian Islands and west of the 180th parallel, at least during the period from June 7 to June 24.

Soviet and Japanese exploratory vessels have been sighted in many areas of the Gulf. The Japanese exploratory fishing trawler Izumo Maru was prospecting about 100 miles south of Seward. The Russian trawler RT 4454 was sighted approximately 30 miles off Biorka Island near Sitka on June 22. The vessel was believed fishing for ocean perch. At last report, a considerable number of Russian and Japanese trawlers were working near the Trinity Islands off Kodiak.

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SALMON FISHERY TRENDS, JUNE 1962:

Southeastern Alaska: Due to the continued failure of the early runs of salmon to northern waters of Southeastern Alaska, the Icy Strait district and Western district were closed to salmon purse-seining until July 10. Pink salmon to date have been of extremely small size and the number of chum salmon was disappointing. At last report, the only district open to purse-seining in Southeastern Alaska was the outside section of the west coast district.

Central Alaska: The salmon runs to Central Alaska are apparently stronger this year. The Cordova district, which includes the Copper and Bering Rivers, has packed 2,411 cases of kings and 58,866 cases of reds. This indicates a very good run for the Cordova district.

Western Alaska: The red salmon run to Bristol Bay appears to be shaping up about as expected. Last year at this time the pack of red salmon amounted to 303,382 cases. To date this year the pack is 61,091 cases.

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HERRING FISHERY:

The herring reduction fishery in Alaska for 1962 began on June 12. The only reduction plant operating this season is the one located at Washington Bay. Although only 3 seiners are fishing, the catches have been so heavy the plant has been unable to keep pace with the deliveries. Approximately 450 tons of herring had been delivered by June 17. The age composition of the catch during the first week was: 19 percent 4-year-old fish, 67 percent 5-year-olds, 13 percent 6-year-olds, and 1 percent 7-year-olds. Catch per unit of effort has been 820 pounds per ton day. This approaches the maximum catch per unit of effort obtained in 1961.

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TANNER CRAB FISHERY:

Trawling explorations in Southeast Alaska for marketable tanner crabs (Choenocetes bairdii), undertaken in mid-May by a Juneau firm with the vessel Neptune, were discontinued in mid-June after a thorough search failed to reveal commercial concentrations in trawlable waters. Depths from 10 to 110 fathoms were surveyed near Juneau, in Icy Strait, Northern Lynn Canal, and offshore at Cape Fairweather. The catch in each area averaged 100 market-size tanner crabs per one hour drag; about 50 percent of the crabs had recently moulted and were soft.

## Alaska Fisheries Investigations

The following is a report of June 1962 activities and studies by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Auke Bay, Alaska.

HERRING INVESTIGATIONS:

The herring tag recovery apparatus at the Washington Bay herring reduction plant was activated early in the month. This operation is part of a biological research study to define the contributions of various stocks of herring to the commercial fishery, to plot migration routes, and to obtain an estimate of natural and fishing mortality in herring populations.

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SALMON FRY MIGRATIONS:

The salmon fry migration from Grassy Point Creek at Karluk Lake dropped to a very low level in the first week of June, whereas the Meadow Creek run peaked at that time. Both camps were closed by June 23, with the arrival of adult reds off the creek mouths. Between 266,000 and 327,000 fry migrated from Grassy Point into Karluk Lake during the study period. Meadow Creek contributed between 650,000 to 728,000 fry during the same period. The smolt out-migration from Karluk Lake for the period May 18 through June 23 was estimated at 1,494,000. This estimate includes both tails of the migration curve. The spring adult red salmon migration into Karluk Lake up to and including June 21 has totaled 104,494 spawners. The run was sampled every fourth day to obtain length, sex, and age data. Four high-seas tagged reds had passed through the weir.

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BRISTOL BAY RED SALMON STUDIES:

The red salmon out-migration from the Naknek Lakes was the largest since the Naknek smolt studies started in 1956. This year an estimated 15,000,000 red salmon smolt left the Naknek Lakes. The previous peak year was 1959, when the smolt out-migration was estimated at 12,000,000. The Ugashik River smolt out-migration was very large also, with the index catch being within a few thousand of the 1958 peak index catch of 456,000. The out-migration estimate for this year is nearly 16,000,000, while the 1958 out-migration estimate was 11,000,000.

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KING CRAB STUDIES:

All research data collected by the Bureau's Montlake Biological Laboratory on king crab south of the Alaska Peninsula have been transferred to the Auke Bay Biological Laboratory in Alaska. The Auke Bay Laboratory is now responsible for tag recovery and analyses of king crab data resulting from the trawl survey conducted in cooperation with the International Pacific Halibut Commission. In mid-June, the Commission began a second trawl survey of the continental shelf bordering the Gulf of Alaska. Operations will extend from Kodiak Island to Cape Spencer and will use three trawlers. Plans were made to place a Bureau observer aboard one Commission vessel which will operate out of Kodiak. Arrangements have also been made to charter the 80-foot vessel Paragon to tag king crabs in the offshore waters between Chirikof Island and the Shumagin Islands.

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PACIFIC HERRING MAY BE SERIOUS PREDATOR OF PINK SALMON FRY:

Studies of the early salt water life of pink salmon at Little Port Walter in southeastern Alaska indicate the Pacific herring may be a serious predator of pink salmon fry in that area, according to an article in the latest Transactions of the American Fisheries Society, an international fisheries research publication.

In May 1960, the stomach contents of 537 herring were examined by the author of the article. The fish had been caught by beach seines and gill nets fished in the bay near the stream mouth during the peak of the pink salmon fry migration. He found that 286 herring stomachs held pink salmon fry. The average number of fry in each stomach was 14.

The author, who is a biologist at the U.S. Bureau of Commercial Fisheries Laboratory at Auke Bay, Alaska, stated that herring appear in the bay at Little Port Walter occasionally throughout the year. He said the herring often concentrate there in large schools during the spring and summer months, the same time young pink salmon enter salt water from the spawning streams.

Observations by other biologists confirm the report of herring eating salmon fry. A biologist for the Fisheries Research Institute, University of Washington, observed herring chasing and eating salmon fry in Uyak Bay, Kodiak Island, during 1958 and 1959. He examined the stomachs of herring caught by beach seine in Browns Lagoon, Uyak Bay, and found as many as 10 fry in a single herring stomach. In 1962, another Bureau of Commercial Fisheries biologist

repeated many of the observations made by the author of the article on herring predation upon pink salmon fry entering the Little Port Walter estuary.

The addition of herring to the list of salmon predators does not necessarily mean that predation by herring is general. According to the Auke Bay Laboratory biologist, the extent and areas of predation are not known. He pointed out, however, that the Little Port Walter observations, and those made at Uyak Bay, demonstrate that predation upon salmon fry by herring does occur in widely separated areas, and has been observed upon several occasions in different years.

## Alaska Fisheries Exploration and Gear Research

TRAWLER CHARTERED FOR KING CRAB EXPLORATIONS:

The steel-hulled Seattle trawler Yaquina, a 75-foot vessel, was selected in June 1962 for this summer's work by the Bureau's Exploratory Fishing and Gear Research Base, Juneau. A contract charter was signed early in July. The vessel departed for Portlock Bank near Kodiak Island to begin a six-week survey of the commercial potential of king crab and associated stocks. The vessel is expected to be used continuously until November on two additional six-week surveys, one for Seward area shrimp explorations and the other for Southeastern Alaska bottomfish explorations.

## American Dietetic Association

ANNUAL MEETING:

The 45th Annual Meeting of the American Dietetic Association will be held in Miami Beach, Fla., October 9-12, 1962. Daytime sessions for the first three days will be held at the Auditorium where an extensive exhibition of food service equipment and food products will be on display. On the last day, sessions will be held at the Deauville and Carillon, the joint headquarters hotels.

Several sessions will be devoted to diet and nutrition. Attention will be given to atherosclerosis and one of the speakers on this subject will talk on "Fats, Rats, Chicken, and Men." A session on obesity and weight control will include a talk on "Nutritional Deficiencies in Other Parts of the World." Disaster feeding and civil defense will be considered at another session.

Food service administration will be the subject of another session. An associate professor of Michigan State University will talk on new trends in foods. Another speaker will talk about producing quality foods. One speaker will discuss merchandising food, and another, "New Trends in Food."

## California

MIDWATER TRAWLING FOR SALMON FINGERLINGS CONTINUED:

M/V "Nautilus" Cruise 62-N-6b (June 11-15, 1962) and 62-N-6c (June 25-29, 1962): The capture of marked salmon fingerlings on their seaward migration was the objective of both trips by the California Department of Fish and Game research vessel Nautilus. The vessel operated in the Carquinez Strait, using a cotton midwater trawl with a 15-foot square opening. Trawling was conducted between 8 a.m. and 3 p.m., and each tow lasted 20 minutes. All tows were alternated between upstream and downstream, and between north shore, center, and south shore of the channel.

Other Species Caught by Nautilus on Cruise 62-N-6b and 62-N-6c

| Species | Number |
|---|---|
| Northern anchovy (Engraulis mordax) | 46,000 (est.) |
| Pacific herring (Clupea pallasi) | 11,500 (est.) |
| Striped bass (Roccus saxatilis) | 3,600 (est.) |
| Sacramento smelt (Spirinchus thaleichthys) | 2,000 (est.) |
| King salmon (Oncorhynchus tshawytscha) | 755 |
| Northern midshipman (Porichthys notatus) | 25 |
| American shad (Alosa sapidissima) | 24 |
| Splittail (Pogonichthys macrolepedotus) | 24 |
| Jacksmelt (Atherinopsis californiensis) | 13 |
| Starry flounder (platichthys stellatus) | 9 |
| Surfsmelt (Hypomesus pretiosus) | 7 |
| Staghorn sculpin (Leptocottus armatus) | 2 |
| Walleye surfperch (Hyperprosopon argenteum) | 2 |
| Rainbow trout (Salmo gairdnerii) | 1 |
| Pacific lamprey (Entosphenus tridentata) | 1 |
| Shiner perch (Cymatogaster aggregata) | 1 |
| Sacramento squawfish (Ptychocheilus grandis) 1/ | 1 |
| Night smelt (Spirinchus starksi) | 1 |
| Three-spined stickleback (Gasterosteus aculeatus) | 1 |

1/New species appearing for first time since midwater trawling operations began on April 10, 1961.

A total of 109 tows completed in the Strait during the cruises yielded a total

catch of 755 king salmon (Oncorhynchus tshawytscha). Nineteen of these fish were marked recoveries.

Note: See Commercial Fisheries Review, August 1962 p. 9.

## Cans--Shipments for Fishery Products, January-May 1962

The amount of steel and aluminum consumed to make cans shipped to fish and shellfish canning plants during January-May 1962 was 0.4 percent above that used during the same period in 1961. Prior to this year, the figures covered only tinplate cans, but beginning with January 1962 aluminum cans are included. It is believed that only a small amount of aluminum is being used in cans used for fishery products at present.

A total of 1,222,507 base boxes of steel (tinplate) and aluminum were used in the manufacture of cans shipped to fishery plants during the first five months of 1962, whereas in the same period of 1961 (when only tinplate was reported), 1,217,306 base boxes of steel were consumed. More tuna, Maine sardines, and mackerel were canned in the first five months of 1962 than in the same period of 1961.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size.


## Central Pacific Fisheries Investigations

TUNA STUDIES IN SOUTH PACIFIC CONTINUED:

M/V "Charles H. Gilbert" Cruise 56 (April 24-May 12, 1962): Long-line fishing for tuna and other climax predators in waters adjacent to Christmas Island was conducted during this cruise by the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert. The specimens obtained were to be used for studies by the University of Washington Laboratory of Radiation Biology.

Five long-line fishing stations were occupied at designated locations shown in figure 1. Sixty baskets of 180-fathom mainline gear

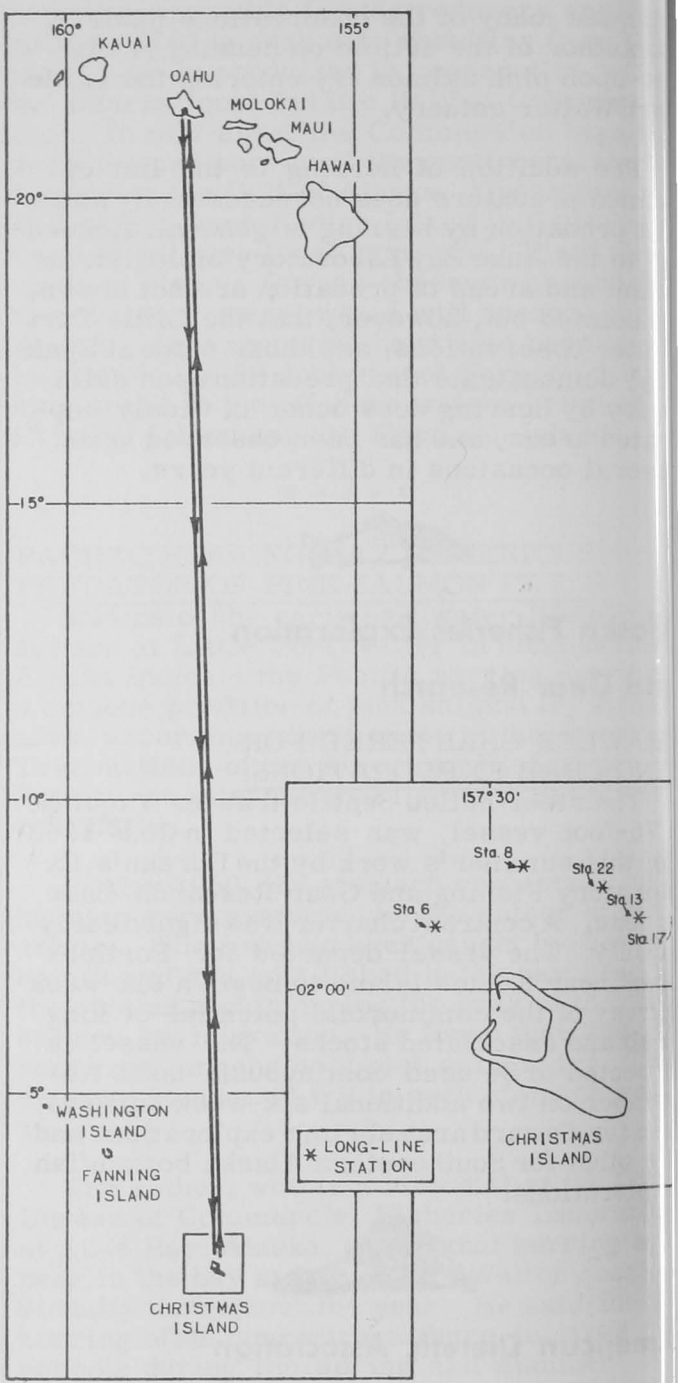



Fig. 1 - Track chart of Charles H. Gilbert Cruise 56 (April 24-May 12, 1962).

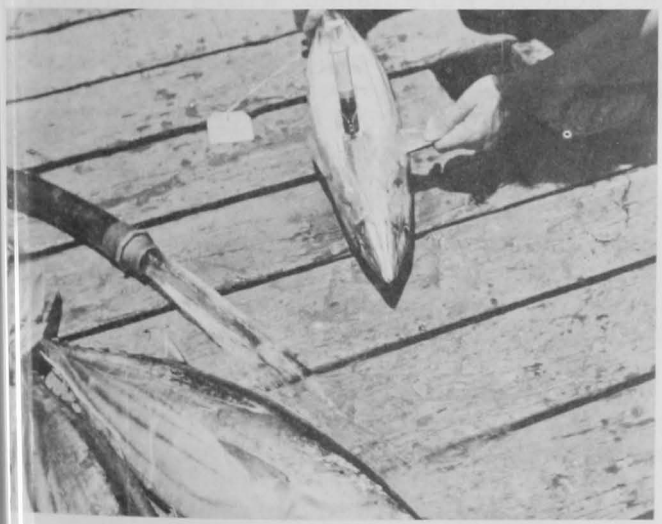
with 16-fathom droppers were fished at stations 6, 8, 13, and 17, and 20 baskets of similar gear were fished at station 22. The catch rate of tuna (per 100 hooks) ranged from 1.1 at station 6 to 21.9 at station 13. A total of 154 yellowfin tuna, 9 big-eyed tuna, 1 wahoo, 1 sailfish, 1 black marlin, 1 lancetfish, and 15 sharks were caught at the 5 long-line stations.

Samples of eyes, liver, and muscle were taken from 51 yellowfin tuna, 6 big-eyed tuna

1 wahoo, and 2 spearfish. Livers were taken from 3 sharks. Those samples, which were taken from long line-caught fish, were frozen for further study by the University of Washington.

Plankton and neckton were collected with 1-meter plankton nets and a 6-foot Isaac-Kidd midwater trawl. Eight 30-minute 0-50 meter oblique plankton tows and three 30-minute surface plankton tows were made with a 1-meter open net. A non-quantitative portion approximately one-fourth of each sample was preserved in formalin. The remainder was frozen. Settling volumes ranged between 205 and 250 ml. Three hauls with the 6-foot midwater trawl were made to a depth of approximately 70 meters.

Water samples were collected to a depth of 1,200 meters using bottle casts. Six Nansen bottle casts (without reversing thermometers) were made to obtain water samples at the following depths: 25, 50, 100, and 300 meters. A five-gallon surface sample was obtained at each of the six stations by bucket.



Collecting tuna blood sample.

Blood samples were collected from tuna and marlin for serological studies at the Bureau's Biological Laboratory, Honolulu. A total of 142 blood samples were obtained from 131 yellowfin tuna, 9 big-eyed tuna, 1 black marlin, and 1 sailfish.

Eighty-two BT casts and collections of surface salinity samples were made on runs between Honolulu and Christmas Island. Casts were made at intervals of approximately 30 miles. Four BT casts were made in the survey area with a surface salinity sample collected at each. During this cruise, two night-light stations were held in the survey area, and the thermograph was operated continuously.

Four skipjack tuna schools and 17 unidentified schools were sighted during the cruise.

On the run between Honolulu and Christmas Island, one case of drift bottles (20 bottles per case) was dropped each hour for the first 6 hours after departure, and after that, one case was dropped every 3 hours until 15° N. On the return trip, one case of drift bottles was dropped at 15° N. and one case 3 hours later.

M/V "Charles H. Gilbert" Cruise 57 (June 4-25, 1962): This cruise in the Line Islands area, principally off Christmas Island, by the Charles H. Gilbert was also concerned with long-line fishing for tuna and other climax predators needed as specimens in studies by the University of Washington.

Five long-line fishing stations were occupied at the locations shown in figure 2. Sixty baskets of 6-hook, 210-fathom main-line gear with 16-fathom droppers were fished at each station. The catch rate of tuna (per 100 hooks) ranged from 1.1 at station 16 to 3.9 at station 21. A total of 28 yellowfin tuna, 3 big-eyed tuna, 12 skipjack tuna, 1 wahoo, 1 striped marlin, 1 lancetfish, and 21 sharks were caught at the five long-line stations.

Samples of eyes were taken from 8 yellowfin and 2 skipjack tuna; samples of liver from 27 yellowfin, 3 big-eyed, and 12 skipjack tuna, 1 wahoo, 1 striped marlin; samples of muscle from 27 yellowfin, 3 big-eyed, 12 skipjack tuna, 1 wahoo, 1 striped marlin. The tissues were taken from long-line-caught fish and frozen for further study by the University of Washington.

Plankton and nekton were collected using 1-meter plankton nets and a 6-foot midwater trawl. Thirteen 30-minute 0-50 meter, one 0-100 meter oblique plankton tows, and five 30-minute surface plankton tows were made with a 1-meter open net. Settling volumes ranged from 75 to 1,150 ml. Two hauls with the 6-foot midwater trawl were made to a depth of approximately 55 and 64 meters, respectively.

Water samples were collected to a depth of 300 meters with bottle casts. Five bottle

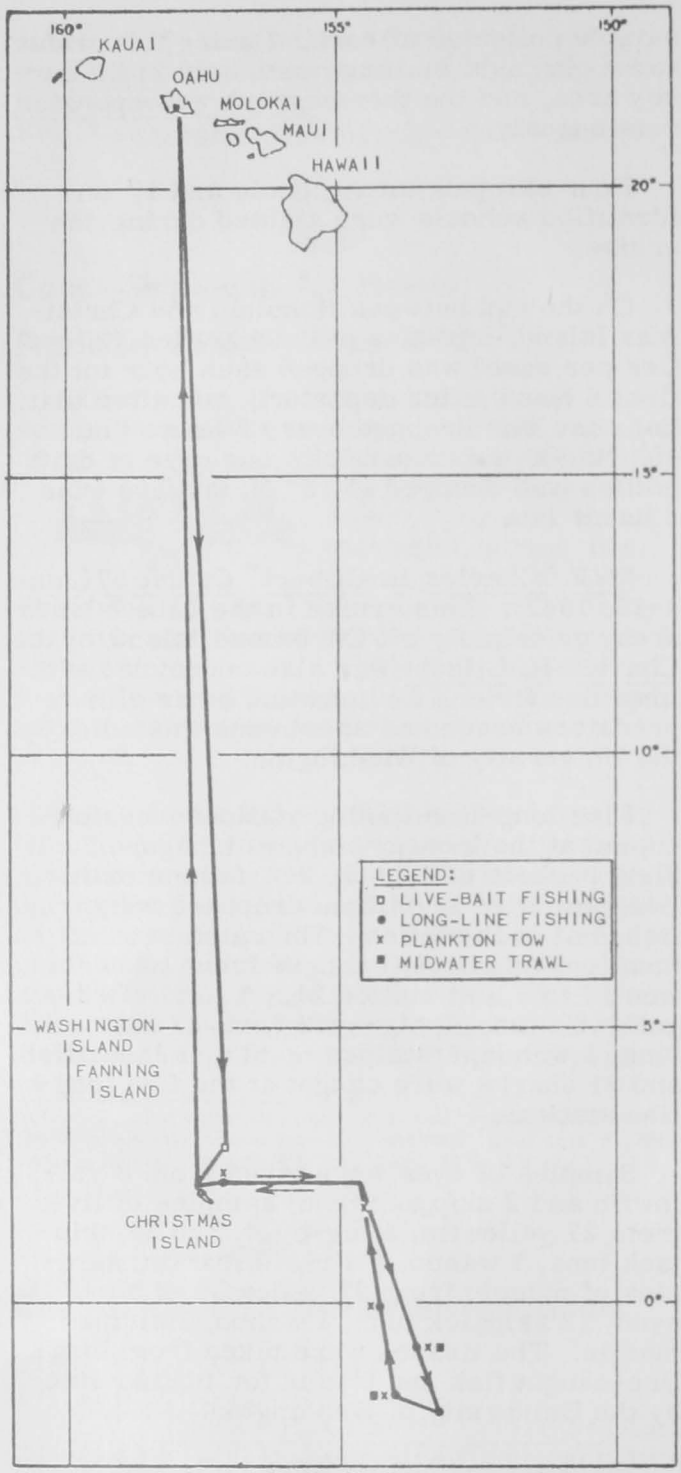



Fig. 2 - Track chart of Charles H. Gilbert Cruise 57 (June 4-25, 1962).

casts (without reversing thermometers) were made to obtain water samples at depths of 25, 50, 100, and 300 meters. A 5-gallon surface water sample was obtained at each station by bucket.

Blood samples for serological studies were collected from: (1) up to 300 skipjack taken by live-bait fishing methods, (2) 191 skipjack and 2 yellowfin tuna caught by live-bait fishing at 03°08' N., 157°01' W., (3) all tunas and marlins taken by long-line fishing, and (4) 28 yellowfin, 3 big-eyed, and 12 skipjack tuna, 1 wahoo, 1 striped marlin (all of these were caught by long line). Other biological and oceanographic data were collected.

M/V "Charles H. Gilbert" Cruise 58 (July 10-19, 1962): The Hawaiian waters from Oahu to French Frigate Shoals were explored during this cruise by the Charles H. Gilbert.

A total of 37 fish schools (based on sightings of bird blocks) were recorded during the period. Twenty-two of the schools were observed while within the area of the fishery, including the first scouting leg west of Niihau, and 15 schools were observed to the west. One school was composed of yellowfin tuna estimated to consist of fish weighing 125 pounds each, 7 were skipjack, and 29 were unidentified.

One yellowfin, 1 unidentified, and 4 skipjack schools were fished, with a catch from two schools of 39 skipjack. Both the schools were fished in an area 40-60 miles west of Niihau--16 skipjack averaging 25 pounds each were caught from one school and 23 4½-pound skipjack from a second school.

Other results of the cruise were:

1. Nine night and 6 daylight surface plankton collections were made using a 1-meter net.

2. Sixteen blood samples were collected from the 25-pound skipjack caught about 60 miles west of Niihau.

3. Trolling for 104 hours resulted in a catch of 13 little tunny, 6 yellowfin, 1 skipjack (4 were lost), 3 dolphin (1 lost), and 1 wahoo. Two little tunny and 2 yellowfin were returned for skeletal studies.

4. Drift bottles and cards were released in groups of about 100 at four locations off eastern Oahu, namely Manana Island, Kailua Bay, Mokolii Island, and Laie Point.

5. Live bait was obtained from three sources: (a) mosquito fish from airport drainage ditches, (b) tilapia from the State Fish and Game bait plant, and (c) iao from French Frigate Shoals.

Note: See Commercial Fisheries Review, June 1962 p. 8.

## Crab Meat

### NEW CRAB-PICKING MACHINE INVENTED:

A power-driven crab-picking portable machine that could revolutionize crab processing has been invented in North Carolina. Francis Altman, the inventor, who is manager of a crab-processing plant in Oriental, N. C., believes that the machine is the first of its kind to use a dry process. The inventor holds the patent rights jointly with another resident of Oriental, N. C. The latter and his brother jointly own two crab plants in North Carolina which process and pack a pasteurized brand of crab meat--one is located in Oriental and the other in Whortonsville.

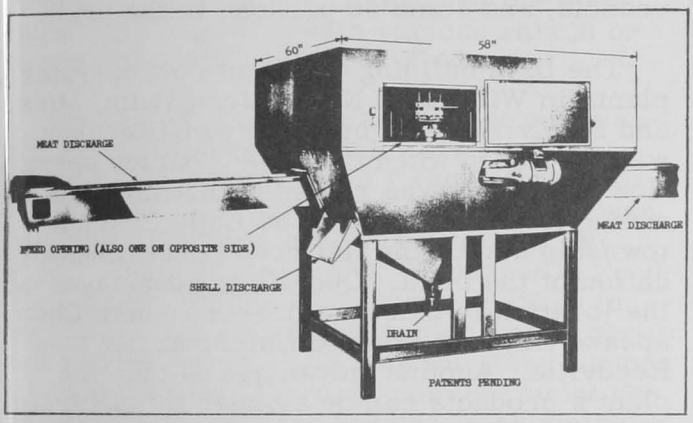



Fig. 1 - Sketch of crab-picking machine. Shows some detail of the various parts of the machine.

Built of stainless steel, the portable machine is fed from two sides. The meat is separated from the shell cleanly, and then comes out on a conveyor and is raked into cans. The crab meat is still encased in the shell when it is fed into the machine that the patent-right holders have named "The Crab Master." Three people are needed to operate the machine. Two feed it, the other rakes in the meat. Some 15 to 17 workers will be required to "deback" and "bob" the crabs before they can be placed in the picking machine. By hand the crab is first debacked--that is, its hard top shell is removed; then its meaty portions are cut into pieces about the size of ordinary cup cakes. These portions are placed by women into rotary cups. Each of the rotary containers has eight unit heads. The portions fit snugly in the cups. A fast worker can feed the bobbed portions into each side of the machine at a rate of up to 150 per hour.

"This machine," the inventoor states, "will actually do the work of 60 to 70 workers and require the services of not more than 20 persons in the course of an eight-hour work day." This means that the machine and 20 workers can process as much crab meat in an eight-hour day as 60 to 70 women workers now produce by using the age-old method of picking the meat from the shells by hand.

Altman spent more than two years in building the crab meat picker. The machine costs about $8,000 to build. The inventor has demonstrated his machine to crab processors in North Carolina and other states. The North Carolina Board of Conservation and Development and its chairman, the Governor of North Carolina, have expressed great interest in the new machine.

The machine will be manufactured by a company in Baltimore, Md. Plans at present are to build at least 12 of the machines in addition to the prototype model the inventor is now demonstrating. The present holders of the patent rights plan to retain the patent rights. They plan to lease the machine to crab processors at the rate of about $3 per hour. The machine will not be sold outright.

Crab processing is a fast-growing industry in North Carolina. In 1961, according to the U. S. Bureau of Commercial Fisheries, North Carolina ranked fourth in landings of hard blue crabs in the Nation with a record of more than 16 million pounds. Under North Carolina law, blue crabs can be taken year-round.

Fig. 2 - Francis Altman, right, beside the crab-picking machine he invented. At Oriental, N. C., a crab-processing plant employee feeds bobbed crabs into the machine where the meat is separated from the shell. The machine is patented.

Pasteurized crab meat is taking its place in the crab industry of North Carolina. North Carolinians eat some crab meat, but the State's processors find their best markets for about all they can process in Baltimore, Philadelphia, and New York City, where it is shipped daily under contract. (News release dated July 15, 1962, from the North Carolina Department of Conservation and Development.)

## Federal Purchases of Fishery Products

### DEPARTMENT OF DEFENSE PURCHASES, JANUARY-JUNE 1962:

Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, less fresh and frozen fishery products were purchased in June 1962 by the Defense Subsistence Supply Centers than in the previous month. The decline was 6.8 percent in quantity and 7.6 percent in value.

Table 1 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, June 1962 with Comparisons

| QUANTITY | | | | VALUE | | | |
|---|---|---|---|---|---|---|---|
| June | | Jan.-June | | June | | Jan.-June | |
| 1962 | 1961 | 1962 | 1961 | 1962 | 1961 | 1962 | 1961 |
| (1,000 Lbs.) | | | | ($1,000) | | | |
| 2,357 | 1,593 | 11,973 | 10,872 | 1,328 | 702 | 6,762 | 5,311 |

Compared with the same month a year earlier, purchases in June 1962 were up 48.0 percent in quantity and 89.2 percent in value. This shows that higher-priced fishery products were purchased this June because the value of the purchases increased

much more than the quantity. During the first six months of 1962, purchases were up 10.1 percent in quantity and 27.3 percent in value as compared with the same period in 1961. Again, because of the purchase of higher-priced fishery products and an increase in the price of most fishery products, the value increased more than the quantity.

Prices paid for fresh and frozen fishery products by the Department of Defense in June 1962 averaged 56.3 cents a pound, 0.6 cents a pound less than in the previous month, but 12.2 cents a pound more than in the same month of 1961.

Table 2 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, June 1962 with Comparisons

| Product | QUANTITY | | | | VALUE | | | |
|---|---|---|---|---|---|---|---|---|
| | June | | Jan.-June | | June | | Jan.-June | |
| | 1962 | 1961 | 1962 | 1961 | 1962 | 1961 | 1962 | 1961 |
| | (1,000 Lbs.) | | | | ($1,000) | | | |
| Tuna | 1 | - | 3,707 | 2,662 | 1/ | - | 2,062 | 1,175 |
| Salmon | - | - | 1,015 | 2 | - | - | 638 | 2 |
| Sardine | 18 | 1 | 50 | 90 | 9 | 1 | 25 | 44 |

1/Less than $1,000

Canned: Canned sardines were the principal canned fishery product purchased for use of the Armed Forces in June this year. For the first six months of this year purchases of canned tuna and salmon were up substantially as compared with the same period of 1961. But purchases of canned sardines during the first half of 1962 were down because of the short packs of both Maine and California sardines during 1961. Purchases of the three principal canned fishery products (tuna, salmon, and sardines) in the first 6 months of 1962 were up 73.3 percent in quantity and 123.2 percent in value as compared to the same period in 1961. The greater increase in value was due to larger purchases of canned salmon and an increase in the price of canned tuna.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.

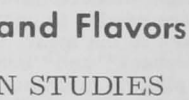
## Fish Meal

NEW PLANT PROPOSED FOR CAPE CHARLES, VA.:

A new fish meal processing plant is planned at Cape Charles, Va. The plant will be in operation early in 1965, according to the "Virginia-Pilot," a Norfolk, Va., newspaper. The new facility will represent a plant investment of about $1,750,000 with an annual payroll of from $300,000 to $400,000. An industry spokesman stated the operation will be carried on by a wholly-owned firm.

The factory is estimated to cost $750,000 and will be located on Cape Charles Harbor on land owned by the Pennsylvania Railroad. The remainder of the plant investment will go for a fleet of six vessels costing from $150,000 to $200,000 each. It was reported that about 100 men will be employed on the vessels, and some 50 persons in the plant.

The firm building the plant now operates plants in Wildwood, N. J., Moss Point, Miss. and Reedville, Va., but the Reedville plant will be closed when the Cape Charles operation begins. It was reported that the firm was approached by both the Cape Charles township and by the Railroad concerning location of the plant. One of the advantages of the location is that it is nearer to both Chesapeake Bay and Atlantic fishing areas than Reedville. Another advantage is that the plant's products can be shipped by rail from Cape Charles, which is not the case at Reedville.



## Fishy Odors and Flavors

PROGRESS ON STUDIES TO DATE (JUNE 1962):

In 1955 the U. S. Bureau of Commercial Fisheries initiated its first program on the chemistry of fishy odors and flavors by awarding a contract for the study to the Hormel Institute, University of Minnesota, Austin, Minn. At that time, the potential causes of such fishy odors and flavors had not been thoroughly understood. The assumption was made that the primary cause of such odors was an oxidative splitting of the polyunsaturated fish oil fatty acids to shorter chain carbonyl compounds, some of which possess fishy odors and flavors.

Dr. Jacques Chipault of the Hormel Institute began a comprehensive investigation of the chemistry of the oxidation of fish oils. Menhaden oil was oxidized by aeration and the numerous carbonyl compounds as musty, stale, sharp-acrid, putrid, and sweet.

Work on Odors and Flavors at the Seattle Laboratory: Quite independent of the fish oil

program, the Bureau's Technological Laboratory at Seattle conducted a study aimed at finding the chemical nature of compounds responsible for the fishy odors and flavors resulting from spoilage of the protein and other nitrogenous components of fish. This work was started by David Miyauchi in 1956 and continued after 1957 by Dr. Herman Groninger. Maurice E. Stansby, the Director of the Laboratory, noted that many of the odors being found associated with spoiled fish in this research by Miyauchi and Groninger seemed also to occur in many of the menhaden oils mixed in with various rancid or otherwise oxidative types of odors.

Stansby, therefore, carried out some experiments, some of which were first reported at a conference of fishery technologists at Davis, Calif., 1959. This work was continued and a paper, "Speculations on Fishy Odors and Flavors," appeared in Food Technology, April 1962 (pages 28-32). In this paper the idea is presented that we should not distinguish sharply between fishy flavors in spoiling fish resulting from bacterial decomposition and fishy flavors in oxidizing oils. Rather, it is shown that these phenomena probably occur together in each case. Thus in fish oil, the fishy flavor may be due to chemical changes involving both straight oxidation of the fatty acids in fish oil, but also changes in small traces of nitrogen, phosphorous, sulfur, or other components present in the oil may also play an important role. Work along this line from a general point of view is continuing at Seattle. Although Dr. Chipault began in 1959 some work on the possibility of some of these trace components of fish oils being involved in fishy odors in fish oils, it was felt that so many aspects were now involved in the mechanism of fishy flavor development, that additional effort was needed to prevent Dr. Chipault's research from being spread over too many aspects.

Research on Fishy Flavors: Accordingly, in 1960, a contract project was awarded for Dr. Mangold to investigate mechanisms for fishy odor and flavor development over and beyond straight oxidative deterioration. Dr. Mangold, previous to any contract work with the Bureau, had collaborated informally with Malins of the Seattle Laboratory in the adaptation of thin-layer chromatography to the analysis of fish oils. This research has been of tremendous importance not only to the fish oil program, but also to lipids chemistry in general. Before Mangold and Malins' research, thin-layer chromatography was an almost unknown technique used in very few laboratories, and it had never been applied to lipids. Largely as a result of the efforts of Mangold and Malins, this new technique was adapted to the lipid field, and today this method is finding rapidly increasing use in hundreds of laboratories in this country and elsewhere throughout the world. For two papers, which Mangold and Malins presented on thin-layer chromatography before the American Oil Chemists' Society, they jointly received a year ago the Bond Award for the best paper on oil chemistry of the year. Thin-layer chromatography as adapted by Mangold and Malins to fish oils is becoming of great value to the fish oil program, especially with respect to monitoring reactions in preparing fish-oil derivatives. By applying this new technique, it is now possible to improve upon such reactions, some of which had previously been studied and had to be discarded because in the past the analytical methods had not been good enough to follow all of the reactions occurring.

When Dr. Mangold received his first contract from the Bureau on the fish oil program, the first problem was to have available rapid methods for separation and determining the various nitrogen, phosphorous, and sulfur compounds suspected of being partially responsible for fishy flavors and odors in menhaden oil. He, therefore, developed thin-layer chromatographic methods for analysis in fish oils of small traces of such compounds as mercaptans and amines. A paper describing these methods was published in 1962 (Mangold and Kammereck, J. Am. Oil Chem. Soc., vol. 39, pp. 201-206.) The method is currently being used to analyze fish oils to determine whether any of these types of compounds are associated with fishy odors common in fish oils.

Another approach to fishy odors in fish oils is also being investigated by Dr. Mangold. It is known that fish oils can be completely deodorized and yet these will have reversion of the fishy odor or flavor. This return of a fishy odor on flavor sometimes occurs either in the absence of oxygen or when so little oxygen is present that some mechanism other than oxidation is suspected of being responsible. With some foods other than fish, a mechanism has very recently been proposed to account for similar behavior. It has been shown that some oils contain certain precursors of fishy or other off-flavors. These precursors are not just the triglycerides or fatty acids. Rather they

are a class of compounds related to plasmalogens, which have been termed "aldehydrogenic compounds." These are labile compounds containing an ether linkage. They readily break down to aldehydes that possess fishy or similar flavors and odors. Dr. Mangold is currently looking into the possibility that such compounds may play a role in the mechanism of fishy flavor formation in menhaden oils.

Recent Work of Dr. Chipault: Since Dr. Mangold has been assigned to work in the area which Dr. Chipault had started to investigate on "fishiness" resulting from reactions other than mere oxidative rancidity, Dr. Chipault's current project deals with investigation of odoriferous and other compounds formed from relatively pure highly polyunsaturated fish-oil fatty acids such as the C22 hexsenoic fatty acid. This phase of the work was started in mid-1962. It is felt that past work of Dr. Chipault carried out in the early stages of the program (1955-1959) has demonstrated that the situation during oxidation of fish oil triglycerides is too complicated for a reasonably small program to elucidate all the complex reactions. The present approach is being used because it is felt that the use of model systems with lesser numbers of reactants will enable the mechanism of fishy-rancid odor and flavor development to be much more quickly investigated. Some somewhat similar studies are also in progress at the Seattle Laboratory of the Bureau in a program unrelated to the fish oil program yet which involves oxidation of relatively pure fish oil polyunsaturated fatty acids. This research, which is financed by the Atomic Energy Commission, may eventually be of aid in accelerating results on the program on fishy odors in fish oils as currently being studied by Dr. Chipault.

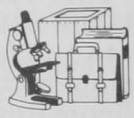
Inter-relationship Between Program of Contractors at Hormel Institute and Other Research at Seattle Laboratory: Several programs as listed below are being carried out at the Bureau Laboratory at Seattle, most of which are not directly a part of the fish oil program, yet which are giving results that are furthering the efforts of the contract research on fishy odors and flavors being carried out at Hormel Institute. These programs are as follows:

| Program | Investigator |
|---|---|
| Compounds Forming in Spoiling Fish | Dr. Groninger |
| Nature of Compounds Responsible for Fishy Odors | M. E. Stansby |
| Effect of Irradiation on Fish Oil Fatty Acids | Dr. Stout |
| Furnishing Palatable Fish Oil for Research at Other Institutions | Gauglitz |
| Stability of Fish Oil and Derivatives | Houle |

It has been found throughout the contract investigations on fishy odors and flavors that it is highly desirable to maintain the closest liaison among the various projects concerned with this work. The biggest problem from this standpoint is the definitions of vocabulary terms describing various odors and flavors. Such subjective words as musty, stale, sweet, etc. mean different things to different people. For example, at Seattle Dr. Groninger was using "stale" to denote the same odor as Dr. Chipault at Hormel Institute had termed "fishy." On one occasion Dr. Chipault ran into a new type of odor which he tried to describe in words but which meant nothing to other investigators. Later it developed this was an odor which had been known at the Seattle Laboratory for many years and had always been described as "sweet."

In order, so far as possible, to eliminate these difficulties, a series of workshop sessions has been held between personnel of the Seattle Laboratory and those of the Hormel Institute. For example, two such sessions were held last year, one at Seattle attended by Hormel Institute personnel and one at Hormel Institute attended by Stansby. At the latter session, Stansby took back dozens of samples of fishery products having many different odors and flavors. These samples were examined and terminology discussed. A similar session was scheduled during September 1962 in Seattle.

There are other ways in which cooperation among these various programs is very helpful. An example of this concerns the Seattle production with the large-scale molecular still of gallon quantities of palatable fish oil for research by outside agencies. In the course of this work, concentrates of "fishy" odors and flavors are removed during the refining steps. These are often sent to Dr. Chipault and/or Dr. Mangold as sources of compounds for their research into the chemistry of fishy odors and flavors. Also, some of the purified oils may still retain different types of fishy flavors and sometimes portions of these oils are sent for research at the Hormel Institute.



## Fish Farming

FISH CROP FROM FLOODED RICE LANDS: Ways to improve the production of fish on flooded rice lands are being studied at the new Fish Farming Experimental Station at Stuttgart, Arkansas, by the U. S. Bureau of Sport Fisheries and Wildlife. All completed experimental ponds at the new station had been filled with either surface or ground water and stocked with fish by June 1962.

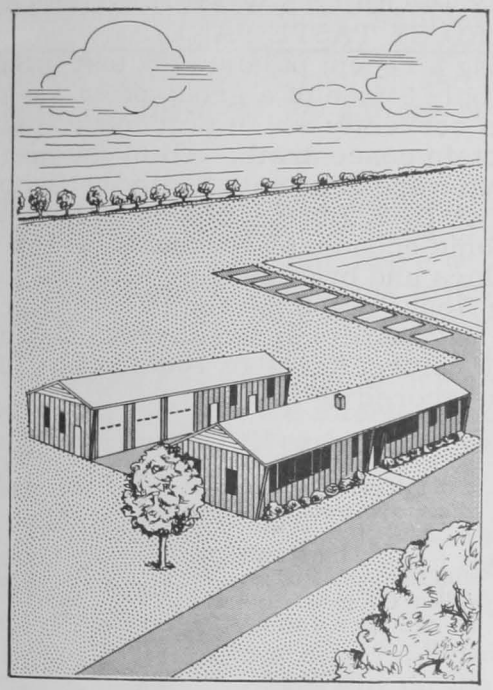


Fig. 1 - Sketch of the Fish Farming Experimental Station, Stuttgart, Arkansas.

Some of the ponds were fertilized to encourage a growth of algae. The amount of fish harvested from any area is directly related to its fertility. Basic units in the conversion of inorganic elements to proteins and carbohydrates are the tiny microscopic plants known as algae. With the aid of energy from the sun, these tiny organisms form the initial food particles which will ultimately end in a food fish. Tiny animals known as zooplankton feed on the algae. These are, in turn, consumed by small fish of nearly all species. Small fish are then pursued by predators which will eventually provide food for man. Such a cycle is known as a Food Chain.

If the proper inorganic elements are lacking in a pond, few, if any, of the needed plants can grow and the pond is said to be infertile. In such cases commercial fertilizers are often added to encourage a "bloom" or growth of algae. Precautions must be taken to avoid over-fertilization lest an excessive bloom occur and cause an oxygen depletion on a hot, cloudy day.

All species of fish are dependent upon zooplankton during their early life stages. In stocking a properly fertilized pond or reservoir, fishery biologists recommend using a variety of species which will use all of the available food with a minimum of competition among the species. Variations such as bluegill-bass; catfish-minnows; or catfish-buffalofish-bass are desirable combinations. Carp may be added to these combinations to control excess vegetation. It is possible, however, to raise only a single species in a pond or reservoir.

The ponds at the Experimental Station at Stuttgart were stocked with different combinations of species at varying rates. The Marion National Fish Hatchery supplied

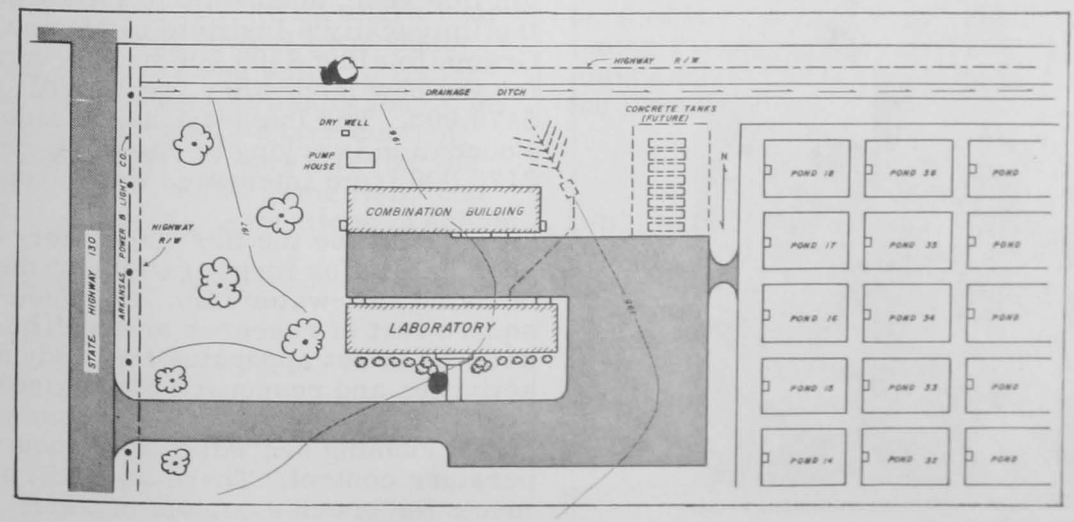



Fig. 2 - Diagram showing arrangement of the Station.

40,000 channel catfish and 12,000 crappies; the Corning National Fish Hatchery furnished 10,000 fingerling bass; and the Arkansas State hatchery at Lonoke, Arkansas, provided large-mouth buffalofish, fathead minnows, and Israeli carp. Two flathead catfish had been spawned successfully at the station by June 1962.

Field studies are being made at the Station to (1) determine the species of fish best suited for culture; (2) find methods for efficiently spawning fish and producing fingerlings for stocking purposes; (3) develop economical methods for raising desirable fish to a useful size; (4) develop controls for undesirable species of fish; (5) develop suitable methods for harvesting fish; (6) develop controls for aquatic weeds; and (7) determine, in cooperation with the Department of Agriculture and the Rice Branch Experiment Station, the effects of fish-rice rotations on soil fertility.

Laboratory research includes studies on (1) parasites and diseases affecting fish raised in reservoirs and the development of control measures; (2) the effect of environmental changes on the physiology of fish; (3) the effects of agricultural chemicals on fish survival; (4) the nutritional requirements of fish; (5) improvement of strains of fish through selective breeding and mutation; and (6) improved techniques for spawning fish through the use of hormones and manipulation of the water quality.

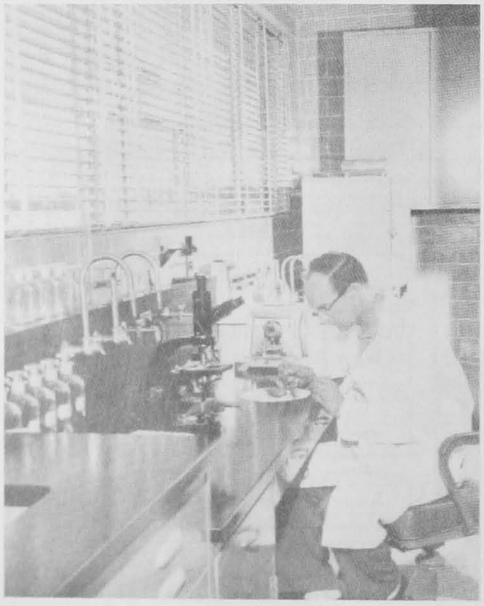


Fig. 3 - Biologist examining specimens in the laboratory at Stuttgart.

Research facilities are provided with both surface and ground water, and with air, gas, and electrical outlets. Office-laboratories for the research staff are equipped with the latest in scientific equipment.

## Fish Protein Concentrate

BAKERY PRODUCTS WITH CONCENTRATE SAMPLED BY TASTE PANEL:

During a recent palatability test in Seattle Wash., only 8 men of a group of 33 were able to guess correctly which products contained fish protein concentrate. All of the men in the group were associated with the fishing industry. A U. S. Bureau of Commercial Fisheries home economist served the group butter cookies and bran muffins with and without fish flour. Each person rated the products on palatability score sheets. Out of a possible perfect score of 100 percent, the products scored as follows:

| | |
|---|---|
| BUTTER COOKIES | |
| Sample A with fish protein concentrate | 90.58 percent |
| Sample B without fish protein concentrate | 88.52 " |
| BRAN MUFFINS | |
| Sample A with fish protein concentrate | 89.06 percent |
| Sample B without fish protein concentrate | 88.43 " |

## Florida

NEW FISH BEHAVIOR LABORATORY:

Construction of a fish behavior laboratory at the University of Miami is expected to begin this year, according to the Director of the University's Institute of Marine Science. Grants totaling $300,000 have been received for the new laboratory, which will cost $470,000. The International Oceanographic Foundation is trying to raise the remaining $170,000 from interested fishermen.

This will be the first laboratory designed specifically for investigations of the behavior of living salt-water fish. Fourteen thousand square feet of research area will be equipped with the latest apparatus for studying the activities and responses of all kinds of marine life. Every laboratory room will have clear, running sea water with accurate temperature control. There also will be instruments for precise control of water sound, light, and chemical action.

Utilizing this new Controlled Environments Building, scientists will be able to duplicate sea conditions or even to create a new environment for animals under study, using complex instruments to record their reactions. The building's design permits living specimens to be transferred from the sea to tanks with maximum safety. Special pressurized tubular tanks up to 40 feet in length will enable investigators to study extremely large fish under simulated conditions of great depth. Water in the tanks will be regulated for temperature, salinity, oxygen, carbon dioxide, acid-base relationship, and cloudiness. Filtered rooftop settling tanks will provide up to 600 gallons of water a minute.

Complex electronic equipment will record and measure the nervous reactions of fish to various stimuli. In addition, there will be facilities for studying responses to the earth's magnetic field; rooms shielded from magnetic attraction, outside sound and light; and at least one laboratory equipped with a Faraday cage to screen out outside interference while minute electrical impulses from nerves and muscle tissue are recorded.

The new laboratory will help find answers to many questions that have plagued fishermen and marine scientists alike: How and why do fish migrate? What system of biological navigation do they have? Why do they feed only at certain times? Why do they prefer different types of bait on different occasions? In short--what goes on in the mind of a fish?

Emphasis will be placed on "pure" science investigations such as studies of porpoise communication by sonar and the current research of the Institute on shark hearing systems, but the practical byproducts of such a facility should be of value to fishermen. From its research projects may come new and effective forms of shark control, improved baits and lures, new data on the feeding habits and times of game fish, and accurate charting of the migrations of school fish.

Note: See Commercial Fisheries Review, July 1962 p. 17 and May 1962 p. 19.

## Great Lakes

LAKE TROUT PLANTED IN LAKE MICHIGAN FROM FERRY:

Experimental plantings of lake trout from the National Fish Hatchery, Charlevoix, Mich., were made during the early summer of 1962 in Lake Michigan, directly from the Chesapeake and Ohio Ferry as it passed over the Milwaukee Reef. Nearly 73,000 lake trout weighing more than 3,800 pounds, were successfully planted in that way. Personnel and equipment from the State of Michigan's Department of Conservation assisted in the operation.

* * * * *

OUTLOOK PROMISING FOR TRAWLING IN LAKE MICHIGAN:

The future looks promising for trawl fishing in Lake Michigan with the start of the 1962 summer fishing season. In June, State of Michigan-licensed commercial fishermen had firm orders for all the chubs they could catch, plus a fair amount of alewives.

A freezer with a 2-million-pound capacity is being built at the dock in Saugatuck, Mich. Ice machines, forklift, and other equipment were ordered, and the facility was expected to be in operation by late June or early July. The equipment and docking facilities are being financed by a Saugatuck construction company which has confidence in the future of the fish business in Lake Michigan.

Details of the sea lamprey and lake trout programs for Lake Michigan were discussed by U. S. Bureau of Commercial Fisheries personnel at a meeting in Milwaukee on June 15, 1962. The meeting was attended by members of the United States section of the Great Lakes Fishery Commission to discuss problems concerning the budgets and program of the Commission.

* * * * *

ORGANOLEPTIC EVALUATION OF FRESH-WATER HERRING:

Because of increased interest by the Lake Superior fishing industry to better utilize lake herring from that Lake, the U. S. Bureau of Commercial Fisheries technological laboratory at Ann Arbor, Mich., has been making an organoleptic evaluation of herring products. About early summer, various lake herring products were placed in cold-storage at 0° F.

to obtain preliminary information as to the effects of processing variables on their quality.

Fillets, headed and gutted, and whole herring, with no glaze, an ice glaze, or an alginate glaze were individually heat-sealed in cellophane pouches. Breaded herring fillets were also put up, replacing the conventional egg batter in one lot with a thin alginate dip before applying the breading. The samples are being held at 0° F. and are scheduled for periodic organoleptic examinations, following final processing (to a breaded fillet and deep-fat frying).

A one-month examination of the various herring fillet products in storage was conducted early in July 1962. The one-month examination did not reveal any marked differences between lots of fillets or with the control, although the products treated with alginate received slightly fewer deduction points for flavor and texture defects. The examinations are to be continued at regular intervals.

## Great Lakes Fishery Investigations

WESTERN LAKE SUPERIOR FISHERY SURVEY CONTINUED:

M/V "Siscowet" Cruise 2 (June 4-14, 1962): Spring environmental conditions were studied at three limnological stations in the Apostle Islands region--southeast of Stockton Island, northeast of Bear Island, and in Pike's Bay. Routine limnological collections included records of water temperatures, Secchi-disc readings, water samples for chemical analyses, and bottom and plankton samples. The water temperature did not change during the early part of the cruise, but by mid-June surface water temperatures in some areas had reached 55° F. Secchi-disc readings ranged from 10 feet in Pike's Bay to 25 feet northeast of Bear Island. Plankton abundance was relatively low at all stations.

Studies were continued on the distribution and abundance of native and hatchery-reared lake trout in the Apostle Islands area. Most of the lake trout caught in that area were from the 15- to 25-fathom depth range.

With the completion of Cruise 2, the Siscowet in 1962 had captured 497 small lake trout, of which 477 (96 percent) were fin-clipped. Of the recaptured hatchery-reared fish planted before 1962, a total of 252 (64 percent) were from the 1961 Bayfield shore plant, 115 (29 percent) were from the 1960 shore plant, and 22 (6 percent) were from the 1959 boat plant. Those returns support evidence obtained during the 1961 season that the success of the 1960 plant was excellent, and that results from the 1959 plant were poor. The first-year survival of the 1961 plant appeared to be excellent.

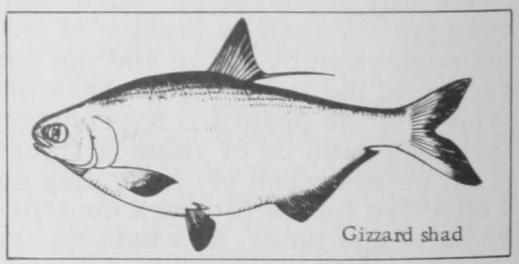
Trawling with the Siscowet during, and immediately after the release of approximately 20,000 lake trout from shore, confirmed observations made in 1961 that the fish reach suitable trout habitat (15 fathoms, 1 mile from shore) in 3½ to 4 hours after planting.

Note: See Commercial Fisheries Review, Aug. 1962 p. 18.

* * * * *

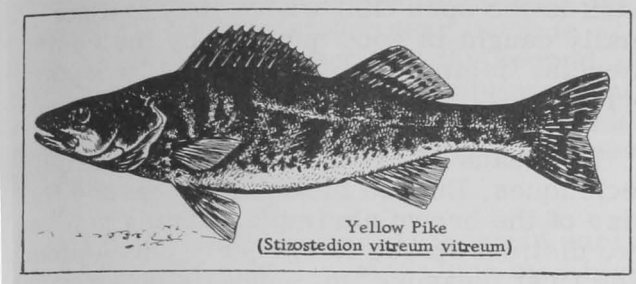
LAKE ERIE FISH POPULATION SURVEY CONTINUED:

M/V "Musky II" and M/V "Madtom" (July 1962): Vessel operations in July were mainly exploratory, and to ascertain the relative abundance and distribution of young-of-the-year fish. The Musky II made 35 offshore trawl tows, mostly in the Sandusky and Islands regions. The Madtom, a 16-foot outboard craft, made 55 tows at depths of 4 to 15 feet in selected areas along the south shore, between Monroe, Mich., and Barcelona, N. Y. Numerous fish collections were preserved and measurements recorded for later analysis.



Gizzard shad

In the western basin, the 1962 hatch and survival appeared to have been exceptionally good for yellow pike, yellow perch, white bass, alewives, gizzard shad, and spot-tail shiners. Collections later in the season will be necessary to fully evaluate the spawning success of channel catfish, sheepshead, emerald shiners, and smelt. In general, however, a good year was indicated for most species.



Yellow Pike
(Stizostedion vitreum vitreum)

Young-of-the-year (yellow pike) and yellow perch were uniformly distributed throughout the western basin. Approximately 700 yellow pike were caught during July alone, which far exceeded the number of fingerlings taken in any previous year. A single 10-minute tow yielded an estimated 70,000 young yellow perch, and many other tows yielded 5,000 to 10,000 of that species. Collectively, the tows averaged about three times as many young yellow perch as were caught in 1959--the year in which the largest previous year-class on record was produced. Yellow perch (and the young of most other species) were caught at depths of 5 to 10 feet. Yellow pike were most numerous at depths of 10 to 12 feet.

In contrast to the abundance of small fish in the western basin, trawling with the Muskellom for 3 days along the south shore of the central and eastern basins revealed only limited numbers of young fish. The fish were considerably smaller than in the western basin, probably because of the later hatching period and cooler water temperatures. Large numbers of yellow perch were observed in the harbor at Erie, Pa. No young yellow pike were caught east of Vermilion, Ohio.

In the western basin, the growth of the young of all species appeared to be generally comparable to growth in other years. By the end of July, yellow pike were averaging 5 inches in length; yellow perch, $2\frac{1}{2}$ inches; and white bass, 2 inches.

The Musky II made biweekly visits to two stations in the central basin as part of a continuing study of oxygen deficiencies at the lower depths. Dissolved oxygen determinations and depth casts were made at 5-mile intervals. Oxygen deficiencies were noted in only a few of the many water samples taken, which was in contrast to 1961 when depletion was extensive in July of that year.

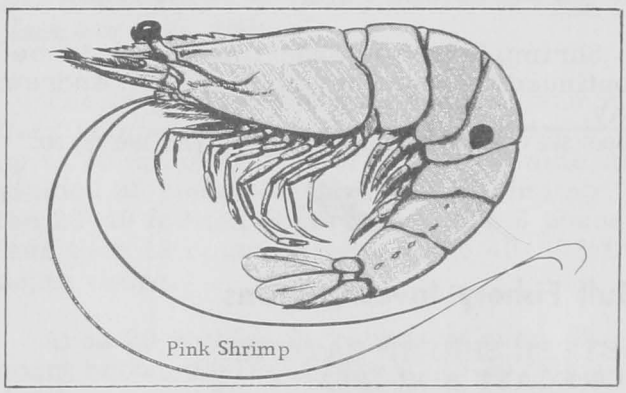
Surface water temperatures averaged about 75° F. in the western sector of the lake and 70° F. in the central and eastern basins, and fluctuated little during the month.

Note: See Commercial Fisheries Review, Aug. 1962 p. 21.

## Gulf Exploratory Fishery Program

BURROWING BEHAVIOR OF PINK SHRIMP STUDIED:

M/V "George M. Bowers" Cruise 37 (April 19-21 and 26-28, 1962), 38 (May 10-15), 39 (June 12-28): Field experiments on the behavior phase of the shrimp gear research project in the Gulf of Mexico were the objectives of these cruises by the U. S. Bureau of Commercial Fisheries research vessel George M. Bowers. Cruises 37 and 38 were conducted in Mississippi Sound where conditions were unfavorable for behavior studies. Conditions for this work were excellent in St. Andrews Bay, Fla. (Panama City) during cruise 39, and the initial phase of the study was completed there.



Pink Shrimp

Experiments were conducted to determine the burrowing behavior of pink shrimp so as to gain a better understanding of the effect of such behavior on the efficiency of commercial fishing gear. The initial objectives were to measure the extent and duration of bottom penetration by the various commercial species, and the effect of artificial stimulation on the animal while in the burrowed state. Observations were made using SCUBA gear to eliminate all but essential artificial environmental effects.

The following data were obtained from these observations and measurements:

1. The manner by which pink shrimp burrow into the bottom using their various appendages.

2. Burrow depths ranged from $\frac{3}{4}$ to 2 inches.

3. Pink shrimp burrow to just below the surface of the substrate, and are very difficult to detect visually.

4. Mechanical stimulation (probes, chain drags, and water jets) to the dorsal body surface cause the burrowed animal to immediately withdraw deeper into the bottom sediment.

5. Artificially-induced sediment clouds above burrowed shrimp caused about half of the individuals to emerge from the bottom.

6. Observed pink shrimp remained burrowed from $13\frac{1}{2}$ to 23 hours. Activity above the bottom seemed to be restricted.

7. Shrimp generally emerged from the bottom between 7 p.m. and 7:30 p.m. and were burrowed again by 9 p.m. A few individuals would usually remain unburrowed and on the bottom for most of the night.

Shrimp behavior experiments are to be continued through the summer in St. Andrews Bay.

Note: See Commercial Fisheries Review, Jan. 1962 p. 20.

## Gulf Fishery Investigations

### BETTER SHRIMP CATCHES FORECAST FOR 1962:

A significant upward trend in the shrimp harvest from northern Gulf of Mexico waters during the last half of 1962 is indicated by findings of shrimp studies conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex. This prediction is based on an analysis of comparable measures of abundance obtained for young brown shrimp in the Galveston area over the past three years.

Although the brown shrimp reproduces offshore in almost all seasons, the greatest spawning activity takes place during the period late January to early March. The resulting masses of larvae arrive at the barrier island passes and begin to enter inshore "nursery" areas roughly 4 to 5 weeks after spawning and hatching. Some 6 to 7 weeks later they reach a size suitable for sport fishing bait, and soon thereafter migrate back to the open Gulf where they are normally caught in good quantity by the commercial fishing fleet during July to September.

By means of carefully executed sampling techniques, Bureau biologists measure the size of the brown shrimp's "spring run" at two distinct stages in its early development. The first measure, or index, is obtained as the shrimp pass through Galveston Bay entrance. At that stage they are very densely concentrated, average only about 5/8 of an inch in length, and are called postlarvae. The second index is obtained from statistics of the commercial bait shrimp fishery which operates throughout the Galveston Bay system, one of the more important nursery areas on the upper Gulf coast. Referred to as juveniles or "bait," the shrimp at that stage range from 2 to 4 inches long, but are not so crowded or numerous as when they were sampled at the Bay entrance six weeks earlier. Commercial size is reached at a length of approximately 5 inches and shortly after the shrimp return to the ocean.

Indexes of Abundance for Postlarval, Juvenile, and Adult Brown Shrimp, East Texas Gulf Coast, 1960-1962

| Month | Postlarvae 1/ | | | Juveniles 2/ | | | Adults 3/ | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1962 | 1961 | 1960 | 1962 | 1961 | 1960 | 1962 | 1961 | 1960 |
| Jan. | 27 | - | 3 | - | - | 0.3 | - | 0.33 | 0.43 |
| Feb. | 231 | 1 | 2 | - | - | 0.3 | - | 0.29 | 0.38 |
| Mar. | 5/306 | 23 | 615 | - | - | 0.2 | - | 0.21 | 0.45 |
| April | 280 | 35 | 554 | - | - | 0.4 | - | 0.29 | 0.23 |
| May | 32 | 25 | 16 | 30.4 | 18.3 | 29.9 | - | 0.24 | 0.31 |
| June | - | - | 4/ | - | 37.1 | 105.9 | - | 0.27 | 0.27 |
| July | - | - | - | - | 19.3 | 27.2 | - | 0.56 | 1.43 |
| Aug. | - | 16 | - | - | 11.1 | 17.4 | - | 0.48 | 0.91 |
| Sept. | - | 170 | 3 | - | 2.1 | 1.1 | - | 0.39 | 0.61 |
| Oct. | - | 27 | 1 | - | 1.0 | 3.3 | - | 0.16 | 0.48 |
| Nov. | - | 3 | 1 | - | 1.0 | 0.9 | - | 0.09 | 0.42 |
| Dec. | - | 5 | 1 | - | - | - | - | 0.15 | 0.38 |

1/Average number of postlarvae in "standard," semiweekly samples taken in Galveston Bay entrance; postlarvae range in length from 10-15 millimeters (about 5/8 inch).
2/Average catch of juvenile shrimp (in pounds) per hour's trawling throughout the Galveston Bay system; trawls average about 15 ft. in width and have a mesh of 1-1/2 in.; juvenile shrimp range in length from 40-100 millimeters (1-1/2 - 4 inches); data are obtained from the commercial bait-shrimp fishery which operates continuously.
3/Average catch of commercial-size shrimp (in 1,000 pounds heads-off) per 24 hours' trawling off the Texas coast; adult shrimp range in length from 110-200 millimeters (4-1/2 - 7-1/2 inches; data from offshore commercial fishery.
4/Sample catches not separated by species during June-August.
5/Includes two samples taken in San Luis Pass at the western end of Galveston Island.

Observations in 1960 and 1961 revealed a very strong correlation between the postlarval and juvenile indexes, and, in each year, the subsequent production of commercial-size shrimp. The possibility that these indexes could be used to economic advantage

in predicting shrimp production during the last half of each calendar year became at once apparent. The fact that the second, or juvenile index, serves to substantiate what is suggested by the first or postlarval index, greatly strengthens the method's usefulness as a prediction device.

In 1960, a high postlarval index in early April was succeeded in May-June by a high juvenile index and record high bait-shrimp production. Both indexes forecast a great abundance of shrimp offshore in late summer. As it turned out, 1960 proved to be a record year for brown shrimp production in western Gulf waters. In 1961, the postlarval index dropped to only a fraction of its 1960 level, while the corresponding juvenile index was reduced by two-thirds. Although the production of bait shrimp in Galveston Bay fell only slightly, bait fishermen had to work up to three times harder to catch the amount needed to meet the demand. The subsequent decline in the 1961 commercial shrimp production offshore, as is now well known, brought dire results to the domestic shrimp fishing industry.

Signs of recovery in 1962 are indicated in a postlarval index for the period February-April which approaches that for the corresponding period in 1960, and by a juvenile index for May of this year which exceeds that of the same month in 1960. Bait shrimp production during May 1962 was also the highest ever recorded for that month. On the basis of these observations, as well as supporting observations made and reported by fishermen and other interested persons, the Bureau predicts good to excellent catches for the shrimp fleet fishing the waters off Louisiana, Texas, and areas off northern Mexico during July-October 1962. Over-all shrimp landings in 1962 should measurably exceed those of 1961, though not necessarily equal those of 1960.

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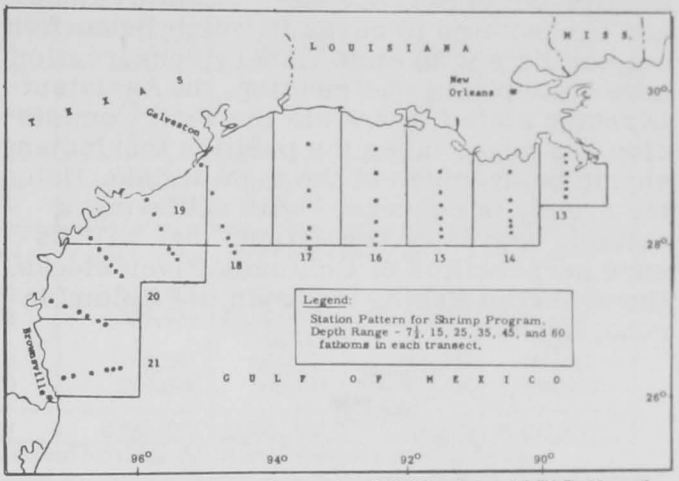
SHRIMP DISTRIBUTION STUDIES:

M/V "Belle of Texas Cruise BT-23 (July 18-24, 1962): Moderate catches of 12-15 count and 26-30 count brown shrimp were made off the Texas coast by the research vessel Belle of Texas. The vessel is operated by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries is studying the distribution of shrimp in the Gulf of Mexico.

Four statistical areas were covered. One 3-hour tow was made in each of 3 depth ranges in each area. A 45-foot shrimp trawl was used. Most of the catches consisted of brown shrimp with traces of white and pink shrimp. Large numbers of small brown shrimp counting over 68 to the pound were found at $7\frac{1}{2}$ fathoms in areas 20 and 21.




Shows the station pattern for cruise BT-23 of the M/V Belle of Texas (July 18-24, 1962).

The largest single catch was 50 pounds of over 68 count brown shrimp in the depth range up to 20 fathoms in area 21. The same area yielded 26 pounds of 12-15 count shrimp in the 20-40 fathom depth range, and 8 pounds of less than 12 count shrimp in the 40-60 fathom depth range.

Area 20 yielded 31 pounds of over 68 count brown shrimp in the up to 20 fathom depth range; 10 pounds of 15-20 count shrimp in the 20-40 fathom range; and 7 pounds of 12-15 count shrimp in the 40-60 fathom range.

A catch of 23 pounds of 26-30 count brown shrimp was made in the up to 20 fathom depth range in area 18. Catches were light in other depth ranges in area 18 and in all depth ranges in area 19.

Note: (1) Shrimp catches are heads-on weight; shrimp sizes per pound are heads-off basis.
(2) See Commercial Fisheries Review, Aug. 1962 pp. 22-23.

## Indian Fishing

LAW ENFORCEMENT CONFERENCE ON INDIAN FISHING:

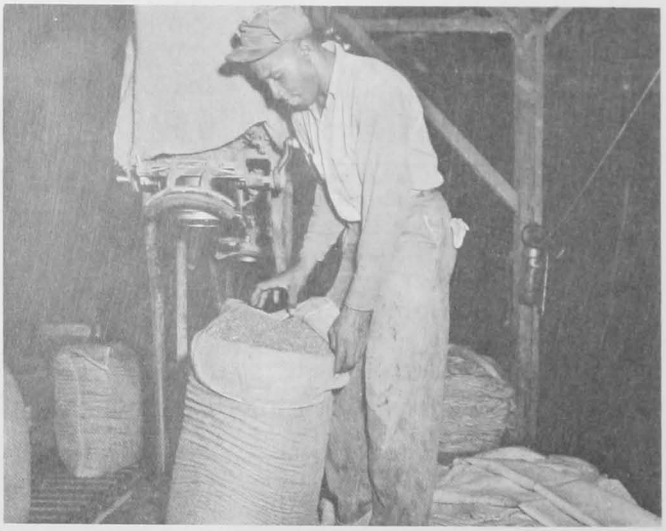
Indian fishing activities on the Columbia River was the subject of a law enforcement

conference in Portland, Oreg., on July 20, 1962. Officials of Washington and Oregon, United States Attorneys involved with Columbia River fishing problems, and representatives of the U. S. Bureau of Indian Affairs, and other Federal agencies attended.

The assistant Director of the Oregon Fish Commission said the meeting was called to develop uniform procedures of enforcement and prosecution in cases in which Indian fishing conflicts with State fishery conservation laws. In opening the meeting, the Assistant Director stated that while the Fish Commission has never taken the position that Indians should be deprived of the right to take fish, the agency is concerned with achieving a suitable degree of regulations that will assure perpetuation of Columbia River stocks. Unrestricted fishing will ruin the Columbia runs, he said.

## Industrial Products

U. S. FISH MEAL AND SOLUBLES: Production and Imports, January-June 1962: Based on domestic production and imports, the United States available supply of fish meal for the first 6 months of 1962 was 44,933 tons or 21.4 percent greater than during the same period of 1961. Domestic production was 11,873 tons or 11.6 percent higher, and imports were 33,060 tons or 30.7 percent greater than in the 6 months period of 1961. Peru continued to lead other countries with shipments of 106,377 tons during the first 6 months of 1962--32,366 tons above the imports in the same period of 1961.



Bagging menhaden scrap meal in a reduction plant in Empire, La.

U. S. Supply of Fish Meal and Solubles, January-June 1961-62 and Total for 1961

| Item | January-June | | Total |
|---|---|---|---|
| | 1/1962 | 1961 | 1961 |
| | (Short Tons) | | |
| Fish Meal and Scrap: | | | |
| Domestic production: | | | |
| Menhaden | 93,538 | 83,900 | 247,551 |
| Tuna and mackerel | 9,968 | 9,705 | 21,243 |
| Herring | 826 | 1,258 | 5,268 |
| Other | 10,043 | 7,639 | 37,203 |
| Total production | 114,375 | 102,502 | 311,265 |
| Imports: | | | |
| Canada | 23,242 | 19,367 | 38,218 |
| Peru | 106,377 | 74,011 | 151,439 |
| Chile | 3,682 | 5,892 | 12,074 |
| Angola | - | 1,433 | 1,543 |
| So. Africa Republic | 7,184 | 6,396 | 13,026 |
| Other Countries | 401 | 727 | 1,545 |
| Total imports | 140,886 | 107,826 | 217,845 |
| Available fish meal supply | 255,261 | 210,328 | 529,110 |
| Fish Solubles: | | | |
| Domestic production 2/ | 49,277 | 40,200 | 112,241 |
| Imports: | | | |
| Canada | 951 | 660 | 1,001 |
| So. Africa Republic | 538 | 307 | 1,351 |
| Other Countries | 2,801 | 252 | 4,387 |
| Total imports | 4,290 | 1,219 | 6,739 |
| Available fish solubles supply | 53,567 | 41,419 | 118,980 |

1/Preliminary.
2/50-percent solids. Includes production of homogenized condensed fish.

The total United States supply of fish meal in calendar year 1961 of 529,100 tons exceeded the peak year 1959 when the quantity amounted to almost 440,000 tons.

The United States supply of fish solubles (including homogenized fish) during January-June 1962 was 12,148 tons more than during the same period in 1961. Solubles and homogenized fish of 49,277 tons manufactured from domestically-caught fish made up 92 percent of the 6-months supply in 1962.

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U. S. FISH MEAL, OIL, AND SOLUBLES: Production, June 1962: During June 1962, 58,400 tons of fish meal and scrap and 6.9 million gallons of marine animal oils were produced in the United States. Compared with June 1961, this was an increase of 7 percent in meal and scrap production and 4 percent in oil.

In June menhaden accounted for 53,000 tons or 91 percent of the meal total, and

Table 1 - U.S. Production of Fish Meal, Oil, and Solubles, June 1962 with Comparisons

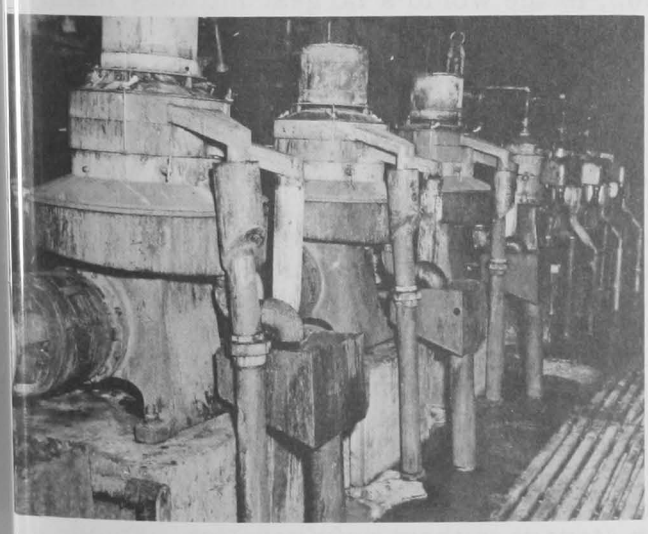
| Product | June | | Jan.-June | | Total |
|---|---|---|---|---|---|
| | 1/1962 | 1961 | 1/1962 | 1961 | 1961 |
| | (Short Tons) | | | | |
| Fish Meal and Scrap: | | | | | |
| Herring | 640 | 1,258 | 826 | 1,258 | 5,268 |
| Menhaden 2/ | 52,994 | 49,646 | 93,538 | 83,900 | 247,551 |
| Sardine, Pacific | - | - | 689 | - | 2,518 |
| Tuna and mackerel | 2/1,837 | 1,169 | 9,968 | 9,705 | 21,243 |
| Unclassified | 2,926 | 2,326 | 9,354 | 7,639 | 14,757 |
| Total | 58,397 | 54,399 | 114,375 | 102,502 | 291,337 |
| Shellfish, marine animal meal and scrap | 3/ | 3/ | 3/ | 3/ | 19,928 |
| Grand total meal and scrap | 3/ | 3/ | 3/ | 3/ | 311,265 |
| Fish solubles | 21,180 | 16,110 | 42,412 | 36,552 | 100,551 |
| Homogenized condensed fish | 3,170 | 1,662 | 6,865 | 8,648 | 11,690 |
| | (Gallons) | | | | |
| Oil, body: | | | | | |
| Herring | 107,200 | 185,320 | 114,200 | 216,930 | 818,017 |
| Menhaden 2/ | 6,572,322 | 6,231,424 | 11,073,892 | 11,047,461 | 31,355,570 |
| Sardine, Pacific | - | - | 19,111 | - | 86,167 |
| Tuna and mackerel | 55,965 | 43,057 | 261,383 | 227,217 | 762,509 |
| Other (including whale) | 176,190 | 163,682 | 564,142 | 374,487 | 1,386,542 |
| Total oil | 6,911,677 | 6,623,483 | 12,032,728 | 11,866,095 | 34,408,805 |

1/Preliminary data. 2/Includes a small quantity produced from thread herring. 3/Not available on a monthly basis.

6 million gallons or 95 percent of the l production.

There were 21,200 tons of fish solubles oduced in June 1962--5,100 tons above e same month of 1961. The production of mogenized condensed fish amounted to 200 tons--about 1,500 tons more than in ne 1961.

During the first half of 1962, meal and rap production amounted to 114,400 tons--11,900 tons above the same period of 1961. The marine animal oil yield totaled 12 million gallons--a gain of 166,600 gallons.



menhaden reduction plants large centrifuges are used to separate most of the oil from the press liquor, obtained when the cooked fish are pressed.

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Production, July 1962: Preliminary data on U. S. production of fish meal, oil, and solubles for July 1962 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

U. S. Production1/ of Fish Meal, Oil, and Solubles, July 1962 (Preliminary) with Comparisons

| Area | Meal | Oil | Solubles | Homogenized |
|---|---|---|---|---|
| | Short Tons | 1,000 Gallons | (Short Tons) | |
| July 1962: | | | | |
| East & Gulf Coasts | 55,105 | 6,191 | 21,244 | 3/1,200 |
| West Coast2/ | 3,091 | 292 | 172 | - |
| Total | 58,196 | 6,483 | 21,416 | 1,200 |
| Jan.-July 1962 Total | 170,645 | 17,794 | 64,903 | 6,570 |
| Jan.-July 1961 Total | 165,937 | 19,497 | 56,894 | 5,895 |

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes Hawaii, American Samoa, and Puerto Rico.
3/Includes condensed fish.

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Major Indicators for U. S. Supply, July 1962: For the first seven months of 1962, fish meal and solubles production was considerably higher than in the same period of 1961. Fish oil production showed a decrease of 1.5 percent.

Major Indicators for U. S. Supply of Fish Meal, Solubles, and Oils, July 1962

| Item and Period | 1962 | 1961 | 1960 | 1959 | 1958 |
|---|---|---|---|---|---|
| | (Short Tons) | | | | |
| Fish Meal: | | | | | |
| Production 1/: | | | | | |
| September | - | 28,642 | 36,239 | 36,874 | 33,185 |
| August | - | 57,031 | 49,709 | 47,364 | 40,783 |
| July | 58,200 | 62,586 | 55,696 | 52,132 | 43,467 |
| Jan.-June | 114,375 | 99,819 | 74,024 | 91,473 | 60,043 |
| Jan.-Dec. prelim. totals 2/ | - | 289,039 | 257,969 | 275,396 | 216,510 |
| Jan.-Dec. final tot. | - | 311,265 | 290,137 | 306,551 | 248,140 |
| Imports: | | | | | |
| September | - | 13,941 | 9,487 | 9,224 | 5,079 |
| August | - | 19,026 | 8,340 | 5,695 | 5,310 |
| July | - | 18,710 | 13,131 | 4,303 | 13,546 |
| June | 26,453 | 19,317 | 11,178 | 10,836 | 9,091 |
| Jan.-May | 114,433 | 88,509 | 55,197 | 90,585 | 46,855 |
| Jan.-Dec. | - | 217,845 | 131,561 | 132,925 | 100,352 |
| Fish Solubles: | | | | | |
| Production 3/: | | | | | |
| September | - | 11,232 | 12,573 | 23,979 | 22,301 |
| August | - | 19,685 | 16,921 | 29,785 | 24,653 |
| July | 22,600 | 22,589 | 18,876 | 30,163 | 24,995 |
| Jan.-June | 49,277 | 40,200 | 36,946 | 58,888 | 33,421 |
| Jan.-Dec. totals | - | 112,241 | 98,929 | 165,359 | 130,177 |
| Imports: | | | | | |
| September | - | 263 | 38 | 1,732 | 253 |
| August | - | 318 | 180 | 4,718 | 2,819 |
| July | - | 708 | 96 | 4,938 | 607 |
| June | 872 | 207 | 149 | 202 | 137 |
| Jan.-May | 3,418 | 1,012 | 2,369 | 8,871 | 2,156 |
| Jan.-Dec. totals | - | 6,739 | 3,174 | 26,630 | 14,567 |
| | (1,000 Gallons) | | | | |
| Fish Oils: | | | | | |
| Production: | | | | | |
| September | - | 3,224 | 3,939 | 4,353 | 3,689 |
| August | - | 6,548 | 4,910 | 3,877 | 4,106 |
| July | 6,500 | 7,553 | 5,337 | 4,143 | 3,791 |
| Jan.-June 4/ | 12,033 | 11,264 | 6,877 | 8,010 | 5,812 |
| Jan.-Dec. prelim. totals | - | 33,471 | 26,690 | 24,418 | 21,625 |
| Jan.-Dec. final tot. | - | 34,416 | 27,886 | 24,978 | 22,028 |
| Exports: | | | | | |
| September | - | 1,269 | 1,861 | 1,129 | 665 |
| August | - | 1,774 | 186 | 2,449 | 752 |
| July | - | 589 | 5,414 | 3,770 | 791 |
| June | 656 | 2,805 | 2,084 | 1,514 | 242 |
| Jan.-May | 7,745 | 6,279 | 4,959 | 5,067 | 4,078 |
| Jan.-Dec. totals | - | 16,331 | 19,154 | 19,264 | 12,539 |

1/Does not include crab meat, shrimp and misc. meals.
2/Preliminary data computed from monthly data. Fish meal production reported currently comprised 86 percent of the annual total for 1958, 90 percent for 1959, 89 percent for 1960, and 92 percent for 1961.
3/Includes homogenized fish.
4/Preliminary data computed from monthly data. Represents over 95 percent of the total production.
Note: Data for 1962 and 1961 are preliminary.

## Inventions

PRECOOKED FROZEN "LOX AND ONIONS":

A method that will allow smoked salmon, onions, and shortening to be combined and prepared as a precooked frozen food product has been issued a patent. The inventor claims that his new product can be repeatedly thawed and refrozen without loss of flavor, natural juices and taste characteristics, and without change in appearance from a freshly-prepared product. The inventor points out that the housewife thaws what she needs, mixes it with eggs to make an omelet, and returns the remainder to the freezer or refrigerator. By adding cream cheese or other ingredients, the patented recipe may also be used as a sandwich spread or dip. (Patent Number 3,012,896, U. S. Patent Office Classification Number 99-193, granted December 12, 1961, to Moe Phillip Katz, 2085 Farm Road, Alexandria, Va.)

## Irradiation Preservation

NEW UNITED STATES ARMY RADIATION RESEARCH LABORATORY:

The first radiation facility specifically designed for food irradiation research was dedicated on June 28 at the Army Quartermaster Research and Engineering Research Center, Natick, Mass. The new U. S. Army Radiation Research Laboratory, the construction of which was completed in June 1962, is the world's largest military installation for the preservation of food by ionizing energy.

The new research laboratory is equipped with the largest known cobalt-60 source in the world (equivalent to more than one million grams of radium), a specially designed 24-million-electron-volt 18-kilowatt variable-linear accelerator, and supporting control and food-sampling preparation laboratories. The laboratory will be concerned primarily with research on radiation of foods for use by the military, but will also conduct studies on different types of foods for civilian use.

By perfecting irradiation techniques, the Army will be able to treat perishable food for storage without refrigeration. Equipment in the laboratory will permit precise control of radiation conditions to a hitherto unattainable high degree of accuracy.

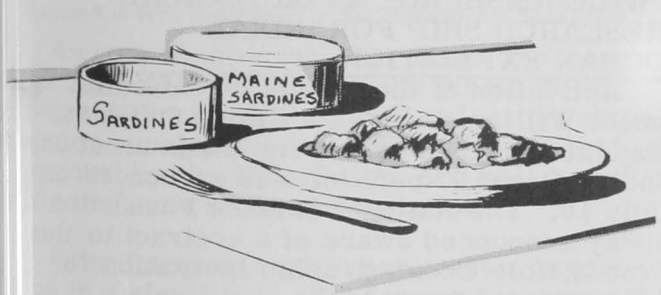
The Army program is currently concentrating on sterilization of beef, pork, smoked ham, and chicken, as meat items of major logistical importance.

By agreement with the Department of Defense, the U. S. Atomic Energy Commission undertook the design and construction of the laboratory at Natick. Following general facility acceptance tests and training of Army operating personnel during the summer of 1962, the Army was to accept responsibility for the fully operational laboratory about September 1, 1962. The Laboratory was built at a cost of about $1.8 million.

## Maine Sardines

CANNED STOCKS, JULY 1, 1962:

Distributors' stocks of canned Maine sardines began to improve on July 1, 1962, after steadily declining for the previous 14 months. But stocks on hand of 134,000 actual cases on July 1, 1962, were still 36 percent below the 208,000 cases on hand on the same date in 1961, according to estimates made by the U. S. Bureau of the Census.




Canners' stocks on July 1, 1962, totaled 374,000 standard cases (100 $3\frac{3}{4}$-oz. cans), an increase of 86 percent over the 201,000 cases on hand July 1, 1961. The Maine sardine pack during June 1962 amounted to 107,500 standard cases. Stocks held by canners on June 1, 1962, totaled only 50,000 cases.

The Maine Legislature authorized a 1962 season of 13 months--December 2, 1961-January 1, 1963. The 1962 season pack December 2-July 28 totaled 890,000 standard cases. The 1961 season was from April 15 to December 1, the usual legal packing season for canned sardines in Maine, and the pack April 15-July 28 was 179,000 cases. During the same period in 1960, the pack was 848,000 cases. On April 15, 1962, the date on which the packing season started in former years, carryover stocks amounted to 33,000 cases. One year earlier on April 15, 1961, carryover stocks totaled 457,000 cases.

The Maine Sardine Council in late July reported that fishing was good all along the Maine coast. But the small size of the fish had slowed down production because packing costs go up sharply when small fish are handled.

## Marketing

EDIBLE FISHERY PRODUCTS MARKETING PROSPECTS, FALL 1962:

In the coming fall months, the United States per capita consumption of fishery products is expected to be slightly higher seasonally than during each of the first two quarters of 1962. Commercial landings of food fish and shellfish in August were at the season's peak, and the total for 1962 could be higher than in 1961. Landings of both shrimp and sardines were unusually light in 1961.

Retail prices, which were somewhat higher during the first half of 1962 than in the same period of 1961, are expected to drop slightly during the peak supply season, but will remain higher than a year earlier.

Supplies of fishery products in cold storage at midyear were about 13 percent lower than during the middle part of 1961. But there will be a gradual build-up in stocks of frozen

Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, July 1, 1962, With Comparisons1/

| Type | Unit | 1961/62 Season | | | | | 1960/61 Season | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7/1/62 | 6/1/62 | 4/1/62 | 1/1/62 | 11/1/61 | 7/1/61 | 6/1/61 | 4/1/61 | 1/1/61 | 11/1/60 |
| Distributors . | 1,000 actual cases | 134 | 99 | 148 | 193 | 202 | 208 | 215 | 267 | 233 | 277 |
| Canners . . . | 1,000 std. cases2/ | 374 | 50 | 45 | 144 | 221 | 201 | 294 | 506 | 1,029 | 1,258 |

1/ Table represents marketing season from November 1-October 31.
2/ 100 $3\frac{3}{4}$-oz. cans equal one standard case.

View looking south on South Street in the salt-water section of New York City's Fulton Fish Market.

fishery products and canned fish because of increased fishing and processing in the third quarter.

United States imports of most fishery products through the first half of 1962 were generally greater than a year earlier, and are expected to continue so for the remainder of this year.

Note: Prepared by the Bureau of Commercial Fisheries, Fish and Wildlife Service, U. S. Department of the Interior, and published in the Department of Agriculture's July 1962 issue of The National Food Situation (NFS-101).

## Massachusetts

MARINE FISHERIES PROMOTION AND DEVELOPMENT LAW ENACTED:

A new Massachusetts marine fisheries law was signed (Chapter 715) by the Governor of Massachusetts on July 23, 1962, and became effective as of that date. The purpose of the new law, which was declared an emergency law, was to immediately bring about the orderly and coordinated activities of the Massachusetts marine fisheries and all activities relating there.

The law as amended provides for the following:

1. A Marine Fisheries Advisory Commission composed of 9 members within the Division of Marine Fisheries, such members to be appointed by the Governor with the approval of the Council. Initially, 3 members of the Commission are to be appointed for terms of 3 years, another 3 members for terms of 2 years, and the other 3 members appointed for terms of 1 year. As the term of a member expires, his successor is to be appointed for a term of 3 years.

2. The Commission shall hold public hearings and make recommendations to the Director for the proper management and development of the marine fisheries of the Commonwealth of Massachusetts.

3. Additional funds for maintaining, managing, operating, and administering the Division of Marine Fisheries in carrying out its functions.

The new law is designed to help both the commercial and sports fisheries of Massachusetts, and is expected to result in expanded activities in the fields of fishery biology and statistics.

## Oceanography

"WILLIAMSBURG" AS BIOLOGICAL RESEARCH SHIP FOR INDIAN OCEAN EXPEDITION:

Activation of the former Presidential yacht Williamsburg as a United States biological research vessel for the International Indian Ocean Expedition was announced on July 10. The National Science Foundation today announced award of a contract to the Woods Hole Oceanographic Institution for activation of the vessel.

Fig. 1 - The former presidential yacht Williamsburg is being reactivated as a United States biological research vessel and its name changed to Anton Bruun.

Fig. 2 - The former presidential yacht Williamsburg was transferred to the National Science Foundation of Washington on August 9 in brief ceremonies at the Philadelphia Naval Base.

Amount of the cost-plus-fixed-fee contract is $500,000. Under the terms of the contract, the Institution will select the shipyard to accomplish the activation, subject to approval by the Foundation, and will supervise the work for the Foundation.

"The International Indian Ocean Expedition is a significant step forward in scientific cooperation," said the Foundation Director in making the announcement. "It represents not only the cooperative efforts of many countries, but cooperation among scientists of widely varying disciplines. Biologists as well as physical scientists will have a major share in the work. We are delighted that the Williamsburg is available as an important addition to their research capabilities."

Title to the ship remains with the United States Government, and she will be operated as a public vessel. Transfer of accountability from the Navy to the National Science Foundation, an independent agency of the Government, is now in process.

The Williamsburg early in July was in reserve status at the Philadelphia Naval Shipyard. She was to be towed to a private shipyard for activation, which is expected to take about 60 days from the date of her arrival in the yard.

Activation will include minor alterations necessary to make a research vessel capable of carrying 26 scientific personnel and 19 crew members. The former Presidential suite will be converted into laboratory areas. A wet lab will be installed below, where specimens will be received, bottled, and prepared for storing. A dry lab above will be equipped with microscopes and other instruments for preliminary examination and classification of specimens, and for such work as measurements of plankton density.

Two winches and a small crane will be installed for dredging and deep-sea work. In addition, a side deck platform will be constructed for fishing long lines.

Activation will also include bringing the engines to full operating condition, and installing larger bilge keels to enhance the ship's stability.

Following activation and a shakedown cruise, the Williamsburg is expected to begin her Indian Ocean cruise in early 1963. Present plans call for the ship to spend most of her two-year research cruise period in the western half of the Indian Ocean, although one track is planned in the Bay of Bengal on the eastern side of the Indian subcontinent. Her voyages will take her from the northern part of the Arabian Sea west of India down to the latitude of the Cape of Good Hope, crossing and recrossing the equator.

While participating in the International Indian Ocean Expedition, she will make port chiefly at Bombay, India, for resupply and to exchange personnel and specimens. Many biological specimens, particularly plankton, will be exchanged and sorted at the International center at Cochin, India.

Among the questions that biologists aboard Williamsburg will be seeking to answer are:

What organisms are found in the Indian Ocean--from microscopic plankton to large fish, oceanic mammals, and sea weeds?

What is the distribution, both seasonal and geographic, of these organisms, and what is their relative abundance?

What is the productivity of these organisms?--particularly organisms which if properly exploited could contribute greatly to the food needs of the peoples of the area.

The President announced on March 13, 1962, that he was making the Williamsburg available for participation in the International Indian Ocean Expedition, and assigned responsibility for conversion and assignment of the ship to the National Science Foundation.

The Williamsburg is 243 feet long and displaces 1,700 tons. Built in 1930 as the Aras, her name was changed during World War II when she became a Navy escort vessel. She was later converted to a Presidential yacht.

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"WILLIAMSBURG" RENAMED "ANTON BRUUN" AND CONVERTED TO A RESEARCH VESSEL:

The former Presidential yacht Williamsburg will be renamed the Anton Bruun, the Director of the National Science Foundation announced on July 30, 1962. The ship was recently transferred to the Foundation for conversion to a research vessel for the International Indian Ocean Expedition.

"Anton Bruun was a noted marine biologist, associated with the University Zoological Museum of Copenhagen, and was first chairman of the International Oceanographic Commission, which is now sponsoring the Indian Ocean expedition," the Director said. "So it is most fitting that the ship be named after him."

The Director made the announcement during a talk at the NATO Advanced Study Institute on Algae and Man, held at the University of Louisville, Kentucky.

## Oregon

ALBACORE TUNA STUDIES IN NORTH PACIFIC:

To study albacore tuna movements and to collect oceanographic data affecting tuna movements off the Oregon coast were the objectives of the June 28-July 8 exploratory cruise by the Sandra Lee, a vessel chartered by the Oregon Fish Commission. The Commission has sponsored an annual exploratory cruise to study tuna for the last four years.

The Sandra Lee followed a zigzag course within an area 40 to 140 miles off the Oregon coast. The initial catch, consisting of 3 albacore tuna, was made at 8:30 a.m. July 5, about 115 miles west of Cape Sebastian. Water temperature in the area of the first catch was 59° F. Water temperature readings in other areas ranged between 58° and 60° F. Many forage fish and numerous birds were seen north of the area of the first catch. No commercial vessels were observed fishing for tuna in the area at the time of the first catch.

Last year the first tuna was caught on July 6, and 15 fish were taken during Oregon's 1961 exploratory tuna cruise.

Note: See Commercial Fisheries Review, August 1961 p. 34.

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CHINOOK SALMON TRUCKED AROUND COUGAR DAM:

The erection of Cougar Dam, a U. S. Army Corps of Engineers' flood control structure, on the South Fork of the McKenzie River in Oregon created a serious upstream passage problem for fish. During construction, the South Fork has been diverted through a tunnel. The diversion is no obstacle for young downstream migrant salmon heading for the ocean. But adult chinook salmon heading upriver are unable to negotiate the fast moving waters in the tunnel.

A temporary fish passage facility, operated by the Corps of Engineers under supervision of the Oregon Fish Commission, has been located just below the dam site to move the important South Fork spring chinook run past the construction area. A cement and steel adaptation of the ancient weir and funnel trap has been built across the stream. The weir shunts the salmon into a cement chamber. A strong current of water leads them next through a funnel entrance into a steel tank. When 20 to 50 fish are in the tank the entrance is closed and the steel tank trap is lifted by crane to a waiting truck. Water-recirculating hoses and an air line

are attached to the tank and the salmon are hauled seven miles upstream to the release site.

The salmon taxi, now in its third season of operation, had moved over a thousand adult salmon from this year's spawning run past the Cougar Dam project by the end of June.

* * * * *

NEW CRAB-TAGGING METHOD:

The success of the Oregon Fish Commission's new Dungeness crab-tagging program became more apparent as the season advanced, according to the head of shellfish investigations at the Newport Laboratory at Newport. He emphasized that the retention of the tag through several successive sheddings represents a major breakthrough in the study of the migration, distribution, and growth rates of crabs. An insertion point was found along the splitting line of the crab shell which makes retention possible, and paves the way to a much more comprehensive study of crabs. Two types of tags are used in the operation, a nylon spaghetti-type and a plastic dart-type tag. According to the Laboratory chief, more has been learned in the past year regarding growth rate than was determined during several previous seasons of study. The value of tagging efforts in the past was limited by the fact that crabs shed their shells as often as two or more times each year, with the tag being lost at the first shedding.

The Laboratory chief stated that as of July 1962, over 100 recoveries had been made from the 1,000 specimens released last summer with the new tag. More were being reported almost daily. One recovered crab was tagged in July 1961 in the Sally's Bend area of Yaquina Bay and recaptured in June 1962. This crab, when tagged, was of subegal size, measuring $4\frac{1}{2}$ inches across the back. It had grown to $6\frac{1}{2}$ inches in width, had shed its shell twice, and regenerated a claw which was missing when tagged.

The Commission's biologist pointed out that the public could render a valuable service in the study of this important food species by reporting tag recoveries. "So far we have received tags from both ocean- and bay-caught crabs," he said, "and recoveries have been made as far from the Yaquina Bay tagging locale as Alsea Bay, some 20 miles down the coast." If crab fishermen would send in the carapace, or back shell, and the tag, along with details regarding location and date of catch, the information gained would be of great value in the management and development of this important resource. According to the Laboratory chief, occasionally a tag is returned without the back shell, and while these are helpful in the study, the back shells are of very great importance as they are the means of determining growth rate.

Note: See Commercial Fisheries Review, May 1962 p. 25.

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RAZOR CLAM TAGGING STUDIES:

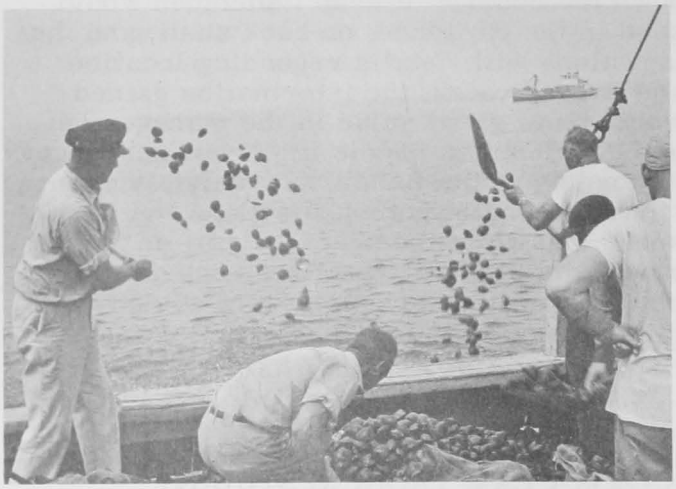
A method of tagging razor clams that will help provide biological facts to guide clam conservation measures has been devised by Oregon Fish Commission biologists. The razor clams are tagged by drilling a small hole through the upper edge of the shell. One end of a monofilament fishing line four feet in length can then be tied to the clam's shell. Color-coded plastic beads are slipped on the line to identify individual clams. A float one-half inch in length is then tied to the other end of the monofilament line and the clam is returned to the beach.

Periodically the tagged clams are dug and examined to determine the rate of growth and the extent of movement from one area of the beach to another. The Oregon Fish Commission has requested sport and commercial clam diggers to avoid removing tagged razor clams from the beach. In most tagging programs, the recovery and reporting of tagged specimens is desired. But tagged razor clams are an exception at present.

## Oysters

PROGRESS IN DEVELOPMENT OF CHEMICAL CONTROL METHOD FOR ENEMIES:

Various aspects of a chemical control method for oyster enemies are being studied in Lewis Gut, an arm of Bridgeport Harbor. It is traditionally known as an area where oysters set quite consistently, and where growth of young adult oysters is quite rapid. That area is also known as a "drill hole." During recent years, that oyster-seed-producing section of Long Island Sound has not



Planting of adult clams, Mercenaria (Venus) mercenaria, on experimental lots in New Haven Harbor prior to their treatment with different concentrations of drill-controlling chemicals.

been extensively used because of the predatory oyster drills.

Chemical treatment was applied on June 27 and 29, 1962, by biologists of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn. Approximately 30 acres of the bottom were treated using the Laboratory's formula, consisting of a mixture of sand, Polystream and Sevin, at the rate of 5 yards of sand per acre. Biologist-divers examining the bottom of the "Gut" after treatment found that all forms of snails had been affected. This included oyster drills, Urosalpinx and Eupleura, and conchs, such as Busycon and Polinices. The Polinices is the arch enemy of clams. It kills them by boring holes through the shell near the umbo and then consuming the molluscan meats through the holes. The rest of the clam was affected only slightly, or not at all. The only exception was noted among the worms, which were seen twisting out of their burrows.

It is too early to evaluate all aspects of this experiment on oysters because final conclusions may be drawn only at the end of the season. But it can be stated now, that the chemical treatment reduced the oyster drill population by more than 99 percent.

A method for determination of Polystream in meats of oysters and clams has been successfully developed and has been submitted to the Pesticide Branch, Division of Food, Food and Drug Administration, for approval. Quantities of Polystream of less than 0.05 parts per million in shellfish meats can now be accurately detected.

Using newly-developed analytical methods, preliminary tests of samples, collected from the area receiving twice the maximum dose of treated sand needed to exterminate drills, indicated that although Polystream is present in minute quantities in oyster meats collected soon after treatment of the beds, this residue almost completely disappears within 120 days even though the oysters remain on the chemically-treated bottom. A sample of clam meats, taken 120 days after the bed had been treated, showed no traces of Polystream. The oysters and clams were planted on the experimental beds several days before the chemically-treated sand was spread over them.

As reported earlier concerning use of the insecticide Sevin, the second component of the Laboratory's formula, no traces of it were found in oysters or clams two weeks after the treatment.

Regardless of these promising preliminary results, no final conclusions as to the safety of the method have been formed. That will be possible only after examination of much larger numbers of samples of clam and oyster meats from areas treated in various manners, and after the results of these examinations are studied and accepted by the U. S. Public Health Service and the Food and Drug Administration.

The Milford Laboratory was informed by a marine biologist of the State of Oregon that, by using the Milford Laboratory's formula at the rate of 1,000 pounds of Polystream Sevin-treated sand per acre in their experiments, they achieved near absolute extermination of the mud shrimp, Upogebia and Callianassa. The experiment demonstrated that two other enemies of oysters may be easily and cheaply controlled at an approximate cost of $10 per acre. Since some of the shrimp-infested oyster grounds of the Pacific Northwest formerly produced up to 1,000 bushels of oysters a year, the cost of controlling mud shrimp may be only about one cent per bushel, or even less if the treated ground does not become reinfested for several years. (Bulletin No. 2, July 26, 1962.)

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## LONG ISLAND SOUND OBSERVATIONS ON SPAWNING AND SETTING AS OF JULY 26:

**Setting of Starfish: The first setting of starfish appeared on the collectors on June 27. They were most common in the Bridgeport area. Starfish setting has continued since**

that date, reaching its highest between July 12 and 16 and then decreasing. Thus far, nevertheless, starfish setting has remained heaviest in the Bridgeport area although one station at a 30-foot depth in Milford also showed quite an intensive setting of starfish between July 2 and 12, the U. S. Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn., reports.

Setting of Oysters: Systematic studies of the plankton collected at 3 stations have been conducted since the oyster spat collectors were placed in the water in June. Plankton samples from the auxiliary stations, including one station on Lot 152 in New Haven Harbor and 3 stations in Lewis (Bridgeport) Gut, are also collected as a matter of routine. Each sample consists of the plankton contained in 250 gallons of water.

The numbers of bivalve larvae have been unusually light all summer. Oyster larvae first appeared about July 18 at 2 stations. Several days later, on July 23, 25 oyster larvae per 250 gallons of water were recorded at one station; 5 at another station; and 10 at another. All of these were mature, ready-to-set individuals. No oyster larvae of any age were found in samples taken at the Bridgeport Station or in Lewis Gut, where extensive experiments on chemical control of drills are conducted, but copepods, crab, and barnacle larvae, as well as larvae of gastropods and worms, were present in large numbers and appeared normal.

The first setting of ossers occurred on July 18. Thus, once again, the formula for prediction of the beginning of setting, which states that, "setting is normally expected to occur on July 19±4 days," proved to be correct. At first, recently-set oysters were found only at two stations in the New Haven area, but later the setting became of a more general nature, being the most intense at 3 stations. A light setting also occurred in the Milford area, while virtually none took place in Bridgeport.

Because of the presence of mature larvae in plankton samples collected in New Haven and because many oysters on the collectors removed from the water July 23 were only a few hours old, good setting was expected to continue for several more days at 3 stations. If the intensity is maintained at about the same level, or if it increases, the industry may expect a set of commercial importance in that area provided, of course, that it can be protected against predators.

Biologists of Milford Laboratory, using information obtained from studies of plankton samples and other observations, are advising the members of the Connecticut oyster industry as to where shells should be planted to secure the best possible results. For example, they advised against planting shells at the time in the Bridgeport area where no setting was occurring. Instead, it was suggested that advantage be taken of the setting in the New Haven area by planting shells in that location.

In mid-July several auxiliary stations for observations on spawning and setting of oysters and starfish were established. On one of the stations located in New Haven Harbor near Lighthouse Point, studies will be conducted on intensity of oyster and starfish setting on chemically-treated and untreated oyster shells planted as cultch. Five stations were established in Lewis Gut where experiments on extermination of drills by the Laboratory's chemical method are now in progress. (Bulletin No. 2, July 26, 1962.)

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## MARYLAND OBSERVATIONS ON SPAWNING AND SETTING, JULY 1962:

July of this year was unseasonably dry and cool. This has prevented further strong rises in water temperatures that continued to run around 77° F. locally, a little below seasonal normal, but favorable to oyster spawning. Salinities continued above normal, according to the "Special Oyster Bulletin" of the Maryland State Chesapeake Biological Laboratory, Solomons.

The combination of long continued summer water temperatures, attained earlier than usual in May, and the above normal salinities resulted in an early build-up of the fungus parasite, Dermocystidium, in the southern portions of the Maryland Chesapeake area (from the vicinity of Solomons to Virginia). A number of oysters heavily infected by the parasite were found on trays in St. Marys River, Holland Straits, and at Solomons. There was an accompanying mortality on those trays that is definitely above normal for this season and among some groups quite heavy.

Oysters crowded together on a tray are known to develop a higher degree of infection by Dermocystidium than do oysters that are more scattered on the bottom. However, oysters infected by the parasite also are appearing on natural beds in the affected areas. On Cinder Hill in Holland Straits 17 out of 20 living oysters collected on July 19 showed positive Dermocystidium infection, mostly light. A number of recent boxes were present on the bar. Gapers from trays and the one gaper (dead oyster) taken from a natural rock were all heavily parasitized by the fungus to the extent that the oyster deaths were almost certainly due to Dermocystidium.

High water temperatures and high salinity favor development of the fungus and intensity of infection with subsequent oyster mortality tending to increase in proportion to the length of time that water conditions remain favorable to the parasite. Usually, peak losses occur in late summer. The present conditions indicate that such losses will be higher than usual during 1962. Future seasonal conditions, however, will influence the severity of the expected mortality.

Dermocystidium has shown no tendency to spread among oysters growing in low-salinity water such as usually is found over the extensive oyster-growing grounds above the Solomons area. Moving infected oysters to lower salinity, however, does not kill the parasite and oysters seriously affected by it will continue to die. Oysters on a densely-populated bottom tend to develop a higher degree of infection than do oysters that are more scattered because of the easier transmission of the fungus from one oyster to another. Young oysters generally appear to be immune to the parasite but develop infections during the second year and may undergo heavy losses during the third year in areas where Dermocystidium is common.

Sizable losses from the parasite have occurred during other seasons in St. Marys River and in Holland Straits where oyster populations are fairly dense. Also, on several bars in Pocomoke Sound and in upper Tangier Sound oyster losses occurred in the past on bars that were then densely populated but now contain fewer oysters.

Losses can be reduced by not permitting dense populations of oysters to remain in Dermocystidium infested areas for more than two years before harvesting them. In portions of the Gulf Coast where this parasite is a very serious pest, it has been found that better oyster crops can be produced when oysters are harvested while young. Furthermore, the more rapid growth of young oysters results in a higher bushel return from two successive crops of young (3"+) oysters than from a single crop that is left for the same total number of years to produce oysters that are larger but slower-growing and fewer in numbers due to the natural mortality over a longer period.

No increases of infection by the parasite MSX were observed through July this year. The principal oyster mortalities associated with MSX were observed to occur in early summer and again in late summer and early fall with scattered deaths throughout the rest of the year. It is too soon for the late summer losses to be apparent this season. Since MSX infection in Marlyland has continued to be quite low and confined to the Tangier-Pocomoke Sound area, it is hoped that it will not be a serious problem in this year's oyster production.

The number of oyster spat attached to clean test shells exposed for one-week periods continued to increase in most areas. A substantial set already had occurred in St. Marys River and along the eastern side of the Bay at Punch Island and Barren Island.

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MARYLAND SETTING OBSERVATIONS, JULY 1962:

An increase in oyster setting rates in the Tred Avon River and Broad Creek, Md., compared with last year was apparent, according to a July 26, 1962, report from the Biological Laboratory of the U. S. Bureau of Commercial Fisheries, Oxford, Md. This development was revealed in laboratory counts of oyster spat in bottom collector bags tended on a weekly replacement schedule at 5 stations in the Tred Avon River and 4 stations in Broad Creek. All stations were occupied both years. Setting rates are expressed as the accumulated counts of spat on 20 inner oyster shell faces per bag per week from late June to mid-July, approximately half the expected most active oyster-setting season.

Counts of setting at the Cedar Point station were of some interest because they demonstrated differences in bottom and off-bottom rates. In addition to the regular bottom weekly collector bags at Cedar Point this year, the Laboratory tended weekly bags suspended in 1-foot strata off the bottom to just below the low-water mark.

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WEED "STEALS" OYSTERS PLANTED IN OYSTER RIVER:

Deliberate or accidental introduction of a foreign species into oyster coastal waters often upsets the balance of nature and causes unexpected trouble. Some years ago a Japanese species of green marine weed known as Codium fragile appeared in Peconic Bay at the eastern end of Long Island and rapidly spread over the bottoms of planted oysters. In the spring of 1961, several thousand bushels of Peconic Bay oysters, apparently clean of large fouling plants, were planted in Oyster River near Chatham, Mass. Shortly after that Codium was found on shellfish grounds, attached to newly planted stock. Its rapid growth during the following months amazed the oystermen and caused them considerable concern when it became necessary to spend extra time in cleaning the oysters for marketing.

Codium continued its rapid growth in the summer of 1962. Specimens examined at the U. S. Bureau of Commercial Fisheries Woods Hole Laboratory in July 1962 were much heavier and larger than the oysters to which they were attached. The unwanted weeds were nearly 3 feet high. On good sunny days so many gas bubbles were formed at the blunt, sausage-like tips of the Codium branches, that both oysters and the attached plants floated in the water and were carried away by the tides. Codium has become an "oyster thief." In the past weeds that "steal" oysters were rarely found on shellfish grounds of the American coast.

## Pacific Territories

EXPANDED FISHERIES DEVELOPMENT PROGRAM PLANNED:

Programs to increase the fishery economy, said Secretary of the Interior Stewart L. Udall, is one of the priority points of a five-point program to accelerate the development of the Pacific areas (Samoa, Guam, and the Pacific Trust Territory) administered by the United States. The announcement of the five-point program to accelerate social, political, and economic progress in those Pacific areas was made by the Secretary following his return from an inspection tour. The tour included an inspection of fisheries facilities in the areas visited.

Secretary Udall said priority would be given to fisheries development programs which represented the best immediate hope of islanders for economic self-sufficiency. This would include not only development of such facilities as tuna canneries, but the training of natives in long-line fishing, and boat construction and operation. Most of the natives in those areas are skilled only in fishing close to shore, and have neither the knowledge or equipment for deep-sea fishing.

Negotiations have been under way with some of the major fisheries firms which would result in new sources of income for the islanders. A new tuna cannery which will employ about 400 persons, is planned for American Samoa. A tuna cannery in American Samoa operated by a United States firm has been packing tuna for several years.

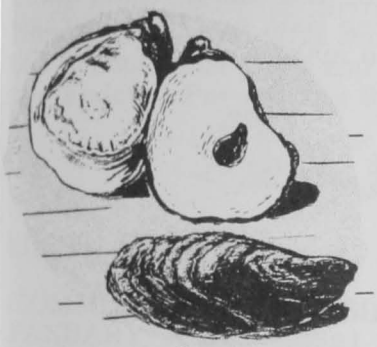
## South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, APRIL-JUNE 1962:

The following is a report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for April-June 1962:

Oyster Research: A number of small sub-tidal oyster beds have been located and charted in the last four months off South Carolina. Because these "deep-water" beds are usually quite small, they have little commercial value but, being generally unmolested, the oysters are superior in quality and configuration to intertidal oysters. Experimental planting is being done to try to enlarge several of these sub-tidal oyster beds.

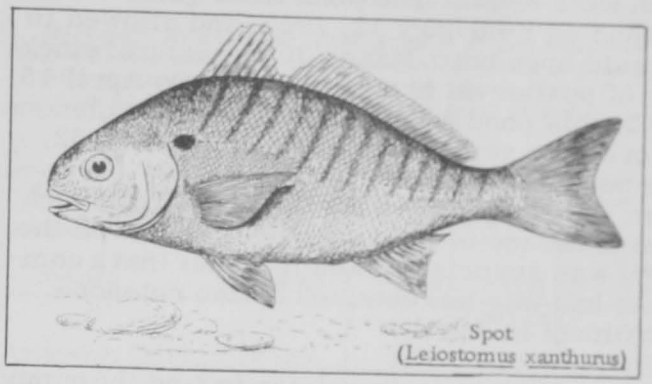
The rather large-scale planting of the substitute cultch (solite) made last August did not produce oysters. One cause of failure may have been silting. Recently the solite beds in Toogoodoo Creek were washed by slowly running the Laboratory's boat back and forth over the beds at high water. This did clear up some silt and left fresh-looking solite exposed. About fifty standard bushels of the solite were dredged, washed, and replanted in Leadenwah River. To date there has been only a light set on the material. The set is not comparable to that noted on steamed-shell cultch.



Oyster

Bears Bluff has been cooperating with a Yonges Island canning company in an effort to rehabilitate old oyster beds in Beaufort County in the Fripp Island area. A mechanical raking device was used to dig off the tops of the high old oyster beds in an attempt to soften them, lower the elevation, and expose clean shell which would serve as fresh cultch for a new population of oysters.

Shrimp Research: Experimental plankton tows at regular stations throughout the inshore area were continued during the second quarter. Results showed that postlarval brown shrimp were more than five times as abundant during the 1962 recruitment period as in 1961. Postlarval brown shrimp entered tidal sounds and rivers for a longer period of time this year and were more consistent in quantity than during either 1961 or 1960. Postlarval white shrimp began to show up in plankton catches in mid-May and became increasingly abundant towards the end of quarter. These postlarvae should reach peak abundance sometime in July, judging from data obtained in previous years.



Spot
(Leiostomus xanthurus)

Otter-trawling at regular shrimp survey stations indicated that spot have been about 30 percent more numerous during the April-June quarter of this year as compared with that of 1961. Croakers showed an increase of over 40 percent during the present quarter as compared with last year's. White shrimp were only slightly more numerous in experimental trawl catches this quarter than in 1961, but brown shrimp showed a considerable increase this year, being almost 60 times as plentiful at regular stations as they were during 1961.

Bears Bluff Laboratory's cast-net records also indicate a great increase in numbers of brown shrimp this year. Over 20 times as many brown shrimp were taken at cast-net stations in May and June of 1962 as in the same period of 1961. This indicates that the commercial catch of brown shrimp should be considerably better than in 1961, and quite possibly the best in the past three years. If white shrimp also have a successful season, a bumper crop of shrimp should result this year.

Pond Cultivation: Two one-acre experimental shrimp ponds were drained and harvested during this quarter. One of the ponds was drained and closed off completely on February 12, 1962. This pond was then stocked by means of pumping water from a nearby creek with an 8-inch irrigation pump. During the period of February 12 to March 30, 1962, approximately $3\frac{1}{2}$ million gallons of water were pumped into this pond. On April 16, the pond was treated with rotenone (3 lbs. per acre foot) to remove predatory fish. On June 25 the pond was drained and harvested. Approximately 19 pounds of brown shrimp were taken and the number of fish harvested was minimal, indicating that the rotenone treatment had been successful.

The other one-acre pond had been drained on February 1, 1962, and screened with ½-inch wire mesh. The pond flood gates were opened on February 12, 1962, and allowed to remain open until March 30 for natural stocking of postlarval brown shrimp. On April 16, 1962, this pond was also treated with rotenone in order to remove fish. On June 26, 1962, the pond was drained and harvested. Seventeen pounds of brown shrimp were collected. The presence of large numbers of fish in the pond was surprising, and it is felt that a complete kill was not obtained by the rotenone treatment in April.

A similar experiment comparing the pumping method of stocking with the flowing method was made last summer during the season when white shrimp were present. The purpose of this recent experiment was to further evaluate the different methods. In this case, the pumping method was equally as productive as the flowing method. In last year's experiment the natural flowing method was about 2.5 times more effective. However, in that case less water was pumped. The results of the two experiments are really not comparable nor conclusive. They do show that stocking shrimp by means of a pump is possible. However, in both cases the natural flowing method seems to be more feasible when viewed from a cost basis. Pumping is expensive.

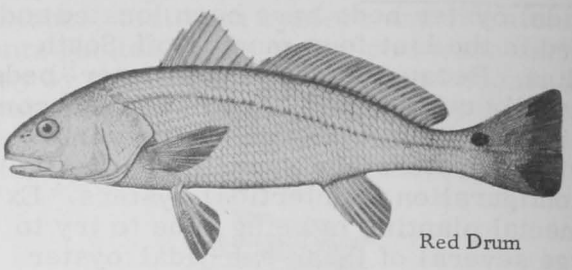
Note: See Commercial Fisheries Review, May 1962 p. 29.

## Sport Fishing

TROPICAL PACIFIC GAME FISH SCHOOLING AND FEEDING BEHAVIOR STUDY:

A three-year study of the schooling and feeding behavior of several Pacific game fish was begun in July 1962. The U. S. Bureau of Sport Fisheries and Wildlife has employed a graduate student at the University of California at Los Angeles to make the study. The study will provide information on the roosterfish, scad, grouper, yellowtail, barracuda, and sand bass. Field observations will be conducted in the lower Gulf of California. Underwater observations by camera and tape recorder will be emphasized.

This is the third graduate study supported by the Bureau of Sport Fisheries and Wildlife in its marine program. Two others, now



Red Drum

in progress at the University of Miami, concern the bluefish and red drum. The studies are designed to furnish life history information on important game fish, and to encourage promising students to make a career in fishery biology.

## Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS, JULY 1962:

| Item and Period | 1962 | 1961 | 1960 | 1959 | 1958 |
|---|---|---|---|---|---|
| | ..... (1,000 Lbs. Heads Off) ..... | | | | |
| Total Landings, So. At. & Gulf States: | | | | | |
| September ... | - | 9,691 | 18,832 | 18,331 | 15,847 |
| August ..... | - | 10,944 | 20,441 | 18,595 | 14,173 |
| July ..... | 14,000 | 10,500 | 21,746 | 17,493 | 13,457 |
| Jan.-June .... | 32,100 | 31,030 | 36,775 | 35,511 | 36,098 |
| Jan.-Dec. ..... | - | 91,395 | 141,035 | 130,660 | 116,552 |
| Quantity canned, Gulf States 1/: | | | | | |
| September ... | - | 785 | 2,236 | 2,108 | 2,825 |
| August ..... | - | 1,206 | 5,041 | 2,427 | 2,809 |
| July ..... | 3,800 | 3,042 | 6,319 | 3,085 | 4,805 |
| Jan.-June .... | 8,000 | 5,405 | 9,840 | 10,938 | 7,109 |
| Jan.-Dec. ... | - | 15,760 | 28,594 | 24,679 | 26,404 |
| Frozen inventories (as of each mo.) 2/: | | | | | |
| September 30 . | - | 13,361 | 26,119 | 18,079 | 16,896 |
| August 31 .... | - | 12,728 | 20,171 | 23,780 | 15,274 |
| July 31 ..... | 4/ | 14,849 | 17,397 | 22,357 | 12,351 |
| June 30 ..... | 13,796 | 19,416 | 15,338 | 19,283 | 10,664 |
| May 31..... | 13,904 | 24,696 | 17,540 | 21,137 | 11,013 |
| January 31 ... | - | 31,842 | 34,332 | 30,858 | 17,963 |
| Imports 3/: | | | | | |
| September ... | - | 8,190 | 7,541 | 7,620 | 7,471 |
| August ..... | - | 6,743 | 6,407 | 5,107 | 6,628 |
| July ..... | 4/ | 6,635 | 7,319 | 7,861 | 6,340 |
| June ..... | 9,397 | 8,065 | 8,932 | 8,300 | 6,018 |
| Jan.-May .... | 54,604 | 49,103 | 42,433 | 41,526 | 26,260 |
| Jan.-Dec. ... | - | 126,268 | 113,418 | 106,555 | 85,393 |

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 33.
2/Raw headless only; excludes breaded, peeled and deveined, etc.
3/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
4/Not available.

△ △ △ △ △ △ △ △ △ △ △

## Tuna

### BLACKFIN TUNA STUDIED TO DETERMINE FEDERAL SPECIFICATION REQUIREMENTS:

Six small blackfin tuna from the Gulf of Mexico were canned by the U. S. Bureau of Commercial Fisheries technological laboratory at Pascagoula, Miss., during early summer. The objective was to determine if blackfin tuna from the Gulf would meet Federal specification requirements for canned tuna. The first examination revealed that blackfin tuna should easily meet the U. S. Food and Drug Administration mandatory standard of identity for light meat tuna. The quality of the product was good and also should meet the Federal Purchasing Specifications.

## United States Fisheries

### COMMERCIAL FISHERY LANDINGS, JANUARY-JUNE 1962:

Total Landings: Landings of fish and shellfish in the United States during the first 6 months of 1962 amounted to about 8 million pounds more than during the comparable period of 1961. Production of edible fish was about 35 million pounds less than in the first half of 1961, while landings of nonedible species, principally menhaden, were up 43 million pounds.

Menhaden: During the first 6 months of 1962, landings amounted to 833 million pounds--up 51 million pounds over 1961.

Tuna: Landings in California (including transshipments of United States-caught fish from South America) totaled 151 million pounds to July 14, 1962--down about 24 million pounds compared with the same period in 1961. Purse-seine landings in California dropped 9 million pounds, clipper-fleet landings were down about 10 million pounds, and transshipments declined 5 million pounds.

Fig. 1 - Shrimp trawlers tied up at a dock in Thunderbolt, Ga.

Salmon: On the basis of the reported pack of canned salmon, it was estimated that the Alaska catch to July 15, 1962, totaled almost 80 million pounds--a decline of about 40.5 million pounds or 34 percent compared with the same period of 1961.

Mackerel: At mid-year, 1962 landings of jack mackerel (38.3 million pounds) exceeded those in the previous year by 12 million pounds; while the catch of Pacific mackerel (16 million pounds) declined slightly during the same period.

United States Commercial Fishery Landings of Certain Species for Periods Shown, 1962 and 1961

| Species | Period | 1/1962 | 1961 | Total 1961 |
|---|---|---|---|---|
| | | (1,000 Lbs.) | | |
| Anchovies, Calif. | 6 mos. | 1,100 | 2,074 | 6,500 |
| Cod: | | | | |
| Maine | 5 mos. | 1,100 | 1,069 | 2,507 |
| Boston | 6 " | 12,300 | 11,309 | 18,837 |
| Gloucester | 6 " | 1,700 | 1,411 | 3,358 |
| Total cod | | 15,100 | 13,789 | 24,702 |
| Haddock: | | | | |
| Maine | 5 mos. | 700 | 1,114 | 2,940 |
| Boston | 6 " | 45,800 | 45,239 | 84,093 |
| Gloucester | 6 " | 9,700 | 8,320 | 15,025 |
| Total haddock | | 56,200 | 54,673 | 102,058 |
| Halibut 2/: | | | | |
| Alaska | 6 mos. | 14,200 | 12,530 | 25,077 |
| Wash. & Oreg. | 6 " | 7,200 | 8,693 | 14,947 |
| Total halibut | | 21,400 | 21,223 | 40,024 |
| Herring: | | | | |
| Maine | 5 mos. | 3,800 | 40 | 54,463 |
| Alaska | 6 " | 6,700 | 15,200 | 48,600 |
| Industrial Fish, Me., & Mass. 3/ | 6 mos. | 10,800 | 11,211 | 41,851 |
| Mackerel: | | | | |
| Jack | 6 mos. | 38,300 | 25,910 | 98,900 |
| Pacific | 6 " | 16,100 | 17,274 | 39,100 |
| Menhaden | 6 mos. | 833,300 | 782,114 | 2,308,000 |
| Ocean perch: | | | | |
| Maine | 5 mos. | 28,000 | 30,126 | 77,350 |
| Boston | 6 " | 300 | 267 | 701 |
| Gloucester | 6 " | 32,300 | 29,328 | 53,991 |
| Total ocean perch | | 60,600 | 59,721 | 132,042 |
| Salmon, Alaska | to July 15 | 79,700 | 120,200 | 264,800 |
| Scallops, sea, New Bedford (meats) | 6 mos. | 10,000 | 9,744 | 20,648 |
| Shrimp (heads-on): | | | | |
| So. Atl. & Gulf | 6 mos. | 53,100 | 52,134 | 153,400 |
| Washington | 6 " | 600 | 607 | 1,459 |
| Squid, Calif. | 6 mos. | 5,700 | 882 | 5,400 |
| Tuna, Calif. | to July 14 | 151,300 | 175,460 | 307,263 |
| Whiting: | | | | |
| Maine | 5 mos. | 3 | - | 14,147 |
| Boston | 6 " | 70 | 45 | 144 |
| Gloucester | 6 " | 8,300 | 6,760 | 51,598 |
| Total whiting | | 8,373 | 6,805 | 65,889 |
| Total all above items | | 1,372,173 | 1,369,061 | 3,715,099 |
| Other 4/ | | 306,327 | 301,425 | 1,439,901 |
| Grand Total | | 1,678,500 | 1,670,486 | 5,155,000 |

1/Preliminary.
2/Dressed weight.
3/Excludes menhaden.
4/Includes landings for species not listed.
Note: Finfish generally converted to round weight, crustaceans to weight in the shell, and mollusks reported in meats only.

Fig. 2 - Boxes of iced fish on a truck, Weems, Va.

Scallops: New Bedford landings through June 1962 totaled about 10 million pounds--256,000 pounds more than in the previous year. Landings of scallops during 1961 were the largest on record.

Shrimp: Landings in the South Atlantic and Gulf States during the first 6 months of 1962 amounted to 53 million pounds--about 1 million pounds more than in 1961.

* * * * *

## FISH STICKS AND PORTIONS PRODUCTION, APRIL-JUNE 1962:

United States production of fish sticks amounted to 16.1 million pounds and that of fish portions was 18.2 million pounds during the second quarter of 1962, according to preliminary data. This was a gain of 3 percent in fish sticks and 47 percent in portions as compared with the same quarter of 1961. The increase in portions was mainly due to greater production of raw breaded portions (up 4.3 million pounds).

Table 1 - U.S. Production of Fish Sticks by Months and Type, April-June 1962 1/

| Month | Cooked | Raw | Total |
|---|---|---|---|
| | (1,000 Lbs.) | | |
| April | 5,028 | 452 | 5,480 |
| May | 5,152 | 457 | 5,609 |
| June | 4,669 | 389 | 5,058 |
| Total 2nd Qtr. 1962 1/ | 14,849 | 1,298 | 16,147 |
| Total 2nd Qtr. 1961 | 14,589 | 1,067 | 15,656 |
| Tot. 1st 6 mos. 1962 1/ | 34,380 | 2,436 | 36,816 |
| Tot. 1st 6 mos. 1961 | 33,722 | 2,350 | 36,072 |
| Tot. Jan.-Dec. 1961 | 65,006 | 4,813 | 69,819 |

1/Preliminary.

Table 2 - U. S. Production of Fish Sticks by Areas, April-June 1962 and 1961

| Area | 1/1962 | | 2/1961 | |
|---|---|---|---|---|
| | No. of Firms | 1,000 Lbs. | No. of Firms | 1,000 Lbs. |
| Atlantic Coast States | 23 | 13,229 | 22 | 13,421 |
| Inland & Gulf States | 4 | 1,892 | 6 | 1,232 |
| Pacific Coast States | 7 | 1,026 | 10 | 1,003 |
| Total | 34 | 16,147 | 38 | 15,656 |

1/Preliminary. 2/Revised.

Table 3 - U.S. Production of Fish Sticks by Months, 1958-1962

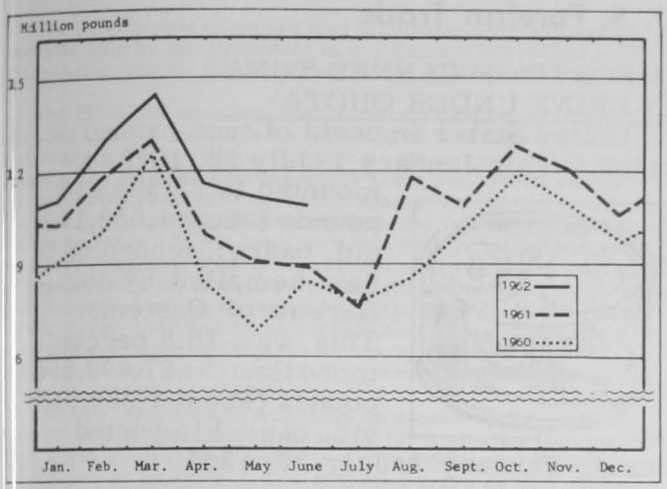
| Month | 1/1962 | 2/1961 | 1960 | 1959 | 1958 |
|---|---|---|---|---|---|
| | (1,000 Lbs.) | | | | |
| January | 6,104 | 6,091 | 5,511 | 6,277 | 5,471 |
| February | 6,859 | 7,092 | 6,542 | 6,352 | 5,925 |
| March | 7,706 | 7,233 | 7,844 | 5,604 | 5,526 |
| April | 5,480 | 5,599 | 4,871 | 4,717 | 4,855 |
| May | 5,609 | 5,129 | 3,707 | 4,407 | 4,229 |
| June | 5,058 | 4,928 | 4,369 | 4,583 | 4,702 |
| July | - | 3,585 | 3,691 | 3,790 | 4,574 |
| August | - | 6,937 | 5,013 | 3,879 | 4,358 |
| September | - | 5,216 | 5,424 | 5,353 | 5,328 |
| October | - | 6,143 | 6,560 | 5,842 | 5,485 |
| November | - | 6,298 | 6,281 | 4,831 | 5,091 |
| December | - | 5,628 | 5,329 | 4,743 | 5,467 |
| Total | - | 69,903 | 65,142 | 60,378 | 61,011 |

1/Preliminary. 2/Revised.

Table 4 - U. S. Production of Fish Portions by Months and Type, April-June 1962 1/

| Month | Breaded | | | Unbreaded | Total |
|---|---|---|---|---|---|
| | Cooked | Raw | Total | | |
| | (1,000 Lbs.) | | | | |
| April | 1,427 | 4,773 | 6,200 | 149 | 6,350 |
| May | 1,135 | 4,471 | 5,606 | 144 | 5,749 |
| June | 1,043 | 4,864 | 5,907 | 175 | 6,082 |
| Tot. 2nd Qtr. 1962 1/ | 3,605 | 14,108 | 17,713 | 468 | 18,181 |
| Tot. 2nd Qtr. 1961 | 2,116 | 9,835 | 11,951 | 451 | 12,402 |
| Tot. 1st 6 mos. 1962 1/ | 6,537 | 29,009 | 35,546 | 1,042 | 36,588 |
| Tot. 1st 6 mos. 1961 | 4,888 | 21,586 | 26,474 | 964 | 27,438 |
| Tot. Jan.-Dec. 1961 | 11,003 | 46,783 | 57,786 | 2,061 | 59,847 |

1/Preliminary.




U. S. production of fish sticks and portions, 1960-1962.

Table 5 - U. S. Production of Fish Portions by Areas, April-June 1962 and 1961

| Area | 1/1962 | | 2/1961 | |
|---|---|---|---|---|
| | No. of Firms | 1,000 Lbs. | No. of Firms | 1,000 Lbs. |
| Atlantic Coast States . . | 23 | 9,937 | 24 | 6,484 |
| Inland & Gulf States . . | 7 | 7,623 | 12 | 5,488 |
| Pacific Coast States . . | 8 | 621 | 6 | 430 |
| Total . . . . . | 38 | 18,181 | 42 | 12,402 |

1/ Preliminary.
2/ Revised.

Table 6 - U. S. Production of Fish Portions by Months, 1958-1962

| Month | 1/1962 | 2/1961 | 1960 | 1959 | 1958 |
|---|---|---|---|---|---|
| | (1,000 Lbs.) | | | | |
| January . . . . . | 5,102 | 4,303 | 3,632 | 2,692 | 1,973 |
| February . . . . . | 6,374 | 4,902 | 3,502 | 3,025 | 1,254 |
| March . . . . . | 6,931 | 5,831 | 4,706 | 3,225 | 1,471 |
| April . . . . . | 6,350 | 4,484 | 3,492 | 2,634 | 2,268 |
| May . . . . . | 5,749 | 3,879 | 3,253 | 2,684 | 1,478 |
| June . . . . . | 6,082 | 4,039 | 3,995 | 3,247 | 1,504 |
| July . . . . . | - | 3,986 | 4,088 | 2,227 | 2,161 |
| August . . . . . | - | 4,987 | 3,558 | 2,796 | 1,516 |
| September . . . . . | - | 5,769 | 4,631 | 3,558 | 1,566 |
| October . . . . . | - | 6,783 | 5,275 | 4,314 | 2,560 |
| November . . . . . | - | 5,813 | 4,790 | 3,483 | 1,979 |
| December . . . . . | - | 5,215 | 4,459 | 3,262 | 2,060 |
| Total . . . . . | - | 60,061 | 49,381 | 37,147 | 21,790 |

1/Preliminary. 2/Revised.

Cooked fish sticks made up 92 percent of the fish stick total. The remaining 8 percent consisted of raw fish sticks. A total of 17.7 million pounds of breaded fish portions (of which 14.1 million pounds were raw) and 468,000 pounds of unbreaded portions were processed during the second quarter of 1962.

Plants on the Atlantic Coast produced the bulk of the fish sticks and portions--23.2 million pounds. The remaining 1.1 million pounds of sticks and portions were produced in Gulf, inland, and Pacific Coast plants.

During the first 6 months of 1962, fish stick production of 36.8 million pounds was up 2 percent and the fish portions production of 36.6 million pounds was up 33 percent as compared with the first half of 1961.

□□□□□□□□□

## U. S. Fishing Vessels

### DOCUMENTATIONS ISSUED AND CANCELLED, JULY 1962:

During July 1962, a total of 33 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 50 in July 1961. There were 23 documents cancelled for fishing vessels in July 1962 as compared with 24 in July 1961.

Table 1 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, July 1962 with Comparisons

| Area (Home Port) | July | | Jan.-July | | Total |
|---|---|---|---|---|---|
| | 1962 | 1961 | 1962 | 1961 | 1961 |
| | (Number) | | | | |
| Issued first documents 2/: | | | | | |
| New England . . . . . | 5 | 4 | 20 | 21 | 33 |
| Middle Atlantic . . . . . | - | 1 | 2 | 5 | 12 |
| Chesapeake . . . . . | 2 | 5 | 23 | 41 | 75 |
| South Atlantic . . . . . | 4 | 5 | 21 | 29 | 47 |
| Gulf . . . . . | 9 | 12 | 62 | 73 | 100 |
| Pacific . . . . . | 13 | 22 | 100 | 124 | 149 |
| Great Lakes . . . . . | - | 1 | 1 | 9 | 12 |
| Puerto Rico . . . . . | - | - | - | 2 | 2 |
| Total . . . . . | 33 | 50 | 229 | 304 | 430 |
| Removed from documentation 3/: | | | | | |
| New England . . . . . | 1 | 3 | 12 | 11 | 20 |
| Middle Atlantic . . . . . | - | 1 | 26 | 18 | 34 |
| Chesapeake . . . . . | 5 | 3 | 13 | 21 | 28 |
| South Atlantic . . . . . | 4 | 3 | 22 | 18 | 30 |
| Gulf . . . . . | 10 | 4 | 69 | 60 | 103 |
| Pacific . . . . . | 3 | 7 | 72 | 60 | 112 |
| Great Lakes . . . . . | - | 3 | 12 | 8 | 14 |
| Hawaii . . . . . | - | - | 3 | - | - |
| Puerto Rico . . . . . | - | - | 1 | - | |
| Total . . . . . | 23 | 24 | 230 | 196 | 341 |

1/For explanation of footnotes, see table 2.

Table 2 - U. S. Fishing Vessels 1/--Documents Issued and Cancelled, by Tonnage Groups, July 1962

| Gross Tonnage | Issued 2/ | Cancelled 3/ |
|---|---|---|
| | (Number) | |
| 5-9 . . . . . | 5 | 6 |
| 10-19 . . . . . | 16 | 8 |
| 20-29 . . . . . | 3 | 1 |
| 30-39 . . . . . | 1 | 1 |
| 40-49 . . . . . | 2 | 1 |
| 50-59 . . . . . | - | 1 |
| 60-69 . . . . . | 2 | 2 |
| 70-79 . . . . . | 2 | - |
| 90-99 . . . . . | - | 1 |
| 110-119 . . . . . | - | 1 |
| 120-129 . . . . . | - | 1 |
| 220-229 . . . . . | 1 | - |
| 550-559 . . . . . | 1 | - |
| Total . . . . . | 33 | 23 |

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes redocumented vessels previously removed from records. Vessels issued first documents as fishing craft were built: 24 in 1962, 2 in 1961, 1 in 1960, 1 in 1951, 5 prior to 1951. Assigned to areas on the basis of their home ports.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

* * * * *

## DOCUMENTATIONS ISSUED AND CANCELLED, JUNE 1962:

During June 1962, a total of 52 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 64 in June 1961. There were 34 documents cancelled for fishing vessels in June 1962 as compared with 26 in June 1961.

Table 1 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, June 1962 with Comparisons

| Area (Home Port) | June 1962 | June 1961 | Jan.-June 1962 | Jan.-June 1961 | Total 1961 |
|---|---|---|---|---|---|
| | | | (Number) | | |
| Issued first documents 2/: | | | | | |
| New England | 2 | 2 | 15 | 17 | 33 |
| Middle Atlantic | - | 2 | 2 | 4 | 12 |
| Chesapeake | 5 | 11 | 21 | 36 | 75 |
| South Atlantic | 4 | 6 | 17 | 24 | 47 |
| Gulf | 15 | 9 | 53 | 61 | 100 |
| Pacific | 25 | 31 | 87 | 102 | 149 |
| Great Lakes | 1 | 3 | 1 | 8 | 12 |
| Puerto Rico | - | - | - | 2 | 2 |
| Total | 52 | 64 | 196 | 254 | 430 |
| Removed from documentation 3/: | | | | | |
| New England | - | 2 | 11 | 8 | 20 |
| Middle Atlantic | 2 | - | 26 | 17 | 34 |
| Chesapeake | 2 | - | 8 | 18 | 28 |
| South Atlantic | 2 | 3 | 18 | 15 | 30 |
| Gulf | 13 | 12 | 59 | 56 | 103 |
| Pacific | 10 | 9 | 69 | 53 | 112 |
| Great Lakes | 4 | - | 12 | 5 | 14 |
| Hawaii | - | - | 3 | - | - |
| Puerto Rico | 1 | - | 1 | - | - |
| Total | 34 | 26 | 207 | 172 | 341 |

1/For explanation of footnotes, see table 2.

Table 2 - U.S. Fishing Vessels 1/-Documents Issued and Cancelled, by Tonnage Groups, June 1962

| Gross Tonnage | Issued 2/ | Cancelled 3/ |
|---|---|---|
| | (Number) | |
| 5-9 | 2 | 4 |
| 10-19 | 24 | 15 |
| 20-29 | 5 | 3 |
| 30-39 | 6 | 2 |
| 40-49 | 1 | 2 |
| 50-59 | 3 | 2 |
| 60-69 | - | 2 |
| 70-79 | 8 | 1 |
| 110-119 | 1 | - |
| 130-139 | 1 | - |
| 250-259 | - | 1 |
| 370-379 | - | 1 |
| 490-499 | 1 | - |
| 530-539 | - | 1 |
| Total | 52 | 34 |

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes redocumented vessels previously removed from records. Vessels issued first documents as fishing craft were built: 38 in 1962, 2 in 1961, 1 in 1953, 8 prior to 1951, and 3 unknown. Assigned to areas on the basis of their home ports.
3/Includes vessels reported lost, abandoned, foreited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

# U. S. Foreign Trade

## IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-July 28, 1962, amounted to 32,594,317 pounds (about 1,552,110 std. cases), according to data compiled by the Bureau of Customs. This was 16.8 percent more than the 27,898,898 pounds (about 1,328,519 std. cases) imported during January 1-July 29, 1961.


The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1962 at the 12½-percent rate of duty is limited to 59,059,014 pounds (about 2,812,000 std. cases of 48 7-oz. cans). Any imports in excess of the quota are dutiable at 25 percent ad valorem.

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## FISHERY PRODUCTS IMPORTS FROM U.S.S.R.:

United States imports of fishery products from the U.S.S.R. in 1961 amounted to only 59,000 pounds.

U. S. Fishery Products Imports from U.S.S.R., 1961

| Commodity | Quantity | Value |
|---|---|---|
| | Pounds | US$ |
| Antipasto in oil, canned | 362 | 385 |
| Fish in oil, n.e.s., canned | 12,639 | 8,027 |
| Salmon, canned | 10,848 | 8,336 |
| Crab meat, canned | 871 | 705 |
| Fish paste, canned | 260 | 133 |
| Sturgeon roe, salted | 32,732 | 152,862 |
| Sturgeon roe, boiled in air-tight containers | 1,592 | 23,751 |
| Total | 59,304 | 194,199 |

* * * * *

## INSURANCE ON UNITED STATES EXPORTS EXTENDED TO LONGER-TERM POLICIES:

Insurance covering credit and political risks in overseas sales made on terms of up to 5 years is now available to United States exporters. The newly-available medium-term policies can be obtained from the Foreign Credit Insurance Association (FCIA), which operates in cooperation with the Export-Import Bank of Washington.

This is the first time the United States has provided such medium-term assistance for its exporters on an extensive basis, through private business facilities which include ready availability of policy application from insurance agents and brokers.

The FCIA's new coverage was simultaneously announced early in July by the President of the Export-Import Bank in Washington, and by the President of the FCIA in New York.

The FCIA has been issuing short-term export credit insurance (for transactions on terms up to 180 days ) since February 5, 1962. Use of the new medium-term policy in conjunction with the existing short-term policy will enable United States exporters to insure against credit and political risks in transactions whose credit terms are anywhere within a 5-year range. In the medium-term policy, exporters will be covered against loss of 85 percent of the financed portion of transactions for both credit and political risks. Credit risks are insolvency of the buyer and protracted default of payment by the buyer; political risks include such government actions as currency convertibility restrictions, export and import restrictions, war, revolution, civil commotion and expropriation.

The new insurance is available on a case-by-case basis. The FCIA will consider applications for a single sale to a foreign buyer or revolving sales to a foreign buyer. Exporters may cover as many or as few of their buyers as they choose during the policy year, since there is no flat "whole-turnover" requirement in the medium-term program. But should an exporter wish to insure on a "whole-turnover" basis, he may do so at a reduced premium and increase the political risk coverage to 90 percent.

As in the short-term policies, a contract form endorsement may be attached to the medium-term policy to extend the coverage during the period of fabrication or manufacture of the product.

Premium rates for the medium-term policy vary according to terms of payment and the buyer's country. Both FCIA and the Export-Import Bank indicate that the premiums and fees for medium-term insurance in the United States compare favorably with those charged by the leading credit insurance systems in other nations. In fact, in some instances, FCIA rates are lower than those charged by foreign insurers.

The FCIA was formed by private insurance companies late in 1961 at the suggestion of the United States Government through the Export-Import Bank. It is an unincorporated association whose membership now numbers 71 companies. Membership is open to all qualified and responsible insurance companies. Both the medium-term export credit insurance policy and the short-term policy are offered to exporters through agents of member companies and general insurance brokers throughout the United States.

Announcement of the FCIA's new medium-term policy rounds out the Association's basic program. The two policies are designed to help United States exporters meet increasing competition from foreign exports who, for the most part, have the benefit of export credit insurance plans abroad.

Two salient benefits will be provided to United States exporters who use FCIA policies.

1. The exporters themselves will be in better position to extend credit to overseas customers, because the substantial portion of risks in the transactions are covered by the insurance.

2. Exporters will be able to obtain financing more readily from commercial banks and other financial institutions when their foreign accounts receivable are so insured.

In addition, commercial banks in the United States should find FCIA policies attractive in connection with the financing of overseas sales, since proceeds of the policies are assignable to banks.

## Vessels

### FRENCH FISHERY RESEARCH VESSEL VISITS WOODS HOLE, MASS.:

The French fishery research vessel Thalassa docked at the U. S. Bureau of Commercial Fisheries Biological Laboratory, Woods Hole, Mass., July 24-26, 1962. The vessel visited the Laboratory prior to a cruise to Georges Bank and northern Atlantic fishing areas. The chief of the vessel's scientific party explained that the purpose of their trip was to investigate stocks of groundfish, especially those which may now be underexploited. The Bureau's Woods Hole scientists had the opportunity to meet the scientists aboard the vessel, learn something of their work, and examine their equipment. Scien-

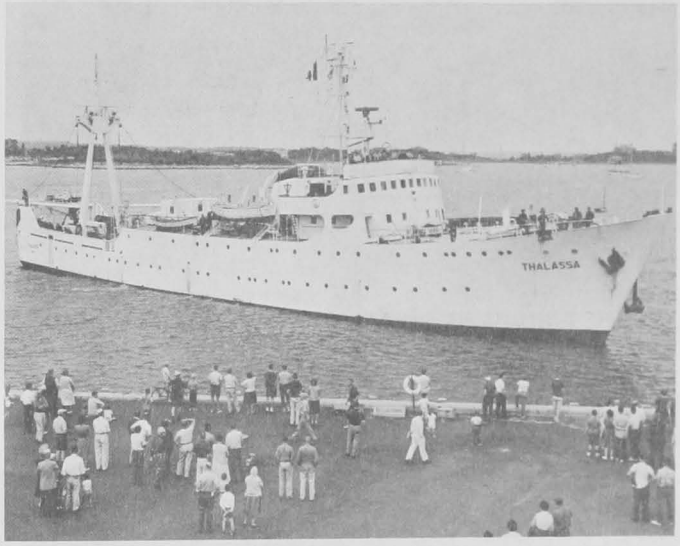



Fig. 1 - French fishery research vessel Thalassa arriving at the U. S. Bureau of Commercial Fisheries dock in Woods Hole, Mass.

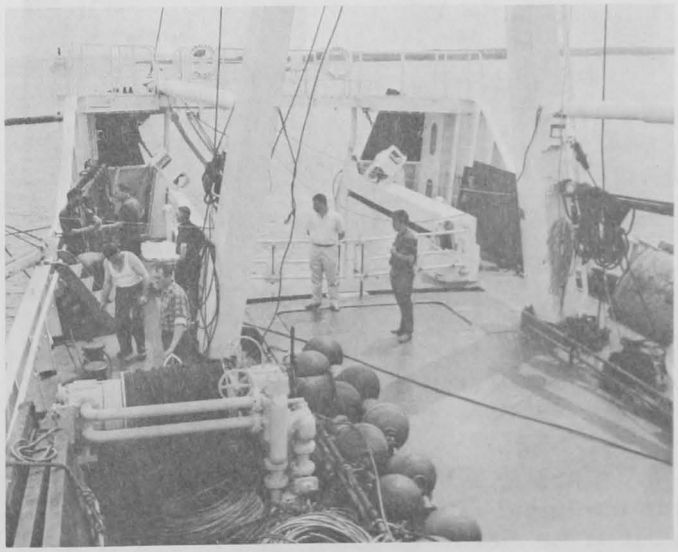


Fig. 2 - Afterdeck of the French vessel Thalassa.

tists on the vessel spent some time ashore conferring with the Bureau's biologists on overlapping studies and problems. A Woods Hole biologist accompanied the vessel on the first leg of her cruise, and he left the vessel at a Nova Scotia port.

Fig. 3 - Tieing net to the head rope of an otter trawl aboard the Thalassa.

The vessel arrived direct from her home port (Brest, France). Also, she planned to explore the commercial stocks of groundfish on the Grand Banks before returning to France some time in September 1962.

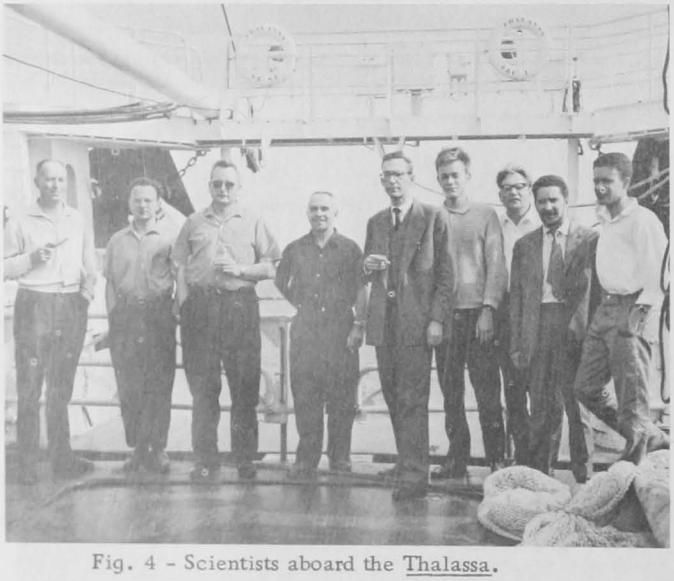


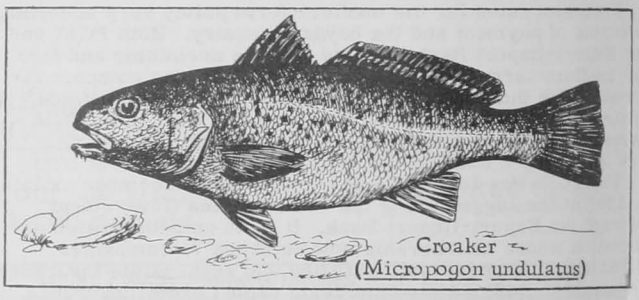
Fig. 4 - Scientists aboard the Thalassa.

A stern trawler with complete biological and chemical facilities, the Thalassa was built at Le Harve in 1960. She is 216 feet long, 1,481 gross tons and has a maximum range of 12,900 miles. The Thalassa's total complement is a crew of 33 and 22 scientists. On this cruise there were 8 scientists, 2 students, and a visiting Polish fishery biologist aboard.

## Virginia

OUTLOOK PROMISING FOR CROAKER POPULATIONS IN CHESAPEAKE BAY SYSTEM:

Improvement in the numbers of croakers inhabiting the Chesapeake Bay system was predicted by marine scientists of the Virginia Institute of Marine Science, Gloucester Point, Va. The prediction made on June 27, 1962, was based on recent winter investigations of the survival of young croakers in upriver areas.




The head of Ichthyology studies at the Institute cited evidence compiled during the past winter indicating a tenfold increase in survival of small croakers over the average of the past five years. He pointed out that these small croakers were spawned in the ocean last fall, and the tiny larvae moved upstream into the brackish-water areas of rivers entering Chesapeake Bay. The supervisor, who is responsible for the Laboratory's young fish sampling program, has been making regular trawl surveys in those upriver areas to determine the abundance of young croakers during fall, winter, and spring, indicating the number of fish arriving, and the number which survive the winter.

The Institute's Ichthyology chief and his co-workers agreed that pinheads (6 to 8 inches in size) would begin to appear in increased numbers late in the summer of 1962 and that the commercial fishery and sport fishery will be considerably improved by 1963. Large croakers from the 1962 spawning season will not appear until 1964.

It was also suggested by the Institute's staff that this does not mean an immediate return to population levels of years prior to the severe cold during the winter of 1957/58. They stated it will take several mild winters in succession and the subsequent successful survival of croaker larvae before a return to high population levels can be expected. They hoped the past 1961/62 mild winter was the first of such a series.

Records kept since about 1880 show the commercial catch of croakers in 1961 was the lowest on record. It was believed the predicted increase should result in a significant improvement.

Croakers spawn offshore along the Continental Shelf each fall. After hatching, the larvae move into the Bay and upstream to approach the brackish-water areas of rivers. Those are the nursery grounds of young croakers during their first winter, which is a very critical time of their life cycle. Survivors of the first winter migrate back downstream with the arrival of spring to join regular croaker migrations. By the end of their first summer, they usually grow to pinhead size and reach adult size by the end of their second year. Rarely does a croaker pass an age of 5 or 6 years. Studies by the Institute also show that the annual mortality of croakers is about 70 percent, only 10 percent of which is caused by fishing.

There was some evidence that the extremely cold winter of 1957/58 had a great deal to do with the severe decline of Chesapeake Bay croaker populations over the past few years. The past mild winter, and the subsequent survival in some abundance of croaker spawn, seems to support that evidence.

## Washington

CHINOOK SALMON TAGGING:

For a salmon tagging operation off West Beach, Whidbey Island, Wash., Washington State Department of Fisheries biologists used the drum-seine vessel Sykes. Tagging began June 17 and continued until mid-August. The purpose was to gain information about migration routes and timing of runs of chinook salmon that pass through the West Beach area. The Department needs the information in order to determine whether

Chinook salmon

to manage the West Beach chinook salmon fishery as a separate fishery, or as part of the chinook fishery in Skagit Bay, Wash.

Salmon were tagged only on Saturday, Sunday, and Monday, when the commercial fleet was not operating. As of June 27, a total of 141 chinook salmon had been tagged, and recoveries had been made at West Beach, Skagit Bay and Skagit River, and Fraser River. The fish averaged about 20 pounds each.

* * * * *

SALMON PLANTED IN KLICKITAT RIVER:

A long-range project to create a run of silver and chinook salmon in the Klickitat River was started in June 1962 by the Washington State Department of Fisheries. Construction of the Castile Falls fishway in 1960 opened up about 30 miles of rich salmon spawning grounds in the upper Klickitat. A plant of 31,300 spring chinook salmon fingerlings was made in the upper Klickitat in August 1961. Additional salmon fingerling plants in the McCormick Meadows area of the river were made on June 21-22, 1962. These consisted of 70,000 large spring chinook salmon from the Wind River; 100,000 silver salmon from the Toutle River; and 50,000 silver salmon from the U. S. Fish and Wildlife Service hatchery at Willard, Wash.

The Washington State Department of Fisheries is carrying out the project with the cooperation of the U. S. Bureau of Indian Affairs, the U. S. Fish and Wildlife Service, and the Yakima Indian tribe. The upper Klickitat is in the Yakima Indian Reservation. The Indian Tribe said they will refrain from fishing in the upper river while runs are established.

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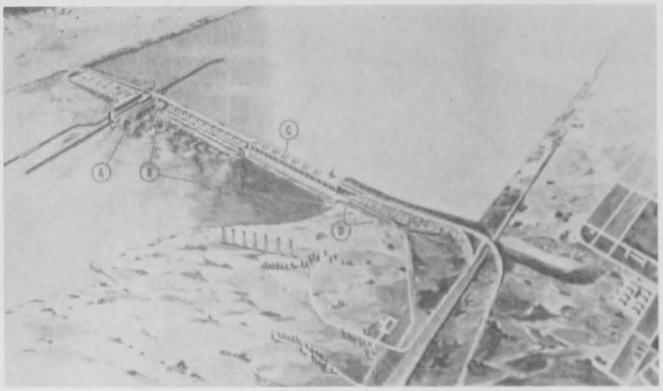
SALMON SPAWNING CHANNEL AT MCNARY DAM ON THE COLUMBIA RIVER:

Fall chinook salmon will spawn naturally in a man-made spawning stream, the eggs



Sketch of McNary Dam on the Columbia River showing fishways for the passage of salmon: A, Washington fish ladder; B, entrances; C, powerhouse; D, Oregon fish ladder.

will hatch, and the young fish will grow and migrate. These facts have been learned in the supplemental spawning channel at McNary Dam on the Columbia River, operated since 1957 by the Washington State Department of Fisheries under a contract from the U. S. Army Corps of Engineers. The contract expired on June 30, 1962. The Washington fisheries agency has proposed a one-year renewal of the contract in order to gain more knowledge on this project. The renewal would also produce a maximum number of seaward chinook salmon migrants from the McNary Dam area.

A number of two-year old jack salmon have returned to the channel's discharge stream during the past two years. The Supervisor of Research for Washington State said that the early returns give promise that enough spawners will return to perpetuate the run to the channel. In the fall of 1961, a total of 63 jack salmon returned to the channel from a 1960 release of 55,850 fingerlings which were marked with a right ventral fin clip. The first large group of chinook salmon released from the channel should return in the fall of 1962 as four-year old spawners. The group includes 39,729 salmon from the channel, of which 20,015 were marked, and 100,000 marked Klickitat Hatchery fish released in the channel.

The biologist in charge of the project said the spawning channel has been considerably improved in the light of knowledge and experience gained in the five years of operation. A major addition to the channel in 1961 was the construction of a rearing pond approximately one acre in size. During the 1962 season, the spawning production of salmon hatched in the channel will be compared with the young produced at the channel by spawners that were hatched at the Klickitat Hatchery. Live boxes will be used to trap and separate the young produced by each group. When the fish are large enough to handle they will be counted and released into the rearing pond.

## Wholesale Prices, July 1962

Stronger market conditions caused by a dip in seasonal landings in New England and a continued good demand for all marine species were responsible for the rise in the July 1962 wholesale price index for edible fishery products to 119.0. From June to July the index rose 0.6 percent, and it was up 14.3 percent from July 1961.

The subgroup index for drawn, dressed, or whole finfish this July rose 7.9 percent from the previous month and was 19.8 percent higher than in July 1961. Compared with June, prices in July were up for all products in this group except Lake Superior whitefish at Chicago. Whitefish prices dropped 13.1 percent from June to July as the supply improved, but they were still 13.1 percent higher than in July 1961. Lake Michigan yellow pike prices at New York City were up 5.6 percent from June to July but dropped 18.1 percent from July 1961. Ex-vessel prices for large haddock at Boston in July were up 65.7 percent from June as a result of lighter landings, and were up 65.2 percent as compared with the same month of 1961. The demand for fresh large haddock was strong because of light landings. From June to July, prices at New York City rose 2.2 percent for fresh western halibut and 1.3 percent for fresh king salmon. Compared with July 1961, prices at New York City this July were 28.5 percent higher for fresh halibut and 12.7 percent higher for fresh king salmon.

From June to July, prices for fresh haddock fillets at Boston were up 23.8 percent despite relatively good landings of small haddock. Fresh shrimp prices at New York City, however, dropped 13.5 percent because of more liberal seasonal supplies from the South Atlantic States. As a result, the processed fresh fish and shellfish index for July dropped 6.0 percent from June, but was up 8.5 percent from July

View of wholesalers' stand on South Street in the salt-water section of Fulton Fish Market.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, July 1962 With Comparisons

| Group, Subgroup, and Item Specification | Point of Pricing | Unit | Avg. Prices 1/ ($) | | Indexes 2/ (1957-59=100) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | July 1962 | June 1962 | July 1962 | June 1962 | May 1962 | July 3/ 1961 |
| ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) | | | | | 119.0 | 4/118.3 | 119.4 | 104.1 |
| Fresh & Frozen Fishery Products: | | | | | 118.5 | 4/117.5 | 118.1 | 100.4 |
| Drawn, Dressed, or Whole Finfish: | | | | | 123.3 | 114.3 | 119.9 | 102.9 |
| Haddock, lge., offshore, drawn, fresh | Boston | lb. | .13 | .08 | 98.6 | 59.5 | 65.7 | 59.7 |
| Halibut, West., 20/80 lbs., drsd., fresh or froz. | New York | lb. | .45 | .44 | 133.0 | 130.1 | 122.2 | 103.5 |
| Salmon, king, lge. & med., drsd., fresh or froz. | New York | lb. | .98 | .96 | 136.2 | 134.5 | 139.7 | 120.8 |
| Whitefish, L. Superior, drawn, fresh | Chicago | lb. | .60 | .69 | 89.5 | 103.0 | 106.0 | 79.1 |
| Yellow pike, L. Michigan & Huron, rnd., fresh | New York | lb. | .48 | .45 | 77.8 | 73.7 | 116.3 | 95.0 |
| Processed, Fresh (Fish & Shellfish): | | | | | 113.4 | 5/120.6 | 119.7 | 104.5 |
| Fillets, haddock, sml., skins on, 20-lb. tins | Boston | lb. | .39 | .32 | 94.7 | 76.5 | 80.1 | 70.4 |
| Shrimp, lge. (26-30 count), headless, fresh | New York | lb. | .90 | 1.04 | 105.5 | 121.9 | 119.6 | 84.9 |
| Oysters, shucked, standards | Norfolk | gal. | 7.50 | 7.50 | 126.5 | 126.5 | 126.5 | 134.9 |
| Processed, Frozen (Fish & Shellfish): | | | | | 113.3 | 112.7 | 110.2 | 90.6 |
| Fillets: Flounder, skinless, 1-lb. pkg. | Boston | lb. | .39 | .38 | 98.9 | 96.3 | 100.1 | 97.6 |
| Haddock, sml., skins on, 1-lb. pkg. | Boston | lb. | .34 | .33 | 98.2 | 96.7 | 96.7 | 96.8 |
| Ocean perch, lge., skins on, 1-lb. pkg. | Boston | lb. | .30 | .30 | 103.4 | 106.1 | 110.4 | 98.2 |
| Shrimp, lge. (26-30 count), brown, 5-lb. pkg. | Chicago | lb. | 1.03 | 1.03 | 122.2 | 122.2 | 116.8 | 84.2 |
| Canned Fishery Products: | | | | | 120.1 | 120.1 | 122.1 | 110.8 |
| Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. | Seattle | cs. | 28.50 | 28.50 | 124.2 | 124.2 | 124.2 | 122.0 |
| Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs. | Los Angeles | cs. | 12.15 | 12.15 | 107.9 | 107.9 | 107.9 | 97.7 |
| Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs. | Los Angeles | cs. | 5.25 | 5.25 | 118.5 | 118.5 | 118.5 | 101.5 |
| Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs. | New York | cs. | 11.31 | 11.31 | 145.1 | 145.1 | 164.3 | 115.8 |

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/ Beginning with January 1962 indexes, the reference base of 1947-49=100 was superseded by the new reference base of 1957-59=100.
3/ Recomputed to be comparable to 1957-59=100 base indexes.
4/ Revisions were minor and did not affect indexes published for June.
5/ Index was unavailable in June.

961. As compared with the same month in 1961, the sub-roup index this July was higher because of substantially igher prices for fresh haddock fillets (up 34.5 percent) and resh shrimp (up 24.3 percent).

The price index for processed frozen fish and shellfish n July 1962 was up 0.5 percent from the previous month nd 25.1 percent higher than a year earlier because of the trong frozen shrimp market at Chicago. Frozen shrimp rices in July remained at the same level as in June, but ere up 45.1 percent from July 1961. From June to July rices for frozen flounder fillets rose 2.7 percent and for addock fillets advanced 1.6 percent, but prices for ocean erch fillets dropped 2.5 percent. Compared with July 1961, prices this July for ocean perch fillets were up 5.3 percent, and flounder and haddock fillets prices also were up slightly.

Canned fishery products prices were unchanged from June to July but the subgroup index this July was 8.4 percent higher than a year earlier. Compared with July 1961, prices this July were up 1.8 percent for canned pink salmon, up 10.4 percent for canned tuna, up 16.7 percent for California sardines, and up 25.3 percent for Maine sardines. Prices for new-pack Maine sardines remained steady during June-July following the 11.7-percent price drop from May. By the end of July, the canned tuna pack was ahead of the same period last year by 10.8 percent and the canned salmon pack (mostly pinks and chums) was better than expected although still below the 1961 season pack.