TRENDS AND DEVELOPMENTS

Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 14--
A LIGHT BOX FOR PHOTOGRAPHING FISH AND INVERTEBRATES AT SEA:

Colored slides and photographs of the fish and invertebrate fauna of the northeastern Pacific Ocean for use in lectures, publications, and identification keys are being compiled by the U. S. Bureau of Commercial Fisheries Exploratory Fishing and Gear Research Base, Seattle, Wash.

The natural colors of most fish and invertebrates fade rapidly upon removal of the animals from their environments. Therefore, it is necessary to photograph them within minutes after capture to obtain their true living color patterns. Initial attempts to photograph specimens at sea were unsatisfactory owing to unsuitable background and lighting, which caused reflections and shadows. To alleviate these problems, a special "light box" was developed. Use of the light box in conjunction with photoflood lamps has provided excellent colored photographs of fish and invertebrates from 6 to 45 centimeters or 2.36 to 17.72 inches (fig. 1).

DESCRIPTION AND MATERIALS

The dimensions of the light box, 27 inches long, 23 inches wide, and $10\frac{1}{2}$ inches deep, were regulated by the maximum field of view encompassed by the camera lens at a distance of 30 inches and the space available in the vessel's wet laboratory (fig. 2).

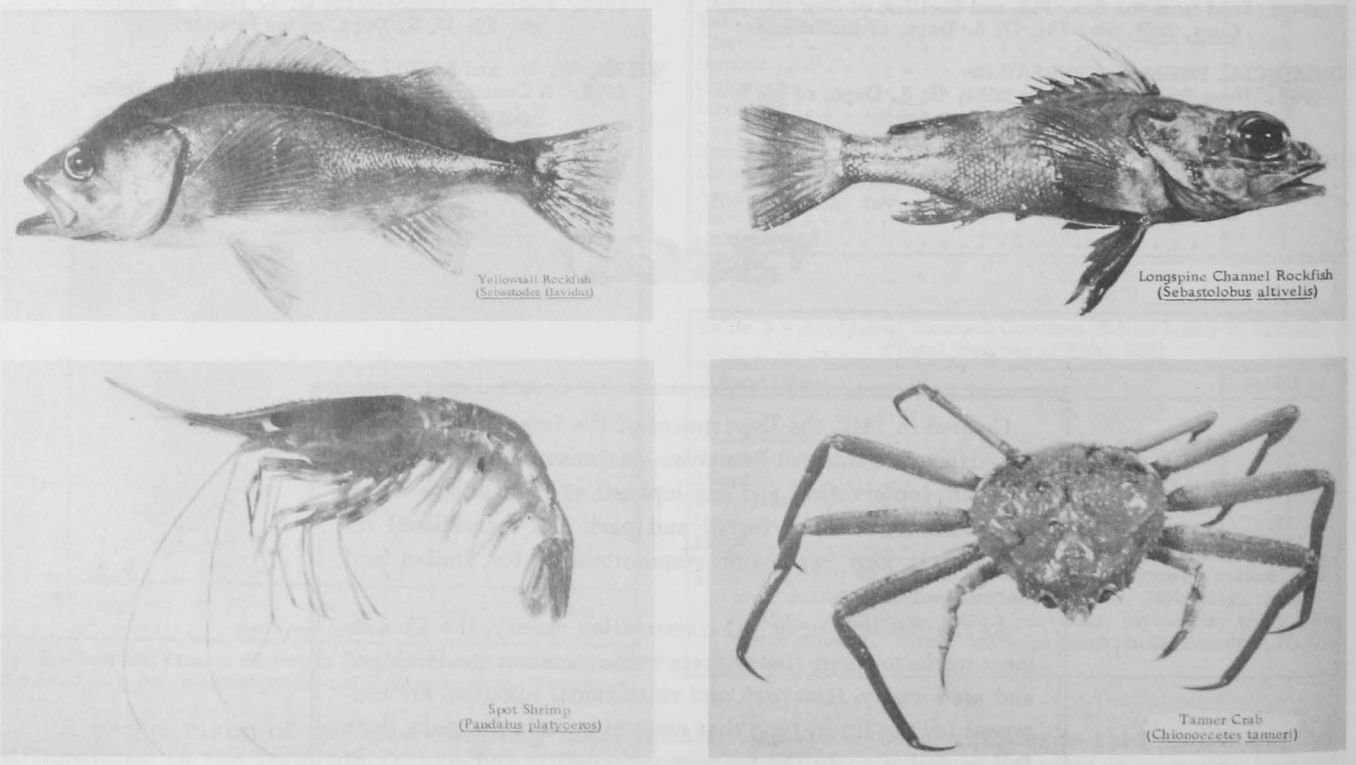

Fig. 1 Photographs taken at sea using the light box installed aboard the John N. Cobb, a U. S. Bureau of Commercial Fisheries exploratory fishing vessel.

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Fish and Wildlife Service
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Fluorescent lights were selected for the background lighting, because they provide low heat emission and greater dispersion of light. White-flashed opal glass was used to further diffuse the lighting into a white uniform background, and safety plate glass was used for the photographic stage.

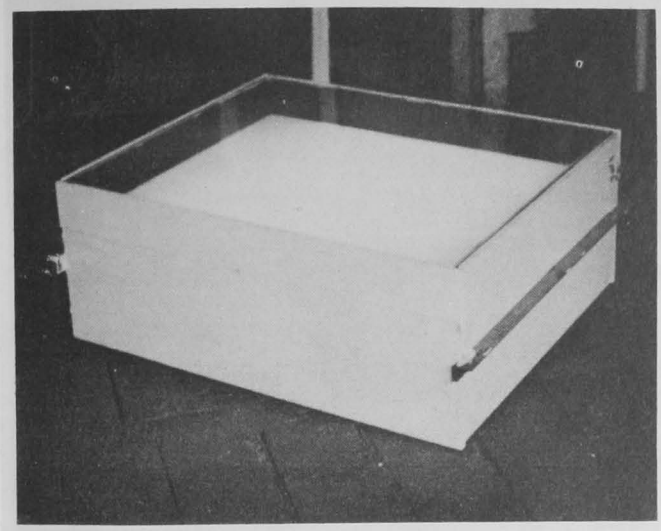

Fig. 2 - Light box prior to installation.

The combination of lighting and glass background eliminated shadows which are normally cast by the specimens when illuminated by photoflood lamps. Lights beneath the white-flashed opal glass diffused any shadows projected through the plate glass.

The photographic light box and photoflood lamps require 110-volt alternating current.

Materials required for the construction of the light box were:

$\frac{1}{2}$-inch exterior grade plywood	48 by 30 inches
$\frac{3}{4}$-inch exterior grade plywood	24 by 24 inches
$\frac{1}{4}$-inch safety plate glass	22.5 by 26.75 inches
$\frac{1}{8}$-inch white-flashed opal glass	22 by 26.5 inches
20-watt fluorescent light fixtures and bulbs	5 each
hinges, 2 by $1\frac{1}{2}$-inches	1 pair
eye hooks, $1\frac{1}{2}$-inches	1 pair
white paint	
black paint	
.020 sheet stainless steel	28 by 26 inches
electrical wiring	
flathead screws, No. 10 $1\frac{1}{2}$-inch	4 dozen
waterproof glue	

The cost of the materials was approximately $70.00.

CONSTRUCTION

The bottom, $27\frac{1}{2}$ by 23 inches, and front and back, $27\frac{1}{2}$ by 9 inches, were cut from $\frac{1}{2}$-inch plywood, and the two ends, 22 by 10 inches, from $\frac{3}{4}$-inch plywood.

On the inner surface of the ends, a $\frac{1}{4}$-inch deep by $\frac{1}{8}$-inch wide dado was cut 3 inches from the top (fig. 3).

A $\frac{3}{8}$-inch wide by $\frac{1}{4}$-inch deep rabbet was cut on the top inside edge of the ends, and a

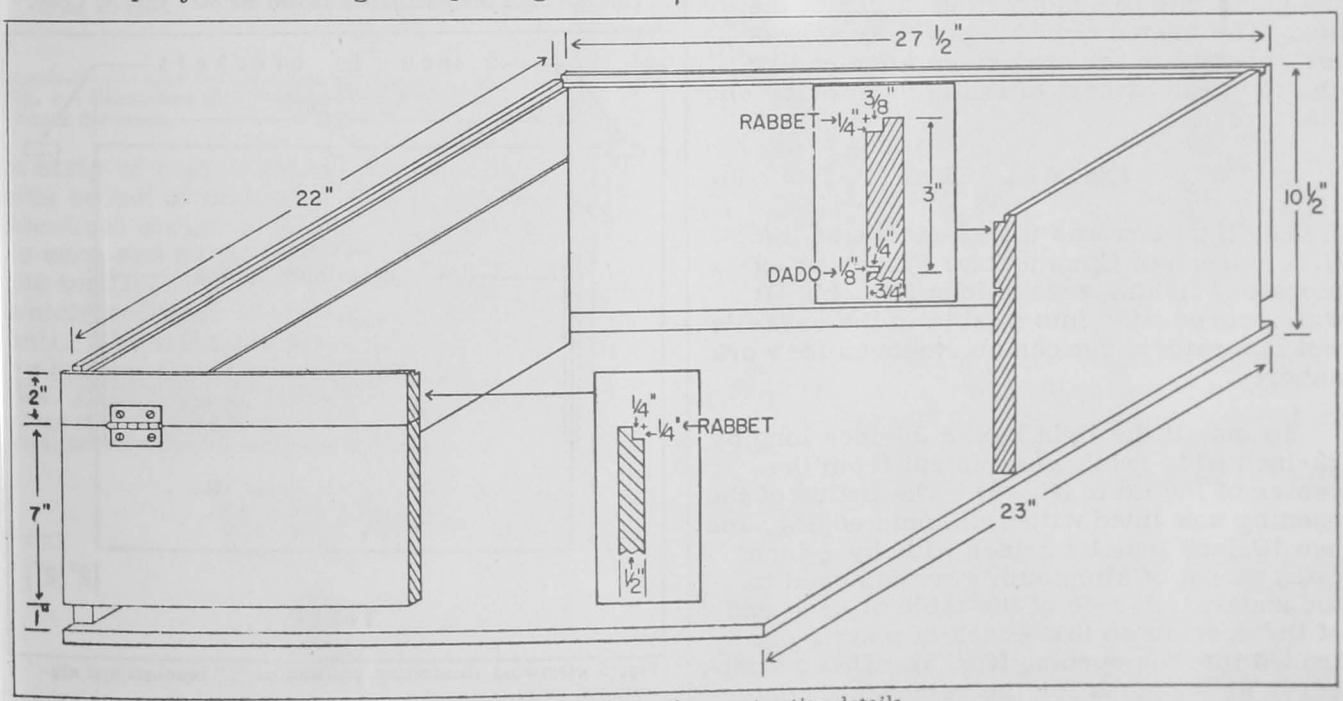

Fig. 3 - Drawing illustrating construction details.

$\frac{1}{4}$-inch wide by $\frac{1}{4}$-inch deep rabbet was cut on the top inside edge of the front and back pieces. After the rabbet was cut in the front piece, it was ripped into two parts, the top portion measuring $27\frac{1}{2}$ by 2 inches and the bottom portion measuring $27\frac{1}{2}$ by 7 inches.

Waterproof glue and No. 10, $1\frac{1}{2}$-inch flathead screws were used to secure each joint. All screw holes were drilled and screw heads were countersunk.

After the ends were attached to the bottom, the back and top portion of the front were secured to the ends (fig. 3). The lower portion of the front was hinged to the top piece and fastened to the ends with eye hooks.

The entire box was painted white except for the top inside 3-inch-wide portion above the dado, which was painted black. Then the inside of the box below the dado was lined with sheet stainless steel.

The light fixtures were equally spaced across the bottom of the box, secured in position, and wired in parallel. A $\frac{1}{4}$-inch hole was drilled in one end of the box to allow passage of the wires to the outside, where they were connected to a light switch.

The safety plate glass was set into the rabbets at the top of the box, and the white-flashed opal glass was installed by sliding the glass into the dados in each end of the box. The hinged front allows easy access for removal of the opal glass for cleaning and for replacement of fluorescent bulbs and starters.

INSTALLATION

The light box was installed aboard the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb. It was incorporated into a table in the vessel's wet laboratory, but can be removed for work ashore.

To install the light box, a 26-inch long by 22-inch wide rectangle was cut from the center of the table (fig. 4). The inside of the opening was lined with aluminum edging, and two 10-inch long by $\frac{3}{4}$-inch wide by $\frac{1}{8}$-inch thick strips of aluminum were fastened to the underneath side of the table at each end of the opening so that $\frac{3}{8}$-inch of a strip protruded into the opening (fig. 5). These strips serve as supports for the removable center

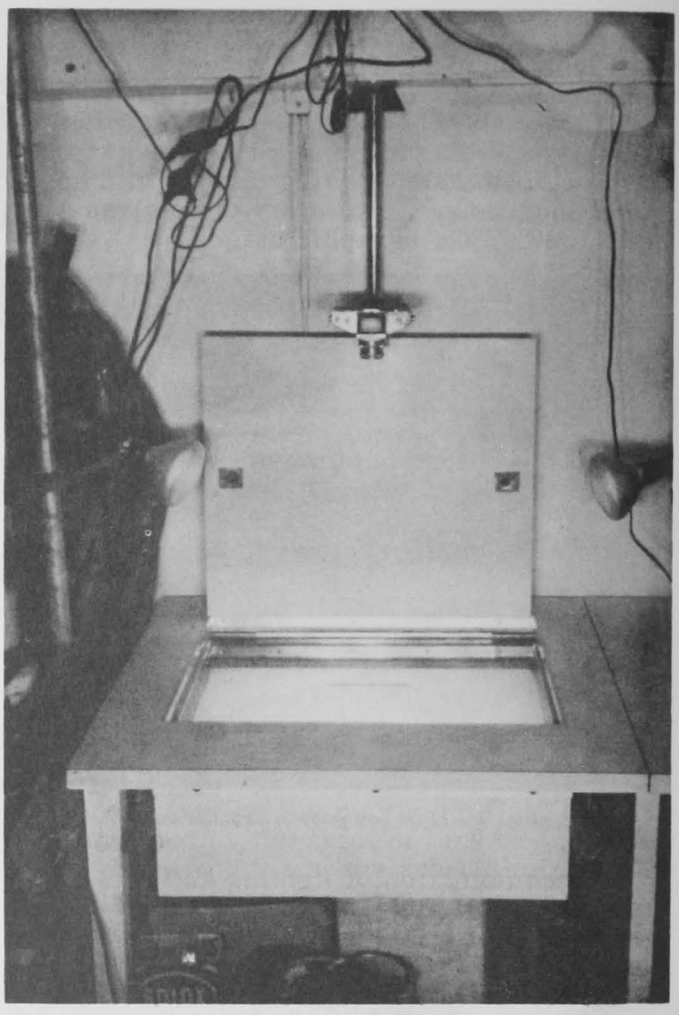

Fig. 4 - Light box installation aboard the M/V John N. Cobb.

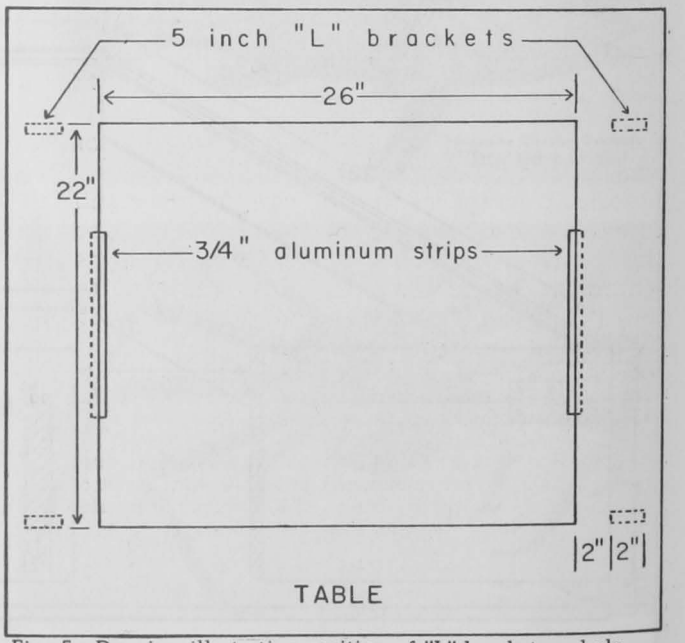

Fig. 5 - Drawing illustrating position of "L" brackets and aluminum strips.

portion of the table. When the light box is not being used, the removable section can be replaced, thus serving as protection for the plate glass photographic stage as well as restoring the table for other activities. Two ring handles were installed to facilitate removal of the top.

The light box was suspended from the table by "L" brackets and strips of angle iron. Two 5-inch "L" brackets were attached to the bottom of the table two inches from each end of the rectangular opening (fig. 5).

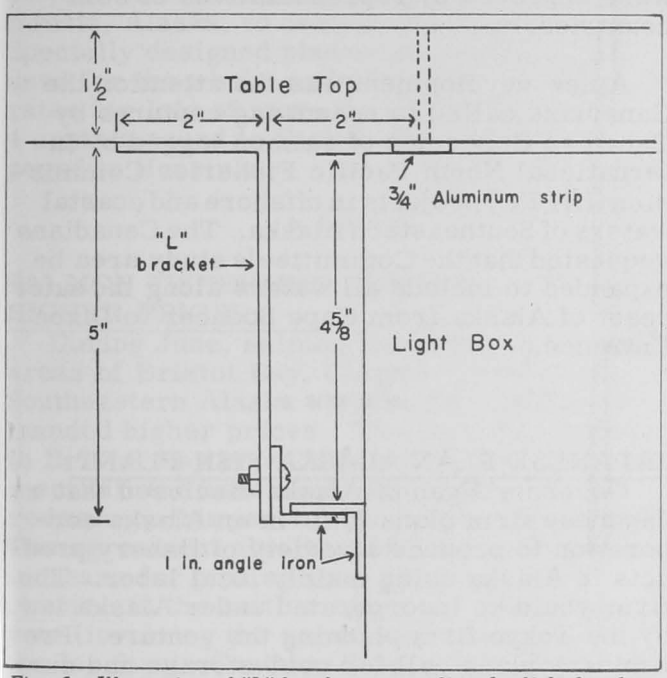

Fig. 6 - Illustration of "L" brackets suspending the light box beneath the table.

A strip of 1-inch angle iron 26 inches long was bolted to each pair of "L" brackets. Identical strips of angle iron were attached to each end of the light box 4⅝-inches from the top (fig. 6). The strips form runners which facilitate installing or removing the unit. The light box was locked into position by bolting the runners together.

Note: Acknowledgment: The author would like to thank Ron Lopp of the Fisheries Research Institute, University of Washington, for his technical assistance and suggestions.

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Alaska

JAPANESE AND SOVIET FISHERIES IN BERING SEA AND GULF OF ALASKA:

The foreign fishing fleet build-up that had accelerated through April and May 1963 in the Bering Sea and Gulf of Alaska leveled off somewhat during June. The major increases were the arrival of the Japanese factoryship Kaiko Maru with 9 catcher vessels, to engage in the long-line fishery north of Unalaska Island, and the appearance of 3 Japanese whale factoryships in the Gulf of Alaska area. By month's end an estimated 180 to 200 Soviet and 210 to 215 Japanese vessels were believed to be fishing in the Gulf of Alaska and eastern Bering Sea.

The Portlock and Albatross Banks near Kodiak became the center of the major fishing effort by the Soviets during June. More than a dozen BMRT stern-ramp trawlers, including 7 or 8 new vessels of that type, and numerous new refrigerated fish transport and support vessels were identified. More than 100 conventional SRT type trawlers were sighted with the total fleet about 150 vessels in June.

Russian crab-canning factoryship operating in the Bering Sea. Home port of this vessel is Vladivostock.

A Soviet whale fleet continued to operate in the eastern Aleutian area and another in the Gulf of Alaska. The fleets, comprised of two factoryships and accompanying killer vessels, had been actively engaged in whaling throughout June.

The entry of the Soviets into the king crab fishing grounds of the Gulf of Alaska occurred in early June. The Pavel Chebotnyagin, Soviet crab factoryship of the Zakharov type, shifted operations from the Bristol Bay area into the Gulf of Alaska as had been predicted.

The vessel was sighted at 56.1° N., 154.8° W., near Chirikof Island. This class of vessel is ultra-modern with numerous unique features in processing equipment, is 531 feet long over-all, has a 65-foot beam, and carries a crew of 640 men and women. Observations were that the vessel was making excellent initial catches with tangle-net gear. Two additional vessels of that type, the Andrei Zakharov and the new Eugeni Nikishin were last reported fishing for king crab in the Bristol Bay area north of Port Moller. But by mid-July the Soviet king crab fleets had departed from the area south of Kodiak Island.

Japanese fishing efforts had largely leveled off during June. Three Japanese whale factoryships were operating south of the Kenai Peninsula, each accompanied by several killer and support vessels. Another whale fleet was in the western Aleutian Islands.

Six factoryships and 75 trawler-type vessels comprised the Japanese long-line fleet operating along the 100-fathom curve between Unalaska Island and the Pribilof Islands in the Bering Sea. The shrimp fleet consisted of 2 factoryships and 26 trawlers operating north of the Pribilof Islands.

Although the Japanese Government had authorized additional vessels to engage in fish meal and oil production in the eastern Bering Sea, only 1 factoryship and 30 trawlers had arrived on the fishing grounds by the end of June.

Two Japanese factoryships were fishing for king crab north of Port Moller in Bristol Bay. Those vessels, utilizing 4 trawlers and 16 "Kawasaki" picker boats, and operating in the same general area as the Soviet crab fleets, reported numerous gear conflicts and heavy losses.

Japanese exploratory efforts in the Bering Sea and Gulf of Alaska included the Akebono Maru 51 and 52, Taiyo Maru, Tenryu Maru, and Seiju Maru. Those vessels have generally been accompanied by an observer from the U. S. Bureau of Commercial Fisheries or the Canada Department of Fisheries. Nine Japanese salmon factoryships were identified in the western Aleutian area.

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BIOLOGISTS AGREE ON DIXON ENTRANCE SALMON REPORTS:

One more step has been completed in the long procedure of clarifying questions regarding stocks of salmon, which are exploited by both Canadian and United States fishermen in the international boundary area around Dixon Entrance. The fourth meeting of the "Committee on Problems of Mutual Concern" was held on June 4, 1963, in Vancouver, B. C. Analyses of previous salmon tagging experiments, which had been exchanged this past year by Canadian and United States biologists, were approved by representatives of both countries.

A new development was the attention the Canadians called to recent tag captures by Canadian fishermen of salmon tagged by International North Pacific Fisheries Commission (INPFC) projects in offshore and coastal waters of Southeastern Alaska. The Canadians requested that the Committee's study area be expanded to include all waters along the outer coast of Alaska from Cape Spencer to Dixon Entrance.

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JAPANESE PLAN ALASKA FISH PLANT:

Governor Egan of Alaska disclosed that a Japanese firm plans to form an Alaska corporation to produce a variety of fishery products in Alaska using mainly local labor. The firm would be incorporated under Alaska law by the Tokyo firm planning the venture. Preliminary plans call for cold-storage and curing shore operations at Bristol Bay, a mobile salt-curing barge, and a mobile fish-meal factory barge. The mobile barges would be used in Cordova, Kodiak, and Southeast areas.

Yearly production (involving 200 operating days) was estimated at some 1,390,000 tons of fishery products, which would go to markets in Japan and other Southeast Asian nations. The Bristol Bay plant and mobile barge are expected to employ 90 Alaskans and 8 Japanese. Additional operations by the Japanese call for "Dungeness crab farms" in the Prince William Sound area and the production of byproducts from seaweeds.

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NEW FISHERY FIRM IN KENAI:

A new fishery firm was reported established in Kenai, Alaska. Their primary interest is in silver (coho) salmon but the operations

will not be limited to that species alone, and will include both fresh-water and marine fish. A minimum goal of 500,000 coho salmon is set for the remainder of this year.

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DUNGENESS CRAB INDUSTRY AT METLAKATLA EXPANDS:

Pan American World Airways announced that its jet transportation service had opened up a new cooked crab meat industry in Alaska. Within four months, PAA has flown nearly 40 tons of cooked Dungeness crab from Metlakatla, Alaska, to Seattle and Honolulu. Specially designed plastic containers are used for the whole cooked crabs. Shipping rates for lots of more than 1,000 pounds are: 4 cents a pound to Seattle and 20 cents a pound to Honolulu.

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SALMON FISHERMEN DEMAND HIGHER PRICES:

During June, salmon fishermen in certain areas of Bristol Bay, Chignik, Kodiak, and Southeastern Alaska stopped fishing and demanded higher prices. The final settlement in Bristol Bay provided for a two-year agreement with the fishermen to receive $1.08 per red salmon this year and $1.09 the next season. The agreement also provides for a 2-cent increase for pink salmon and 1 cent for chums. In the settlement of the price dispute (involving the seine-boat crewmen in the Icy Strait-Chatham Strait area), the Chatham, Hawk Inlet, and Excursion Inlet canneries will pay 26 cents a pound for reds, 98 cents a fish for cohos, 78 cents a fish for chums, and 38-52 cents a fish for pinks. There were indications in certain areas of Bristol Bay that the peak of the red salmon run may have occurred during the price dispute period, although there may also be something abnormal about the Bristol Bay run this year. Reports from Icy Straits indicated a tremendous run of pinks, with 2 boats landing about 25,000 fish each the first day of the open season. The State set the season to alternate 24 hours open and 24 hours closed, thereby allowing canneries to keep pace with deliveries.

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FISHERY TRENDS AT KODIAK:

The fishery economy of Kodiak continued to expand in king crab and shrimp, with salmon fast slipping from its earlier pre-eminent position in the Island economy. Kodiak is predominantly a pink salmon area and, because of last year's very successful season, neither the industry nor the fishermen were very interested in making price concessions (negotiations were hung-up between 44½ and 42 cents per pink salmon; other species prices were of minor concern).

The king crab fishery near Kodiak never really stopped during the 1963 molt season and the larger vessels were able to harvest offshore non-molting crabs at all times. Production during the month of June was expected to be one of the best months on record for the Port Wakefield crab processing plant.

In June, a shrimp processing plant in Kodiak was operating on a two-shift, 7-day-a-week schedule. A new shrimp plant affiliated with a cold-storage company was expected to be in production by the middle of July. A third shrimp plant is to be in operation by late fall.

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ARA FUNDS REQUESTED FOR FISHERY RESEARCH:

Governor Egan of Alaska reported that he had submitted to the Area Redevelopment Administration (ARA) a request for a grant of over a million dollars for a fishery biological and oceanographic research center in Kodiak Alaska. Plans include an exploratory fishing and oceanographic research vessel. The Governor emphasized that the operations of the research center must be financied through research grants.

Alaska Fisheries Investigations

SALMON SPAWNING AREA CONTRACT NEGOTIATED WITH UNIVERSITY OF ALASKA:

The Branch of River Basin Studies, U. S. Bureau of Sport Fisheries and Wildlife, has negotiated a contract with the Wildlife Department of the University of Alaska to determine the location of salmon spawning areas in the Chena River and to determine factors affecting egg success deposited in such areas. The contract is augmented by a grant from the National Science Foundation to the University for related investigations. Data obtained from this contract will be of vital importance

in determining feasibility of fish passage or the type of artificial propagation facility to be recommended on the Chena Flood Control project proposed by the Corps of Engineers near Fairbanks, Alaska.

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UGASHIK RED SALMON SMOLTS HIGHEST ON RECORD:

Over 28 million red salmon smolts were estimated to have left the Ugashik system by mid-June 1963. This is over twice as many as a year ago which was also a record year. The 2.5 million adult spawning escapement in 1960 contributed heavily as two-check migrants to this year's production, and including the one-check fish, that brood year has produced over 27 million smolts or twice as many as those produced by any other brood year. This is considered important information on the general question of what constitutes an optimum escapement for a given system.

California

PELAGIC FISH POPULATION SURVEY CONTINUED:

Airplane Spotting Flight 63-6-Pelagic Fish (June 12-13, 1963): To determine the inshore distribution and abundance of pelagic fish schools, the inshore area from the United States-Mexican Border to Halfmoon Bay, Calif., was surveyed from the air by the California Department of Fish and Game's Cessna "182" 9042T. Adverse weather limited flying time to only 2 of the 4 days originially scheduled.

The area between Point Dume and the United States-Mexican Border was surveyed on June 12. Of 243 anchovy schools observed, 196 were small schools in Los Angeles-Long Beach Harbor. Flights over the harbor area were made at 11:30 a. m. and 3:45 p. m. Pacific Daylight Time. Weather and water conditions were about the same on both flights. On the first transect at 11:30 a. m. not one fish school was sighted. Changes in fish behavior probably account for the "sudden appearance" of anchovy schools on the 3:45 p. m. flight. Changes in the angle of the sun did not appreciably alter scouting conditions.

Twelve anchovy schools were observed in Santa Monica Bay, 2 off Torrey Pines, and 33 between Coronado and the United States-Mexican Border.

Four jack mackerel schools were sighted between San Mateo Point and the Santa Margarita River. Two lampara boats were making sets on fish schools in the immediate vicinity. Interviews with the fishermen revealed that one vessel caught nothing and the other landed 5 tons of jack mackerel.

Three sardine schools were seen off Torrey Pines; 20 other fish schools in the area could not be identified.

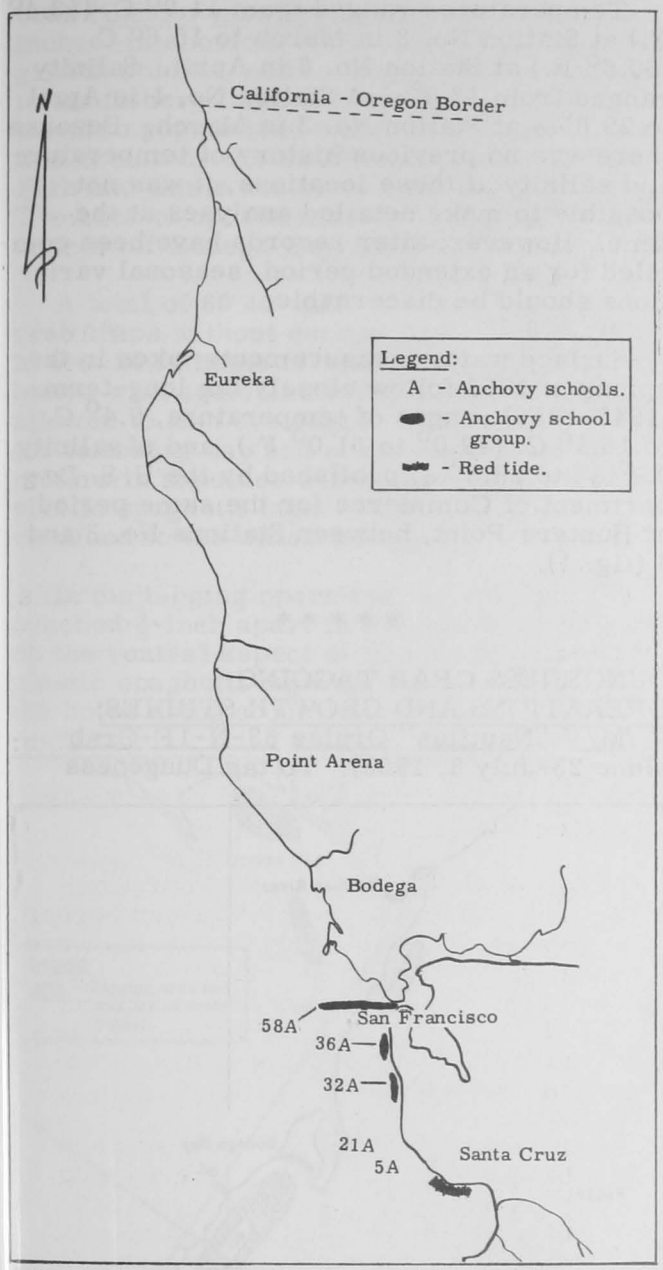
On June 13, the area between Halfmoon Bay and Point Vicente was surveyed when 252 anchovy schools and 1 unidentified school were sighted. Most of the anchovy schools were contained in three school groups. A school group off Cayucos contained 35 schools, 95 were in a loosely-knit group between Oceano and Mussel Point, and 83 were between Goleta Point and Santa Barbara.

Airplane Spotting Flight 63-7-Pelagic Fish: The area from the United States-Mexican border to the California-Oregon border was surveyed on July 8-11, 1963.

On July 8, the coast between Point Conception and the United States-Mexican border was surveyed. Only 26 anchovy schools were observed and none of those were in the Los Angeles-Long Beach Harbor area. The results of that day's survey are noteworthy because most of the bait fishery fleet was operating in that area.

Six anchovy schools off North Island and 5 schools near Coronado Strand were being fished by commercial bait craft in the San Diego area. One achovy school was seen off Oceanside, and 10 more were observed off Carlsbad. Four unidentified schools were spotted off La Jolla Point. A four-mile long reddish brown bloom was seen off Dana Point.

On July 10, cloud banks prevented aerial survey of the coast between Long Beach and Point Sur, but the region between Point Sur and the California-Oregon border was surveyed. Of 152 schools seen, 58 were observed west of the Golden Gate Bridge. That school group exceeded all the rest in total area and ranged from the Farallon Islands to the Golden Gate.



Airplane Spotting Flight 63-7-Pelagic Fish (July 8-11, 1963).

On the same day, 5 anchovy schools were observed off Point Ano Nuevo, 21 were seen off Pidgeon Point, 32 in Half Moon Bay, 4 off San Pedro Point, and 32 schools were observed off Rockaway Beach. An extensive red tide was seen in the Santa Cruz Harbor area. Thirteen bright yellow-green schools of jellyfish were spotted. Most of the larger schools exhibited diploid population concentration centers.

On July 11, clouds prevented survey of the region between San Francisco and Long Beach. On the same day, the area between Eureka and San Francisco Bay was observed. Twenty-six schools of anchovies were seen north of Dumbarton Bridge in San Francisco Bay. Heavy cloud banks prevented any more surveying that day.

No schools of other species were seen on any of the three days of surveying. Red tides were much less in evidence than on previous aerial surveys.

Note: See Commercial Fisheries Review, August 1963 p. 19.

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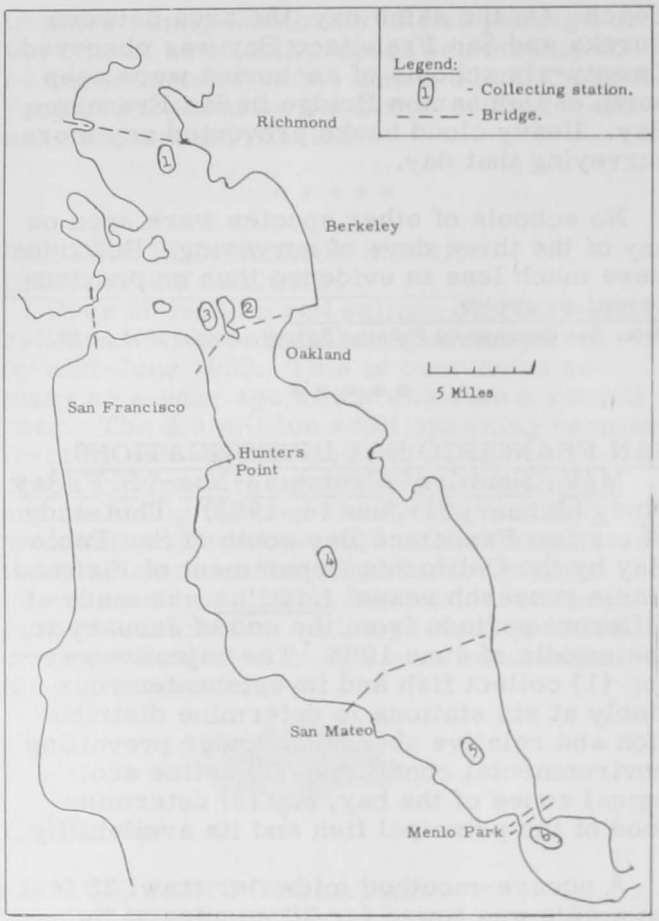
SAN FRANCISCO BAY INVESTIGATIONS:

M/V "Nautilus" Cruise 63-N3a-f S. F. Bay Study (January 31-June 14, 1963): This study of the San Francisco Bay south of San Pablo Bay by the California Department of Fish and Game research vessel Nautilus was made at different periods from the end of January to the middle of June 1963. The objectives were to: (1) collect fish and invertebrates routinely at six stations to determine distribution and relative abundance under prevailing environmental conditions, (2) define ecological zones of the bay, and (3) determine food of the principal fish and its availability.

A square-mouthed midwater trawl 25 feet on a side was towed for 20 minutes at the surface. Each of six stations was also sampled by a 15- to 20-minute bottom tow with a beam-trawl net 10 feet wide and 4 feet high with 1-inch mesh.

Samples of the bottom with its shallow burrowing fauna were brought up with a 100-cubic-inch organgepeel dredge. Those benthos samples were frozen for later sifting and identification of material. A sample was also taken at each station for San Jose State College, for their study of San Francisco Bay bottom materials. Plankton was taken with a $\frac{1}{2}$-meter net having 28 meshes per inch. Each plankton tow lasted 20 minutes and the material was preserved for classification by San Jose State College.

Temperature and salinity measurements were taken from both surface and bottom water where the depths were sufficient to make a measurable difference. At shallow stations only surface observations were made. Bottom water samples were collected with a modified Eckman bottle secured to the orangepeel dredge line 2 feet above the dredge. Temperature was measured to 0.1° C. (33.8° F.) and salinity to 0.1‰.



Shows collecting stations during San Francisco Bay Study by M/V Nautilus.

Over 15,000 fish of 37 different species and several species of crustaceans were taken during February-April. Anchovies (Engraulis mordax), herring (Culpea pallasi), and shiner perch (Cymatogaster aggregata) were taken in greatest numbers. Bay shrimp (Crago sp.) were caught at all stations.

Bottom-dwelling invertebrates were taken incidentally in the beam trawl. Those invertebrates and those taken in the bottom samples represent several phyla. The polychaetes, pelecypods, gastropods, and some of the crustacea are elements of the food chain in the Bay. It will take much more time and effort to disclose the interrelationships between the many forms of vertebrates and invertebrates.

The records of a few cruises show that much of San Francisco Bay is not a biological desert. A biological community exists which represents a tremendous potential for utilization by both sport and commercial interests.

Temperatures ranged from 11.9° C. (53.4° F.) at Station No. 3 in March to 15.6° C. (60.6° F.) at Station No. 6 in April. Salinity ranged from 13.9‰ at Station No. 1 in April to 29.8‰ at Station No. 3 in March. Because there was no previous history of temperature and salinity at those locations, it was not possible to make detailed analyses at the time. However, after records have been compiled for an extended period, seasonal variations should be discernable.

Surface water measurements taken in the spring of 1963 follow closely the long-term (1945-1956) ranges of temperature, 9.4° C. to 16.1° C. (49.0° to 61.0° F.), and of salinity, 9.4‰, to 28.8‰, published by the U. S. Department of Commerce for the same period at Hunters Point, between Stations No. 3 and 4 (fig. 1).

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DUNGENESS CRAB TAGGING OPERATIONS AND GROWTH STUDIES: M/V "Nautilus" Cruise 63-N-1F-Crab (June 23-July 8, 1963): To tag Dungeness

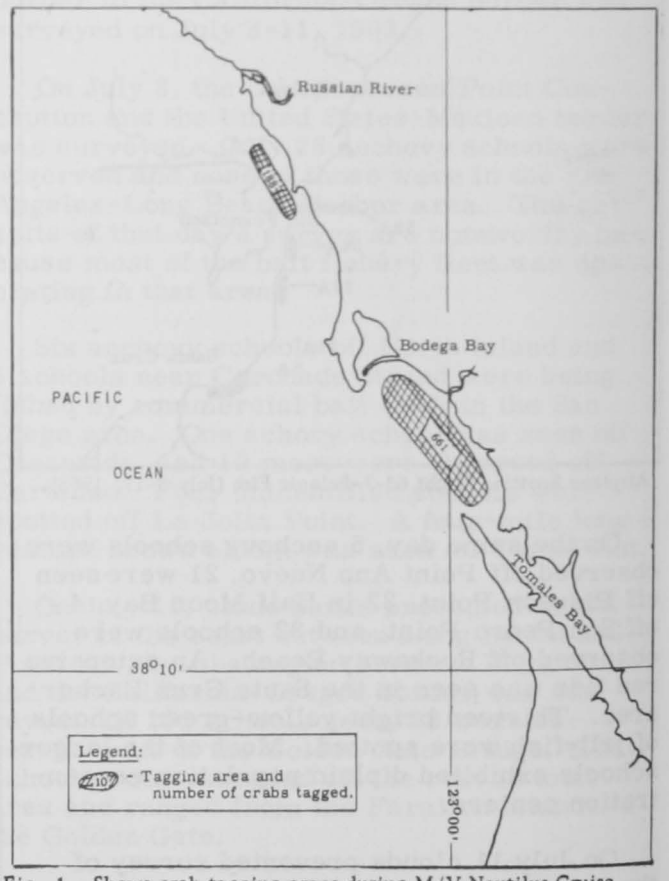

Fig. 1 - Shows crab tagging areas during M/V Nautilus Cruise 63-N-1F (June 23-July 8, 1963).

crab (Cancer magister) 130 millimeters (5.1 inches) in shoulder width and larger for growth studies, and to determine recruitment to the fishery from sublegal components of the crab populations were the objectives of this cruise by the California Department of Fish and Game research vessel Nautilus. The area of operations was in the coastal waters off Bodega Bay and San Francisco.

A total of 60 40-inch commercial-type crab traps without escape ports were fished in 6 to 20 fathoms of water. The traps were baited with squid and rockfish carcasses and allowed to fish overnight. Traps were pulled the following day and crabs over 130 millimeters in shoulder width were tagged with plastic spaghetti tags. Very soft crabs were returned to the water untagged.

In the tagging operation, two holes were punched $\frac{5}{8}$-inch apart in the pleural groove on the ventral aspect of the carapace. A plastic spaghetti tag was threaded through the holes using a curved suture needle. This placement of the tag is for maximum retention when the pleural groove opens during molting. Crabs were returned to the water immediately after tagging. One group of 200 tagged crabs was held overnight in a live box to determine mortality; one crab died.

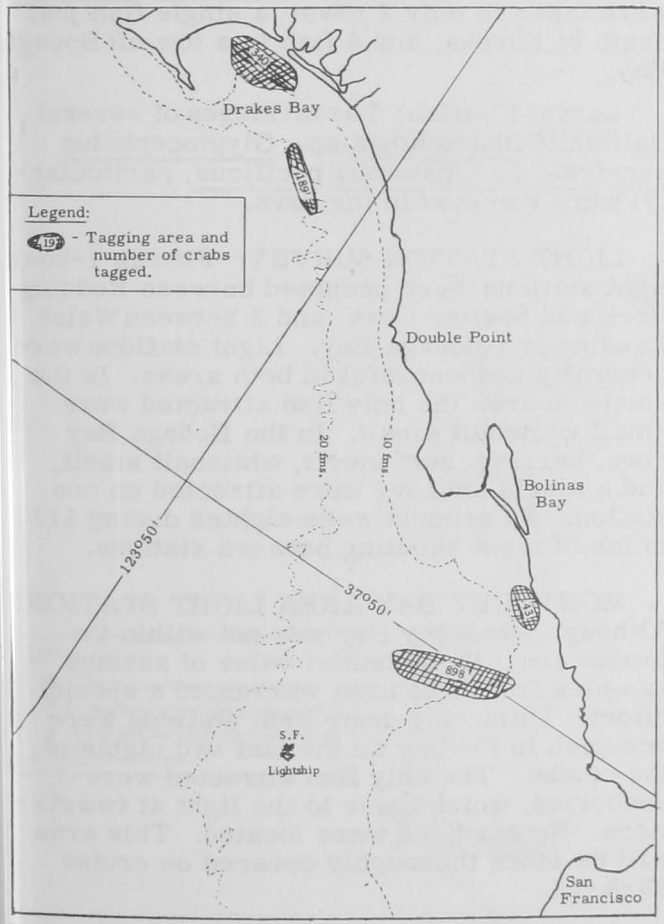

Fig. 2 - Shows crab tagging areas during M/V Nautilus Cruise 63-N-1F (June 23-July 8, 1963).

A total of 2,299 male Dungeness crabs were tagged on this cruise. They ranged from 125 to 195 millimeters (4.9 to 7.7 inches) in shoulder width. Most were 135 to 165 millimeters (5.3 to 6.5 inches) wide.

The principal tagging locations were just south of the Russian River, Bodega Bay, Drakes Bay, and between Bolinas and San Francisco (figs. 1 and 2).

Trawling was conducted for one day off San Francisco to collect samples for the crab growth study. Good samples of the 1962 year-class were obtained. Individuals from that year-class ranged from 37 to 99 millimeters (1.5 to 3.9 inches) in shoulder width at the time taken.

Note: See Commercial Fisheries Review, March 1963 p. 20.

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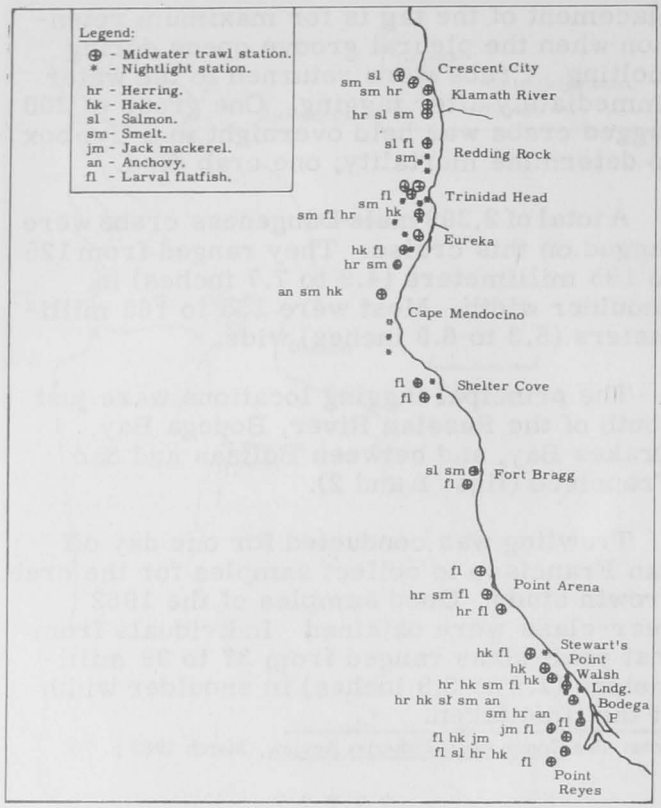
PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 63-A-3-Pelagic Fish (May 10-June 1, 1963): The objectives of this cruise were to: (1) survey the pelagic environment of Northern California, (2) continue comparing catches of night light and midwater-trawl stations, (3) obtain live sardines from Monterey Bay for blood genetic and morphometric studies. The area of operations was in the coastal waters of California between Crescent City and Point Reyes, and the Monterey Bay area.

The cruise was made by the California Department of Fish and Game research vessel Alaska. The results are presented as three separate studies: (a) midwater trawl survey of the area between Crescent City and Point Reyes, (b) a light station survey of select sections within that area, and (c) a special light-station survey of the Monterey Bay area.

MIDWATER-TRAWL SURVEY: A total of 31 midwater-trawl tows were completed. Most of them were made with the net at 50-foot depths, although depths as great as 1,000 feet were tried. Most tows were made in less than 80 fathoms of water and within 10 miles



M/V Alaska Cruise 63-A-3-Pelagic Fish (May 10-June 1, 1963).

of shore. Seven of the 31 tows were made at night. The catches of the more important species were:

Salmon: Juvenile salmon (1 to 12 fish) were caught in 6 tows. The smallest and largest ones (3.2 to 13.3 inches long) were caught off Bodega Bay. The most interesting catch was made off Fort Bragg. Five of 12 salmon in a tow had been marked by removal of the adipose fin and a portion of the right maxillary bone. The marked fish were 5 to 10.4 inches long. Four unmarked salmon were taken in 3 tows between the Klamath River and Trinidad Head.

Herring: Pacific herring (Clupea pallasi) were caught at nine stations throughout the survey area. At seven of the stations, catches were small, ranging from 1 to 59 fish. In the remaining two tows (one a night tow off Point Arena, the other an afternoon tow south of Bodega Bay), 2,000 and 4,000 fish, respectively, were caught. Most of the herring were adults ranging from 5.1 to 7.5 inches long.

Hake: Pacific hake (Merluccius productus) were caught in more tows (10) than any other species. In six tows, the catches were small, varying between 1 and 49 fish, mostly large adults. In the other four tows, however, catches of from 600 to 6,000 juveniles (about 10.2 to 11.8 inches long) were made. Those large catches, plus three smaller catches, were made between Stewarts Point and Point Reyes. The three other successful stations were off Eureka.

Osmerids: Surf smelt (Hypomesus pretiosus) were caught in six tows; the three largest catches were made between Crescent City and the Klamath River. These were mostly 5.1 to 6.7 inches long. Whitebait smelt (Allosmerus elongatus) were taken in six tows in amounts ranging from 4 to 10,000 fish. The three best tows were made off Eureka. Those fish were smaller than the surf smelt, ranging from about 2.6 to 4.3 inches long.

Mackerel: Three large jack mackerel (Trachurus symmetrius) taken in two tows off Bodega Bay were the only mackerel taken. They were 19.1 to 20.7 inches long.

Anchovies: Anchovies (Engraulis mordax) were taken in only 2 tows: a single fish just south of Eureka, and 4 fish in a tow off Bodega Bay.

Larval Flatfish: Larval stages of several flatfish (Citharichthys sp., Glyptocephalus zachirus, Microstomus pacificus, particularly) were common in the tows.

LIGHT STATION SURVEY: Fifteen 1-hour light stations were occupied between Redding Rock and Shelter Cove, and 5 between Walsh Landing and Bodega Bay. Light stations were generally unsuccessful in both areas. In the northern area the only fish attracted were small whitebait smelt. In the Bodega Bay area, herring, surf smelt, whitebait smelt, and a single anchovy were attracted on one station. No schools were sighted during 116 miles of night scouting between stations.

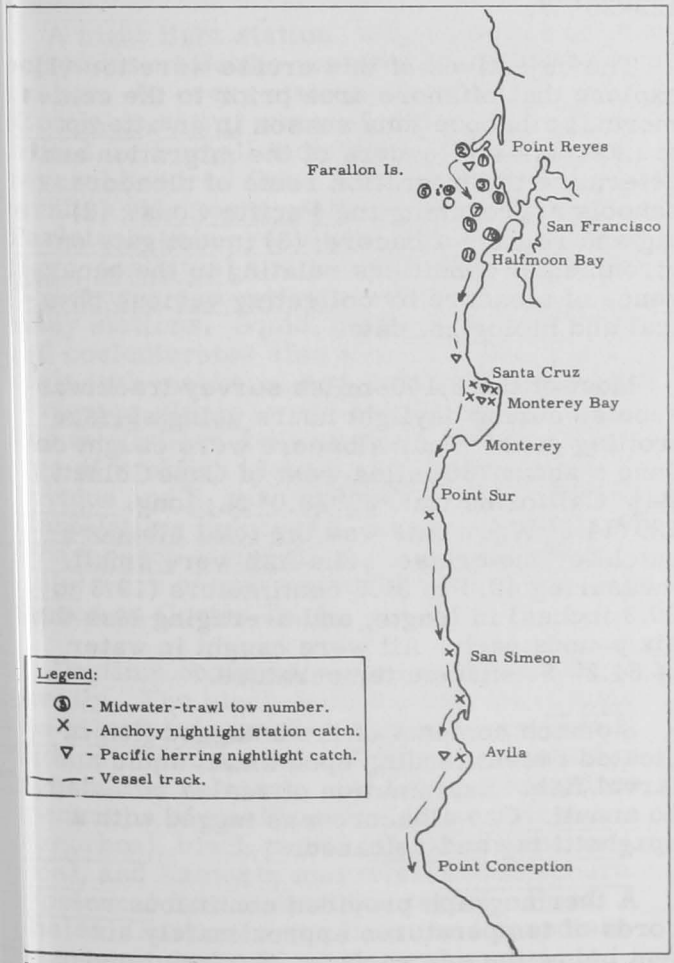
MONTEREY BAY AREA LIGHT STATIONS: Although Monterey Bay was not within the cruise area, the potential value of sardine samples from that area warranted a special effort. Thirteen $\frac{1}{2}$-hour light stations were occupied in the bay on the last two nights of the cruise. The only fish attracted were anchovies, which came to the light at two stations. No sardines were located. This area will be more thoroughly covered on cruise 63-A-4.

A total of 36 anchovy schools was sighted in Monterey Bay during 45 miles of night scouting between stations.

The weather during the entire cruise was very good for the area and time of year, although working conditions were frequently far from ideal. Sea surface temperatures ranged from 49.6° F. off Cape Mendicino to 57.9° F. off Eureka.

M/V "Alaska" Cruise 63-A-4-Pelagic Fish (June 12-July 1, 1963): The objectives of this cruise were to: (1) survey the fish and invertebrates in the pelagic environment of central California using a midwater-trawl and nightlight-blanket net gear, (2) obtain live sardines (Sardinops caeruleas) for subpopulation studies, and (3) further evaluate the midwater-trawl as a sampling device for pelagic fish species.

MIDWATER TRAWLING: Due to loss of gear, only 11 tows were made (all between Point Reyes and Halfmoon Bay). Operations were greatly hampered by extensive concentrations of jellyfish. Tows were made in the upper 20 fathoms of water in areas where the bottom was at depths of 15 to 100 fathoms. All tows except one were made during daylight hours.



hows operations of M/V Alaska Cruise 63-A-4 (June 12-July 1, 1963).

Pacific herring (Clupea pallasi), medusa fish (Icichthys lockingtoni), postlarval Pacific tomcod (Microgadus proximus), jacksmelt (Atherinopsis californiensis), and king salmon (Oncorhynchus tshawytscha) comprised the bulk of the fish catch. Jellyfish were taken in large quantities on all tows and caused extensive damage to the net on one occasion. Pacific herring were caught in the greatest quantities. They were taken in 6 of the 11 tows in quantities up to 400 fish. Sizes ranged from 53 to 180 millimeters (2.1 to 7.1 inches). Small medusa fish under 125 millimeters (4.9 inches) were present in 7 tows. King salmon were taken in 4 tows in catches ranging from 2 to 7 fish. They ranged from 87 to 572 millimeters (3.4 to 22.5 inches) standard length with most exceeding 300 millimeters (11.8 inches). Squid (Loligo opalescens) were taken in 3 tows on the more offshore stations. Complete trawl catches are shown in table.

Trawl Catches by M/V Alaska, Cruise 63-A-4

Tow No.	Herring	Medusa-fish	Jack-Smelt	King Salmon	Pacific Tomcod	Squid	Anchovy	Other
1	2	2	1	-	10	-	-	1
2	6	1	-	-	4	-	-	-
3	400	3	-	3	-	45	-	-
4	-	-	6	-	-	-	-	1
5	-	3	2	-	-	-	-	1
6	-	-	-	-	-	500	-	-
7	-	-	1	7	1	-	-	50
8	300	-	-	-	-	-	500	-
9	-	2	-	5	1	100	-	1
10	13	3	1	2	10	-	1	1
1/11	51	3	-	-	-	-	-	2

1/Indicates night tow.
"Other" includes California pompano (Palometa simillima), surfsmelt (Family osmeridae), rockfish (Family scorpaenidae), electric ray (Torpedo californica), larval flatfish (Bothids and Pleuronectids) and starry flounder (Platichthys stellatus).

NIGHTLIGHT-BLANKET NET STATIONS: A total of 48 nightlight stations were occupied--nearly half of them in Monterey Bay. Periods of adverse sea conditions reduced their efficiency from Santa Cruz southward. Almost the entire catch was comprised of anchovies (Engraulis mordax) and Pacific herring. Anchovies were taken on 8 stations and Pacific herring on 5. The number of successful anchovy stations, however, is not indicative of their distribution and density. In the 300 miles the vessel scouted, a total of

263 anchovy schools were observed, 200 of them between Santa Cruz and Halfmoon Bay. Nightlight stations were totally unsuccessful in that area.

Anchovies were caught in widely scattered areas from Santa Cruz to Avila. Almost the entire catch was made up of large adults ranging from 125 to 158 millimeters (4.9 to 6.2 inches).

Predation by adult anchovies on postlarval anchovies was observed on two occasions. Adults measuring 125 to 150 millimeters (4.9 to 5.9 inches) standard length were seen feeding on postlarvae attracted to the night light. Stomach inspection of collected adults verified the observations.

Almost the entire Pacific herring catch was taken between Point Reyes and Monterey. Large jacksmelt were present on many stations and counted from 1 to 10. Squid appeared under the light in huge schools near Monterey Harbor. No sardines were caught or observed.

In areas where both midwater trawling and nightlighting were conducted, the trawl was much more effective in collecting the pelagic species. With optimum conditions prevailing, nightlighting resulted in a single catch of Pacific herring in contrast to the variety and quantity taken by the trawl. If the trawl had been used over the entire cruise, it would have sampled the extensive anchovy concentrations missed by the nightlight. Another evident advantage of the trawl is the wide range of weather conditions in which it can be operated.

Weather conditions were excellent during the first week of the cruise, but the remainder of the cruise was hampered by intermittent periods of bad weather. Sea surface temperatures ranged from 50° F. at Point Sur to 61.2° F. in Monterey Harbor.

Note: See Commercial Fisheries Review, February 1963 p. 18.

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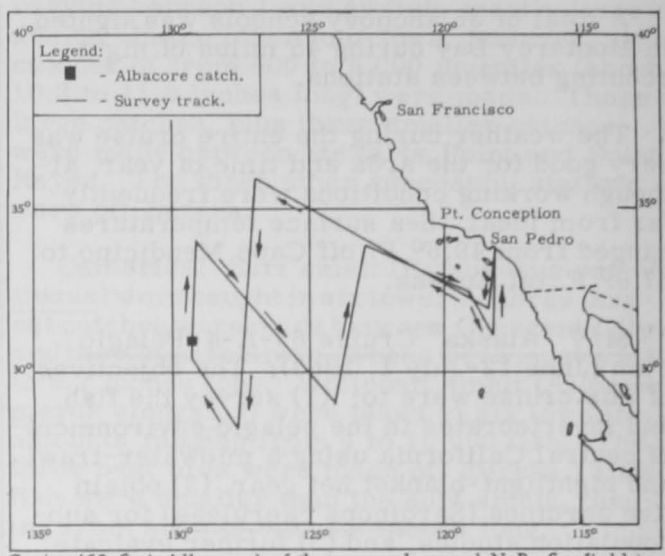
ALBACORE TUNA MIGRATION STUDIES AND TAGGING:

M/V "N. B. Scofield" Cruise 63-S-4-Albacore (May 23-June 21, 1963): Intercepting albacore tuna schools and collecting biological data was the mission of the California Department of Fish and Game research vessel N. B. Scofield during this cruise. The



Cruise (63-S-4-Albacore) of the research vessel N.B. Scofield to study migrations and collect biological data related to albacore tuna.

vessel operated in the high seas off California and northern Baja California between latitudes 28° and 36° N. and offshore to longitude 129°30' W.

The objectives of this cruise were to: (1) explore that offshore area prior to the commercial albacore tuna season in an attempt to intercept the leaders of the migration and determine the migration route of albacore schools approaching the Pacific Coast; (2) tag and release albacore; (3) investigate environmental conditions relating to the occurrence of albacore by collecting various physical and biological data.

Most of the 3,100-miles survey track was scouted during daylight hours using surface trolling gear. Four albacore were caught on June 5 about 780 miles west of Cape Colnett, Baja California (lat. 30°39.0' N.; long. 129°14.5' W.). This was the total albacore catch for the cruise. The fish were small, measuring 49.0 to 51.5 centimeters (19.3 to 20.3 inches) in length, and averaging less than six pounds each. All were caught in water of 64.2° F. surface temperature.

Stomach contents of the untagged fish indicated recent feeding upon small squid and larval fish. Examination of scales revealed no annuli. One albacore was tagged with a spaghetti tag and released.

A thermograph provided continuous records of temperatures approximately six feet below the sea surface. Surface tempera-

tures also were obtained at intervals with a bucket thermometer. Sea surface temperatures encountered along the vessel track ranged from 57.2° F. (14.0° C.) to 65.4° F. (18.6° C.). Sea temperatures suitable for albacore were found throughout most of the survey area.

A total of 81 bathythermograph (BT) casts to a depth of 450 feet were made at approximately 40-mile intervals throughout the survey. During the first half of the cruise they were read, coded, and forwarded to the National Oceanographic Data Center by way of Scripps radio WWD.

Nansen bottle casts to 10-meter (about 33 feet) depths were made at bathythermograph stations. A water sample for salinity determination was obtained at 74 BT stations.

Weather observations were recorded at 6-hour intervals throughout the cruise. These were forwarded to the U. S. Weather Bureau via Scripp's radio WWD.

A night light station was occupied on 14 occasions while the vessel drifted on sea anchor. At every station, Pacific sauries (Cololabis saira) were observed in numbers from 4 or 5 small individuals to schools of several hundred fish. Four species of lanternfish (Myctophum affine, M. californiense, Tarletonbeania crenularis, Centrobranchus nigro-ocellatus) and juvenile jack mackerel (Trachurus symmetricus) were taken at many stations. Squid, amphipods, heterpods, and coelenterates also were netted. Some adult jack mackerel and immature blue shark (Prionace glauca) were caught on hook and line at offshore drift stations. Several species of rockfish (Sebastodes serriceps, S. flavidus and S. paucispinis), Pacific whitefish (Caulolatilus princeps), sharpnose sea perch (Phanerodon atripes), and one mola (Mola mola) were caught while the vessel was anchored on Cortez Bank.

Daytime observations were logged frequently. The black-footed albatross (Diomedea migripes) was the most common bird sighted offshore. One of them was netted, tagged, and released. On several occasions specimens of Beal's petrel (Oceanodroma leucorhoa), black petrel (Oceanodroma melania), and Xantus's murrelet (Endomychura hypoleuca) flew aboard the vessel. Pilot whales, California sea lions, and porpoises also were observed on several occasions.

Three Pacific bonito (Sarda chiliensis) were caught on trolling lines near Cortez Bank and one dolphinfish (Coryphaena hippurus) was caught near the albacore-catch area. At several localities along the vessel track, concentrations of the siphonophore (Velella lata) were observed, and large numbers of Japanese glass net floats were seen in many offshore areas.

* * * * *

INVESTIGATION OF FISH LOSSES FROM DDT-TREATED IRRIGATION WATER:

A two-phase study aimed at controlling conditions which led to fish kills during the spring of 1963 in sloughs north of Sacramento, Calif., has been started by the California Department of Fish and Game in cooperation with State agricultural agencies and rice farmers. It was thought that the fish losses were caused by the discharge of rice irrigation waters which had been treated with DDT. The tests have led to recommendations by the California Agricultural Extension Service that farmers hold DDT-treated water on their rice fields for five days before allowing it to flow into sloughs, drainage ditches, or other waters.

The second phase of the study consists of a new series of tests to further investigate the DDT problem, as well as to explore the use of other chemicals for pest control on rice fields. Investigators hope to find a substitute for DDT which will eliminate the problem of possible residue buildup in wildlife. (California Department of Fish and Game, July 13, 1963.)

Note: See Commercial Fisheries Review, August 1963 p. 21.

Central Pacific Fisheries Investigations

OCEAN CURRENT STUDIES IN CENTRAL NORTH PACIFIC AIDED BY PARACHUTE DROGUES:

M/V "Charles H. Gilbert" Cruise 66 (LANAAU II) (June 7-23, 1963): A previously undescribed subsurface current feature of the North Pacific Ocean (which had been predicted from prior station and bathythermographic data) was confirmed by means of drogue studies and station data during this cruise. This new feature is associated with density gradients between the North Pacific Central and Equatorial water masses in the region 16° N. and 153°30' W.

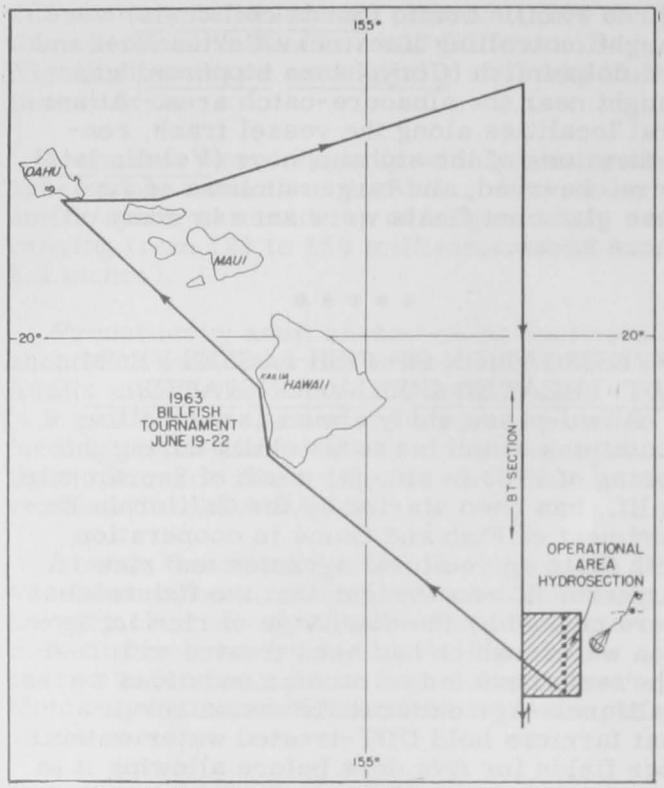


Fig. 1 - Charles H. Gilbert Cruise 66 (Lanaau II) cruise track, June 7-23, 1963.

The area of operations during this cruise by the Charles H. Gilbert, research vessel of the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu, was along longitude 153°30' W. between latitudes 22°00' and 15°22' N. The specific missions undertaken were to:

1. Investigate the physical nature of the subsurface boundary between the North Pacific Central and Equatorial water masses.

2. Determine the current structure within the boundary zone by means of parachute drogues.

3. Conduct, weather permitting, experiments with current crosses to determine (a) the current shear within the mixed surface layer, and (b) the deflection of the surface current (upper 3m.) in relation to the prevailing winds.

4. Obtain simultaneous Carbon-14 productivity measurements for samples incubated on deck, in a light bath, and in situ.

Nine hydrographic casts to 300 meters (984 feet) were made across the subsurface water mass boundary at intervals of 10 miles. The vertical sampling interval was determined from the character of the bathythermograph (BT) trace obtained prior to making each cast. In addition to the hydrocasts, a six-bottle cast was made to 300 meters each day at noon. Those data have not yet been processed but the final result should be the most detailed section yet obtained through the subtropical thermocline. In addition to the hydrographic section, two BT sections were obtained. The first one was obtained on the southbound leg of the cruise, and was used to locate the anticlinal structure of the isotherms which denotes the presence of the subsurface water mass boundary. The second BT section was obtained concurrent with the hydrographic section. Figure 1 shows the vessel's cruise track and the location of the hydrographic section.

A subsurface current moving northeast in the generally west-flowing North Pacific Equatorial Current was measured by a parachute drogue set at a depth of 350 feet. This depth coincides with the core layer of the subtropical salinity maximum. The net speed of the current after a 5-day drift period was on the order of 5 miles a day. Figure 2 shows the plot of the drift. The parachute apparently became detached during the second to the last day as evidenced by the strong westerly drift. That drogue was reset but the resulting drift was not definitive due to apparent malfunctioning of the opening device attached to the apex of the parachute.

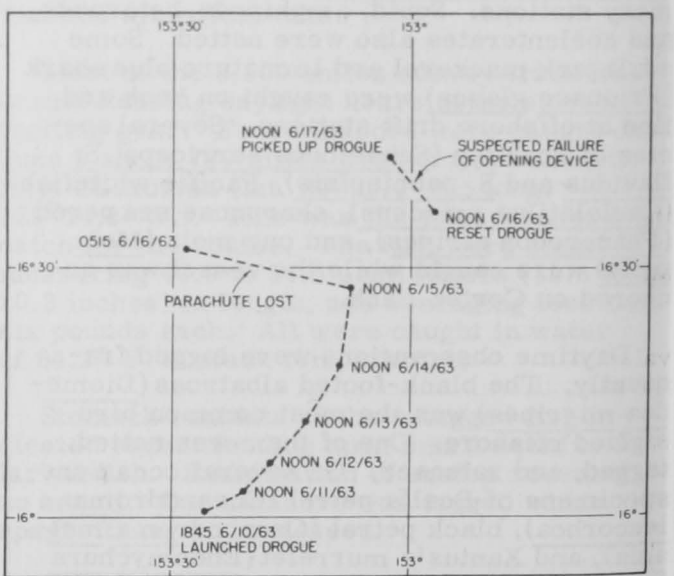


Fig. 2 - Drift of parachute drogue set at a depth of 350 feet (June 10-17, 1963), Charles H. Gilbert Cruise 66.

In addition to the drogue observations, a set of direct current observations were obtained with an Ekman current meter. These data have not yet been corrected for the vessel's drift. It is hoped that from these data at least a relative profile of the current system can be obtained. Other than the Ekman current observations, no attempts were made to investigate the current shear within the mixed layer or the deflecting effect of the wind due to the partial failure of the vessel's radar.

Carbon-14 primary productivity measurements were obtained for comparison between samples incubated on deck and those incubated in situ. The in situ samples were suspended on a light nylon line attached to a free floating buoy. The results of this study are currently being analyzed by the University of Hawaii's Botany Department.

Other activities during the cruise were:

1. A total of 260 drift cards were released.

2. The thermograph was operated continuously. No marked temperature fronts were encountered.

3. The barograph was operated continuously and standard marine weather observations were recorded and transmitted four times daily.

4. A standard watch for bird flocks and fish schools was maintained during daylight hours. Only four bird flocks were sighted and those were all within close proximity of land.

5. Two standard lures were trolled during daylight hours. The total catch consisted of 6 dolphins (C. hippurus), 1 skipjack tuna, and 1 wahoo.

6. BT casts were made at 3-hour intervals throughout the cruise. A surface salinity sample was obtained at each cast.

7. From June 11 through June 17 the sea-surface temperature, wet-dry bulb temperatures, and the atmospheric pressure were recorded at hourly intervals.

Note: See Commercial Fisheries Review, August 1963 p. 21.

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SEASONAL DISTRIBUTION OF YOUNG ALBACORE TUNA DETERMINED BY STUDY OF PREDATORS' STOMACHS:

As part of the albacore ecology program, the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu, Hawaii, has been regularly examining the stomach contents of large pelagic fish landed at the Honolulu fresh fish market, and those taken on cruises of the Laboratory's research vessel, the Charles H. Gilbert. A major purpose of the observations is to monitor the occurrence of juvenile tuna, particularly juvenile albacore. It has been shown that such large predatory fish as the marlins provide one of the best available sources of juvenile tuna specimens.

The fresh fish markets in Honolulu are supplied by a fleet of tuna long-line boats and provide a continuous source of material for the study. It is possible, therefore, to obtain an idea of the seasonal occurrence and abundance of juvenile tuna around Hawaii by examining the stomachs of the large predatory fish that are landed at the markets throughout the year. Since the inception of the Laboratory's sampling program, a full year's data have been collected. Although the number of juvenile albacore found to date is small, there are already some interesting indications. The five juvenile albacore that have been collected were taken from predators landed at the local markets during the months of August-November. These findings corroborate the results of previous studies of albacore spawning based on gonad condition, which indicated that albacore spawn around Hawaii during the summer.

Those specimens and several other juvenile albacore found in the stomachs of predators caught elsewhere in the Pacific Ocean have made it possible to describe the development of certain morphological features of the skeleton of albacore. For example, the angle that the rear edge of the skull makes with the line of the vertebral column is small in adult albacore, but it has been found that this angle is much greater in juveniles and gradually changes as the fish approach adulthood.

The examination of the stomachs of predators is a continuing program. As more juveniles are recorded, other facets of the biology of the albacore will be explained, including growth during the early stages of its life.

Note: See Commercial Fisheries Review, March 1963 p. 22.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-FEBRUARY 1963:

Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, less fresh and frozen fishery products were bought in February 1963 by the Defense Subsistence Supply Centers than in the previous month. The decline was 6.0 percent in quantity and 30.9 percent in value. The purchase of 737,817 pounds of shrimp in January 1963 resulted in an exceptionally high average price of 74.0 cents per pound for purchases in that month. Purchases in February 1963 had an average value of 54.4 cents per pound, and included 394,526 pounds of shrimp, 323,092 pounds of ocean perch fillets, 285,920 pounds of flounder fillets, 245,000 pounds of scallops, 233,040 pounds of haddock fillets, and 147,515 pounds of halibut. The February 1963 purchases also included considerable quantities of cod fillets, oysters, clams, sole fillets, and salmon.

Table 1 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, February 1963 with Comparisons

QUANTITY				VALUE			
February		Jan.-Feb.		February		Jan.-Feb.	
1963	1962	1963	1962	1963	1962	1963	1962
(1,000 Lbs.)				($1,000)			
1,964	1,089	4,053	2,840	1,068	794	2,614	1,790

Compared with the same month a year earlier, purchases in February 1963 were up 80.3 percent in quantity and 34.5 percent in value. During the first 2 months of 1963, purchases were up 42.7 percent in quantity and 46.0 percent in value from those in the same period of 1962.

Canned: Canned sardines were the principal canned fishery product purchased for use of the Armed Forces in both January and February 1963. Purchases of the three principal canned fishery products (tuna, salmon, and sardines) during the first 2 months of 1963 were far below those in the same period of 1962. But in January 1962, the purchases of the Armed Forces satisfied a large part of their canned tuna requirements for the entire year.

Table 2 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, February 1963 with Comparisons

Product	QUANTITY				VALUE			
	February		Jan.-Feb.		February		Jan.-Feb.	
	1963	1962	1963	1962	1963	1962	1963	1962
	(1,000 Lbs.)				($1,000)			
Tuna	10	-	10	3,113	6	-	6	1,739
Salmon	3	-	6	-	2	-	4	-
Sardine	57	4	94	7	24	2	39	4

Notes: (1) 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.

(2) See Commercial Fisheries Review, June 1963 p. 23.

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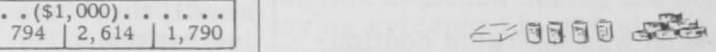
REVISED FEDERAL SPECIFICATION FOR CANNED SHRIMP PROPOSED:

A revised Interim Federal Specification for canned shrimp, to be used for all Federal procurement and purchasing programs, was requested by the General Services Administration. It is being prepared by the U. S. Bureau of Commercial Fisheries.

The proposed specification revision, which was prepared by the Bureau's Technological Laboratory at Gloucester, Mass., has been mailed to industry and other individuals concerned. The Bureau has requested that recommendations for changes be submitted to the Technological Laboratory, U. S. Bureau of Commercial Fisheries, Gloucester, Mass., by September 11, 1963. Copies of the proposed Revised Specification (PP-S-00311b) may be obtained from the Gloucester Laboratory.

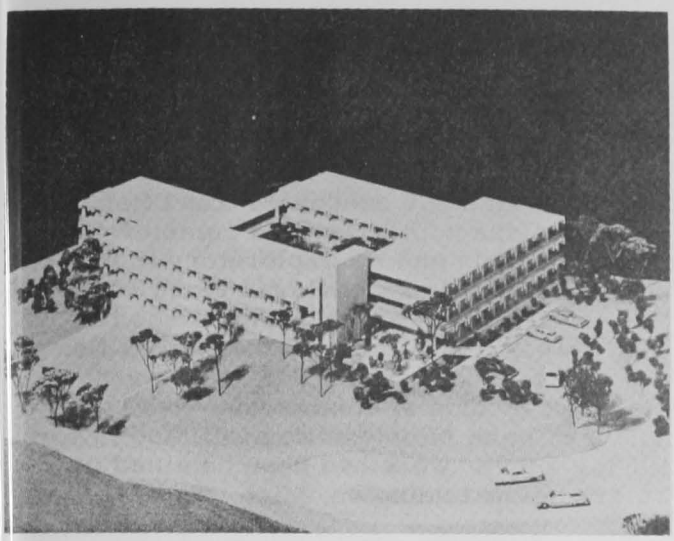


Fisheries Laboratory

NEW MARINE BIOLOGICAL LABORATORY FOR BUREAU OF COMMERCIAL FISHERIES BEING BUILT IN CALIFORNIA:

Ground was broken at La Jolla, Calif., on June 8, 1963, for a new Biological Laboratory to be built for the Bureau of Commercial Fisheries. When completed, the laboratory will be the U. S. Department of the Interior's major oceanographic-fishery research facility on the West Coast. It is scheduled for completion in about 15 months and will house a staff of some 200 Federal, State, and University of California research workers, as well as outside industry people. The laboratory will be under the direction of Dr. E. H. Ahlstrom.

The new facility will consist of a four-building complex with 65,000 feet of laboratory and office space, and will be built on a 2.4-acre tract on the University of California San Diego campus.



Architect's model of new BCF laboratory building at La Jolla, California.

The principal speaker at the groundbreaking ceremony was Under Secretary of the Interior James K. Carr, who said, "The new marine laboratory at La Jolla is a symbol of what we expect and need to accomplish in oceanography in all the fishery research centers of the Nation." Other dignitaries present were Senator Clair Engle (Calif.), and Commissioner Clarence F. Pautzke of the U. S. Fish and Wildlife Service. (National Oceanographic Data Center Newsletter, June 30, 1963.)

Fish Oils

FLAVOR CHANGE INDICATED DURING OXIDATION OF MENHADEN OIL FRACTIONS:

Recent work on a project concerning flavor change in pure oxidizing fish oils, included a study of the difference in flavor progression in oxidizing fractions of menhaden oil using fractions of differing degrees of unsaturation. This work is being conducted by the U. S. Bureau of Commercial Fisheries Technological Laboratory at Seattle, Wash. Menhaden oil fatty acid esters were fractionated into four equal fractions in the molecular still. An additional refining step was necessary to give a satisfactory flavor. The initial flavor of the three most unsaturated fractions was a very small "green" flavor reminiscent of new-mown grass.

The fraction having the lowest iodine number had a burnt fish meal-type flavor observed before in whole oil. It is not known at this time if this burnt flavor is that from saturated fatty acid components or other compounds distilled over in the same boiling range. It has also been noted that all three of the most unsaturated fractions pass through a "cod-liver oil" type "fishiness" before developing characteristic rancidity. This is not in accord with the hypothesis formerly held that this type of "fishiness" might be associated with the unique fish oil acids--those with the highest degree of unsaturation--in which case fraction four (the most unsaturated of the fractions) would have the most if not all of this type of "fishiness" during oxidation. Work on oxidation of menhaden oil fractions is being continued.

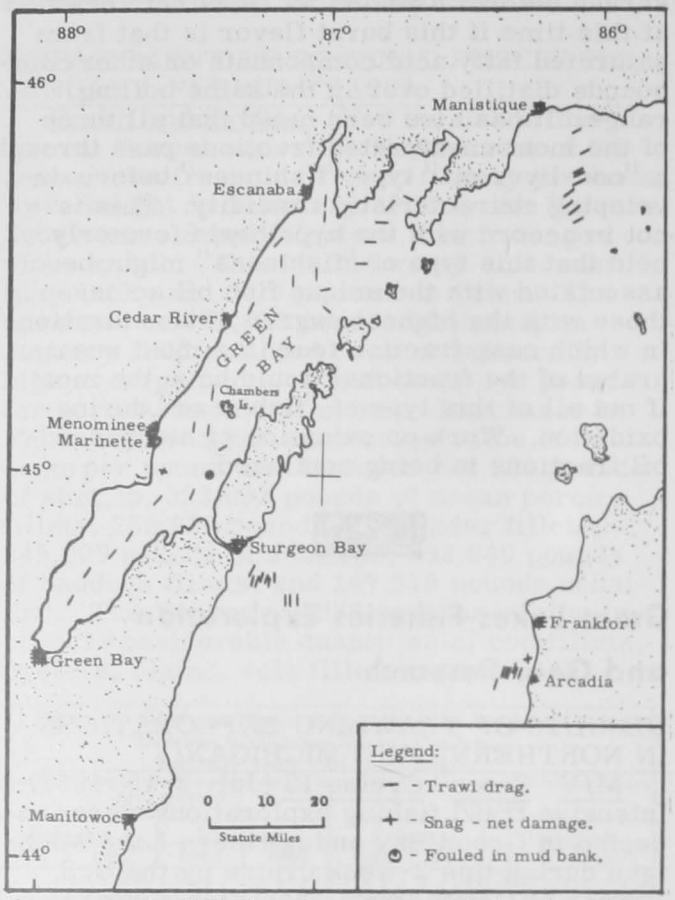
Great Lakes Fisheries Exploration and Gear Research

RESULTS OF TRAWLING EXPLORATIONS IN NORTHERN LAKE MICHIGAN:

M/V "Cisco" Cruise 12 (July 2-15, 1963): Intensive trawl fishing explorations were conducted in Green Bay and northern Lake Michigan during this 2-week cruise by the U. S. Bureau of Commercial Fisheries research vessel Cisco. Primary objectives were to: (1) determine the geographic and depth distribution and the abundance of various fish stocks, (2) define areas suitable for otter-trawl-type fishing, and (3) assess the effectiveness of commercial-type otter trawls for catching abundant species such as alewife, smelt, and bloater chubs. The areas explored will be revisited periodically for some time in order to follow seasonal fluctuations in the distribution of fish and their availability to otter trawls.

In order to expedite and economize commercial fisheries research activities going on concurrently in Lake Erie and Lake Michigan, the Bureau's research vessels Cisco and Kaho exchanged duties during this cruise period. While the Cisco was used for trawl explorations in Green Bay and northern Lake Michigan, the Kaho was used for environmental research in Lake Erie.

Noteworthy features of Cruise 12 include the virtually straight-alewife catches taken in Green Bay, the generous amount of obstruction-free trawlable grounds located in both



Area covered by M/V Cisco during Cruise 12 (July 2-15, 1963).

Green Bay and northern Lake Michigan, and the total (or near total) absence of yellow perch, whitefish, and yellow pike from trawl catches throughout the cruise. Those findings may prove to be important in advancing the development of methods for utilizing alewife which have become extremely abundant in recent years, and often a nuisance in Lake Michigan and connecting waters. Like the predatory sea lamprey, the alewife is another Great Lakes invader from the Atlantic Ocean.

Green Bay pound-net fishermen at Cedar River and Menominee have produced several million pounds of alewife for animal food markets in the past year or two. Pound-net fishing is effective, however, only when fish are in relatively shallow inshore waters. Trawling could make it possible to follow alewife into deeper waters and extend the producing season from the present few weeks to as long as 9 or 10 months. Commercial trawlers have accomplished this objective in southern Lake Michigan since 1959. Such an extension of the production period provides a considerable advantage in handling and storing the catch for supplying processors who operate at a sustained level throughout the year.

The Bureau has conducted trawl fishing investigations with chartered commercial fishing vessels and its exploratory fishing vessel Kaho in Lake Michigan since 1960. The biological research vessel Cisco has used trawls for sampling Great Lakes fish populations since 1954. The assessment of the trawl method of commercial fishing in northern Lake Michigan was initiated in April 1963; all prior work had been confined to waters below Ludington, Mich., and Algoma, Wis.

Working closely with State fisheries agencies in Michigan and Wisconsin, the Bureau has been instrumental in establishing a trawl fishery in southern Lake Michigan which has produced from 7.0 to 8.7 million pounds of fish during each of the last three years. The trawl catch amounted to about 34 percent of

Table 1 - Summary of Production Rate and Species Composition of Trawl Catches from Green Bay during M/V Cisco Cruise 12

Nearest 5-Fathom Depth Increment	No. of Drags	Catch Rate in Pounds Per Drag		Catch Composition	
		Range	Average	Species	Percentage of Catch
Green Bay--Chambers Island and South					
5	2	395 to 629	512	Alewife	98.6
				Smelt	0.0
				Yellow perch	0.6
				Other	0.8
10	1/2	50 to 553	302	Alewife	95.3
				Smelt	0.8
				Yellow perch	0.6
				Other	3.3
15	2/5	1 to 120	58	Alewife	65.1
				Smelt	34.2
				Yellow perch	0.0
				Other	0.7
Green Bay--North of Chambers Island					
5	5	100 to 290	169	Alewife	98.9
				Smelt	0.0
				Yellow perch	0.4
				Other	0.7
10	6	1 to 862	419	Alewife	99.7
				Smelt	0.0
				Yellow perch	0.0
				Other	0.3
15	3	60 to 290	128	Alewife	88.8
				Smelt	10.4
				Yellow perch	0.0
				Other	0.8
20	3	27 to 144	94	Alewife	53.4
				Smelt	43.4
				Yellow perch	0.0
				Other	3.2

1/Two other drags made in this depth; one encountered snag and tore up. The trawl gear malfunctioned during the other drag.

2/One other drag was halted; gear fouled in mud bank.

the total Lake Michigan commercial fish production in 1961. At certain times of the year, trawlers catch as much as 9 tons of alewife in a single drag lasting only 10 to 30 minutes. State fisheries agencies and the Bureau keep commercial trawl operations under careful surveillance in order to follow the effects of trawling on species other than alewife and bloater chubs which are plentiful. So far, other species (mostly large chubs) have made up less than 10 percent of the annual Lake Michigan trawl catch.

FISHING RESULTS: A total of 57 drags was made with a standard 52-foot (headrope) Gulf of Mexico-type semiballoon fish trawl. All drags lasted 30 minutes except for three, which were terminated when the net became fouled on bottom obstructions. Resulting gear damage was minor. Bottom conditions

Table 2 - Total Weight (in Pounds and Species Composition) of 30-Minute Trawl Catches at Trawling Stations off Sturgeon Bay, Wis., and Arcadia and Manistique, Mich., during M/V Cisco Cruise 12

Nearest 5-Fathom Depth Increment	Sturgeon Bay		Arcadia		Manistique	
	Catch in Pounds	Species (Percentage of Catch)	Catch in Pounds	Species (Percentage of Catch)	Catch in Pounds	Species (Percentage of Catch)
10	1	1/A-(100) 2/B-(0) C-(0) O-(0)	6/ 0		115	A-(78) B-(3) C-(3) 3/O-(16)
15	38	A-(5) B-(63) C-(13) 3/O-(19)	69	A-(3) B-(62) C-(30) O-(5)	150	A-(23) B-(11) C-(6) 3/O-(60)
20	32	A-(2) B-(53) C-(44) O-(1)	225	A-(0) B-(66) C-(33) O-(1)	42	A-(5) B-(33) C-(29) 3/O-(33)
25	55	A-(0) B-(73) C-(27) O-(0)	137	A-(0) B-(59) C-(40) O-(1)	6	A-(0) B-(33) C-(0) 3/O-(67)
30	16	A-(0) B-(69) C-(31) O-(0)	340	A-(0) B-(76) C-(24) O-(0)	12	A-(0) B-(33) C-(25) O-(42)
35	91	A-(1) B-(66) C-(33) O-(0)	7/225	A-(0) B-(76) C-(24) O-(0)	6	A-(17) B-(67) C-(16) O-(0)
45	8	A-(12) B-(63) C-(25) O-(0)	106	A-(0) B-(74) C-(24) O-(1)	35	A-(3) B-(43) C-(54) O-(0)
50	4/----		----		115	A-(0) B-(70) C-(20) 5/O-(10)
60	80	A-(0) B-(14) C-(6) 5/O-(80)	----		12	A-(0) B-(42) C-(0) 5/O-(58)
70	12	A-(33) B-(0) C-(0) 5/O-(67)	66	A-(2) B-(35) C-(15) 5/O-(48)	----	
80	206	A-(0) B-(2) C-(1) 5/O-(97)	----		----	

1/A-Alewife, B-Bloater chub, C-Large chub, O-Other species.
2/(O) = less than one percent.
3/All smelt.
4/---- Suitable trawling areas but not fished this cruise.
5/All freshwater sculpin.
6/Snag - tore net.
7/One other drag resulted in a "water haul" caused by a strong current.

and vertical distribution of fish were determined with a high-resolution white-line-type depth-sounder recorder.

Using an hourly catch rate of 500 pounds or more as a basis for indicating a potential for profitable commercial trawl fishing, good results were obtained in Green Bay itself, and in Lake Michigan proper off Arcadia, Mich. Catches were virtually alewife only at all depths fished in Green Bay, while bloater chub (at depths of 15 to 50 fathoms) and freshwater sculpin (at depths of 60 to 80 fathoms) dominated catches in the open lake. Although catches were relatively small off Sturgeon Bay, Wis., and Manistique, Mich., the bottom was found suitable for trawling and it is presumed that trawl fishing will be better in those areas at other times.

Commercially significant catches of alewife were taken in Green Bay only (table 1). Three drags at depths between 3 and 8 fathoms in the southern half of the Bay produced 390, 530, and 620 pounds. Seven drags in the northern half of the Bay, at depths from 3 to 16 fathoms, produced catches ranging from 290 to 860 pounds and averaging 438 pounds of alewife per drag.

Lake Michigan proper (table 2) yielded commercially significant catches off Arcadia, Mich., only, where bloater chub catches of 223, 225, and 340 pounds per drag were taken at depths of 20, 35, and 30 fathoms, respectively. Large chub made up 24 to 33 percent of those catches. Best catches off Sturgeon Bay were 90 pounds of chub at 35 fathoms and 200 pounds of freshwater sculpin at 80 fathoms. Best catches off Manistique were 90 pounds of alewife, 90 pounds of smelt, and 103 pounds of chub at 10, 15, and 50 fathoms, respectively.

In Green Bay, species other than alewife were taken as follows:

Species	No. of Drags Yielding	Size of Catch
Chubs	3	up to 3 pounds
Herring	4	up to 2 pounds
Sculpins	4	less than 1 pound
Sea lamprey	5	1 individual/drag
Shiners	1	less than 1 pound
Smelt	4	5 to 84 pounds
Suckers	3	5 to 20 pounds
Whitefish	7	up to 3 pounds
Yellow perch	5	up to 3 pounds

In Lake Michigan proper, species other than chubs appeared in catches as follows:

Species	No. of Drags Yielding	Size of Catch
Alewife	16	up to 15 pounds except one 90-pound catch
Herring	4	up to 2 pounds
Sculpins	14	up to 12 pounds except 3 catches of 32, 64, and 200 lbs.
Smelt	16	up to 16 pounds except one 90-pound catch
Stickleback	1	less than 1 pound
Whitefish	1	one small individual

BIOLOGICAL DATA COLLECTED: Cooperating scientists from the Bureau's Division of Biological Research aboard the Cisco during the Green Bay portion of the cruise collected length, weight, sex, and state-of-maturation data of alewife and smelt. Scale samples were taken from alewife for age and growth studies.

WATER TEMPERATURES: Bathythermograph recordings revealed a high degree of stratification throughout the areas investigated. Surface temperatures ranged from 56° F. to 74° F. in Green Bay and from 56° F. to 60° F. in open Lake Michigan waters.

Note: See Commercial Fisheries Review, August 1963 p. 23.

Great Lakes Fishery Investigations

WESTERN LAKE SUPERIOR FISHERY SURVEY CONTINUED:

M/V "Siscowet" Cruise 3 (June 24-July 3, 1963): Studies of the abundance and distribution of juvenile lake trout in western Lake Superior were continued during this cruise by the U. S. Bureau of Commercial Fisheries research vessel Siscowet. Particular emphasis was given to bottom trawling in outlying waters, where small lake trout are less abundant than in areas near the planting sites. The average number of juvenile lake trout caught in each 15-minute trawl tow at stations located 10 miles or more from the nearest planting site varied from nothing to 3.5. At distances of 5 miles or less the catch ranged from 10 to 23 per tow. Of 246 juvenile lake trout taken in trawls during the cruise, a total of 244 (99.2 percent) were hatchery-reared. Most were taken at depths of 20-25 fathoms.

Experimental gill nets (2 nets each of six mesh sizes, from 2 to $3\frac{1}{2}$ inches), set at 25-28 fathoms east of Madeline Island and south of Stockton Island, yielded 107 small lake trout of which 102 (95.3 percent) were fin-clipped. All of the fin-clipped lake trout

caught during the cruise had been planted in the Bayfield region.

Other species commonly taken in the trawls and gill nets were smelt, chub (bloater), and sticklebacks. One 15-minute trawl tow at 15 fathoms yielded 52 yearling coregonines (whitefish).

Large-mesh plankton nets towed at 1 to 18 fathoms below the surface took 22 larval fish, among which were coregonines, smelt, trout-perch, and sculpin.

Surface water temperatures during this cruise ranged from 45.9° F. in Pikes Bay to 66.9° F. east of Madeline Island.

Note: See Commercial Fisheries Review, August 1963 p. 28.

* * * * *

ENVIRONMENTAL CONDITIONS IN APOSTLE ISLANDS AREA OF LAKE SUPERIOR STUDIED:

M/V "Siscowet" Cruise 4 (July 15-24, 1963): Midsummer environmental conditions were studied at three limnological stations in the Apostle Islands region of Lake Superior on this cruise by the U. S. Bureau of Commercial Fisheries research vessel Siscowet. The limnological collections included water samples, bottom and plankton samples, records of water temperature, and Secchi-disc readings. Surface water temperatures reached 69.3° F. among the islands but in the open lake the water temperature was 57.9° F. Plankton appeared to be more abundant in the warmer waters of the island region.

Experimental gill nets (two nets each of six mesh sizes, from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches) were fished at 15-27 fathoms at Presque Isle Bay, Punky Bay, and just east of Madeline Island to establish a catch-per-unit-effort index for lake trout which can be used to measure the relative abundance of naturally-produced and hatchery-reared lake trout in future years.

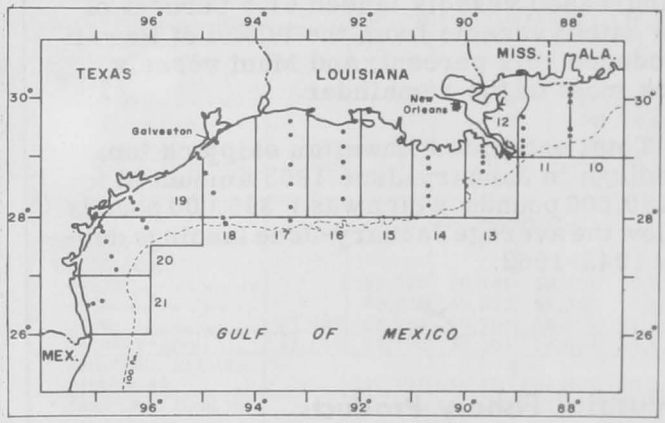
The total catch from twelve 2-night sets (43,000 feet of gill nets) was 333 lake trout (ranged from 8.6 to 27.0 inches long) of which 313 (94 percent) were fin-clipped. Most of the lake trout were re-marked by removal of the anal fin and returned alive to the water. The lake trout planted at Bayfield in 1960-61 were most common among the fin-clipped fish. Other species taken in the gill nets (in order of frequency) were smelt, bloater chub, lake herring, whitefish, and longnose suckers.

Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-7 (July 10-17, 1963): Catches of brown shrimp were especially good in 3 of the 8 statistical areas covered during this cruise by the chartered research vessel Gus III, operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory at Galveston, Tex. This cruise off the Louisiana and Texas coasts is part of a shrimp distribution study in the Gulf of Mexico.

More brown shrimp (mostly small) were caught in the 10-20 fathom depth than other depth ranges. White shrimp catches from most areas were 15-20 count and were best at stations nearer shore. One 3-hour tow with a 45-foot shrimp trawl was made in each of the 3 depth ranges in all areas.



Shows the station pattern for the shrimp distribution studies in the Gulf of Mexico during Cruise 7 of Gus III.

Areas 14 and 20 yielded the best catches of brown shrimp, mostly 31-40 count from 10-20 fathoms. The yield of large brown shrimp (15-20 count) from those areas was small, but with a relatively good catch of 23 pounds of 15-20 white shrimp from 0-10 fathoms in area 20.

Area 13 yielded a total of 48 pounds of brown shrimp about evenly distributed among the 3 depth ranges, and 2 pounds of 15-20 count white shrimp.

A total catch of 51 pounds from Area 18 included 40 pounds of small brown shrimp, mostly from 0-10 fathoms. The remainder was large white shrimp (15-20 count) from that same depth.

Large white shrimp (15-20) were present in catches from all areas but one. The percentage of white shrimp taken from those areas ranged from 22 to 60 percent of the total catch per area, with the higher white shrimp ratio from Areas 16 and 19.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, August 1963 p. 29.

Hawaii

SKIPJACK TUNA LANDINGS, JANUARY-JUNE 1963:

Skipjack tuna landings in Hawaii during June 1963 were about 1 million pounds, or 755,000 pounds below the 1948-62 average for the month. This June there were 128 productive vessel trips. Individual catches ranged from 180 pounds to 23,920 pounds. Oahu-based vessels landed 61.5 percent of the catch; vessels from the Island of Hawaii produced 19.2 percent; and Maui vessels took most of the remainder.

Total estimated Hawaiian skipjack tuna landings in January-June 1963 amounted to 2,750,000 pounds, which was 1,395,000 pounds below the average January-June landings during 1948-1962.

Industrial Fishery Products

U.S. FISH MEAL AND SOLUBLES:

Production and Imports, January-June 1963: Based on domestic production and imports, the United States available supply of fish meal for January-June 1963 amounted to 272,090 short tons--9,368 tons (or 3.6 percent) more than during the same period in 1962. Domestic production was 31,680 tons (or 26.0 percent) less, but imports were 41,048 tons (or 29.1 percent) higher than in the same period in 1962. Peru continued to lead other countries with shipments of 136,051 tons.

The United States supply of fish solubles (including homogenized fish) during January-June 1963 amounted to 42,923 tons--a decrease of 12,845 tons as compared with the same period in 1962. Domestic production and imports dropped 21.4 percent and 43.1 percent, respectively.

U. S. Supply of Fish Meal and Solubles, January-June 1963 with Comparisons

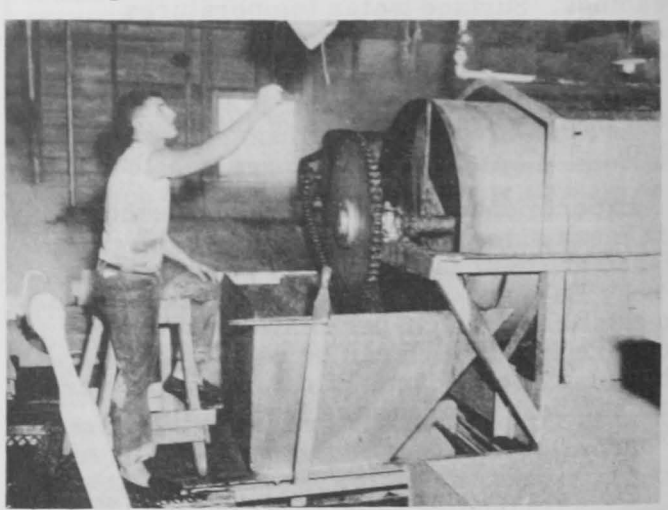
Item	Jan.-June 1/ 1963	Jan.-June 1962	Total 1962
	(Short Tons)		
Fish Meal and Scrap:			
Domestic Production:			
Menhaden	68,528	89,772	238,680
Tuna and mackerel	10,369	14,968	26,559
Herring	428	1,141	5,095
Other	10,831	15,955	40,898
Total production	90,156	121,836	311,232
Imports:			
Canada	23,328	23,242	42,806
Peru	136,051	106,377	186,249
Chile	16,798	3,682	9,247
So. Africa Republic	4,466	7,184	10,084
Other countries	1,291	401	3,921
Total imports	181,934	140,886	252,307
Available fish meal supply	272,090	262,722	563,539
Fish Solubles:			
Domestic production 2/	40,484	51,478	124,334
Imports:			
Canada	1,341	795	1,335
Iceland	-	2,205	2,332
Other countries	1,098	1,290	2,641
Total imports	2,439	4,290	6,308
Available fish solubles supply	42,923	55,768	130,642

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

* * * * *

U. S. FISH MEAL, OIL, AND SOLUBLES:

Production, July 1963: Preliminary data on U. S. production of fish meal, oil, and solubles for July 1963 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.



Fish pumps are used to carry fish from the hold of the vessel into the reduction plant. From the dewatering sieve, a Moss Point, Miss., plant uses a "quarter box," which measures the quantity of fish by volume rather than by weight.

U. S. Production[1] of Fish Meal, Oil, and Solubles, July 1963 (Preliminary) with Comparisons				
Area	Meal	Oil	Solubles	Homogenized[3]
	Short Tons	1,000 Pounds	Short Tons	Short Tons
July 1963:				
East & Gulf Coasts	38,487	28,276	15,238	2,531
West Coast[2]	2,030	468	1,292	-
Total	40,517	28,744	16,530	2,531
Jan.-July 1963 Total	130,673	98,532	53,173	6,372
Jan.-July 1962 Total	177,438	143,294	65,694	8,020

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes Hawaii, American Samoa, and Puerto Rico.
3/Includes condensed fish.
Note: Beginning with March 1963 fish oil is shown in pounds instead of gallons. Conversion factor, 7.75 pounds equal 1 gallon.

* * * * *

Production, June 1963: During June 1963, 34,500 tons of fish meal and 27.6 million pounds of oil were produced in the United States. Compared with June 1962, this was a decrease of 26,671 tons or 44 percent in meal and scrap production, and a decrease of approximately 27.3 million pounds or 50 percent in oil.

Menhaden meal showed a decrease of 24,421 tons or 46 percent, while menhaden oil (26.3 million pounds) was 50 percent less than in June 1962.

A total of 13,587 tons of fish solubles was manufactured in June 1963--a decrease of 37 percent compared with the same month in 1962. Production of homogenized condensed fish amounted to 1,341 tons--a decrease of 1,829 tons or 58 percent.

The quantity of fish meal processed during the first 6 months of 1963 amounted to 90,156 tons--31,680 tons less than in the same period of the previous year. Fish solubles and homogenized fish production totaled 53,366 tons--an increase of 1,888 tons. Production of marine-animal oil amounted to 69.8 million pounds--a decrease of 25.8 million pounds.

Table 1 - U. S. Production of Fish Meal, Oil, and Solubles, June 1963 1/ with Comparisons

Product	June		Jan.-June		Total
	1/1963	1962	1/1963	1962	1962
	(Short Tons)				
Fish Meal and Scrap:					
Herring	278	795	428	1,141	5,095
Menhaden 3/	29,147	53,568	68,528	89,772	238,680
Sardine, Pacific	-	-	9	648	702
Tuna and mackerel	939	2,837	10,369	14,968	26,559
Unclassified	4,136	3,971	10,822	15,307	27,297
Total	34,500	61,171	90,156	121,836	298,333
Shellfish, marine-animal meal and scrap	4/	4/	4/	4/	12,899
Grand total meal and scrap	4/	4/	4/	4/	311,232
Fish solubles:					
Menhaden	12,018	18,734	28,573	30,275	84,885
Other	1,569	2,842	8,070	14,383	28,353
Total	13,587	21,576	36,643	44,658	113,238
Homogenized condensed fish	1,341	3,170	3,841	6,820	11,096
	(1,000 Pounds)				
Oil, body:					
Herring	2/	831	2/	885	5,255
Menhaden 3/	26,316	52,413	64,447	88,290	237,815
Sardine, Pacific	-	-	-	148	167
Tuna and mackerel	269	437	1,664	2,172	5,175
Other (including whale)	1,042	1,243	3,677	4,109	7,396
Total oil	27,627	54,924	69,788	95,604	255,808

1/Preliminary data.
2/Included in "other" or "unclassified."
3/Includes a small quantity of thread herring.
4/Not available on a monthly basis.
Note: Beginning with February 1963, fish oil is shown in pounds instead of gallons. Conversion factor, 7.75 pounds equal 1 gallon.

* * * * *

Major Indicators for U. S. Supply, June 1963: United States production of fish meal in June 1963 was lower by 36.7 percent, as compared with June 1962. Fish oil and fish solubles production also decreased by 48.8 percent and 33.8 percent, respectively.

Major Indicators for U.S. Supply of Fish Meal, Solubles, and Oil, June 1963					
Item and Period	1963	1962	1961	1960	1959
	(Short Tons)				
Fish Meal:					
Production 1/:					
August	-	38,955	57,031	49,709	47,364
July	-	52,574	62,586	55,696	52,132
June	36,982	58,397	53,162	44,293	52,006
January-May	55,656	55,748	55,978	46,646	39,467
Jan.-Dec. prelim. totals 2/	-	288,336	289,039	257,969	275,396
Jan.-Dec. final tot.	-	310,000	311,265	290,137	306,551
Imports:					
August	-	28,253	19,026	8,340	5,695
July	-	25,857	18,710	13,131	4,303
June	-	26,453	19,317	11,178	10,386
January-May	163,482	114,433	88,146	55,197	94,585
January-December	-	252,307	217,845	131,561	133,955
Fish Solubles:					
Production 3/:					
August	-	15,833	19,603	16,891	30,378
July	-	22,165	21,870	20,208	33,133
June	16,109	24,350	17,821	19,549	29,594
January-May	26,373	24,886	20,132	19,742	33,721
Jan.-Dec. prelim. totals	-	120,063	109,018	106,361	176,913
Jan.-Dec. fin. tots.	-	124,334	112,241	98,929	165,359
Imports:					
August	-	422	318	180	4,718
July	-	306	708	96	4,938
June	-	872	207	149	954
January-May	2,116	3,418	1,012	2,369	8,871
January-December	-	6,308	6,739	3,174	26,630
	(1,000 Pounds) 5/				
Fish Oils:					
Production:					
August	-	33,526	50,749	38,052	30,043
July	-	46,608	58,533	41,362	32,108
June	27,432	53,565	48,794	36,207	37,401
January-May	41,166	39,299	38,504	16,894	24,676
Jan.-Dec. prelim. totals 4/	-	257,131	259,400	206,848	189,240
Jan.-Dec. final tot.	-	255,808	266,670	215,861	193,324
Exports:					
August	-	33,272	13,304	1,395	18,367
July	-	128	4,421	40,603	28,276
June	-	4,922	21,036	14,360	11,358
January-May	97,551	58,084	47,092	37,191	37,999
Jan.-Dec. totals	-	123,050	122,486	143,659	144,481

1/Does not include crab meat, shrimp, and misc. meals.
2/Preliminary data computed from monthly data. Fish meal production reported currently comprised 90 percent for 1959, 89 percent for 1960, 93 percent for 1961 and 1962.
3/Includes homogenized fish.
4/Preliminary data computed from monthly data. Represents over 95 percent of the total production.
5/Beginning with March 1963 fish oil is shown in pounds instead of gallons. Conversion factor, 7.75 pounds equal 1 gallon.
Note: Data for 1963 are preliminary.

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FISH MEAL IS A RELIABLE SOURCE OF TRACE MINERALS:

When comparisons are made between nutritional values of fish meal and other protein

concentrates, the trace minerals are not always taken into consideration. The value of such trace minerals should not be ignored. The reasons are given in the paper "Nutrient Composition and Evaluation of British Columbia Whole Herring Meal"[1/]:

> "Today there is a tendency in formulating poultry feeds to use fewer and fewer major ingredients in any given ration. For example, in a corn-soya broiler ration as much as 90 percent of the total ration may consist of corn and soyabean oil meal alone. With this type of ration there is an increased possibility of encountering deficiencies of trace minerals as compared with the situation some years ago when rations were composed of a much greater variety of natural feedstuffs such as oats, bran and wheat middlings. In the latter case there was a probability that the grains and grain by-products came from different areas and there was accordingly little likelihood of soil deficiencies in any particular area adversely influencing the mineral composition of the ration as a whole."

Fish meal can be relied upon to supply a variety of valuable minerals, including trace minerals, as shown in the table.

Mineral Content of Menhaden Meals[1/] (Mean of 6 Meals)

Mineral	Percent	Mineral	p. p. m.
Calcium	6.0	Boron	1.8
Magnesium	0.2	Cobalt	1.4
Phosphorus	3.5	Copper	7.7
Potassium	0.4	Fluorine	89
Salt (NaCl)	0.6	Iodine	4.7
Sulfate (SO_4) Water soluble	0.1	Iron	572
		Manganese	55.1
		Zinc	134

1/Snyder, D. G., L. E. Ousterhout, and others. "The Evaluation of the Nutritive Content of Fish Meals by Chemical Methods." Poultry Science XLI, 1736, 1962.

The table includes information not only on the minerals usually reported upon but also on some minerals upon which little or no information has been available.

According to a group of Norwegian workers,[2/] in fish meal "the high content of some minerals, especially. . . (calcium, phosphorus, sodium, chlorine, and iodine). . . may be an asset, especially in supplementing poor rations" for cattle. Fish meal, the only protein concentrate available in Norway during World War II, gave excellent results when used with the otherwise poor feedstuffs available for cattle at that time, and it appears that one reason for the excellence of those results was the presence of trace minerals in the meal.

As a source of trace minerals in mixed feeds for poultry and swine, fish meal is not only economical but dependable as well.

1/March, B. E.; J. Biely; H. L. A. Tarr, 1963. J. Fish Res. Bd. Canada, 20 (1), p. 229.

2/Ekern, A.T., T. Homb, and others, "Fish and Fishery Products in Ruminant Nutrition," Fish in Nutrition, 1962, p. 324, published by Fishing News Ltd., London, England.

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OBSERVATIONS ON USE OF FISH MEAL AND OIL IN ANIMAL NUTRITION:

Mixed feed producers in several southern States and scientists at State Experiment Stations in Florida, Louisiana, and Mississippi, and the Tennessee Experiment Station at Knoxville were visited around mid-June 1963 by an animal nutritionist of the U. S. Bureau of Commercial Fisheries Technical Advisory Unit. These are some of his observations:

The level of fish meal used in broiler and growing layer-type chick rations in the areas visited appears to be around 3 percent (a level perhaps somewhat higher than the mean level fed in the United States as a whole).

A professor at the Florida Experiment Station said that on his recent visit to Peru, he had seen pigs that had been fed mainly fish meal rather than grain supplemented by fish meal and other feed ingredients. He stated that the Peruvians are finding that swine grow very rapidly on such a ration. The pork produced by the fish meal-fed pigs is made into a highly flavored sausage which is very popular in South America.

Some of the research now in progress at the State Experiment Stations visited may eventually have a bearing on utilization levels of fish products. For example, recent tests showed that chicks that had received 2 and 4 times the levels of vitamin D presently recommended by nutrition authorities grew faster than those limited to the recommended level. If those tests are confirmed, this may be of importance to the fish-reduction industry because menhaden oil and some other fish oils contain vitamin D at relatively high levels. Other work has shown that protein hydrolysates, such as steam-treated feathers, stimulate ruminant growth. Additional findings resulting from those investigations may demonstrate heretofore unsuspected values of some animal proteins, including those of fish in animal nutrition.

Investigations in progress at one of the southern experiment stations are demonstrating the existence of an interaction between the levels of ingested protein and energy and rates of growth. Such studies, presumably pointing the way to greater economy in feeding, may result in increased efficiency in the utilization of fish meal and other protein concentrates.

To control feed intake of cattle with a minimum of labor, animals at one station were fed concentrate rations that were 12 to 14 percent stabilized fat. This high fat level prevented the cattle from eating more feed than the optimum intake each day even though they had free access to the feed. The need for daily hand feeding was therefore eliminated. In addition, an investigation is in progress at that same station to determine the extent to which fat in the feed limits microbiological activity in the rumen and prevents loss of energy in rumen gases. Both lines of investigation may lead to information

that could pave the way for some utilization of marine oils in ruminant feeding.

An investigation at the Tennessee Experiment Station on the feeding of menhaden oil to growing cattle has been completed. The investigation demonstrated that young cattle can consume rations containing up to 7.5 percent menhaden oil without exhibiting either a decrease in rate of feed consumption or symptons of indigestion.

Irradiation Preservation

NEW METHOD OF ASSESSING FRESH FISH QUALITY STUDIED:

The need for a rapid determination of fresh fish quality has been accentuated by the studies on preservation of fishery products by use of ionizing radiation. This work is being done at the U. S. Bureau of Commercial Fisheries Technological Laboratory at Seattle, Wash. That Laboratory has found that the measurement of hypoxanthine in fish may help fulfill that need. In three species of fish it was found that the hypoxanthine values are very nearly zero in freshly-killed fish and that the hypoxanthine content accumulates at a fairly uniform rate in fish held at melting-ice temperatures. Hypoxanthine can be determined rapidly and easily by spectrophotometry.

* * * * *

EXPERIMENTS ON MICROWAVE PASTEURIZATION OF CRAB MEAT PROMISING:

To determine the feasibility of pasteurizing blue crab meat with high frequency microwaves, preliminary experiments were conducted during the summer of 1962 at the U. S. Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Mass. Results of the initial experiments were encouraging. Total bacteria plate counts showed a reduction from 5.4 million per gram to 8,500 per gram in the microwave pasteurized sample and from 5.4 million per gram to 250 per gram in a hot-water pasteurized sample. The results of taste tests showed a slight preference for the microwave pasteurized sample. To heat the crab meat samples, to an internal pasteurization temperature of 170° F. with microwaves, required approximately two minutes. This was a short heat-processing period in comparison to the approximately 75 minutes required to obtain a 170° F. internal temperature in a hot-water bath.

A report from the Bureau's Technological Laboratory at Seattle, Wash., on the microwave pasteurization of dungeness crab meat confirms the Gloucester Laboratory's opinion that the microwave technique has promising possibilities. Both laboratories had troubles with the plastic containers in which the crab meat was processed. They agree that suitable containers must be found that will withstand the rigors of the heat produced during the short microwave process. Both laboratories plan to continue investigations on this potential pasteurization technique.

Note: See Commercial Fisheries Review, June 1963 p. 35 and February 1963 p. 42.

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ATOMIC ENERGY COMMISSION BUILDS IRRADIATION PRESERVATION LABORATORY IN MASSACHUSETTS:

Groundbreaking ceremonies for a new Marine Products Development Irradiator facility at Gloucester, Mass., were held by the U. S. Atomic Energy Commission (AEC) on July 26, 1963. It will be located adjacent to the U. S. Bureau of Commercial Fisheries Technological Laboratory. The fishery products irradiator is being built to demonstrate the feasibility of extending the refrigerated storage life of fresh fishery products as a part of the AEC radiation-pasteurized food program.

The ceremony was attended by industry and government officials. The principal speaker was Representative William H. Bates (Mass.), member of the Congressional Joint Committee on Atomic Energy, who discussed the application of pasteurizing doses of radiation to fishery products. Talks on irradiation of fishery products were also given by the Director of the Division of Isotopes Development, AEC, and Thomas D. Rice, Special Assistant to the Commissioner, U. S. Fish and Wildlife Service. Industry members gave their views on the application of radiation to fishery products. The ceremony was followed by a luncheon consisting of irradiated fishery products--clam chowder, fried clams, fried haddock, and finnan-haddie. The products served were over two weeks old and were well received by the group.

When completed in late 1964, the $600,000 facility will operate on a near-commercial scale, processing marine products at a rate of up to one ton an hour using a 250,000-curie cobalt-60 radiation. The irradiator

will be operated as part of the research and development program conducted for AEC by the U. S. Bureau of Commercial Fisheries Technological Laboratory at Gloucester.

Fresh food successfully pasteurized by radiation does not lose its characteristic appearance, taste, or odor, but does have a longer refrigerated shelf-life. The energy--gamma radiation emitted by the radiocobalt source--passes through the food without leaving a trace. As it does, it destroys bacteria and other spoilage-causing organisms. As a result of the process, fishery products such as flounder, haddock, clams, shrimp or crab, can be kept in ocean-fresh condition for over four weeks under normal refrigeration. The results of research up to now show that low dose radiation pasteurization does not affect food wholesomeness or nutritional values. (National Oceanographic Data Center Newsletter, June 30, 1963.)

Maine Sardines

CANNED STOCKS, JULY 1, 1963:

On July 1, 1963, canners' stocks of Maine sardines were up 71.9 percent and distributors' stocks were up 61.9 percent from those of July 1, 1962. The average wholesale price of canned Maine sardines at New York City in July 1963 was $8.11 per standard case compared with $10.86 per case in July 1962.

On April 15, 1963, when the new canning season opened, carryover stocks at the canners' level amounted to about 660,000 cases as compared to a carryover of only 33,000 cases on April 15, 1962. (The pack in 1961 was unusually small.) The sardine pack during April 15-June 30, 1963, amounted to 232,000 cases, and by July 27, 1963, the pack reached 728,000 cases. During the 1962 canning season, the pack to June 30, 1962, was 452,000 cases, and by July 27, 1962, the pack totaled 890,000 cases.

Notes: (1) The usual 7½-month Maine sardine packing season opened on April 15 in 1963. The 1962 season was extended to 13 months--Dec. 2, 1961-Jan. 1, 1963--but the 1962 pack canned before April 15 was insignificant.
(2) See Commercial Fisheries Review, August 1963 p. 36.

Marketing

EDIBLE FISHERY PRODUCTS MARKETING PROSPECTS IN SECOND HALF OF 1963:

During the second half of 1963, the United States per capita consumption of fishery products is expected to increase slightly over the first 6 months of the year. It is expected there will be more fresh and frozen fish available but supplies of some canned fishery products will be lower during the remainder of this year. Per capita consumption of fishery products for the year may be somewhat lower than in 1962.

Retail price trends for fishery products were mostly downward toward the end of the first half of 1963. Generally, prices dropped for shrimp, salmon, canned tuna, and freshwater fish varieties. However, some price strengthening for most fishery products is probable in the second half of the year.

Edible fishery products in cold storage on July 1, 1963, were 166 million pounds compared with 137 million pounds on July 1, 1962. An inventory buildup was under way during the summer months as commercial landings of fish and shellfish approached their seasonal peak.

United States imports of most fishery products during the first part of 1963 were generally lower than a year earlier. But there was a very large increase in receipts of frozen shrimp and canned sardines not-in-

Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, July 1, 1963, With Comparisons 1/

Type	Unit	1962/63 Season					1961/62 Season					1960/61 Season	
		7/1/63	6/1/63	4/1/63	1/1/63	11/1/62	7/1/62	6/1/62	4/1/62	1/1/62	11/1/61	7/1/61	6/1/61
Distributors	1,000 actual cases	217	215	264	271	230	134	99	148	193	202	208	215
Canners	1,000 std. cases 2/	643	536	699	1,092	1,348	374	50	45	144	221	201	294

1/ Table represents marketing season from November 1-October 31.
2/ 100 3¾-oz. cans equal one standard case.
Note: Beginning with the Canned Food Report of April 1, 1963, U. S. Bureau of the Census estimates of distributors' stocks were based on a revised sample of merchant wholesalers and warehouses of retail multiunit organizations. The revised sample resulted in better coverage. The January 1, 1963, survey was conducted with both samples to provide an approximate measure of the difference in the two samples. That survey showed that the estimate of distributors' stocks of canned Maine sardines from the revised sample was 13 percent above that given by the old sample.
Source: U. S. Bureau of the Census, Canned Food Report, July 1, 1963.

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

oil. Imports are expected to be higher for most species during the second half of 1963. In recent years, imports have provided an increasing proportion of total United States consumption of fishery products. In 1962, imports accounted for about 45 percent of that total, up from about 23 percent in 1950.

Note: This analysis was prepared by the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the Department of Agriculture's August 1963 issue of the National Food Situation (NFS-105).

North Atlantic Fisheries Investigations

SEA HERRING AND SURF CLAM SURVEYS CONDUCTED:

M/V "Delaware" Cruise 63-5 (June 20-29, 1963): This cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware was divided into two parts: Part I: (June 20-24)--A herring survey under the direction of the Boothbay Harbor Biological Laboratory, Boothbay Harbor, Me., and Part II: (June 25-29)--A clam survey conducted by the Exploratory Fishing and Gear Research Base, Gloucester, Mass.

Adult Sea Herring Populations Sampled: The objectives during the first part of the cruise were to: (1) sample populations of adult sea herring and to obtain ecological data, and (2) make plankton tows for larvae of spring-spawned herring.

The areas of operation were the Northeast Peak of Georges Bank, the Northern Edge of Georges Basin, and north of Cultivator Shoals. The route to Georges Bank was via Platts Bank and Cashes Ledge.

Three otter-trawl sets of about one hour each were made in the areas indicated in figure 1. These sets were made at depths of approximately 40 fathoms. Gill nets (2 cotton and 3 nylon with a combined length of 750 feet) ranging in mesh size from 2 to $2\frac{3}{4}$ inches were set in 88 fathoms of water. A midwater trawl was set at approximately 30 fathoms in 40 fathoms of water.

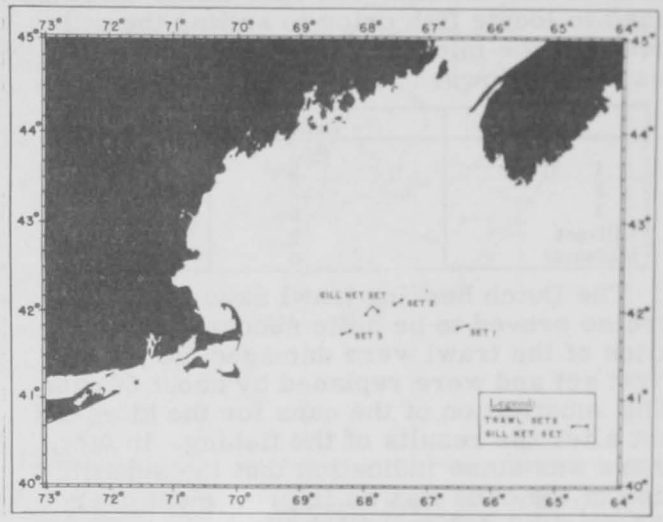

Fig. 1 - Area of operations of M/V Delaware during Cruise 63-5, and showing trawl sets and gill-net sets.

Four 1-meter net oblique tows (10 meters-5 meters-surface) were made during the cruise. Two Hardy recorders (one at 10 meters and one at the surface) were towed on June 28 and 29 (during surf clam cruise)

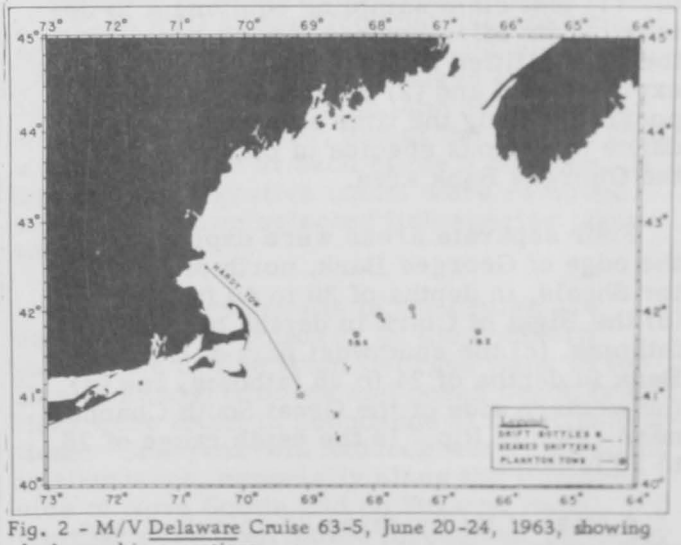

Fig. 2 - M/V Delaware Cruise 63-5, June 20-24, 1963, showing hydrographic operations.

from 41°07' N. 69°10' W. to Gloucester, Mass. The Hardy recorders were towed about 100 miles.

At each trawl set, at the gill-net set, and at other selected sites 5 drift bottles and 5 sea-bed drifters were released. Bathythermograph casts were made, surface salinity samples collected, and weather observations recorded at each station.

Sets were made only in areas in which the fish-finder indicated large schools of fish on or near the bottom. The fish-finder was also used to locate fish prior to setting the gill-nets and the midwater trawl. The results were as follows:

Sets	Herring	Weight
	Bu.	Lbs.
1	8	650
2	57	4300
3	9	700
Gill-net	3	250
Midwater	0	0

The Dutch herring trawl used during the cruise proved to be quite successful. The kites of the trawl were damaged during the first set and were replaced by about 60 cans. The substitution of the cans for the kites did not alter the results of the fishing. In fact, there was some indication that the substitution of the cans was an improvement over the original design. Of the five gill-nets set, three-fourths of the entire catch were obtained with cotton nets. No herring larvae were obtained from the plankton tows.

Clam Sampling Equipment Tested and Abundance Investigated: Objectives of the second part of Delaware cruise 63-5 were to: (1) test clam sampling equipment to determine its effectiveness, and to evaluate the possibilities of its performance on future explorations, and (2) determine as nearly as possible during the time available the abundance of various species of clams in or near the Georges Bank area.

Four separate areas were explored: (a) the edge of Georges Bank, north of Cultivator Shoals, in depths of 30 to 40 fathoms, (b) the Bight of Clark in depths of 24 to 50 fathoms, (c) the southwest part of Georges Bank in depths of 24 to 36 fathoms, and (d) the western side of the Great South Channel near "Middle Rip," in the depth range of 26 to 50 fathoms.

A total of thirty-three 30-minute drags were made during this part of the cruise. Three of the drags were made with a jet dredge (without manifold or jet) having a 48-inch blade width. The use of this dredge was discontinued following severe damage (unrepairable) to the blade. The remaining 30 drags were made with a conventional Fall River quahog dredge with 27 teeth spaced in a 48-inch opening; the teeth were set to fish into $9\frac{1}{2}$ inches of the seabed. Both dredges were rigged to fish from the portside using the main trawl winch, the towing cable, and the forward gallows. The dredge used was hauled aboard with the "take-out" boom after each drag.

Fishing results during this part of the cruise were:

(1) On the edge of Georges Bank, north of Cultivator Shoals quahog or hard clam (Venus mercenaria) catches ranged from none to $\frac{3}{4}$ bushels per drag. Quantities of empty quahog shells were encountered; the largest single haul of shells was 12 bushels for one drag. While no surf clams (Spisula solidissima) were taken in that area, one drag yielded three dozen 4- to 6-inch empty surf-clam shells.

(2) At the Bight of Clark, five of the nine drags produced completely negative results. Of the remaining four drags, the largest catch consisted of 5 quahog clams and 12 empty shells. One-half bushel of large mussel shells (Mytilus sp.) were taken at another station.

(3) On the southwest part of Georges Bank, 14 drags were made of which 3 had completely negative results. Of the remaining 11 drags, the largest catches included 31 quahogs, 22 cherrystone quahogs (about $2\frac{1}{2}$ to 3 inches), 70 mussels, one $4\frac{1}{4}$-inch surf clam, and several empty surf-clam shells (about 4 to 6 inches long).

(4) In the area on the western side of the Great South Channel, the fishing was very poor and the bottom hard. Of 4 drags made, only 1 yielded any indication of clams--only one 3-inch surf clam was taken in the first drag in that area.

On completion of the clam phase of the cruise, it was concluded that:

(1) The jet clam dredge is not suitable for use without the jet.

(2) Adjustments should be made to the Fall River dredge before it becomes a completely adequate piece of sampling gear for use aboard the Delaware.

(3) The Georges Bank area is much too large to have been surveyed in the period of time permitted. Several more cruises will be necessary before any conclusions can be made on clam populations.

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SUMMER DISTRIBUTION AND ABUNDANCE OF GROUNDFISH SPECIES STUDIED:

M/V "Albatross IV" Cruise 63-5 Revised (July 18-August 19, 1963): To determine the summer distribution and relative abundance of groundfish species from the Bay of Fundy southward to Hudson Canyon, and to study food and its availability to a number of groundfish species at selected stations were the objectives of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Albatross IV. Hydrographic data were collected at each fishing station.

Fig. 1 - The Albatross IV, research vessel of the U. S. Bureau of Commercial Fisheries.

On this cruise, survey operations were conducted at selected stations along the inshore waters of Massachusetts, the Gulf of Maine, along the western side of Nova Scotia, on Browns Bank and Georges Bank, and the southern New England area to Hudson Canyon.

A total of 188 groundfish survey stations were completed. All fish were measured and 1,715 stomachs of various species from different locations were examined. Scale samples were taken from 1,420 adult haddock, and over 1,000 young-of-the-year haddock were frozen for further study at the Bureau's biological laboratory at Woods Hole. Length-girth measurements were made on 200 whiting (silver hake) and 100 red hake. Some 850 sea herring were frozen for the Bureau's Biological Laboratory at Boothbay Harbor, Me. Blood samples were taken from 9 species of groundfish. Invertebrates taken by the trawl were enumerated and samples preserved for further analysis.

Fig. 2 - Shows the station pattern for Cruise 63-5 of the research vessel Albatross IV, July 18-August 19, 1963.

A total of 248 bathythermograph casts were made during this cruise, and 605 sea-bed drifters were released.

At five specific locations, Nansen bottle casts were made at noon and midnight for temperature, salinity, and oxygen determinations, as well as for fluormeteric analysis and species composition of phytoplankton. Zooplankton samples were taken at 5 levels through the water column, and on the bottom with Miller samplers, and at the surface with a one-meter net at each of the 5 stations. A total of 515 digestive tracts were removed and frozen from selected fish species taken in the trawl.

Preliminary results of the cruise are summarized as follows: In the northern part of the cruise from Georges Bank to the Bay of Fundy, haddock and ocean perch (redfish) were found in abundance at specific locations. One-year-old haddock were also found in abundance, especially along the western side of Nova Scotia and on Browns Bank. Whiting were distributed throughout the study area. A concentration of that species was

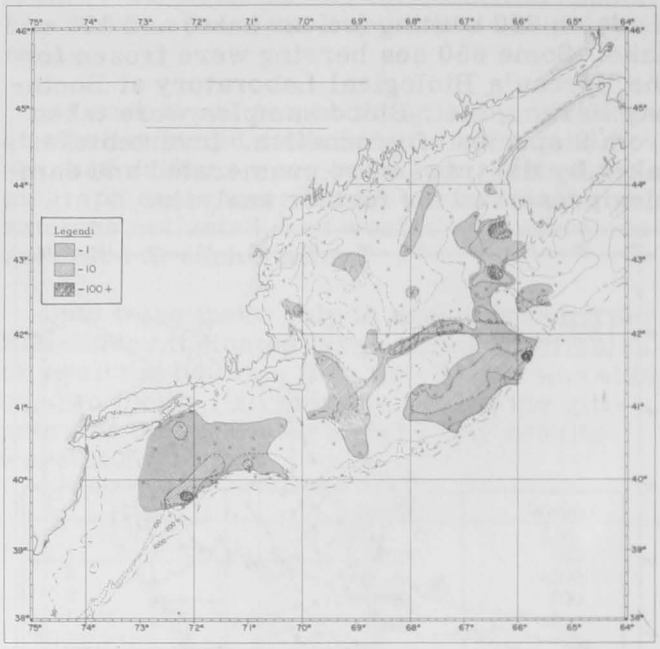


Fig. 3 - Shows the distribution and relative abundance of zero haddock on Cruise 63-5 by the Albatross IV.

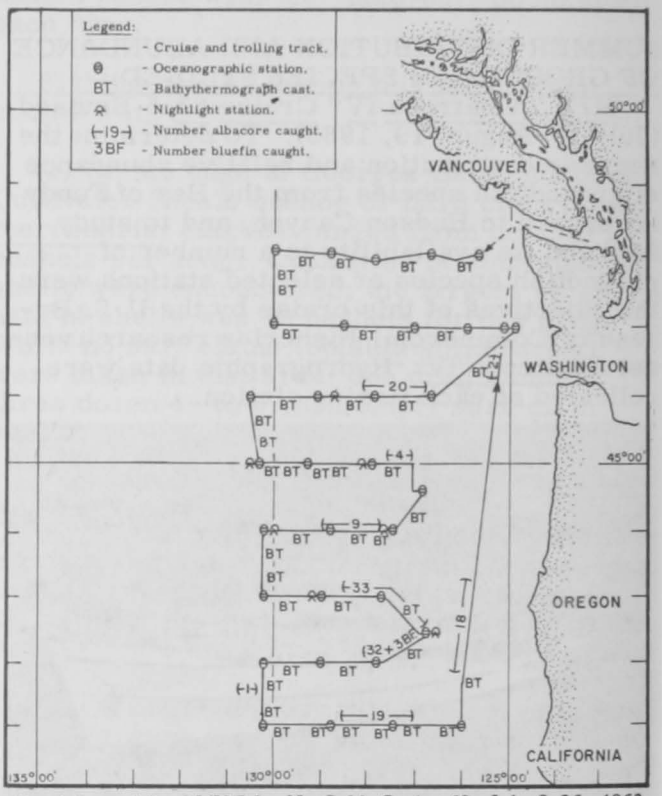
found on the western side of Georges Bank around Cultivator Shoal. In the southern area, squid were most abundant and finfish relatively low in abundance. Good catches of young-of-the-year haddock were made throughout the cruise (fig. 3). A total of 1,532 young haddock were taken at 91 stations (48 percent of the total 188). Those fish ranged from 5 to 16 centimeters (2.0 to 6.3 inches long) with a mean of 10 centimeters (3.9 inches). The distribution of the young fish ranged more to the southward, with 377 (25 percent) taken south of Georges Bank. Some young haddock were also taken in midwater with the Miller samplers, and in the bottom trawl when used as a midwater trawl.

Delaware cruise 63-5 was the first of a series of groundfish survey cruises to be conducted at various times of the year to study the distribution and relative abundance of all groundfish species.

North Pacific Exploratory Fishery Program

ABUNDANCE AND DISTRIBUTION OF ALBACORE TUNA AND OTHER PELAGIC SPECIES STUDIED:

M/V "John N. Cobb" Cruise 60 (July 6-26, 1963): The principal objective of this cruise was to obtain information on the abundance and distribution of albacore tuna (Thunnus germo) and other pelagic species by trolling jigs and nightlight observations. Conducted by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb, the cruise consisted of three weeks of exploratory fishing and oceanographic work off the coast of Washington, Oregon, and California. The vessel returned to her base at Seattle, Wash., July 26, 1963. Oceanographic



Trackline of the M/V John N. Cobb Cruise 60, July 8-26, 1963.

data, including salinity, oxygen, and chlorophyl determinations were obtained by participating staff members of the Bureau's Fisheries Biological Laboratory, San Diego, Calif.

Regions surveyed during the cruise extended from 48° N. to 41° N. latitude and offshore to 130°35' W. longitude. Most waters within 120 miles of the coast were avoided to keep from duplicating work being done by the Oregon State University vessel Acona, which was occupying inshore stations from 44°40' N. to 42°00' N. latitude.

A total of 34 oceanographic stations were occupied and 42 bathythermograph casts made. To explore for albacore, trolling was conducted along the trackline between oceano-

graphic stations. The exception occurred along part of the track on 41° N. latitude, where it became necessary to continue under way during night hours in order to maintain a desired schedule. Trolling was generally conducted during daylight hours using 7 lines towed at a speed of about 7 knots. A combination of red and white feather jigs was normally used but they were occasionally supplemented by light- or dark-colored bone-type jigs. Strikes and catches were distributed about equally between the seven lines. No attempts were made to circle the areas of highest albacore abundance.

A total of 140 albacore and 3 bluefin tuna (Thunnus saliens) were caught, of which 107 viable fish were tagged and liberated. Blood and heart samples were immediately taken from the other tuna and refrigerated for future studies. The albacore ranged from 52 to 83 centimeters (20.5 to 32.7 inches) long and weighed from 9 to 32 pounds. About 75 percent of them ranged between 62 and 68 centimeters (24.4 to 26.8 inches) long.

Observations at nightlight stations showed only meager concentrations of saury (Cololabis saira), lanternfish (Myctophidae), or other marine life, except on one occasion when large numbers of small saury (3 to 4 inches long) surrounded the vessel. A continual watch was also maintained for the presence of marine life while the vessel was under way during daylight hours. Very few birds or marine animals were observed. Sparsely-scattered Spanish men-of-war were observed in only one small area of the trackline.

Note: See Commercial Fisheries Review, August 1963 p. 42.

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PELAGIC TRAWL EFFICIENCY IN CATCHING SALMON TO BE EVALUATED:

M/V "John N. Cobb" Cruise 61: To evaluate the catching efficiency of the Cobb pelagic trawl for taking immature and mature salmon as compared to the catching efficiency of gill nets is the objective of this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb.

The vessel left Seattle, Wash., on August 5, 1963, for six weeks of experimental high-seas pelagic trawling in certain offshore waters of the Pacific Ocean between Adak Island and Kodiak Island, Alaska. The exact areas to be investigated were to be determined by analysis of gill-net catches made by the Bureau's chartered vessel Bertha Ann prior to arrival of the John N. Cobb.

A series of four surface tows were to be made each day by the John N. Cobb relatively close to gill-net sets made by the Bertha Ann. Weather permitting, 2 tows of each series were to be made parallel, in opposite directions, and the remaining 2 tows made perpendicular, in opposite directions, to the string of set gill nets. Alternation between day-time towing and night-time towing was to occur at the end of each five days (all gill-net sets were to be made at night). During each five-day operating period, two tows were to be made in midwater with depth of the tow to be determined by analysis of echo-soundings.

Oceanography

SEABIRD-PLANKTON-OCEANOGRAPHY RELATIONSHIPS STUDY:

A contract covering the study of seabird-plankton-oceanography relationships in an area about 200 by 250 miles southwest of the Hawaiian Islands was awarded to the Smithsonian Institution by the U. S. Department of the Army, in July 1963. The program is part of the Army's medical-ecology research and is primarily concerned with birds as carriers (vectors) of disease. Information will be sought on the following questions: (1) How abundant are birds in the study area? (2) What are the diurnal and nocturnal difference in their abundance? (3) Where do the birds come from? (4) How is their abundance and distribution related to the abundance of plankton? and (5) What is the influence of physical oceanographic factors on bird distribution and abundance?

The U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu, Hawaii, is collaborating in the study and will make available for the program data that have been collected over a number of years on seabird studies in the Central Pacific Ocean.

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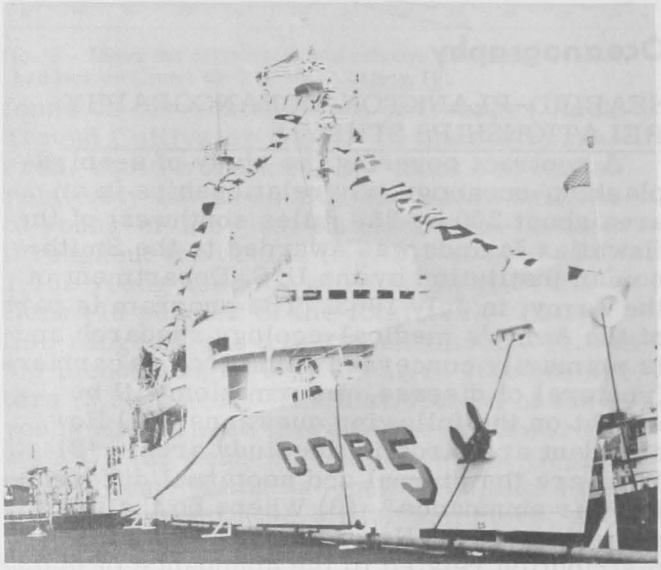
NEW OCEANOGRAPHIC RESEARCH VESSEL FOR U. S. NAVY:

A new U. S. Navy oceanographic research vessel, the USNS Davis (T-AGOR 5), visited Washington, D. C., on May 31, 1963, for in-

stallation of oceanographic equipment, and also a plaque presentation ceremony. The vessel was docked at the Navy Yard Annex at the same time as the U. S. Bureau of Commercial Fisheries oceanographic research vessel Albatross IV, both of which were open for inspection by the general public.

The USNS Davis was launched at Sturgeon Bay, Wis., on June 30, 1962, and is the third of a new class of U. S. Navy oceanographic research vessels. Specifically designed for that purpose, she will be operated by the Military Sea Transportation Service under the technical control of the U. S. Hydrographic Office. Following the Washington, D. C., visit, the Davis proceeded to the West Coast where she is to be used as a floating platform for scientific experiments in the Pacific Ocean.



The new U. S. Navy oceanographic vessel, USNS Davis in full dress while on a visit to Washington, D. C.

The new research vessel is taking part in the Navy's ten-year oceanographic (TENCO) scientific study to advance knowledge of the ocean, and also study the effect of the ocean on sound transmission. The studies will contribute to the effectiveness of naval operations, naval weapons, and vessel equipment and design.

The technical dimensions of the vessel are: over-all length, 208 feet 10 inches; beam, 37 feet 5 inches; draft, 15 feet 2 inches; deadweight (loaded), 1,325 tons. Machinery includes a 1,000-hp. main propulsion unit; twin caterpillar 600-shaft-hp. generators; 1 solar gas turbine for silent running; 175-hp. bow thruster unit with a 3-foot propeller for anchor or drift control maneuverability; 10-ton boom; a deep-sea coring and anchoring winch with 45,000 feet of tapered wire rope; an intermediate winch with 30,000 feet of wire rope.

Scientific equipment on the vessel includes a geomagnetic system consisting of proton precision magnetometer for measuring the strength of the earth's magnetism; a gravity meter to record the earth's gravity field; an electronic oceanographic system for measuring the sea's temperature, sound velocity, and pressure. She is also equipped with classic oceanographic equipment--bathythermographs, Nansen cast gear, and an underwater stereo camera.

The Davis will carry a crew of 19, and was scheduled to embark a group of 15 scientists on her arrival on station off the West Coast. The scientists represent the U. S. Naval Electronics Laboratory, San Diego, the U. S. Naval Test Station, China Lake, Calif., and the Applied Physics Laboratory, University of Washington, Seattle, Wash. (Military Sea Transportation Service, August 1963.)

* * * * *

KEEL LAID FOR NEW COAST AND GEODETIC SURVEY VESSEL:

Keel-laying ceremonies for the first of two Class II, Medium Survey Ships, to be built at a shipyard in Pt. Pleasant, W. Va., for the U. S. Coast and Geodetic Survey, were held on August 12, 1963.

The vessel, to be known as the Fairweather, will be equipped with specialized depth-recorders and positioning systems. It will be built of welded steel construction, strengthened for navigation in ice, and propelled by Diesel engines, with twin-screw, reversible-pitch propellers. The over-all length will be 220 feet and 8 inches, with a 42-foot beam, and loaded displacement of 1,615 tons. Service speed will be 14.5 knots with a cruising range of 8,000 nautical miles.

The propulsion equipment will be controlled by a centralized automated system. The vessel will have what is known as a "bow thruster" that delivers 5,000 pounds thrust on the bow either to port or starboard for maintaining position, slow maneuvering, and to facilitate docking.

The new survey vessel is to be named after the well known Fairweather Range and Mt. Fairweather, Alaska, which is near the approximate location of her first assignment. She will carry a complement of 12 officers and a crew of 60.

The Fairweather will be specifically designed to conduct hydrographic surveys--to provide nautical charts of United States coastal waters for safe navigation. She will be used to determine the depth and shape of the ocean bottom, the position of the submerged hills and valleys, as well as other navigational information. This information is vital in guiding ships through safe channels and avoiding the hidden dangers below the water's surface.

* * * * *

YOU CAN HELP IN THE STUDY OF OCEAN CURRENTS:

A study of the circulation of the waters and currents on the continental shelf off the east coast of the United States is being conducted by the Woods Hole Oceanographic Institution. This program is operated in cooperation with the U. S. Fish and Wildlife Service and the Fisheries Research Board of Canada as well as with the various marine science laboratories along the Atlantic Seaboard. You can assist in this program by returning any drift bottle cards or sea-bed drifter labels you find. It is important to note carefully the location where the bottle or drifter was found and the date. A small reward will be sent to you by mail for this contribution to science, together with a notice of where the bottle or drifter was released. If you are a commercial fisherman, turn the drift bottle card or the label over to a Port Interviewer or Fishery Officer who will pay you the reward on the spot, the same way he does for fish tags.

About 30,000 bottles and drifters are released each year off the east coast of the United States on a year-around basis. The returned information is being collected to produce a series of maps which will be published in the American Geographical Society's Serial Atlas of the Marine Environment. This information will be useful in the study of the drift of fish eggs and larvae during their planktonic stages. (Woods Hole Oceanographic Institution, Woods Hole, Mass., July 23, 1963.)

* * * * *

OCEANOGRAPHIC DATA DISPLAY SYSTEM BEING DEVELOPED:

A prototype operating model of a World Oceanographic Data Display (WODD) system was unveiled this past summer at Maynard, Mass., to a select group of representatives from the Woods Hole Oceanographic Institution (WHOI) and National Oceanographic Data Center (NODC). The model was shown by a group of computer specialists working under the supervision of a former Harvard University professor who served as consultant-advisor on the project.

The system introduces an entirely new concept in oceanographic analysis and procedures for preparation of reports and atlases. By means of this system, an oceanographer can conduct analysis, quality control, or information retrieval on all available oceanographic station data through a series of visual displays generated by a digital computer on a cathode ray tube.

At this point in the system's development, one can display on the scope the following

Fig. 1 - Oceanographers viewing some IGY tracks on display scope.

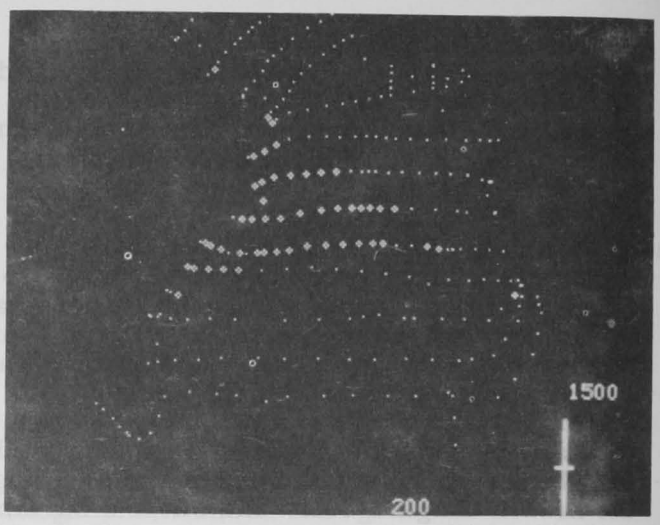


Fig. 2 - Close-up of oceanographic research Meteor data as it appears on display scope.

parameters at any standard depth: temperature, salinity, oxygen, specific volume anomaly, and dynamic depth. Other combinations of data display are also operational. Planning and programming are proceeding on isentropic and vertical section displays.

Figures 1 and 2 show oceanographers viewing some IGY[1/] tracks on the display scope and a close-up of the Meteor[2/] data as it appears on the scope. In the close-up, the temperature distribution at 200 meters is displayed. Each dot represents the location of a specific oceanographic station. Stations reporting temperatures of 15.00° C. or higher at a depth of 200 meters appear as bright dots (4-point diamonds). Stations reporting temperatures lower than 15.00° C. (59° F.) at 200 meters appear as dim dots (single points). In this way, the temperature distribution is outlined on the visual display scope in the form of a brightly lit (or conversely, a dimly lit) assembly of dots. The temperature (or other parameter) scale may be run up or down automatically in any desired graduation. The appearance of the dots (bright or dim) will change with the changing parameter scale and the parameter value at any station can be determined.

Reference data appear on the screen if one uses an electronic pointer (light pen) to designate a particular station of interest.

By giving the system a command with an input-output typewriter, or by use of the light pen, the geographical area of interest can be enlarged to any degree desired. The final objective of this program is the design of a full-scale system and the establishment of specifications for equipment and computer programs to handle all available world-wide oceanographic station data in a manner similar to that described.

Development of the project is continuing. At present the computer has a limited memory (400 oceanographic stations using a PDP-1 computer), but this appears to be no particular problem. A grid system is being planned for the screen and work is proceeding on isentropic and vertical profile displays.

1/IGY (International Geophysical Year--data compiled by vessels Chain and Crawford of WHOI).
2/Vessel Meteor (German Atlantic cruises conducted in 1925-27).

Oysters

MARYLAND OBSERVATIONS ON 1963 SPATFALL:

Test shells exposed this season received few or no set prior to the last week in June 1963, according to a July 19 Oyster Report from the Chesapeake Biological Laboratory of the State of Maryland, Solomons. However, a strong wave of good setting occurred in late June and early July in Eastern Bay, upper Little Choptank River, St. Marys River, Smith Creek, and the lower Maryland side of the Potomac.

To that date a light but increasing set was occurring in the Harris Creek area, the Bay off Barren Island, the lower Patuxent, and Hooper Straits.

The Tar Bay Seed Area, Fishing Bay, Piney Island Swash, Holland Straits area, and

Pocomoke Sound had not yet received any significant set.

Setting tapered off in Eastern Bay, the Little Choptank, and Smith Creek. It reached during the week an exceptionally high peak in St. Marys River where a near record total of 10,659 spat were found on 20 shell faces that were overboard for seven days. Where those heavy sets occurred it was likely that most oysters were fairly well spawned out and that the major spawning for the season had been completed.

Obviously only a small percentage of the intense sets, that on some shells amounted to more than a thousand in one week, can possible survive due to lack of space. On natural cultch, and on planted shell that has accumulated considerable fouling, the set will be much lighter. However, it appears that a good quantity of high-count seed, capable of excellent yields when thinly planted on good growing bottom, will be available this fall and later from those areas already set. Transplanting is essential and should be done early when heavy sets occur if maximum use is to be made of the potential yield from such seed. When not transplanted, such thickly set oysters will mostly fail to reach marketable size and not only will be stunted, but will be thin and watery, misshapened and susceptible to severe losses from oyster parasites.

Pollution

OXYGEN DEFICIENCY RESULTING FROM SECONDARY POLLUTION DESTROYS FISH IN POTOMAC RIVER:

Secondary pollution is becoming a challenging problem to sanitary engineers and oceanographers interested in the conservation of aquatic resources, according to the scientist in charge of the Ecology-Pollution Department of the Virginia Institute of Marine Science. In the summer of 1963, he said, "Waste-disposal water may receive the most complete sanitary treatment possible and be entirely free of disease organisms, yet certain chemical changes resulting from waste treatment often touch off secondary pollution. Decomposition of organic matter releases phosphorus, nitrogen, and trace elements--the same nutrients used in commercial fertilizers--and they stimulate algal growth. . . . Although these microscopic plants actually give off oxygen to the water during daylight as a result of photosynthesis, they consume it during the hours of darkness when photosynthesis ceases. . . ." He pointed out that oxygen is needed by all living organisms. In areas where heavy concentrations of algae occur, the loss of oxygen at night can leave the water almost devoid of this vital element by early morning.

The Virginia scientist attributed extensive fish losses in the Potomac River in mid-1963 to an oxygen deficiency resulting from an algae "bloom." Scientists noted several peculiar characteristics of the Potomac fish kill. Better than 90 percent of the dead fish were white perch; the remainder consisted largely of eels, catfish, and yellow perch--all bottom-dwelling fish. Swimming near the surface in areas where perch had recently died, young menhaden were unaffected and menhaden are known to be extremely sensitive to toxicants in the water.

The selective kill pattern ruled out the presence of poisonous materials such as pesticides or industrial wastes. The water was unusually green, and had an extremely low dissolved oxygen content in the deeper layers during the early morning hours. The heavy growth of algae, low oxygen concentration in the early morning hours, and death of bottom fish established the cause of the kill--oxygen deficiency.

The Virginia Institute of Marine Science emphasized that the oxygen deficiency and fish losses were the result of several natural and manmade forces acting simultaneously on the Potomac River. These were: (1) a sudden increase in water temperature, (2) high solar radiation values, (3) relatively calm water conditions, (4) low dilution rates, and (5) artificially enriched waters. (The natural waters are receiving nitrogen, phosphorus and trace element enrichment from agricultural areas and from urban waste products. Sewage treatment plants are designed to convert and remove putrescible solids from sewage, and discharge an innocuous liquid into the receiving waters of creeks and rivers. But in the breaking down of raw sewage, significant quantities of nitrogen and phosphorous are converted to fertilizers that can be immediately used by aquatic plants.)

The five conditions described above produced an algae population that was much above that usually found in the Potomac River. High

populations of algae can seriously deplete the oxygen level of water at night, particularly near the bottom. In the Potomac River, only those species of fish that inhabit the deeper waters were killed. No fish were killed in the tributary creeks, and surface fish were not affected.

Scientists at the Virginia Institute of Marine Science consider the destruction of the utility of our water resources by a series of natural phenomena acting in conjunction with a change produced by man's activities to be a very serious potential threat. Our population is not only increasing, it is also concentrating into urban areas. This also concentrates the introduction of nutrients into nearby streams. Water uses destroyed as the result of artificial enrichment are just as serious a loss as if destroyed by direct pollution.

Speaking of both direct and secondary pollution, the Director of the Ecology-Pollution Department of the Institute said, "Modern science and technology is working toward prevention or curtailment of pollution of existing water supplies so that cities and industries may be assured of future growth. A slowdown of economic growth in certain States has already occurred due to water shortages. Our best hope for adequate water supplies by the year 2,000 lies in the re-use of water: one community far upstream using the water for domestic and industrial purposes, purifying it, and then returning it to the stream for use by communities located downstream." He pointed out that in order to do this it will be necessary to have a great deal of information that science and technology does not now have. Considerable research will be needed to acquire the necessary knowledge. (Virginia Institute of Marine Science, July 21, 1963.)

* * * * *

RADIOACTIVE WASTE DISPOSAL PROBLEMS:

With the increasing use of radioactive materials in industrial, military, and scientific processes, the problem of dumping radioactive wastes has become urgent, according to the Director of the Ecology-Pollution Department of the Virginia Institute of Marine Science. He pointed out that certain radioactive substances retain effectiveness over scores of years, and all of their effects are not yet known. If released in the aquatic environment, many radioactive materials become strongly attached to silt or clay particles, and may remain in the area permanently. Science has yet to devise methods of flushing such materials from a specific area in the event of a large accidental release. (Virginia Institute of Marine Science, July 21, 1963.)

* * * * *

EFFECTS OF PESTICIDES ON FISH STUDIED AT TISHOMINGO FISH HATCHERY:

Preliminary tests of the effects of pesticides on fish, carried out by the U. S. Bureau of Sport Fisheries and Wildlife Fish Hatchery, Tishomingo, Okla., were completed in May 1963. The completion of pathological examinations of fish subjected to various concentrations of 2,4-D, heptachlor, and DDT will serve to establish necessary concentrations of pesticides and duration of subsequent studies on the effects of those pesticides.

Critical concentrations of 2,4-D on bluegill appear to lie between 1 and 3 p.p.m. (parts per million). A single exposure of bluegill to heptachlor at 0.025 p. p. m. showed no pathological effect on samples taken up to three months following exposure. Heptachlor incorporated in bluegill food at the rate of 1 mg./kg. of body weight showed no pathological effects after a period of 118 days. Rainbow trout exposed to a cumulative total of 40 p.p.b. (parts per billion) of DDT added to water at rates of 5 p.p.b. daily showed no pathological effects.

Salmon

EXCESSIVE ESCAPEMENT THREATENS NORTH PACIFIC RUN TO FRASER RIVER:

Excessive salmon escapement was the major problem facing the North Pacific Salmon Fisheries Commission this year, according to a July 30, 1963, statement by the Chairman of the Commission. The Commission regulates certain pink and sockeye salmon fisheries in designated waters adjacent to the United States-Canadian boundary of the State of Washington and the Province of British Columbia. The tie-up of the British Columbia fishing fleet and the small size of the United States fleet created the escapement problem.

A decision to increase United States fishing time to 4 days for the week ending August

3, 1963, was announced at a Commission meeting on July 30. At that time, the Commission's staff reported that more than 50 percent of the Fraser River sockeye salmon run had been escaping United States fishermen. Escapement up the Fraser River was estimated at about 100,000 fish per day. It was further reported that escapement to the Chilko River of the Fraser system had exceeded the desired amount.

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"FIRST RETURNS" REPORTED ON HUGE FISH HATCHERY EVALUATION PROJECT IN NORTHWEST:

In July 1963, the "first returns" were coming in on "Operation Fin Clip," the gigantic fish-marking program launched last year by the U. S. Bureau of Commercial Fisheries in cooperation with the fishery departments of Washington and Oregon. "Operation Fin Clip" involves the marking of approximately 32 million fall chinook salmon in the Columbia River and its tributaries over a four-year period, reports the Bureau's Regional Director of Region 1.

Purpose of the project is to evaluate the contribution made to the commercial and sports catch of fall chinook salmon by Columbia River hatcheries. The Bureau, which contributes about $2 million a year for operation and maintenance of 22 state and Federal hatcheries on the Columbia River and its tributaries, wants to find out how valuable those hatcheries are to the total fish catch in order to determine whether it should continue spending money for that purpose.

Fig. 1 - An early return of fin-clipped 2-year old fall chinook salmon. Biologist points toward area of missing fin.

The Regional Director said a report by the Bureau's Columbia River Fishery Program Office showed that by the end of June a total of 14 of the first 8 million marked baby salmon which were placed into the river last year under the program had been recovered at scattered points along the Pacific Coast.

Recovery locations were Winchester Bay, Oreg.; Westport and Ilwaco, Wash.; and Moss Landing, just north of Monterey, Calif.

All but one of the 14 fish were caught by sports fishermen. The single exception was a fish taken by commercial troll in California.

"While 14 is not a great number, this is only the beginning. We expect the big majority of the fish released the first year will not be caught until they return from the ocean as four-year-olds in 1965," the Regional Director stated.

Fig. 2 - Biologists search for fin-clipped fall chinook salmon and collect biological data.

The recovery phase of the project will continue through 1969.

The Bureau will keep a close count of all the returning "Operation Fin Clip" fish which are caught. To accomplish this, fisheries biologists of the States of Washington, Oregon, and Alaska as well as biologists of the United States and Canadian governments are stationed at key landing spots from Alaska to San Francisco Bay to count the marked fish as they are brought in by both commercial and sports fishermen.

The Bureau's supervisor of appraisal studies of the Columbia River Fishery Program Office said that the 32 million fish involved in "Operation Fin Clip" are being marked in a special way so they can be differentiated from other marked fish. The adipose fin and the maxillary (protruding upper jaw bone) are being clipped with the left and right maxillary clipped on alternate years so that the year in which the fish were spawned can be determined when they are caught.

The first 14 returns were sent to the Oregon Fish Commission laboratory for analysis.

Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS, JULY 1963:

Item and Period	1963	1962	1961	1960	1959
			(1,000 Lbs., Heads-Off)		
Total landings, So. Atl. and Gulf States:					
September	-	13,182	9,691	18,832	18,330
August	-	12,332	10,944	20,441	18,595
July	15,000	12,283	10,500	21,746	17,493
June	12,776	11,316	8,233	12,427	14,547
January-May	26,070	20,770	22,797	24,348	20,967
January-December	-	105,779	91,396	141,035	130,660
Quantity canned, Gulf States 1/:					
September	-	1,727	598	2,222	1,936
August	-	1,333	1,090	4,427	2,228
July	4,100	3,551	2,793	5,802	2,833
June	4,700	4,913	3,438	6,920	7,061
January-May	4,975	2,625	1,525	2,114	3,027
January-December	-	23,210	14,500	26,394	22,659
Frozen inventories (as of end of each mo.) 2/:					
September 30	-	12,843	13,361	24,492	26,119
August 31	-	12,754	12,728	20,171	23,780
July 31	3/	13,677	14,849	17,397	22,352
June 30 4/	24,047	13,796	19,416	15,338	19,283
May 31 4/	25,114	13,904	24,696	17,540	21,137
April 30 4/	24,954	15,637	27,492	20,502	23,331
March 31 4/	27,970	16,607	31,345	23,232	24,893
Imports 5/:					
September	-	9,696	8,629	8,190	7,541
August	-	7,381	6,743	6,406	5,107
July	3/	8,265	6,635	7,319	7,861
June	9,439	9,397	8,065	8,932	8,300
January-May	61,046	54,604	49,103	42,433	41,526
January-December	-	141,384	126,268	113,418	106,555
			(¢/lb., 26-30 Count, Heads-Off)		
Ex-vessel price, all species, So. Atl. & Gulf Ports:					
October	-	90.0	68.7	53.0	44.4
September	-	90.9	70.1	52.2	46.4
August	-	83.6	66.1	52.0	46.9
July	6/57-78	82.1	55.8	54.6	49.2
June	6/72-83	84.4	53.7	64.1	60.7
May	6/80-86	83.7	52.8	62.9	63.3
April	6/82-90	82.2	55.4	60.6	65.2
March	6/85-92	80.9	56.0	56.3	67.6
Wholesale price froz. brown (5-lb. pkg.) Chicago, Ill.:					
October	-	108-115	83-90	69-73	59-62
September	-	113-118	87-90	65-70	62-64
August	-	110-112	76-91	64-67	62-64

(Table continued on next column)

Item and Period	1963	1962	1961	1960	1959
			(1,000 Lbs., Heads-Off)		
July	80-97	3/	70-75	72-77	62-74
June	95-102	102-104	67-72	76-77	73-74
May	98-103	96-103	67-69	74-77	70-76
April	100-105	94-97	69-70	74-75	75-82
March	102-106	94-95	69-71	65-68	81-83

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 30.3. The figures in the section (Quantity canned, Gulf States) have been completely revised beginning with February 1963 on the basis of a new conversion factor (formerly 33.0 pounds per case).
2/Raw headless only; excludes breaded, peeled and deveined, etc.
3/Not available.
4/Inventory of Mar. 31, 1963, includes 1,536,000 pounds; Apr. 30, 1963, includes 545,000 pounds; May 31, 1963, includes 553,000 pounds; and June 30, 1963, includes 667,000 pounds for firms not reporting previously.
5/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
6/Range in prices at Tampa, Fla.; Morgan City, La., area; Port Isabel and Brownsville, Texas, only.
Note: Data for 1963 and 1962 are preliminary. June 1963 landings and quantity used for canning estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.

Transportation

NEW RAIL-BARGE BETWEEN SOUTHEASTERN ALASKA AND BRITISH COLUMBIA IN SERVICE:

On June 6, 1963, a shipment of frozen halibut was loaded into a mechanically refrigerated car at Saxman, Alaska (near Ketchikan), and moved by barge and railroad to Cincinnati, Ohio. This was the first time that a mechanically refrigerated railroad car moved directly from Alaska to the lower 48 states. The new ferry from Saxman to Prince Rupert, British Columbia, is the connecting link in the all-rail route. It signals the start of a transportation service which may offer cost advantages to some shippers. Rehandling charges involved in combination water and rail routing are avoided.

Carload shipments of frozen fishery products from the terminal at Saxman have also been made to Chicago, Ill., and Miami, Fla.

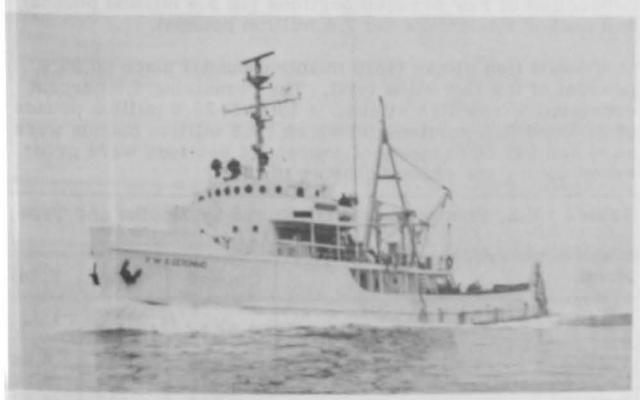
Tuna

ATLANTIC TUNA-OCEANOGRAPHIC STUDIES:

Scientists from the United States are joining those from several other nations in studying the commercially valuable tuna resources of the Atlantic Ocean. In the first part of June 1963, two U. S. Bureau of Commercial Fisheries research vessels, the Delaware and the Geronimo, completed cruises during which oceanographic, biological, and fishery

data and samples were collected in the Gulf Stream and Sargasso Sea. Earlier in 1963, the EQUALANT I survey in the equatorial Atlantic by vessels of the United States and six other nations added biological and oceanographic data about an area (from the coasts of Africa to South America, the Canary Islands south to Ascension Island) that may have a large undeveloped fishery potential. A similar international multiple-vessel survey, EQUALANT II, was scheduled for the same area in August 1963. Later this year, Norwegian scientists will study tuna in the waters of the northeastern Atlantic. In addition, the Fisheries Laboratory in Lowestoft, England, will send a vessel to the Bay of Biscay, to undertake a similar program.

The recent tuna and Gulf Stream study by the Delaware (cruise 63-4) from April 19-June 10, 1963, was sponsored by the Bureau of Commercial Fisheries, the Woods Hole (Mass.) Oceanographic Institution, and the National Georgraphic Society. Exploratory fishing and oceanographic observations were conducted from the Delaware at various places in the Atlantic Ocean from Gloucester, Mass., to a point southeast of the Azores. Tuna were caught during the cruise with Japanese-type long-line gear and trolling lines. Special midwater trawls were used for catching smaller fish; plankton nets and midwater trawls were used to collect eggs and larval fish. A wide array of instruments was used in gathering oceanographic data.



U. S. Bureau of Commercial Fisheries research vessel Geronimo.

On the return trip of the Delaware, the program of the vessel was coordinated with that of the Geronimo. The Geronimo, a Bureau research vessel, left its home port of Washington, D. C., May 7 for a 30-day cruise in the Gulf Stream and the northwestern Atlantic to test oceanographic and biological gear, to provide oceanographic and some biological data to the Delaware, and to study the "scattering layers" (those layers of heavy concentration of small fish and other biological life near the surface of waters bordering on the Gulf Stream.)

The scientists aboard the Geronimo kept those on the Delaware informed of the location of the boundaries of the Gulf Stream. The Gulf Stream, while flowing in a generally northeasterly direction, varies considerably in width and location, sometimes shifting several miles a day. The western, or inshore, edge of the Gulf Stream is characterized by a sudden change in water temperature. During this cruise, temperature changes of as much as 25° F. in less than one mile were noted, although even more marked changes are common.

The Geronimo made three transects of the Gulf Stream--one east of Cape Hatteras where the Stream was 57 miles wide; another south of Connecticut where the Stream had narrowed to 35 miles; and the third south of Cape Cod where it had widened to 102 miles.

Additional research will be needed to determine (1) the extent and the possible value as food for tuna of the concentrations of small fish and other organisms found in the scattering layer; and (2) the effect on tuna and other marine life of the warm water pools which are often cut off from the main warm current of the Gulf Stream. The pools exist as "islands" of warm water, each rather quickly dissipated by mixing with colder inshore waters.

On returning to Washington, D. C., the Geronimo was outfitted for its part of the work in EQUALANT II. In late July 1963, the vessel left for waters off West Africa, the scene of operations during the International Cooperative Investigations of the Tropical Atlantic.

United States Fisheries

COMMERCIAL FISHERY LANDINGS, JANUARY-JUNE 1963:

Total Landings: Fish and shellfish landings in the United States during the first 6 months of 1963 were about 240 million pounds or 14 percent less than during the same period a year earlier. Production of edible fish was about 63 million pounds less than in the first half of 1962, and landings of nonedible species (principally menhaden) were down 177 million pounds.

United States Commercial Fishery Landings of Certain Species for Periods Shown, 1963 and 1962

Species	Period	1/1963	1962	Total 1962
		(1,000 Lbs.)		
Anchovies, Calif. 2/. .	6 mos.	2,100	1,100	2,252
Cod:				
Maine	5 mos.	1,000	1,091	2,260
Boston 3/	6 "	9,700	12,306	21,213
Gloucester 3/	6 "	1,900	1,845	3,823
Total cod		12,600	15,242	27,296
Haddock:				
Maine	5 mos.	900	717	2,545
Boston 3/	6 "	42,900	45,699	83,057
Gloucester 3/	6 "	11,900	9,758	16,089
Total haddock		55,700	56,174	101,691
Halibut: 4/				
Alaska	6 mos.	12,600	14,238	27,496
Wash. & Oreg.	6 "	6,500	7,207	12,404
Total halibut		19,100	21,445	39,900
Herring, Maine	5 mos.	100	3,796	156,699
Industrial Fish, Me. & Mass. 5/	6 mos.	19,500	10,882	42,741
Mackerel:				
Jack 2/	6 mos.	43,000	38,294	93,414
Pacific 2/	6 "	15,200	16,104	44,980
Menhaden	6 mos.	649,400	835,443	2,249,100
Ocean perch:				
Maine	5 mos.	21,800	27,993	69,453
Boston	6 "	300	295	909
Gloucester	6 "	22,300	32,231	53,619
Total ocean perch		44,400	60,519	123,981
Salmon, Alaska . . . to July 14		59,900	77,740	280,000
Scallops, sea, New Bedford (meats)	6 mos.	7,900	9,997	19,309
Shrimp (heads-on):				
So. Atl. & Gulf	7 mos.	85,600	70,547	167,800
Washington	6 "	400	607	1,400
Squid, Calif. 2/	6 mos.	6,700	5,716	7,056
Tuna, Calif. . . . . to July 20		123,100	160,858	284,559
Whiting:				
Maine	5 mos.	4	3	17,831
Boston	6 "	70	77	212
Gloucester	6 "	11,800	8,207	53,183
Total whiting		11,874	8,287	71,226
Total all above items		1,156,574	1,392,751	3,713,404
Other 6/		299,102	303,667	1,526,296
Grand total		1,455,676	1,696,418	5,239,700

1/Preliminary.
2/Cannery receipts.
3/Landed weight.
4/Dressed weight.
5/Excludes menhaden.
6/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.

Menhaden: During the first 6 months of 1963, landings amounted to 649 million pounds--down 186 million pounds as compared with 1962. Landings increased slightly in the Gulf area, but were down substantially all along the Atlantic Coast.

Tuna: Landings (including bonito) in California totaled 126 million pounds to July 20, 1963--a decrease of about 36 million pounds as compared with the same period in 1962. Purse-seine landings in California dropped off 23 million pounds, and clipper-fleet landings amounted to only half of the 21 million pounds for that period in 1962. Transshipments of U. S.-caught fish from South America declined from 5 million pounds in 1962 to 2 million pounds in 1963.

Salmon: On the basis of the reported pack of canned salmon, it was estimated that the Alaska catch to July 14, 1963, totaled 60 million pounds--a decline of about 18 million pounds or 23 percent as compared with the same period of 1962.

Groundfish: At mid-year, 1963 landings of cod (13 million pounds) and ocean perch (44 million pounds) were down 3 and 16 million pounds, respectively, while landings of haddock (55.7 million pounds) remained the same as for the same period in 1962.

Scallops: New Bedford landings during the first half of 1963 amounted to 8 million pounds--falling below the 1962 yield for this period by 2 million pounds or 21 percent.

Shrimp: South Atlantic and Gulf States landings during the first 7 months of 1963 totaled about 86 million pounds--15 million pounds more than in 1962.

Whiting: The catch at Gloucester through June 1963 (12 million pounds) was 4 million pounds or 44 percent greater than the quantity taken to that date in 1962.

* * * * *

FISH STICKS AND PORTIONS PRODUCTION, APRIL-JUNE 1963:

United States production of fish sticks amounted to about 19.4 million pounds and that of fish portions was 24.2 million pounds during the second quarter of 1963, according to preliminary data. This was a gain of 17.7 percent in fish sticks and 32.0 percent in portions as compared with the same quarter of 1962. The increase was due to a greater production of raw breaded portions (up 5.4 million pounds) and cooked fish sticks (up 3.4 million pounds).

Cooked fish sticks (18.5 million pounds) made up 95.4 percent of the fish stick total. The remaining 4.6 percent consisted of raw fish sticks. A total of 23.6 million pounds of breaded fish portions (of which 19.5 million pounds were raw) and 642,000 pounds of unbreaded portions were processed during the second quarter of 1963.

Table 1 - U.S. Production of Fish Sticks by Months and Type, April-June 1963 1/

Month	Cooked	Raw	Total
	(1,000 Lbs.)		
April	6,438	249	6,687
May	5,831	334	6,165
June	6,236	302	6,538
Total 2nd Qtr. 1963 1/	18,505	885	19,390
Total 2nd Qtr. 1962	15,090	1,389	16,479
Total 1st 6 mos. 1963 1/	41,062	2,054	43,116
Total 1st 6 mos. 1962	34,513	2,592	37,105
Total Jan.-Dec. 1962	66,801	5,416	72,217

1/Preliminary.

Table 2 - U. S. Production of Fish Sticks by Areas, April-June 1963 and 1962

Area	1/1963		2/1962	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States ...	21	16,207	23	13,229
Inland & Gulf States	5	1,985	5	2,030
Pacific Coast States	10	1,198	9	1,220
Total	36	19,390	37	16,479

1/Preliminary.
2/Revised.

Table 3 - U.S. Production of Fish Sticks by Months, 1959-1963

Month	1/1963	2/1962	2/1961	1960	1959
	(1,000 Lbs.)				
January	7,634	6,082	6,091	5,511	6,277
February	8,246	6,886	7,097	6,542	6,352
March	7,846	7,658	7,233	7,844	5,604
April	6,687	5,719	5,599	4,871	4,717
May	6,165	5,643	5,129	3,707	4,407
June	6,538	5,117	4,928	4,369	4,583
July	-	3,740	3,575	3,691	3,790
August	-	5,760	6,927	5,013	3,879
September	-	6,582	5,206	5,424	5,353
October	-	6,698	6,133	6,560	5,842
November	-	6,305	6,288	6,281	4,831
December	-	6,027	5,618	5,329	4,743
Total	-	72,217	69,824	65,142	60,378

1/Preliminary.
2/Revised.

Table 4 - U.S. Production of Fish Portions by Months and Type, April-June 1963 1/

Month	Breaded			Un-breaded	Total
	Cooked	Raw	Total		
	(1,000 Lbs.)				
April	1,457	6,362	7,819	185	8,004
May	1,760	5,372	7,132	279	7,411
June	846	7,795	8,641	178	8,819
Tot. 2nd Qtr. 1963 1/	4,063	19,529	23,592	642	24,234
Tot. 2nd Qtr. 1962	3,722	14,160	17,882	481	18,363
Tot. 1st 6 mos. 1963 1/	8,132	38,919	47,051	1,452	48,503
Tot. 1st 6 mos. 1962	6,816	28,955	35,771	1,065	36,836
Tot. Jan.-Dec. 1962	14,007	62,290	76,297	2,381	78,678

1/Preliminary.

Table 5 - U. S. Production of Fish Portions by Areas, April-June 1963 and 1962

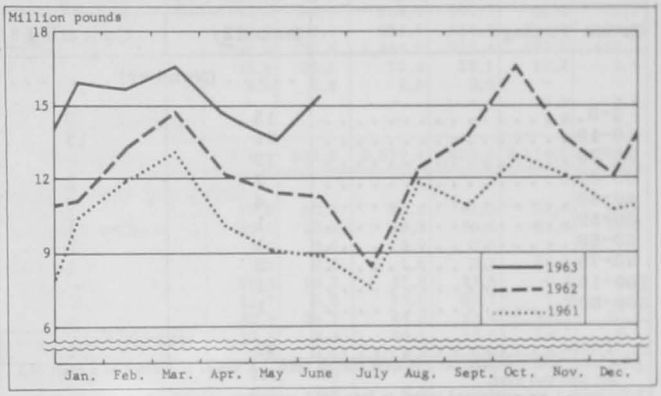
Area	1/1963		2/1962	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	23	14,456	23	9,937
Inland & Gulf States	6	8,995	12	7,857
Pacific Coast States	9	783	7	569
Total	38	24,234	42	18,363

1/Preliminary.
2/Revised.

Table 6 - U. S. Production of Fish Portions by Months, 1959-1963

Month	1/1963	2/1962	2/1961	1960	1959
	(1,000 Lbs.)				
January	8,199	5,077	4,303	3,632	2,692
February	7,383	6,360	4,902	3,502	3,025
March	8,687	7,036	5,831	4,706	3,225
April	8,004	6,408	4,484	3,492	2,634
May	7,411	5,818	3,879	3,253	2,684
June	8,819	6,137	4,039	3,995	3,247
July	-	4,679	3,962	4,088	2,227
August	-	6,687	4,963	3,558	2,796
September	-	7,180	5,745	4,631	3,558
October	-	9,871	6,759	5,275	4,314
November	-	7,406	5,789	4,790	3,483
December	-	6,019	5,191	4,459	3,262
Total	-	78,678	59,847	49,381	37,147

1/Preliminary.
2/Revised.



U. S. production of fish sticks and portions, 1961-63.

Plants on the Atlantic Coast produced the bulk of the fish sticks and portions--30.7 million pounds. The Gulf and Inland States produced 11.0 million pounds, and the Pacific Coast States 1.9 million pounds.

U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, JUNE 1963:

During June 1963, a total of 62 vessels of 5 net tons and over was issued first documents as fishing craft, as compared with 52 in June 1962. There were 31 documents cancelled for fishing vessels in June 1963 as compared with 34 in June 1962.

Table 1 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, June 1963 with Comparisons

Area (Home Port)	June		Jan.-June		Total
	1963	1962	1963	1962	1962
	(Number)				
Issued first documents 2/:					
New England	-	2	10	15	28
Middle Atlantic	1	-	8	2	3
Chesapeake	5	5	22	21	43
South Atlantic	6	4	33	17	47
Gulf	18	15	115	53	110
Pacific	30	25	108	87	130

(Table continued on next page)

Area (Home Port)	June 1963	June 1962	Jan.-June 1963	Jan.-June 1962	Total 1962
			(Number)		
Great Lakes	1	1	3	1	5
Puerto Rico	1	-	2	-	2
Total	62	52	301	196	368
Removed from documentation 3/:					
New England	2	-	26	11	24
Middle Atlantic	5	2	27	26	39
Chesapeake	-	2	10	8	23
South Atlantic	7	2	34	18	38
Gulf	7	13	62	59	104
Pacific	8	10	51	69	111
Great Lakes	2	4	9	12	22
Hawaii	-	-	1	3	3
Puerto Rico	-	1	-	1	1
Total	31	34	220	207	365

1/For explanation of footnotes, see table 2.

Table 2 - U. S. Fishing Vessels--Documents Issued and Cancelled, by Tonnage Groups, June 1963

Gross Tonnage	Issued 2/	Cancelled 3/
	(Number)	
5-9	15	9
10-19	21	13
20-29	13	-
30-39	2	2
40-49	4	2
50-59	1	1
60-69	1	3
70-79	3	1
100-109	1	-
800-809	1	-
Total	62	31

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes 1 redocumented vessel in June 1963 previously removed from records. Vessels issued first documents as fishing craft were built: 45 in 1963; 1 in 1961; 1 in 1960; 14 prior to 1951; and 1 unknown.
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.

* * * * *

FINANCIAL ASSISTANCE FOR VESSELS AND GEAR AVAILABLE FROM THE FISHERIES LOAN FUND:

The Fisheries Loan Fund was authorized by the Fish and Wildlife Act of 1956. This Act provides authority for the Secretary of the Interior to make loans for financing and refinancing operations, maintenance, repair, replacement, and equipment of fishing gear and vessels. This program is still active and loans are available for the purposes mentioned.

As of July 31, 1963, a total of 1,273 loan applications for $34,736 had been received by the U. S. Bureau of Commercial Fisheries, the agency administering the Federal Fisheries Loan Fund. During that period, 674 loans were approved for $15,484,000. These loans are made for a maximum of 10 years at 5 percent simple interest.

* * * * *

MORTGAGE INSURANCE PROGRAM ASSISTS FINANCING OF VESSEL CONSTRUCTION:

The Fishing Vessel Mortgage Insurance Program is designed to assist the financing of the construction of a new vessel in the same manner that the Federal Housing Administration (FHA) helps finance home construction. The funds are obtained from a commercial lender but the Department of the Interior insures the mortgage--thus guaranteeing the lender that he will have no losses.

This program, which is administered by the U. S. Bureau of Commercial Fisheries, can only be used to finance the construction, reconstruction, or reconditioning of fishing vessels. To be eligible, the work must be done by the low bidder after competitive bidding. The mortgage cannot exceed 75 percent of the cost of the work being performed.

* * * * *

NEW FISHERY RESEARCH VESSEL OF BUREAU OF COMMERCIAL FISHERIES VISITS NATION'S CAPITAL:

The new fishery-oceanographic research vessel (Albatross IV) of the U. S. Bureau of Commercial Fisheries was in Washington, D. C., May 30-June 2, 1963, for inspection by the general public and Federal Government officials. The Secretary of the Interior

Fig. 1 - The Albatross IV, docked in Washington, D. C., was inspected by the general public May 30-June 2.

Fig. 2 - Visitors aboard the Albatross IV in Washington, D. C., inspecting the vessel's otter-trawl net which is spread out for display on the stern deck. Note the roller and chute for the net at the rear of the photo.

Stewart L. Udall, on May 9, commissioned the vessel at its home port, Woods Hole, Mass., where one of the Bureau's fishery biological laboratories is located.

Research to be conducted by the vessel will include charting the distribution and abundance of groundfish and scallops, environmental factors causing seasonal and long-term fluctuations in fish stocks, collection of bottom organisms that form the food supply for groundfish, and investigation of plankton populations and general oceanographic conditions.

Note: See Commercial Fisheries Review, June 1963 p. 48; January 1963 p. 56; July 1962 p. 42.

U. S. Foreign Trade

AIRBORNE IMPORTS OF FISHERY PRODUCTS, MARCH-APRIL 1963:

Airborne fishery imports into the United States in March 1963 amounted to 743,915 pounds valued at $377,344, a decrease of 6.1 percent in quantity and 10.3 percent in value from those in the previous month. In April 1963, there was a slight increase with imports of 760,359 pounds valued at $365,682.

Total airborne imports in January-April 1963 were 3.4 million pounds valued at about $1.8 million as compared with the same period in 1962 of 2.5 million pounds valued at $1.1 million. The increase was due mainly to larger shipments of shrimp and spiny lobsters.

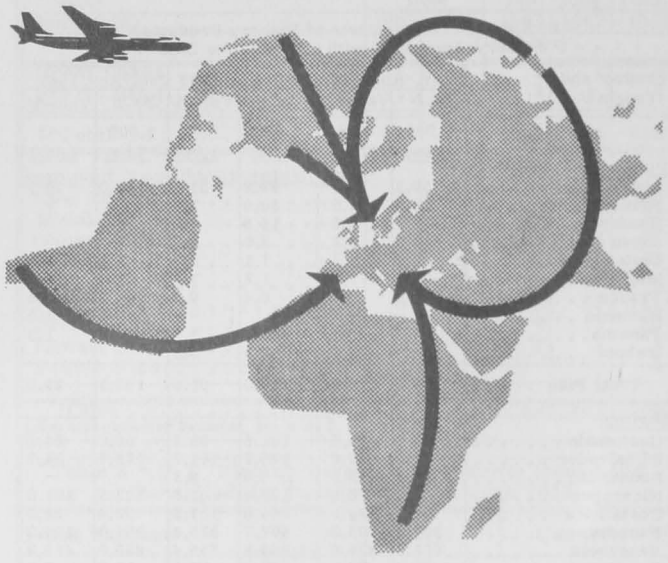
Raw headless shrimp continued to make up the bulk of the airborne shrimp imports--in March 1963, shipments consisted of 558,876 pounds of fresh or frozen raw headless, 20,869 pounds of frozen peeled and deveined, and 685 pounds of unclassified shrimp; in April 1963, shipments consisted of 653,127 pounds of fresh or frozen raw headless, 20,825 pounds of frozen peeled and deveined, and 21,764 pounds of unclassified shrimp. Approximately 80 percent of the total airborne shrimp imports in March and April 1963 entered through the U. S. Customs District of Florida. The remainder entered through the Customs Districts of New Orleans (La.) and Los Angeles (Calif.).

Airborne imports of shellfish other than shrimp in March 1963 included 77,106 pounds of spiny lobster tails and 4,340 pounds of unclassified spiny lobster products. In April 1963, airborne spiny lobster tail arrivals consisted of 20,039 pounds of lobster tails and 4,450 pounds of unclassified spiny lobster products. The spiny lobster airborne imports originated in Central and South American countries and entered through the Customs Districts of Florida and Puerto Rico.

U. S.1/ Airborne Imports of Fishery Products, January-April 1963 with Comparative Data

Product and Origin2/	Mar.-Apr. 1963		Jan.-Apr. 1963		Jan.-Apr. 1962	
	Qty.3/	Value4/	Qty.3/	Value4/	Qty.3/	Value4/
	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000
Fish:						
Mexico	59.3	18.1	99.2	31.1	153.0	26.1
British Honduras	10.7	2.9	30.6	7.6	-	-
Honduras	7.0	2.0	15.5	4.0	-	-
Japan	2.0	8.2	2.0	8.2	-	-
United Kingdom	0.4	1.2	1.1	2.7	1.0	0.3
Iran	1.2	7.4	1.2	7.4	-	-
France	-	-	0.4	0.3	0.2	0.5
Rumania	-	-	-	-	0.1	1.0
Panama	-	-	-	-	7.8	1.3
Ireland	-	-	0.8	0.3	-	-
Total Fish	80.6	39.8	150.8	61.6	162.1	29.2
Shrimp:						
Guatemala	39.2	21.6	101.5	53.9	66.0	34.1
El Salvador	37.7	27.6	145.2	101.7	125.7	84.7
Honduras	5.8	3.3	5.8	3.3	-	-
Nicaragua	183.9	58.1	193.4	61.6	603.5	201.6
Costa Rica	73.6	36.1	284.0	137.3	52.4	21.2
Panama	202.3	108.9	607.7	326.4	384.0	194.5
Venezuela	658.6	322.6	1,464.8	715.4	865.8	415.9
Ecuador	72.4	23.1	72.4	23.1	12.2	3.4
France	2.6	0.9	2.6	0.9	-	-
Mexico	-	-	-	-	6.0	3.9
Netherlands Antilles	-	-	-	-	3.0	2.7
Total Shrimp	1,276.1	602.2	2,877.4	1,423.6	2,119.0	962.1
Shellfish other than Shrimp:						
Mexico	22.8	13.3	70.9	41.5	27.8	16.0
British Honduras	30.9	22.0	98.2	76.4	61.9	38.6
El Salvador	5.0	3.6	5.0	3.6	-	-
Honduras	1.2	0.5	1.6	0.8	60.2	47.7
Nicaragua	20.9	14.7	47.8	37.9	0.4	0.3
Costa Rica	11.7	6.5	73.8	60.1	1.4	1.2
Jamaica	32.8	24.7	44.3	33.4	28.2	20.5
Netherlands Antilles	12.5	8.4	29.1	18.3	14.2	9.3
Colombia	2.9	4.5	2.9	4.5	0.1	0.2
Ecuador	1.1	0.3	2.2	1.8	0.9	0.7
Tunisia	0.5	0.6	0.5	0.6	-	-
Leeward and Windward Islands	1.6	0.5	1.6	0.5	14.8	5.2
British Guiana	1.7	0.3	1.7	0.3	-	-
Canada	1.8	0.7	1.8	0.7	-	-
Venezuela	-	-	13.7	6.0	22.3	13.6
Panama	-	-	-	-	1.0	1.0
Guatemala	-	-	-	-	2.4	1.9
Japan	-	-	-	-	5/	0.3
France	-	-	-	-	0.2	0.4
Dominican Republic	-	-	6.2	5.0	-	-
Total Shellfish (except shrimp)	147.4	100.6	401.3	291.4	235.8	157.0
Grand Total	1,504.0	742.4	3,429.5	1,776.6	2,516.9	1,148.3

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.
2/When the country of origin is not known, the country of shipment is shown.
3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
4/F.o.b. point of shipment. Does not include U. S. import duties, air freight, or insurance.
5/Less than 1,000 pounds.
Note: These data are included in the over-all import figures for total imports, i.e., these imports are not to be added to other import data published.
Source: United States Airborne General Imports of Merchandise, FT 380, March and April 1963, U. S. Bureau of the Census.



The leading finfish product imported by air in the first four months of 1963 was fish fillets (mostly from Mexico, Honduras, and British Honduras).

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consist of fresh and frozen products.

* * * * *

EDIBLE FISHERY PRODUCTS, JUNE 1963:

United States imports of edible fishery products in 1963, in general, reflect the failure of the California sardine fishery last season by more imports of canned sardines not-in-oil; the comeback of the Maine sardine fishery this season by the drop in imports of canned sardines in-oil; the sharp drop in demand for canned tuna in the second quarter of this year by substantial drops in the imports of canned tuna in-brine and frozen tuna.

Imports of fresh, frozen, and processed edible fish and shellfish into the United States in June 1963 were down 4.6 percent in quantity and 9.6 percent in value from the previous month. In June, imports were down for canned tuna in brine from Japan; frozen swordfish from Japan; canned sardines (in-oil and not-in-oil) from Norway, Portugal, Japan, and South Africa Republic; canned crab meat from Japan; frozen spiny lobsters from Australia and South Africa Republic; frozen shrimp from El Salvador, British Guiana, and India. The decline was partly offset by increased imports of frozen groundfish fillets from Greenland, Canada, Iceland, and Norway; frozen flounder fillets from Canada; fresh swordfish from Canada; frozen tuna (other than albacore) from Australia and Trinidad; fresh and frozen salmon from Canada.

Compared with the same month in 1962, imports in June 1963 were the same in quantity, but down 5.7 percent in value. This June there was a heavy cutback in imports of canned tuna in brine, canned sardines (in-oil and not-in-oil), frozen spiny lobsters, and canned salmon. But imports were up for frozen groundfish (principally blocks and slabs, haddock, and cod), fresh swordfish from Canada, frozen albacore tuna from Japan, and other frozen tuna from Peru.

In the first 6 months of 1963, imports were down 5.0 percent in quantity and 3.0 percent in value. Fluctuations in individual import items were much greater than the over-all totals indicate. Imports were down sharply in 1963 for canned tuna in brine and frozen tuna (mostly from Japan), canned sardines in oil, frozen spiny lobsters, and canned salmon. On the other hand, there was a large increase in imports of canned sardines not-in-oil (mostly from South Africa Republic) and frozen shrimp, as well as heavier shipments of frozen groundfish fillets, fresh swordfish from Canada, canned crab meat from Japan, and frozen frog legs from India.

U. S. Imports and Exports of Edible Fishery Products, June 1963 with Comparisons

Item	Quantity				Value			
	June		Jan.-June		June		Jan.-June	
	1963	1962	1963	1962	1963	1962	1963	1962
	(Millions of Lbs.)				(Millions of $)			
Imports:								
Fish & Shellfish:								
Fresh, froz. & processed 1/	84.1	84.1	531.5	559.7	30.0	31.8	185.4	191.1
Exports:								
Fish & Shellfish:								
Processed only 1/ (excluding fresh & frozen)	2.0	3.2	16.6	17.4	1.0	1.0	6.6	6.9

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

Exports of processed fish and shellfish from the United States in June 1963 dropped only slightly from those of the previous month but the value from May to June was up 42.9 percent. The June exports of canned mackerel, sardines, and squid were below those of the previous month but the value from May to June increased sharply because of substantially larger shipments of higher-priced products--canned shrimp (up 245 percent) and canned salmon (up 17.6 percent).

Compared with the same month in 1962, the exports in June 1963 were down 37.5 percent in quantity, although the value of the exports was the same in both months. A sharp drop in exports of canned sardines (not in oil) and canned squid (none shipped to the Philippines) this June was offset by larger shipments of most other canned fish export items.

Processed fish and shellfish exports in the first 6 months of 1963 were down 4.6 percent in quantity and the value dropped 4.4 percent from the same period in 1962. The drop in value was due to a general decline in the price of canned fishery products in 1963. The decline in quantity was due mainly to lower shipments of canned sardines and a drop in exports of canned mackerel to the Congo Republic. There were increases in exports of canned salmon and canned squid and in particular canned shrimp which increased 49.5 percent from the same period in 1962. Although not covered in the table, exports of frozen shrimp were up sharply in the first half of 1963 (increase mostly in exports to Japan), and there was a substantial increase in exports of frozen salmon.

* * * * *

IMPORTS OF CANNED TUNA UNDER QUOTA:

United States imports of tuna canned in brine during January 1-August 3, 1963, amounted to 29,036,028 pounds (about 1,382,700 std. cases), according to data compiled by the Bureau of Customs. This was 10.9 percent less than the 32,594,317 pounds (about 1,552,100 std. cases) imported during January 1-July 28, 1962.

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1963 at the 12½-percent rate

of duty is limited to 63,130,642 pounds (or about 3,006,221 std. cases of 48 7-oz. cans). Any imports in excess of the quota are dutiable at 25 percent ad valorem.

* * * * *

IMPORTS OF FISH MEAL AND SCRAP BY CUSTOMS DISTRICTS, JUNE 1963:

About 67 percent of the fish meal and scrap imports in June 1963 entered through the Customs Districts of Mobile (Ala.), Washington, Galveston (Tex.), and Georgia.

U. S. Imports of Fish Meal and Scrap by Customs Districts, June 1963

Customs Districts	June 1963
	Short Tons
Maine and New Hampshire	50
Vermont	35
Massachusetts	60
New York (N. Y.)	300
Philadelphia (Pa.)	100
Maryland	1/1,298
Georgia	2,147
Mobile (Ala.)	4,058
Galveston (Tex.)	2,372
Los Angeles (Calif.)	2/1,009
San Francisco (Calif.)	1,167
Oregon	165
Washington	3,713
Hawaii	55
Dakota	245
Duluth (Minn.) and Superior (Wis.)	1,445
Michigan	3/ 233
Total	18,452

1/Includes 220 tons of fish meal classified as fertilizer.
2/Includes 347 tons of fish meal classified as fertilizer.
3/Includes 24 tons of fish meal classified as fertilizer.
Note: A list of the entry ports included within each Customs District is given in Schedule D, Code Classification of United States Customs Districts and Ports, which may be obtained free by writing to the Foreign Trade Division, Bureau of the Census, U. S. Department of Commerce, Washington 25, D. C.

Wholesale Prices

EDIBLE FISH AND SHELLFISH, JULY 1963:

With prices in July 1963 down for almost all major fishery products, there was a 3.9-percent drop from the previous month in the wholesale price index for edible fishery products. The exceptions were higher prices in July for salmon and fresh-water fish, while prices for a number of other products held at the same level as in June. Compared with a year earlier, the index this July at 110.0 was down 7.6 percent. Greater supplies of most major fishery products this year account for the lower prices.

At New York City, higher prices for fresh dressed king salmon were largely responsible for a 0.3-percent increase in the subgroup index for drawn, dressed, or whole finfish. Prices for Great Lakes fresh-water fish at New York City and Chicago also rose from June to July. Ex-vessel prices for large haddock at Boston (down 14.8 percent) dropped sharply from the much higher June prices (caused by lighter-than-normal haddock landings). Fresh halibut prices at New York City were steady in July remaining at the same level as in June, but were 20 percent lower than in July a year earlier because of larger stocks in cold-storage at the beginning of the season. Compared with July 1962, the

subgroup index this July was down 10.8 percent--prices for all items (except fresh yellow pike) in the subgroup were lower than in the same month a year earlier.

Seasonal supplies of fresh shrimp from the South Atlantic States were more liberal at New York City during July and this brought prices down sharply from the high June level. A 19.8-percent drop in New York City fresh shrimp prices combined with lower prices for fresh haddock fillets at Boston (down 7.3 percent) were responsible for a 10.6-percent drop from June to July in the subgroup price index for processed fresh fish and shellfish. As compared with the same month in 1962, the subgroup index this July was up 6.5 percent due to substantially higher prices for fresh shucked oysters and slightly higher prices for fresh shrimp.

The lower price trend in the processed frozen fish and shellfish subgroup from June to July was because of the price drop for frozen shrimp at Chicago (down 7.5 percent). Compared with July 1962, frozen shrimp prices this July were 10.2 percent lower because of better fishing. There was a slight decline in prices for frozen ocean perch fillets following the steady and unchanged price level of the previous two months, but those prices were still 12.8 percent higher than a year earlier. July prices for other frozen fillets held at the same level as in June. Frozen fillet prices this July were all higher than a year earlier. The subgroup index at 107.9 this July dropped 4.6 percent from the previous month and was below the same month a year earlier by 2.8 percent.

A decline in prices for canned Maine sardines (down 8.0 percent) was mainly responsible for a 1.3-percent drop from June to July in the canned fishery products subgroup price index. Stocks of canned Maine sardines on July 1, 1963, were up substantially from those of a year earlier when the pack was considerably below normal. In mid-April when the new canning season opened, the carry-over from the previous season at the canners' level was more than 600,000 cases. By the end of July 1963, the new season pack was about 700,000 cases. Prices for canned tuna this July dropped slightly (down 0.9 percent) and were lower than a year earlier by 8.3 percent. Compared with July 1962, prices this July were sharply lower (down 14.4 percent) for all canned fishery products because of larger stocks.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, July 1963 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			July 1963	June 1963	July 1963	June 1963	May 1963	July 1962
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					110.0	114.4	115.9	119.0
Fresh & Frozen Fishery Products:					114.3	120.5	122.4	118.5
Drawn, Dressed, or Whole Finfish:					110.0	109.7	115.4	123.3
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.11	.13	83.4	97.9	86.2	98.6
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.36	.36	106.4	106.4	105.9	133.0
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.85	122.3	118.8	127.5	136.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.59	.57	88.0	84.3	110.4	89.5
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.62	.47	100.7	76.2	108.1	77.8
Processed, Fresh (Fish & Shellfish):					120.8	135.1	133.9	113.4
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.39	.42	93.5	100.8	95.9	94.7
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.91	1.14	106.7	133.0	134.8	105.5
Oysters, shucked, standards	Norfolk	gal.	8.50	8.50	143.3	143.3	139.1	126.5
Processed, Frozen (Fish & Shellfish):					107.9	113.1	114.0	113.3
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	100.1	100.1	98.9	98.9
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.35	.35	102.6	102.6	102.6	98.2
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.33	.34	116.6	117.5	117.5	103.4
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.93	1.00	109.7	118.6	120.4	122.2
Canned Fishery Products:					102.8	104.1	104.9	120.1
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.00	24.00	104.6	104.6	105.7	124.2
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.15	11.25	99.0	99.9	99.9	107.9
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	5.90	5.90	2/100.0	2/100.0	2/100.0	3/118.5
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.11	8.81	104.0	113.0	116.2	145.1

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/One commodity has been dropped in the fishery products index as of December 1962--"Sardines, Calif., tom. pack, No.1 oval (15-oz.), 24 cans/cs."--and replaced by--"Mackerel, jack, Calif., No. 1 tall (15-oz.), 48 cans/cs." Under revised procedures by the Bureau of Labor Statistics all new products enter wholesale price indexes at 100.

3/Based on Calif. sardines and not directly comparable with replacement (jack mackerel) for January-July 1963.