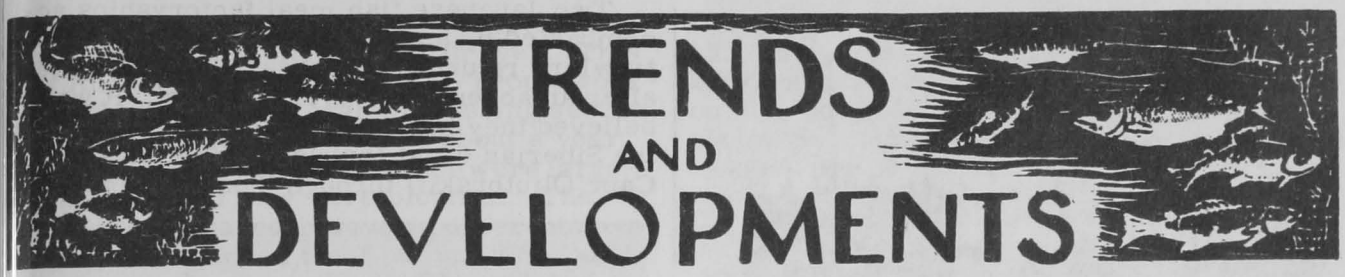

Alaska

HANDLING AND PROCESSING ABOARD JAPANESE VESSELS OF ALASKA SALMON:

Two of the Japanese vessels in Prince William Sound, which processed fresh salmon purchased from Alaska fishermen this past summer, were visited in August 1964 by an observer from the U. S. Bureau of Commercial Fisheries. He was accompanied by the representative of a Japanese international combine who was serving as coordinator for the Japanese fishing firms involved in the salmon purchase. Processing aboard the Japanese factoryships was said to be similar in all cases. The Japanese vessels visited were the stern-ramp freezer trawlers Ibuki Maru and Daishin Maru No. 15. A description of the processing aboard those vessels follows:

Normally, Japanese workmen board the fishing boat and place the fish into a brail with a purse-string closure in the center. No salmon are accepted that are badly watermarked or that have been pewed through the body. Those men handle the fish with gloved hands. When the brail is loaded, it is lifted aboard the processing vessel, and the fish are released on an elevated sorting table. Here the salmon are inspected, segregated by species, and placed in a sheet-metal chute leading to the processing deck below.

Processing aboard is very simple, with all salmon frozen in the round. The fish are thoroughly washed with soft brushes and salt-water sprays (no tanks or dips and no water used twice). Pink salmon are placed in stainless steel freezer pans with removable bottoms that hold about 10 kilograms (22 pounds). The pans hold 6 to 10 pink salmon placed in a single layer side by side, head to tail to head. A similar freezer pan somewhat larger--perhaps 15 kilos (33 pounds)--is used for larger fish.

Small chum salmon are hand-packed like the pink salmon. Larger chum salmon are placed on a sheet of plastic packaging material, sprayed with an antioxidant, and frozen individually.

After being packed, the fish are conveyed to the freezing compartment. The Japanese vessels are equipped with at least 12 hydraulically-operated pressure plate freezers each with a capacity of about 1 ton. In addition, they usually have a blast freezer to handle individual fish and other nonuniform jobs. The freezing cycle is 4 to 6 hours depending on the load and other fish waiting to be processed.

After they are frozen, the fish are conveyed through a glazing machine where temperature is controlled to release the fish from the pans. The pans are removed, and the block is glazed in a second glazing machine before being packed in corrugated cartons for storage in the hold. Handling is assisted by conveyer systems or salt-water flumes, and there is a minimum of hand labor.

According to information from Japanese sources, the pink salmon will be canned in Japan, and the chum salmon sold on the fresh market. The canned salmon will then be exported, probably to the United Kingdom. No fish cutting was observed aboard the vessels visited.

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FOREIGN FISHING ACTIVITIES OFF ALASKA:

U. S. S. R.: Soviet trawling activity in the Gulf of Alaska was gradually reduced through August 1964. By month's end about 30 trawlers accompanied by various types of support vessels were operating alternately on Albatross and Portlock Banks off Kodiak Island. Soviet activity in the Gulf during 1964 has been considerably less than in 1963. It was believed this was due to expanding saury and herring fishing activities off the Siberian

Fig. 1 - Type of Soviet trawler operating in North Pacific and Bering Sea.

coast and Sea of Okhotsk rather than to any lessening of fishing success in waters off Alaska.

Soviet whaling activity shifted into the Bering Sea during August, with one fleet operating east of the Pribilof Islands, a second fleet fishing generally south and west of that island group, and a third hunting along the Aleutian Chain. It was believed that 1964 was the first year the Soviets have commercially exploited the whale resources of the eastern Bering Sea.

Japan: Two Japanese king crab factoryships, the Tokei Maru and Tainichi Maru, accompanied by 12 catcher vessels fished along the north side of the Alaska Peninsula from the vicinity of Unimak Pass to the Port Moller area during August.

Fig. 2 - Sorting and weighing crab meat prior to freezing aboard a Japanese king crab factoryship.

One shrimp factoryship (Einin Maru) accompanied by 12 trawlers continued to fish north of the Pribilof Islands group. The second shrimp factoryship, the Chichibu Maru, was believed en route to resume fishing for shrimp in that same area after transferring the salmon purchased in Prince William Sound to the vessel Haruna Maru on the high seas.

Two Japanese fish meal factoryships accompanied by an undetermined number of trawlers returned to the eastern Bering Sea after an absence of several weeks. It was believed they later shifted operations west t the Siberian coast (between Cape Navarin a Cape Oliutorskii) through most of August.

Fig. 3 - Type of Japanese trawler operating in the Bering Sea.

It was believed that Japanese whaling operations were terminated in August and tha those fleets might be en route to Japan.

Two small Japanese side trawlers and 4 stern trawlers were reported fishing for shrimp and Pacific ocean perch on Albatros Bank off Kodiak during August 1964.

* * * * *

KODIAK HAS EXCELLENT SALMON SEASON:

Kodiak Island had what appeared to be th best pink salmon year in recent history. T weekly closures on salmon fishing there thi year (1964) have been primarily to give the rushed canneries an opportunity to keep pa But a pessimistic note at Kodiak during Au gust was the presence of large king crab v sels with no market for their catch. One shore plant was processing crabs on a par time basis. Only two other processors we then operating--one at Port Wakefield and the other at Jap Bay.

It was believed there would be at least fi king crab plants in operation in Kodiak by late fall. Another plant was operating in Raspberry Straits, just a few minutes flyin time from Kodiak.

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KODIAK PROCESSING PLANT VERY ACTIVE:

A Kodiak cold-storage and processing plant (temporarily put out of commission b

the March 27 earthquake) was reported to have bounced back stronger than ever. This past August there were about 60 people working in the Dungeness crab-processing section of the plant which was started about a year ago. The crabs being processed were large--3-5 pounds, and they were plentiful. The product is prepared in several different ways, ranging from picked meat put up in 5-pound cans to individual selected crabs which are ice-glazed and frozen whole after being dipped in a special formula of brine. Those whole crabs reach the market without being cleaned, but the bright red shells have been scrubbed to a polished sheen. In addition to Dungeness crab, a king crab-processing line has just been set up in another section of the Kodiak plant. That other section is operated by a different firm and employs about 35 people. On the main floor, salmon and halibut are cleaned and frozen during the season. Daily landings of halibut at the plant at the end of July were near 600,000 to 700,000 pounds. The cold-storage section of the plant employs about 45 persons.

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GOOD PROGRESS IN HERRING REDUCTION:

Herring reduction plants at Big Port Walter and Washington Bay were having a good production season this past summer. At Big Port Walter the pumping system of unloading fish is being replaced this year with a "marine leg" bucket elevator, which was used a few years earlier. The reason for the reversion is to slow down unloading equipment and to decrease loss of oil. By the end of August 1964, 88,000 barrels of herring were processed at Big Port Walter, with the oil yield exceeding 5.5 gallons per barrel.

* * * * *

AMPLE SUPPLIES FOR CRAB-PROCESSING PLANTS:

As of August 1964 there were three shore-processing plants and two floating plants processing crabs in the Shumagin Islands and Alaska Peninsula areas. Crab catches in those areas were excellent and adequate to keep the plants operating on a full-time basis.

* * * * *

CORDOVA DUNGENESS CRAB PRICES DROP:

Dungeness crab fishermen in Cordova were faced with a drop in price from 14 cents to 12 cents a pound for whole crab on August 15. The price decline was attributed to market demand. The only Dungeness crab packer on the Sound also said fishermen would be placed on a limit because the plant was unable to keep up with the catch.

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FILING OF FISHERY DISASTER LOAN APPLICATIONS EXTENDED TO OCTOBER 31, 1964:

Extension of the time for acceptance of fishery disaster loans to October 31, 1964, was announced by the Regional Director for the U. S. Bureau of Commercial Fisheries in Alaska, on September 25. The Secretary of the Interior authorized the extension of the time for acceptance of fishery loan applications to be handled as disaster loan applications from September 30, 1964, to October 31, 1964. Disaster loans through the U. S. Bureau of Commercial Fisheries provide financial assistance to fishermen who need to replace or repair commercial fishing vessels or fishing gear that was lost, damaged, or destroyed during the March 27, 1964, earthquake or subsequent tidal waves.

Note: See Commercial Fisheries Review, October 1964 p. 13.

Alaska Fisheries Explorations and Gear Development

SHRIMP EXPLORATIONS OFF ALASKA:

M/V "Paragon" Cruise 64-2 (June 16-September 19, 1964): Exploratory fishing for shrimp and other shellfish (scallops) in the Gulf of Alaska and Bering Sea was the principal objective of this 13-week cruise by the U. S. Bureau of Commercial Fisheries chartered exploratory fishing vessel Paragon.

A total of 308 stations in the area of operations was covered during this cruise. Emphasis was oriented toward completion of uniform seasonal summer shrimp explorations for the northern portion of the Gulf of Alaska from Cape St. Elias westward to the Aleutian Islands. During three summer seasons, beginning in 1962, over 500 exploratory shrimp trawl drags were completed in that area by fishing vessels chartered by the U. S. Bureau of Commercial Fisheries. Secondary objectives of the Paragon's cruise included preliminary shrimp explorations in selected areas of the eastern Bering Sea and recon-

naissance for indications of scallops in waters adjacent to Kodiak and the Alaska Peninsula.

The primary sampling gear used were 40-foot flat and semiballoon shrimp trawls and an 8-foot New England style scallop dredge.

Fig. 1 - Chartered exploratory fishing vessel Paragon.

To facilitate cruise organization and comparative evaluation, the area fished during Paragon's Cruise 64-2 was divided into 5 geographic entities--Area D, consisting of the waters off the northern end of Kodiak Island and Marmot Bay; Area E, the southern portion of Shelikof Strait and waters adjacent to the Alaska Peninsula west to Sutwik Island; Area F, west of the preceding to Unimak Island (including the Shumagin Islands); Area G, Sanak Island west to Unalaska Island including Unimak Pass; and Area H, selected portions of the Bering Sea and Bristol Bay.

The abundance of shrimp in the vicinity of the Shumagin Islands (Area F), indicated by earlier Bureau explorations in 1957, was positively substantiated during this cruise. The average catch rate for 82 thirty-minute trawl drags in that area was over 650 pounds. Individual catches of over 1,000 pounds of shrimp were common. Of particular note was the fact that those catches included significant quantities of the desirable side-stripe shrimp.

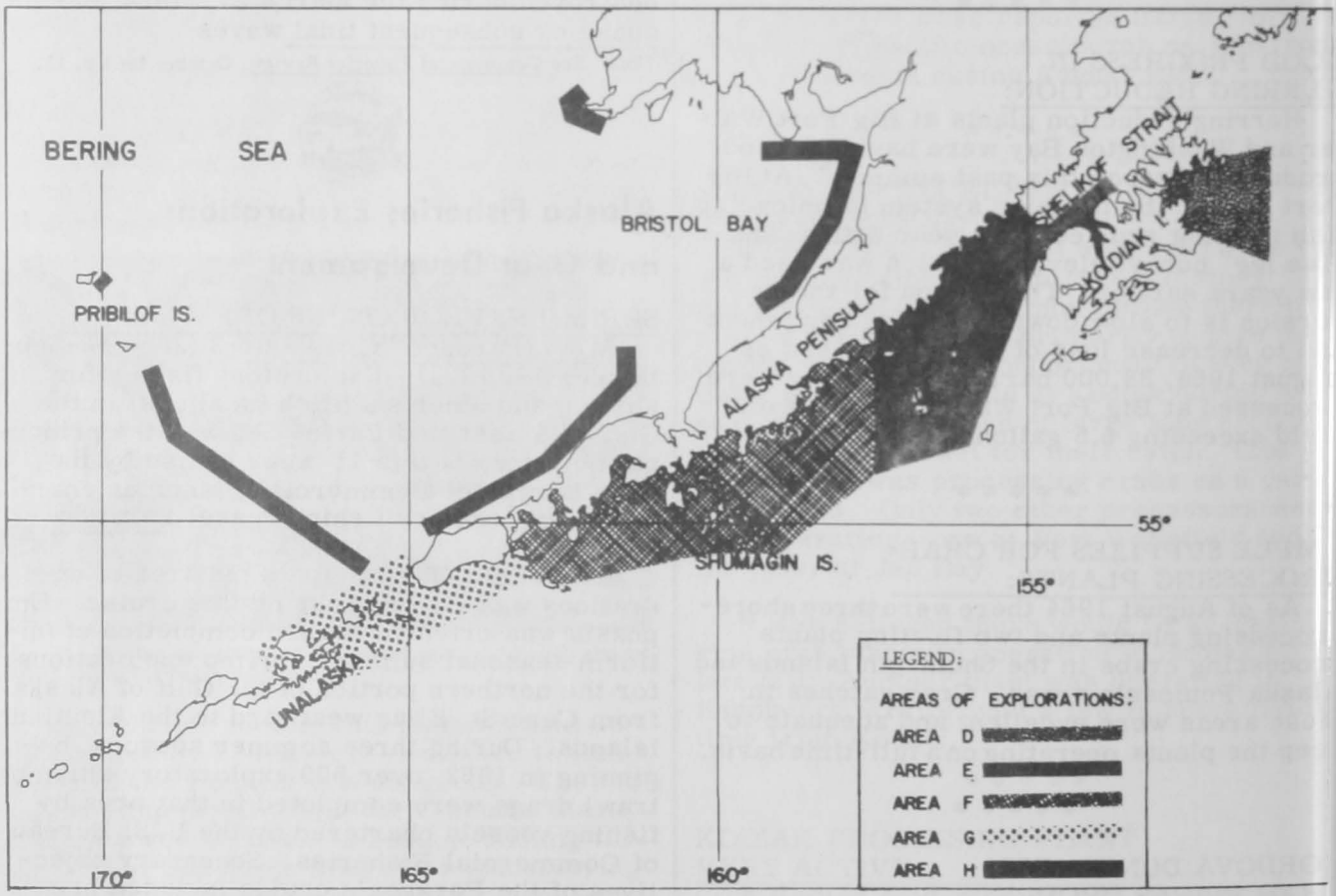

Fig. 2 - Shows division into geographic areas of Paragon Cruise 64-2, June 16-September 19, 1964.

Summary of Catch Data for Shrimp Taken on the M/V Paragon Alaska Exploratory Cruise 64-2

Shrimp Species		Average Catch of Shrimp Per Trawl Drag				
		Area (no. of shrimp trawl drags taking shrimp)				
Common Name	Scientific Name	D(29)	E(14)	F(82)	G(48)	H(59)
		(Lbs.)				
Pink shrimp	Pandalus borealis	58.4	20.0	479.7	75.8	5.3
Side-stripe	Pandalopsis dispar	121.3	37.3	119.6	17.8	0.4
Humpy	Pandalus goniurus	.2	-	35.1	-	-
Coon-stripe	Pandalus hypsinotus	.9	.4	18.9	1.4	-
Total		180.8	57.7	653.3	95.0	5.7

(Pandalopsis dispar) which averaged in size about 26 whole shrimp to the pound. This species was also well represented in Marmot Bay (Area D).

In the overall survey, pink shrimp (Pandalus borealis) was the dominant species, accounting for almost 70 percent of the total shrimp taken. Other species caught, but in relatively small quantities, included "humpy" (Pandalus goniurus) and coon-stripe (Pandalus hypsinotus).

Reconnaissance for scallops was carried out at locations where local knowledge of scallop (Patinopecten caurinus) occurrence had been indicated. Sixty-seven sampling drags were made with an 8-foot wide scallop dredge. From that total, 28 of the drags caught scallops in quantities ranging from 1 to 250 per 30-minute drag. The best catch was from near Marmot Island and consisted of about 250 six-inch scallops. Only six drags took more than one bushel of scallops. The results of those limited scallop explorations do not provide evidence of commercial concentrations in the areas sampled.

In addition to data on shrimp and scallop abundance, records were kept throughout the cruise of other shellfish and fish caught. For example, data such as the size and number of halibut (Hippoglossus stenolepis) taken during trawl drags were recorded. One 30-minute shrimp trawl drag made in inner Bristol Bay yielded 252 juvenile halibut which indicates that location is included in an important nursery area.

Note: See Commercial Fisheries Review, August 1964 p. 14.

Alaska Fishery Investigations

COPPER RIVER SOCKEYE SALMON SEROLOGICAL SAMPLING:

The Branch of River Basin Studies, U. S. Bureau of Sport Fisheries and Wildlife, in Western Alaska has completed its 1964 collection of Copper River sockeye salmon blood samples for serological analysis at the Seattle Biological Laboratory. Samples were taken from 406 fish in the commercial fishery at the Copper River Delta and from 991 fish on the spawning ground of the upper and lower Copper River.

An attempt was to be made this year (1964), on the basis of serological analysis, to separate fish in the commercial fishery into races that have been already identified on the spawning grounds.

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NAKNEK SYSTEM RED SALMON SMOLT OUTMIGRATION:

An estimated 7.2 million red salmon smolt were reported to have left the Naknek Lake system in 1964. Thus, the 1964 outmigration was considerably smaller than the peak outmigration of 16.8 million estimated in 1962.

About 69 percent of the 1964 migrants were 3-year-olds from the 1961 brood year, while the remainder of the smolts were 2-year-olds from the 1962 brood year. From 1956 to 1961, 2-year-old smolt made up the largest part of the yearly outmigrations. However, since 1962, the outmigrants have mainly been 3-year-olds, with the 1964 smolt run having the greatest percentage of 3-year-olds on record.

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KARLUK LAKE SALMON ESCAPEMENT:

Adult escapement of sockeye salmon to Karluk Lake through August 20, 1964, numbered 225,512 fish or somewhat below the

1961-63 average of 264,000 by that date. Also, 219 king salmon and 28,275 pink salmon had passed the weir up to that date. A substantial pink salmon run appeared to be developing at that time.

* * * * *

CRAB TAGGING PROGRAM:

Although bad weather hampered vessel operations during late August, more than 4,000 crabs were tagged. Tagged crabs were released in offshore areas on Albatross Bank, near Chirikof Island, and west of Chirikof Gully near the Semidi Islands. Returns from those releases should give important information on the geographical boundaries of several stocks of crabs.

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OLSEN BAY PINK SALMON RUN, 1964:

The early pink salmon run this past season, which was smaller than in recent years, entered Olsen Creek by August 10, and the late run was beginning to enter the stream by August 20. Chum spawning (totaling about 5,000 fish) was virtually completed by the end of August.

Prior to the Alaska earthquake this past March, 95 percent of chum spawning and 75 percent of pink spawning occurred in the Olsen Creek intertidal zone. This year only 25 percent of the chums utilized the intertidal area, and through August only 35 percent of the pinks. Chums spawned this year in the new intertidal zone between present tidal elevations of 7.5 and 10.5 feet. That elevated area corresponds with the pre-earthquake lower intertidal zone (elevation 2.5 to 5.5 feet), and was never before occupied by chum salmon. Pink salmon are also spawning in the 7.5- to 10.5-foot section; they have used that area before (when it was 2.5 to 5.5 feet), but only in years when spawners were much more abundant than this year.

Mortality of eggs deposited in the pre-earthquake 2.5- to 5.5-foot zone was nearly 100 percent in former years. That high mortality was probably due to a high percentage of fine material in the streambed, and to extreme changes of temperature, salinity, and dissolved oxygen accompanying tidal cycles.

Because of elevation of the spawning area by the earthquake, the lethal effects of tide on the pre-earthquake 2.5- to 5.5-foot zone have now largely been eliminated. The principal remaining limiting factor is excessive fine materials in the streambed gravels. Therefore, survival of eggs in the present 7.5- to 10.5-foot level will depend mainly on how rapidly salmon spawning and stream action will remove the fine materials to permit adequate intragravel water circulation. Assessment of survival in the fall of 1964 and again next spring by egg pumping will give the answers.

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TRANSPLANTING LIVE PINK SALMON:

At Kuiv Island this past August, from 3,000 to 4,000 live pink salmon were seined and placed in circulating sea water tanks aboard a fishing firm's tender. The fish were caught in Bear Harbor, Affleck Canal, and arrived at Little Port Walter in good condition after a 7-hour trip. They were released into a large floating pen in the bay and held for later release in Sashin Creek above the weir. Mortality during capture and transit was less than 5 percent. Observations of the distribution of the transplanted fish in Sashin Creek were to be made, and survival of their progeny will be measured in order to study this method as a transplanting tool.

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STUDIES ON MIGRATIONS OF JUVENILE SALMON:

The M/V Heron accompanied by the reconnaissance-catcher vessel Blue Boat completed Early Sea Life of Salmon cruises 3 (July 27-August 5) and 4 (August 17-24) in major channels of Southeastern Alaska and on the outer coasts of Chichagof and Prince of Wales Islands. Those cruises were part of a series to trace seaward migrations of juvenile salmon as they move through summer nursery areas to the Gulf of Alaska. The cruises were highly successful because ideal weather conditions prevailed for observation and fishing. Round haul seine catches from the Blue Boat ranged from several hundred to several thousand per set.

American Fisheries Advisory Committee

FISHERIES PROBLEMS TO BE DISCUSSED AT 18TH ANNUAL MEETING:

Testing and tasting of irradiated fishery products was to be one of the highlights of the 18th annual meeting of the American Fisheries Advisory Committee scheduled to be held at Beverly, Mass., October 5-7, 1964, announced the Regional Director, North Atlantic Region, U. S. Bureau of Commercial Fisheries, on October 1.

During its 18th meeting, the Advisory Committee will review national and international problems confronting the United States commercial fishing industry and also review research and other programs of the Department of the Interior's Bureau of Commercial Fisheries. Because of the Massachusetts meeting site, special attention will be given to fishery developments in the New England area.

The American Fisheries Advisory Committee, comprised of individuals actively engaged in the commercial fishing industry, advises the Secretary of the Interior on matters pertaining to the commercial fishing industry. It was formed in 1955 under provisions of the Saltonstall-Kennedy Act, which makes funds available to the Department of the Interior for research on domestically-produced fishery products and other programs. Frank P. Briggs, Interior's Assistant Secretary for Fish and Wildlife is the permanent chairman of the committee.

The committee meets once or twice a year depending on circumstances. Its last meeting (17th annual meeting) was at Honolulu, Hawaii, in January 1964. That meeting emphasized oceanographic research and other matters pertaining to the commercial fisheries of Hawaii and the Central Pacific.

In addition to Assistant Secretary Briggs, other Department of the Interior representatives to attend the meeting included Thomas D. Rice, Special Assistant to the Commissioner for Fish and Wildlife, and Donald L. McKernan, Director, Bureau of Commercial Fisheries.

Note: See Commercial Fisheries Review, March 1964 p. 9.

American Samoa

AMERICAN SAMOAN-BASED TUNA FLEET DWINDLING:

The number of tuna vessels operating out of American Samoa is progressively decreasing. In mid-August 1964, there were 35 tuna vessels working out of that base, compared with around 100 vessels in 1963 during peak periods. Of those 35 vessels, 22 are Japanese, 9 Korean, 3 Formosan, and 1 Okinawan. In September, the number of Samoan-based vessels was expected to be further reduced to around 30, due to additional withdrawals contemplated by Japanese vessel owners.

The high cost of vessel operations is said to be one of the major problems for Japanese vessel owners operating out of American Samoa. Fuel, which they have to purchase through the United States packers located on Samoa, is said to cost 50 percent more than in Japan. Another problem troubling Japanese vessel owners is the increasing demand for better working conditions being made by crew members serving on vessels under 100 gross tons, which have poor accommodations.

Those problems are compelling owners of vessels under 100 gross tons to withdraw operations from the Samoan base, and it appears that the base, which Japan originally developed to aid her small and medium tuna vessel owners, is being taken over by the Koreans and Formosans.

The reduction of fleet operations in the South Pacific Ocean is said to have increased the catch rate. The catch rate for albacore is reported to have more than doubled, from 50-60 fish average per long line in 1963 to 120-130 fish in 1964. However, the fish are smaller this year, averaging 33 pounds as compared with 39.6-48.4 pounds in 1963. Japanese fishery circles are primarily attributing the higher catch rate attained this year to the absence of heavy fleet concentrations on the fishing grounds and not to the recovery of resources. (Suisan Keizai Shimbun, August 23, 1964.)

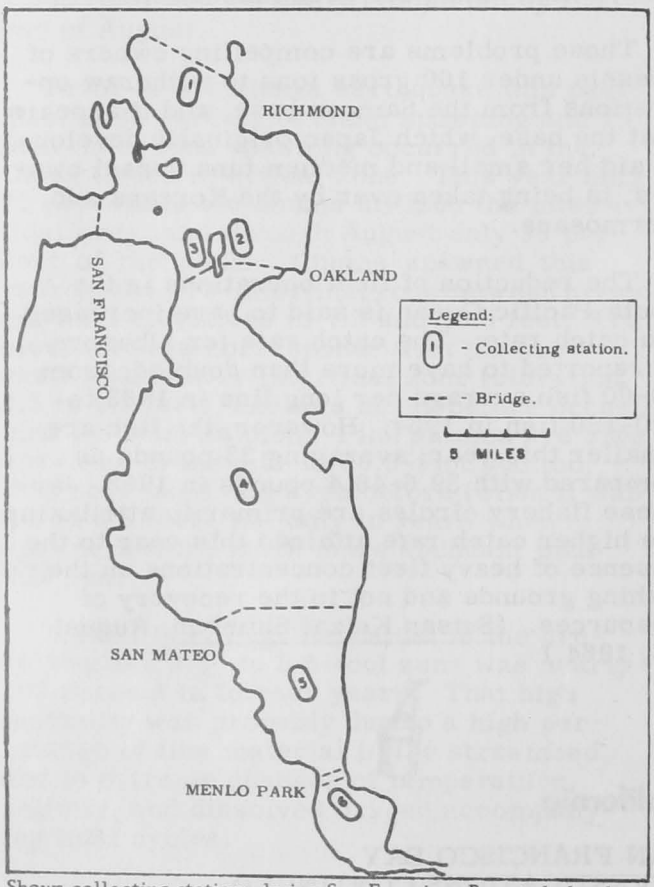
California

SAN FRANCISCO BAY INVESTIGATIONS CONTINUED:

M/V "Nautilus" Cruises 64-N3a-b-c-d-e S. F. Bay Study (February 19-21, 1964, March

14-18, April 21-24, May 16-20, June 16-20): To collect fish species and invertebrates routinely at six stations to: (1) determine their distribution and relative abundance under prevailing environmental conditions, (2) define ecological zones of San Francisco Bay, and (3) determine the food organisms of principal fish species and their availability were the objectives of this series of cruises by the California Department of Fish and Game research vessel Nautilus.

The six stations worked in the Bay study area (San Francisco Bay south of San Pablo Bay) had an average depth ranging from 20 to 50 feet, with the location of each station as follows: (Station 1) - $\frac{1}{4}$ mile south of Redrock; (Station 2) - $\frac{1}{2}$ mile east of northeast corner of Treasure Island; (Station 3) - $\frac{1}{4}$ mile west of northwest corner of Treasure Island; (Station 4) - $\frac{1}{4}$ mile east of radar pylon at north end of San Bruno Shoal; (Station 5) - $\frac{1}{2}$ mile north of No. 2 buoy at entrance to Redwood City Harbor midway between the centers of the San Mateo and Dumbarton bridges; and (Station 6) - $\frac{1}{2}$ mile east of the Dumbarton railroad bridge.



Shows collecting stations during San Francisco Bay study by the Nautilus.

Operations during this cruise included catching surface fish with a midwater trawl 25 feet on a side. This net was towed routinely for 20 minutes, but in May and June most stations were also covered by a second 20-minute tow to check adequacy of the sample. Night tows were made at stations 1, 2, and 3. Replication of tows and night drags indicated the basic 20-minute unit was collecting adequate samples.

On the February and March cruises, bottom collections were made with a 10-foot beam trawl dragged for 20 minutes, or with two 10-minute tows where debris became a problem. On the April, May, and June cruises the bottom was sampled with a 15-foot wide otter trawl as it caught more fish per tow than the beam trawl, and picked up less trash.

Plankton tows lasting 20 minutes with a $\frac{1}{2}$-meter net were made at all stations and the material was preserved for later analysis.

Several dozen shiner perch were collected during the April cruise for bioassays. Ten live white croakers were collected for fish-sound communication studies, and some fish were also collected for the Steinhart Aquarium at San Francisco.

Surface and bottom water temperatures and salinities were taken at stations 1 through 5 but at station 6, which was shallow, surface samples only were taken.

During the first 6 months of 1964, 52 species of fish were taken bringing the total to 62 species for the San Francisco Bay study as of midsummer 1964. Five of the fish species were not taken during 1963. Those not taken were: bonehead sculpin (Artedius notospilotus) at stations 1 and 3; padded sculpin (Artedius fenestralis) at station 1; diamond turbot (Hypsopsetta guttulata) at stations 1, 2, 4, and 5; river lamprey (Lampetra fluviatilis) at station 5; and greenling sea trout (Hexagrammos decagrammus) at station 3.

Surface water temperatures ranged from 11.1° to 18.6° C. (52.0° to 65.4° F.) as compared with 11.9° to 21.1° C. (53.4° to 70.0° F.) for the same period in 1963. Strong winds are the temperature-controlling factor most of the time. Salinities were higher at all stations in 1964 due to less rainfall. The range was from 23.3 to 31.9‰ compared with 16.5 to 29.8‰ for the same period in 1963.

Note: See Commercial Fisheries Review, April 1964 p. 11; December 1963 p. 20; September 1963 p. 15.

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ABALONE OBSERVATIONS AND GROWTH STUDIES:

M/V "Nautilus" and M/V "Mollusk" Cruises 64-N-5A and 64-M-1A-Abalone (June 29-July 13, 1964): The objectives of these cruises by the California Department of Fish and Game research vessels Nautilus and Mollusk in the coastal area from Cambria to Pt. Estero were to: (1) delineate a study area for abalone; (2) sample red abalone randomly for numbers, sizes, sex ratios, and maturity; (3) make habitat and predation observations; and (4) tag abalone for growth studies.

During this cruise, coordinates within the area of operations were plotted and charted by the vessel Nautilus using radar, depth finder, and visible reference points.

Because of poor weather conditions, charting was delayed and diving was so curtailed that underwater observations were made on only one day. Kelp appeared heavier than usual for the time of year. Considerable new shell growth at their margins was observed on abalone measuring 3 to 4 inches, but recent growth had occurred with all sizes sampled during the cruise.

Note: See Commercial Fisheries Review, November 1963 p. 24.

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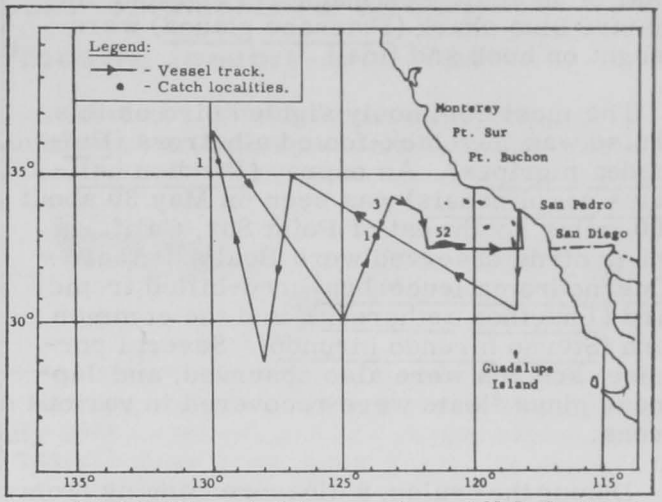
ALBACORE TUNA MIGRATION STUDIES AND TAGGING:

M/V "N. B. Scofield" Cruise 64-S-3-Albacore (May 25-June 23, 1964): The objectives of this cruise by the California Department of Fish and Game research vessel N. B. Scofield were to: (1) intercept the albacore tuna migration and determine its route into the mainland fishing grounds; (2) collect physical and biological data which may be related to albacore occurrence; and (3) tag and release albacore. The area of operations was on the high seas off California and northern Baja California, out to 600 miles offshore between the latitudes of Guadalupe Island and Monterey (latitudes 29°00' to 36°30' N. and to longitude 130°00' W.).

During this cruise, some 3,100 miles were scouted during daylight hours and surface trolling gear was used. A total of 57 albacore tuna were caught, with the first taken in 59.9° F. water on June 9, about 540 miles west of Pt. Buchon. Four more albacore (average 11 pounds) were caught June 18 about 360 miles west of San Diego in 59° to 60° F. water and the remainder (average 14 pounds) were taken June 20-22, about 20 to 30 miles south of San Juan Seamount.



Cruise (64-S-3-Albacore) of the research vessel N. B. Scofield to study migrations and collect biological data related to albacore tuna.

Stomachs from 52 of the specimens were either empty or contained such food items as squid, sauries, and larval fish. Trematodes and copepods were collected from the stomachs and gill chambers. Most of the fish were 2 years old, although a 1-year old fish was taken along with 6 that were 3 years old.

Sea temperatures were obtained at regular intervals by bucket thermometer, while the thermograph provided a continuous record. The temperatures ranged from 57.4° F. northwest of San Juan Seamount to 68.4° F. at the most southerly point of the cruise west of Guadalupe Island.

A total of 78 bathythermograph (BT) casts to 450 feet were made at about 40-mile intervals; a water sample, for salinity determination, and the temperature was obtained at 10 meters by a Nansen bottle cast at each BT station; and weather observations were recorded every six hours.

Eleven night-light stations were occupied on this cruise while the vessel drifted on sea anchor. Pacific sauries (Cololabis saira) ranging from 4 or 5 individuals to schools of several hundred were observed at every station. A juvenile jack mackerel (Trachurus symmetricus), several species of lanternfish (myctophids), and several kinds of larval fish were also taken. The more common invertebrates collected included coelenterates, amphipods, heteropods, tunicates, and salps. A

total of 58 adult jack mackerel and four immature blue shark (Prionace glauca) were caught on hook and line.

The most commonly sighted bird on this cruise was the black-footed albatross (Diomedea nigripes). An osprey (Pandion haliaetus carolinensis) was seen on May 30 about 300 miles southwest of Point Sur, Calif. Other birds observed were Beal's Petrel (Oceanodroma leucorhoa), red-billed tropic bird (Phaethon aethereus), and the common tern (Sterno hirundo hirundo). Several porpoise schools were also observed, and Japanese glass floats were recovered in various areas.

During the cruise, 5 albacore ranging from 62 to 71 centimeters (24.4 to 28.0 inches) were marked with FT-1 dart tags and released.

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

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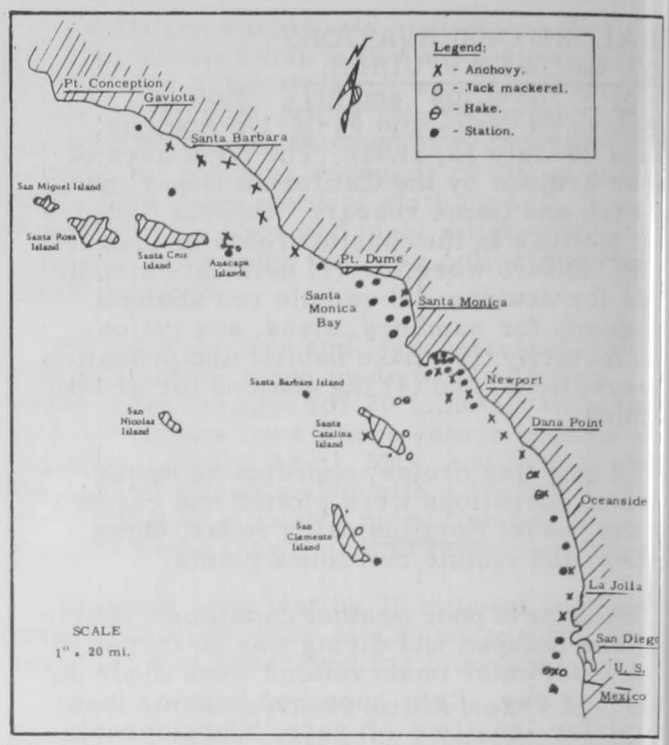
PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 64-A04 Pelagic Fish (June 2-21, 1964): The purpose of this cruise by the California Department of Fish and Game research vessel Alaska in the coastal waters of southern California (including the offshore islands) from Gaviota to San Diego was to: (1) survey the pelagic environment off southern California; (2) assess the density, age and size composition of pelagic species; (3) collect northern anchovy (Engraulis mordax) samples for blood genetic and electrophoretic studies; and (4) take underwater pictures and make observations of the midwater trawl in action.

The midwater trawl, blanket net, and visual scouting were the tools used in this survey. A total of 35 trawl and 21 night-light stations were occupied and 73 miles of ocean were scouted at night between stations. The Precision Depth Recorder was used during each tow and was quite effective in locating schools of fish and fish scattered near the surface.

Photomoter readings, made at most stations, varied from 0 to 99 with most of the readings in the 80's. The zero reading was caused by a heavy "red tide bloom" in Santa Monica Bay.

The only fish sighted during scouting were eight Pacific bonito (Sarda chiliensis) schools.



Pelagic fish population survey by the Alaska Cruise 64-A04 (June 2-21, 1964).

During most of the cruise there was very little phosphorescence in the water, a prerequisite to effective night scouting for fish schools.

Anchovies were the most abundant fish species caught. Other fish taken, in their order of abundance, were: jack mackerel (Trachurus symmetricus), Pacific hake (Merluccius productus), queenfish (Seriphus politus), midshipman (Porichthys sp.), Pacific pompano (Palometa simillima), and small quantities of 19 other species.

Invertebrates caught on this cruise included salps (Salpa tilesiicostata), squid, and euphausiids (Euphasia sp.). Salps were very abundant and complicated trawling by clogging net meshes. In Santa Monica Bay they were so abundant that further trawling operations there were cancelled.

A total of 18 tows was made after dark and 17 during daylight hours (normal working hours were from 1800 to 0200, sunset was about 2030 Pacific Daylight Time). All night tows were successful in catching some species of fish while only 10 of the daylight tows were successful. Only 9 of 21 night-light stations were successful.

ANCHOVIES: Anchovies were found throughout the survey area with the exception of San

Clemente Island. In the Port Hueneme-Santa Barbara area, large schools were noted on the fathometer and anchovies were caught in all but 2 tows. In general, fish in that area, were not large (about 115 millimeters, or 4.5 inches standard length).

The area from Los Angeles to San Diego did not contain any large schools (none were seen on the depth recorder or surface) but fish were scattered near the surface. Deep tows gave poor results while all surface tows were very successful. This same observation was made in the fall of 1963 during a similar pelagic fish cruise. Fish caught were larger than those in the more northerly portion of the survey area with many exceeding 130 millimeters (5.1 inches) and showing more advanced gonad development.

Samples were taken for electrophoretic studies, primarily from areas not fished by the live-bait fleet.

JACK MACKEREL: Most of the jack mackerel taken on this cruise were caught near the offshore islands by midwater trawl. Offshore samples were dominated by the 1963 year-class whereas inshore catches were all small young-of-the-year. Night tows took 95 percent of the catch.

PACIFIC HAKE: Tows made around the offshore islands and between Oceanside and San Diego took 227 hake ranging in size from 64 to 470 millimeters (2.1 to 18.5 inches) standard length. The majority were small, young-of-the-year.

One day of the cruise was spent with the Department of California Fish and Game divers making underwater observations of the midwater trawl in action. Several tows were made at various speeds and depths while the divers crawled about the net. It was noted that parts of the net were taut while other areas were slack. The divers' observations will be very valuable in redesigning the research vessel's old nets and designing new ones. No underwater pictures were taken because of adverse water conditions. Several days of cruise time was lost on this trip because of poor weather and an engine breakdown.

Note: See Commercial Fisheries Review, October 1964 p. 15; December 1963 p. 17.

Cans--Shipments for Fishery Products, January-July 1964

A total of 1,586,934 base boxes of steel and aluminum was consumed to make cans shipped

to fish and shellfish canning plants in January-July 1964, a decrease of 10 percent from the 1,762,839 base boxes used during the same period in 1963. The decline is due partially to a drop in the canning of jack mackerel and Maine sardines.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans in 1964 are derived by use of the factor 23.5 base boxes per short ton of steel. (In the years 1962 and 1963, tonnage data were based on the factor 21.8 base boxes per short ton of steel.) The use of aluminum cans for packing fishery products is small.

Central Pacific Fisheries Investigations

SWIMMING BEHAVIOR OF TUNA AND MACKEREL STUDIED:

Tuna and mackerel never stop swimming in their open ocean environment. This continuous swimming by those species is being studied in experimental tanks at the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu. Swimming is associated in varying degrees with food-seeking, gill ventilation, and depth maintenance.

In the absence of food stimuli, wavyback skipjack (Euthynnus yaito Kishinouye) which have been held in the Laboratory's shoreside tanks for a month usually swim at a uniform slow speed (0.75 meters per second or 2.4 feet per second for a 0.42-meter or 1.3-foot fork-length fish) throughout the day and night. If deprived of food for several days, their swimming speed decreases to 0.55 meters or 1.8 feet per second but increases after a meal. Since other animals, such as mice, become more active when deprived of food for several days, it appears that the slow continuous speed of tuna is not controlled by the food drive. Further evidence of this is that tuna continue to swim at night although feeding is confined to the daylight hours.

When tuna are alerted to the presence of food they swim rapidly if they have not eaten recently. When food odor is introduced into the tank, wavyback skipjack which had not been fed for 2 to 5 hours increase their speed to 1.5 meters or 4.8 feet a second; those not fed for 15 hours or more increase their speed to 1.8 meters or 5.8 feet a second. At sea this behavior characteristic of tuna may increase the probability of their contacting food outside of visual range which they have sensed by chemical means.

Tuna must swim continuously to ventilate their gills and to maintain their swimming depth. Their slow continuous swimming speed may be the slowest possible for adequate ventilation, the slowest possible to maintain depth, or it may be the slowest possible for both.

Wavyback skipjack tuna have no gas bladder and are more dense than sea water (body density equals 1.08 grams per cubic centimeter, sea water density equals 1.02 grams per cubic centimeter); therefore, a fish weighing 1,080 grams (about 38 ounces) in air, still weighs 60 grams (about 2 ounces) submerged in sea water. These fish avoid sinking by continuously swimming; when they swim forward, hydrodynamic lift is exerted against their pectoral fins which act as hydrofoils. The amount of hydrodynamic lift exerted varies with their swimming speed. At slow speeds, wavyback skipjack extend their pectoral fins more than 90 percent of the time. As they increase their speed, they retract their pectoral fins for longer periods apparently to maintain swimming depth. Continuous extension at faster speeds would result in the fish rising to the surface. At speeds greater than 1.2 meters per second or 3.8 feet a second they extend those fins only part way and rarely more than 20 percent of the time.

The amount of gill ventilation obtained from a given speed is controlled in part by variations in the angle at which the mouth is held open and by the percent of time the mouth is completely closed. Pacific bonito (Sarda chiliensis) observed at Marineland of the Pacific in Palos Verdes, Calif., closed their mouths up to 42 percent of the time at slow speeds and had their pectoral fins extended almost continuously. It appears that even slower speeds than are required for hydrostatic lift would probably suffice for gill ventilation of tuna.

Studies are in progress at the Bureau's Kewalo Basin Laboratory in Honolulu, to learn more about the interaction between the gill ventilation and hydrostatic functions of continuous swimming in tuna and to determin how these functional components affect their behavior and activity.

* * * * *

SKIPJACK TUNA BLOOD-TYPING STUDIES EXPANDED:

The following summary of skipjack tuna blood-typing studies through July 1964 was issued by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii:

As a result of blood-typing studies in pre vious years, it is known that the skipjack tun population distribution in the central Pacific can be broken down into a number of isolated breeding subpopulations, and that at least two different subpopulations of skipjack have appeared in Hawaiian waters. Those populations have been tentatively designated as Populations I and II.

To understand monthly features of the availability off Hawaii of the subpopulations, intensive observations have been made since mid-1963 by using blood samples taken at local fish markets or the cannery. The results show that Population I appeared intermittently during October 1963 and then in 1964 during the months of February, March, May, and June, while Population II was usual dominant from November through April. Th alternative appearance of two populations wa assumed to be possibly associated with changes of oceanographic environments in Hawaiian waters.

To attempt to clarify that assumption, a series of cruises by the U. S. Bureau of Co mercial Fisheries research vessel Charles H. Gilbert has been carried out since June 1964. The missions included the collection of blood samples from each skipjack schoo encountered, and oceanographic observation such as salinity, surface-water temperature and bathythermographic data. Although the results of the preliminary observations are encouraging, definite results can not be determined until the present investigation is completed.

Basic studies have been emphasized in order to improve large-scale investigations

Such work includes the development of potential reagents for typing and finding new blood factors as well as determining their genetics. At present, 32 individual differences have been recognized as a combination of the 3 independent blood group systems. Expanded knowledge of those hereditary characteristics will be valuable in solving future problems.

* * * * *

TRADE WIND ZONE OCEANOGRAPHIC STUDIES CONTINUED:

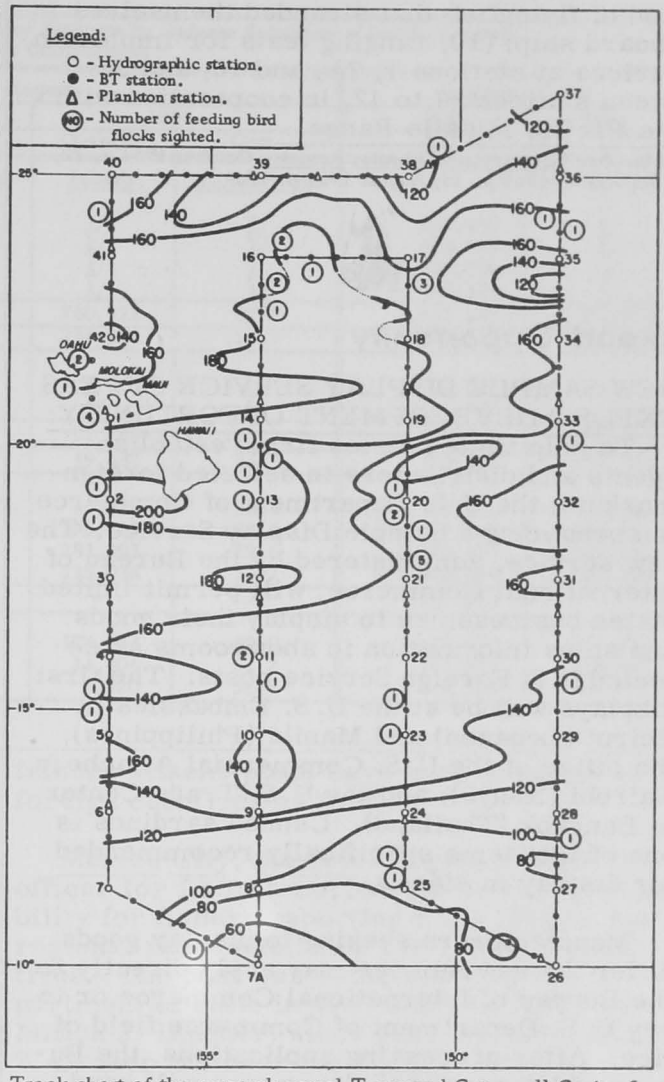
M/V "Townsend Cromwell" Cruise 6 (July 13-August 1, 1964): This was the sixth in a series of oceanographic cruises to determine rates of change in the distribution of properties in the trade wind zone of the central North Pacific. The research vessel Townsend Cromwell of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, operated in the central North Pacific bounded by latitudes 10° N., 27° N. and longitudes 148° W., 158° W. during this cruise, which was completed August 1, 1964.

A total of 42 oceanographic stations were occupied along the cruise track and temperatures and samples for salinity analysis were obtained at each station at 20 depths to 1,500 meters. Deep casts to 4,000 and 5,000 meters had to be canceled because of a defect in the hydrowire.

The most noticeable change in the flow pattern during July was the relaxation of the currents in the area between 13° and 16° N. latitude, where a large counterclockwise eddy had been detected during the vessel's previous cruise (June 15-July 5, 1964). This relaxation appeared to be compensated for by an intensification of the North Equatorial Current south of 13° N. latitude.

Surface temperatures during this cruise showed a continuing trend of warming as indicated by the retreat of the 24° isotherm to the extreme northeast sector of the cruise area and by the appearance of the 27° isotherm in the southern section. Field plots of the oxygen distribution showed a pattern similar to the known oxygen distribution of the cruise region.

During the cruise, 49 feeding bird flocks were sighted, 4 of which were associated with skipjack tuna. Those flocks were more widely scattered throughout the cruise area than were the 28 sightings of the previous cruise. The standard watch for bird flocks and fish schools was maintained during daylight hours.



Track chart of the research vessel Townsend Cromwell Cruise 6 (July 13-August 1, 1964), showing depth contours of the 20° C. isotherm in meters.

Vessel operations on this cruise included: (1) Bathythermograms (BT) at 20-mile and at 10-mile intervals; (2) surface bucket temperatures and water samples for salinity analysis at each bathythermograph observation; (3) dissolved oxygen determinations for each water sample; (4) release of ten plastic enclosed drift cards at 30-mile intervals along the entire cruise track; (5) standard marine weather observations; (6) radiation measurements from the sun and sky; (7) colored photographs of cloud formations; (8) surface plankton tows, for a period of one-half hour, using a 1-meter net at 2000 daily; (9) collection and preserva-

tion of flyingfish that stranded themselves aboard ship; (10) ranging tests for implosion devices at stations 7, 7A, and 16, and between stations 37 to 42, in cooperation with the Pacific Missile Range.

Note: See Commercial Fisheries Review, October 1964 p. 22; September 1964 p. 15; August 1964 p. 17.

Export Opportunity

NEW SAMPLE DISPLAY SERVICE OFFERS EXPORT DEVELOPMENT OPPORTUNITY:

To help United States firms establish agents and distributors in selected foreign markets, the U. S. Department of Commerce is sponsoring a Sample Display Service. The new service, administered by the Bureau of International Commerce, will permit United States businessmen to display their goods and sales information in showrooms at selected U. S. Foreign Service posts. The first displays will be at the U. S. Embassies in Beirut (Lebanon) and Manila (Philippines); the office of the U. S. Commercial Attache in Nairobi (Kenya); and the U. S. Trade Center in Bangkok (Thailand). Canned sardines is one of the items specifically recommended for display in Manila.

Manufacturers seeking to display goods under the new service may apply directly to the Bureau of International Commerce or to any U. S. Department of Commerce field office. After processing applications, the Bureau of International Commerce will send shipping instructions directly to the manufacturers.

Manufacturers taking advantage of the new service will supply merchandise samples and pay the cost of one-way freight from plant to foreign port of entry. The U. S. Department of Commerce will provide the foreign display facilities, the agent-finding service, customs and storage services abroad, and if necessary, take care of the return freight service. The displays will be geared to smaller products, but large, heavy products may be put on exhibit through the use of cutaways, models, films, or slides.

Samples and literature will be displayed for 30 days. Sample displays will be under the management of the U. S. Commercial Attache in each city. Sample display staffs will mount the exhibits, campaign to attract agents and distributors to the showrooms, demonstrate products, prepare summary reports for exhibitors, recommend the most qualified of the foreign representatives who express interest in a product, and supply a business report on each of those representatives. Exhibitors will then negotiate directly with the representatives they select. (International Commerce, September 7, 1964, U. S. Department of Commerce.)

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-AUGUST 1964:

Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, less fresh and frozen fishery products were purchased in August 1964 than in the previous month. The decline was 10.8 percent in quantity and 2.4 percent in value. Compared with the same month in the previous year, purchases in August 1964 were down 4.5 percent in quantity and 3.4 percent in value.

Table 1 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, August 1964 with Comparisons

QUANTITY				VALUE			
Aug.		Jan.-Aug.		Aug.		Jan.-Aug.	
1964	1963	1964	1963	1964	1963	1964	1963
(1,000 Lbs.)				($1,000)			
1,899	1,989	17,413	15,820	1,142	1,182	9,355	8,95

Total purchases in the first 8 months of 1964 were up 10.1 percent in quantity and 4 percent in value from those in the same period of the previous year. In January-August 1964 there were larger purchases of shrimp and scallops, but noticeably lower purchases of cod fillets, ocean perch fillets, and swordfish steaks (see table 2).

Canned: In the first 8 months of 1964, total purchases of the 3 principal canned fishery products (tuna, salmon, and sardines) were up 71.4 percent in quantity and 74.5 percent in value from those in the same period of 1963. The increase was due to larger purchases of tuna and salmon. The gain was partly offset by smaller purchases of canned sardines (see table 3).

Freeze-Dried: Fishery purchases for the Armed Forces in August 1964 included 32,5 pounds of freeze-dried groundfish (cod or

Table 2 - Purchases of Principal Fresh and Frozen Fishery Products by Defense Subsistence Supply Centers, August 1964 with Comparisons

Product	August				January-August	
	1964		1963		1964	1963
	Quantity	Cost	Quantity	Cost	Quantity	
	Pounds	Cents/Pound	Pounds	Cents/Pound	(Pounds)	
Shrimp:						
Raw headless	57,000	84.1	1/	1/	855,450	1/
Peeled and deveined	254,708	108.0	1/	1/	863,422	1/
Breaded	296,100	68.1	1/	1/	2/ 2,815,000	1/
Molded and breaded	75,000	59.0	1/	1/	349,770	1/
Total shrimp	682,808	83.3	780,922	82.8	4,883,642	4,465,414
Scallops	112,230	59.9	236,285	52.9	2,103,090	1,886,650
Oysters:						
Eastern	45,952	97.6	1/	1/	557,582	1/
Pacific	19,464	62.9	1/	1/	191,936	1/
Total oysters	65,416	87.3	95,789	101.9	749,518	757,778
Clams	16,542	31.3	19,482	33.3	198,351	181,164
Fillets:						
Cod	20,500	26.5	34,528	28.4	302,166	455,849
Flounder	170,100	27.6	199,120	29.6	2/ 2,207,866	2,184,254
Ocean perch	246,500	25.6	281,093	29.6	2,370,420	2,584,625
Haddock	92,400	31.0	135,036	33.7	2/ 1,348,854	1,523,469
Haddock portions	135,224	48.6	-	-	155,814	-
Steaks:						
Halibut	113,005	41.8	124,844	39.0	873,077	937,021
Salmon	19,300	69.0	14,406	61.2	144,525	128,587
Swordfish	1,150	48.5	3,020	52.8	9,580	22,750

1/Breakdown not available.
2/Revised.

Table 3 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, August 1964 with Comparisons

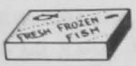
Product	QUANTITY				VALUE			
	Aug.		Jan.-Aug.		Aug.		Jan.-Aug.	
	1964	1963	1964	1963	1964	1963	1964	1963
	(1,000 Lbs.)				($1,000)			
Tuna	599	-	3,216	2,064	254	-	1,455	1,007
Salmon	1/	-	679	18	2/	-	416	12
Sardine	67	11	242	332	32	4	143	135

1/Less than 500 pounds.
2/Less than $500.

haddock) with an average value of $5.40 per pound, and 2,239 pounds of freeze-dried shrimp with an average value of $10.46 per pound.

Notes: (1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because data on local purchases are not obtainable.

(2) See Commercial Fisheries Review, Oct. 1964 p. 23.



Foreign Fishery Reporting

UNITED STATES FISHERY ATTACHE PROGRAM IN FOREIGN COUNTRIES:

The United States Fishery Attache Program has been developed by the Departments of State and Interior to meet the growing responsibilities and interests of the United States Government and domestic fishing industry in foreign fisheries. To date, four fishery attache posts have been established in foreign countries as follows:

Mexico City, Mexico: Regional fisheries officer for Latin America has direct responsibility for fishery reporting from Mexico and regional responsibilities for 18 other countries. The post was established by the Department of State in 1957 and was filled by Milton J. Lindner; since January 1964, Richard S. Croker has been the Fishery Attache.

Tokyo, Japan: This is a one-country post, established by the Department of State in 1958. The first incumbent was Wilvan G. Van Campen; present incumbent is Arnie J. Suomela, who took up his duties as Fishery Attache in April 1961.

Copenhagen, Denmark: Fishery attache for Europe has direct responsibility for fishery reporting from Denmark and regional responsibilities for all other European countries, including the U. S. S. R. The post was established by the Department of State in 1961, and Andrew W. Anderson was selected as the first incumbent. In August 1964, an Assistant Fishery Attache, Salvatore DiPalma, was appointed as a result of the increased workload and travel requirements of that post.

Abidjan, Ivory Coast: The regional fisheries post for West and South Africa was es-

tablished in 1963; the position was filled in January 1964 by George B. Gross.

Freezing

USE OF LIQUID NITROGEN TO FREEZE FISH STUDIED:

The relatively new technique of using liquid nitrogen to freeze fishery products offers considerable promise to the fishing industry in improving process procedures as well as quality of the product. This is particularly true in the production of individually quick-frozen items, where throughput will be greatly increased; weight losses (which run as high as 10 percent in blast freezers) will be eliminated; and color, flavor, and texture may be better maintained than when conventional freezing methods are used.

But there are several technological problems connected with liquid nitrogen freezing that may cause difficulty if the process is adopted without sufficient research. Chief among those problems is that too rapid cooling will cause the product to crack or even to shatter. Generally the damage is very obvious, but occasionally it may not show up until the product is subjected to further processing such as freeze-drying.

As part of the project on the Investigation of New Refrigeration Techniques conducted by the U. S. Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Mass., tests were made to delineate precisely the parameters involved in liquid nitrogen freezing of various fishery products. In preliminary tests with haddock fillets it was found that no damage occurs when nominal freezing rates of 2.0 to 7.0 centimeters per hour are used. With conventional equipment a nominal freezing rate above 0.5 centimeters per hour is considered to be good commercial practice.

Fur Seals

PRIBILOF ISLANDS FUR SEAL SKIN HARVEST, 1964:

During the 1964 sealing season, the harvest of fur seal skins by the Pribilof Islands staff of the U. S. Bureau of Commercial Fisheries amounted to 64,209 skins. Of that total 48,602 skins were harvested on St. Paul Island and 15,607 skins on St. Georges Island.

Removal of blubber is an early step in processing seal skins. Trained workers are shown performing this preliminary step in skin processing on St. Paul Island.

The fur seal skin harvest in 1964 was below the 1963 harvest by 21,045 skins. In 19[illegible] a total of 85,254 skins was harvested as compared with 77,915 skins in 1962.

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

Great Lakes Fisheries Explorations and Gear Development

STUDIES ON TRAWLING OF COMMERCIAL SPECIES IN LAKE SUPERIOR CONTINUED:

M/V "Kaho" Cruise 20 (August 7-22, 19[illegible] Investigating possible ways to improve methods for catching and handling Lake Superior commercial fish species was the principal objective of this 16-day cruise in Lake Superior from Whitefish Bay to the Keweenaw Peninsula. This was the second of three scheduled cruises for that purpose by the U. Bureau of Commercial Fisheries exploratory fishing vessel Kaho.

Although primary consideration was given to determining the seasonal availability of the various species of fish to bottom trawls and locating additional areas suitable for trawling other activities of the cruise were concerned

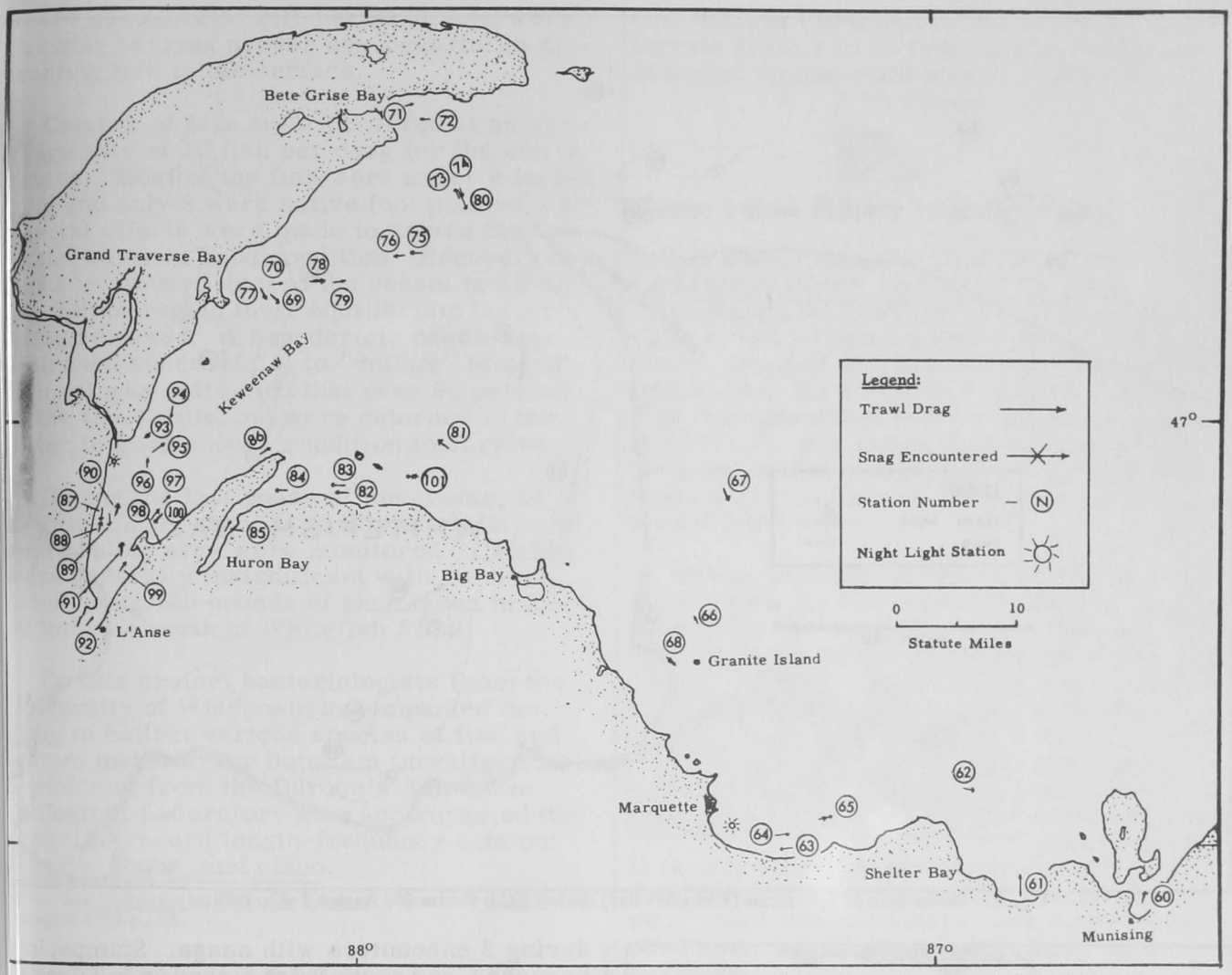


Fig. 1 - Shows area of operations (Munising to Keweenaw Peninsula) during Kaho Cruise 20, August 7-22, 1964.

with (1) attempts to attract fish with submersible lights, (2) collecting length-frequency data on chub, herring, and alewife, (3) obtaining samples of fish for botulism studies, and (4) collecting water samples for limnological investigations.

Good to excellent catches of chub were taken east of the Keweenaw Peninsula near Bete Grise Bay and in Keweenaw Bay, and fair catches of smelt were taken in Keweenaw Bay and Huron Bay. Catches of cisco (lake herring) were insiginficant with the best catch (35 pounds) recorded from Huron Bay. Only two significant catches of common whitefish were taken during the cruise. Dense concentrations of fish were located in several areas monitored during Kaho Cruise 18 (May 25-June 10, 1964). Direction of tow greatly influenced the catch on several drags indicating direction of water current to be a contributing factor in trawl catch rates.

Attempts to attract fish to a special 500-watt white light lamp near the surface were unsuccessful.

Additional trawlable grounds in deeper than 60 fathoms were located north of Granite Island and south of Manitou Island using a high-resolution, white-line-type echo-sounder.

A total of 56 drags was made during the cruise with a 52-foot (headrope) Gulf of Mexico-type fish trawl. Of the total, 42 were completed from Munising west to the Keweenaw Peninsula and 12 in and near Whitefish Bay. All drags lasted 30 minutes except 8 which were terminated early when the net either became fouled on bottom obstructions

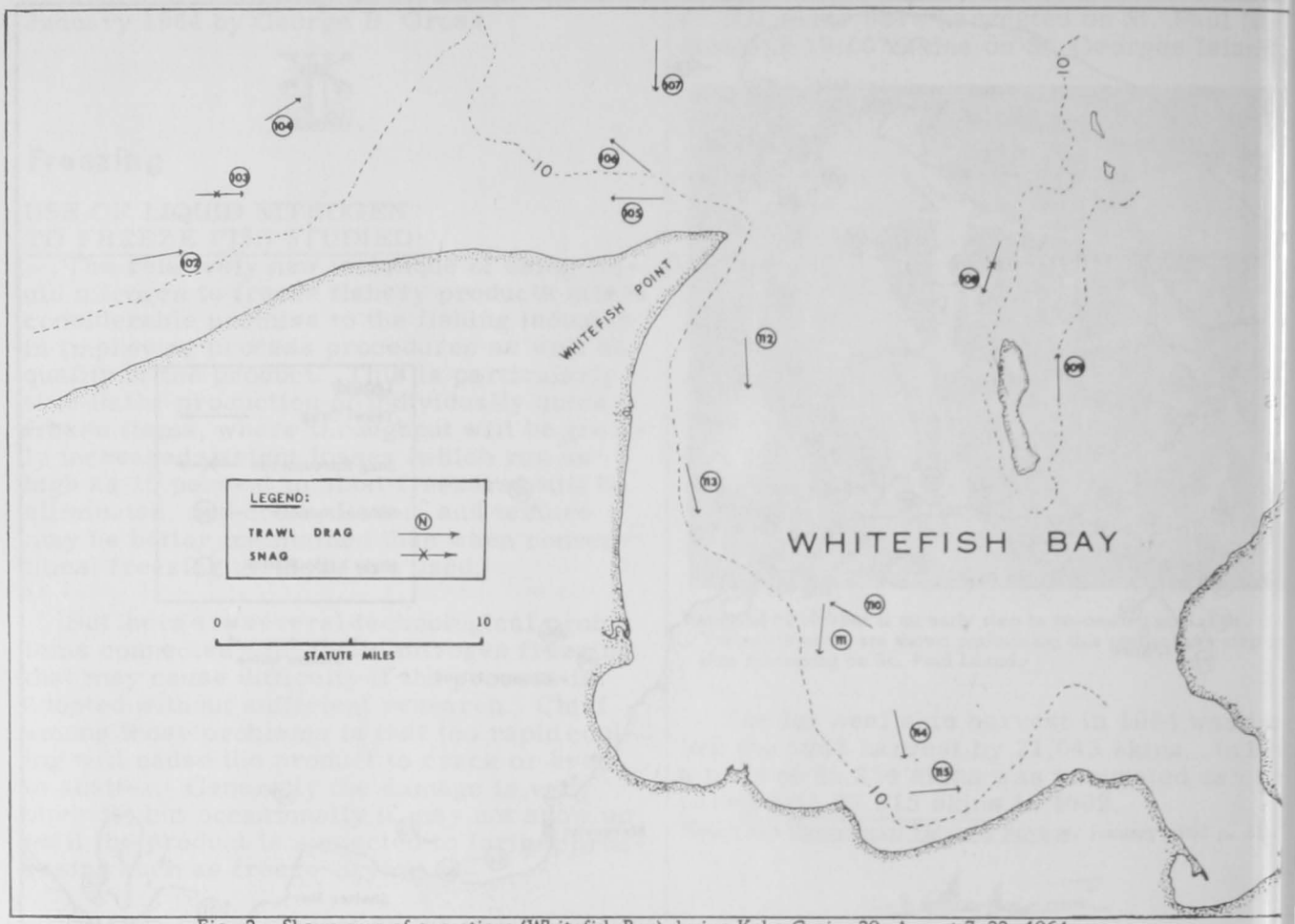


Fig. 2 - Shows area of operations (Whitefish Bay) during Kaho Cruise 20, August 7-22, 1964.

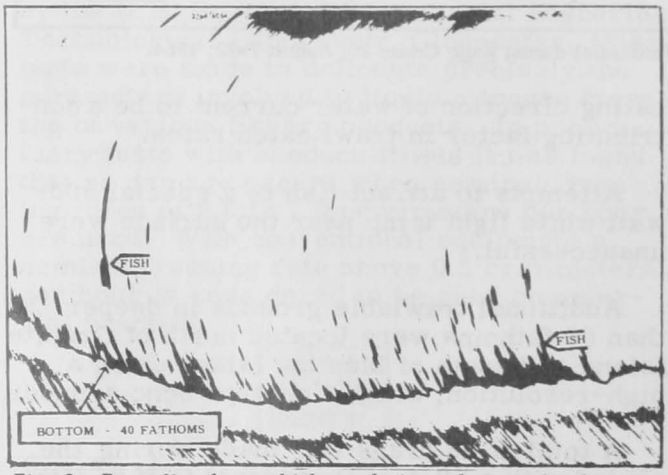


Fig. 3 - Recording from a high-resolution echo-sounder showing the bottom profile and fish on the bottom and at midwater depths. Recording was made at station 75, south of Bete Grise Bay, at a depth of 40 fathoms. Catch consisted of 520 pounds of chubs.

or because of the presence of gill nets in the area, and one drag which was extended to 60 minutes to study the production rates of longer drags. Severe damage to the trawl occurred during 2 encounters with snags. Stumps, lo branches, and rocks were picked up in 7 drag resulting in only minor damage to the trawl o 4 such occasions and no damage in the remaining 3 encounters.

Commercially significant catches of chu (over 200 pounds per 30-minute drag) were taken off the east shore of Keweenaw Penin sula, Keweenaw Bay, and Huron Bay in 35-4 30-40, and 11-15 fathoms, respectively. Th best catch of chub (1,210 pounds) was in 40 fathoms in Keweenaw Bay. The catch consisted of about 70 percent (by weight) or 85 pounds of chub over 9 inches long. Most catches of smelt (ranging up to 240 pounds) occurred in the 8- to 16-fathom depth range and were composed chiefly of 36 count (number per pound) fish. One 45-pound catch of smelt from 25 fathoms in Keweenaw Bay wa largely of 16-count fish.

Only small quantities of cisco (lake herrin were caught throughout the areas fished. A ter-dark experiments with a light in areas

where commercial gill-net fishermen were catching herring proved unsuccessful in attracting fish to the surface.

Catches of lake trout occurred at an average rate of 10 fish per drag for the entire cruise. Most of the fish were under 9 inches long and only 3 were native (not planted) fish. Special efforts were made to return the fish to the water in good condition. Recovery live tanks were used aboard the vessel to allow the fish to regain their equilibrium before being released. A hypodermic needle was also used successfully to "deflate" bloated fish. It was estimated that over 90 percent of the trout collected were returned to the water in good enough condition to survive.

During the last phase of the cruise, 14 of 15 established stations in Whitefish Bay and surrounding area were monitored. Catches were generally insignificant with the best catch being 120 pounds of chub taken in 35-40 fathoms north of Whitefish Point.

On this cruise, bacteriologists from the University of Wisconsin accompanied the Kaho to collect various species of fish and bottom material for botulism investigations. A biologist from the Bureau's Ann Arbor Biological Laboratory also accompanied the vessel to record length-frequency data on alewife, chubs, and cisco.

Note: See Commercial Fisheries Review, September 1964 p. 20; August 1964 p. 25.

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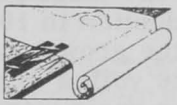
SEASONAL DISTRIBUTION AND ABUNDANCE STUDIES OF ALEWIFE, CHUB, AND YELLOW PERCH IN LAKE MICHIGAN CONTINUED:

M/V "Kaho" Cruise 21: To extend knowledge of the seasonal distribution and abundance of alewife, chub, and yellow perch in Lake Michigan and their availability to bottom trawls was the primary purpose of this cruise by the U.S. Bureau of Commercial Fisheries exploratory fishing and gear research vessel Kaho. The cruise announcement on August 18, 1964, indicated the vessel would conduct trawl explorations in northern Lake Michigan and Green Bay (August 25-September 3, 1964) and in lower and central Lake Michigan (September 9-18, 1964). The cruise plan called for: (1) echo-sounding with high-resolution equipment to record bottom and off-bottom fish concentrations; and (2) trawling with a 52-foot trawl at standard stations (30-minute tows at 5-fathom intervals from 5 to 50 fathoms) to assess the seasonal commercial trawling potential.

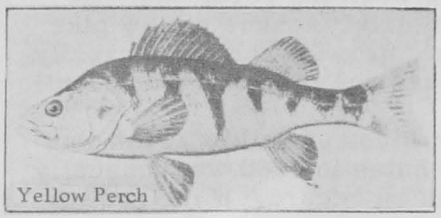


Great Lakes Fishery Investigations

LAKE ERIE YELLOW PERCH LANDINGS DOWN SHARPLY IN 1964:

Commercial landings of yellow perch at Lake Erie by United States and Canadian fishermen dropped sharply in 1964. The yellow perch catch for the first 6 months in 1964 was less than one-third that for the same period in 1963. On that basis, it is estimated that landings of that species for all of 1964 will amount to less than 10 million pounds--the lowest since 1955.

Annual landings of yellow perch from Lake Erie have averaged only about 7 million pounds for the past 50 years. Until the 1950's, the yellow perch was considered secondary to such "money" species as whitefish, blue pike, and yellow pike (walleye). It is only since the disappearance or sharp decline of those higher value species in recent years that producers have come to depend upon the yellow perch to keep them in business.


Yellow Perch

The yellow perch fishery (United States and Canada) reached an all-time high production level in 1956-63, averaging well over 20 million pounds a year. Why then, the sudden drop in landings in 1964? Two factors are believed principally responsible--fluctuations in year-class strength (i.e., numbers of fish that hatch and survive in a given year) and a pronounced slowing of growth rate in recent years.

Relatively strong year-classes of yellow perch were produced in the mid-1950's, topped by an exceptionally good hatch in 1959. Landings from those combined year-classes brought landings to the record highs that were sustained through 1963. But during the more recent of those high production years, the hatches of yellow perch were not always good. The 1960 year-class, for example, is known to have been very weak. That poor

year-class is the one upon which the fishery must depend for the bulk of its catch in 1964.

Concurrent with the large populations that permitted high production in 1956-63 has come a slowing of the growth rate. As late as 1956, many of the yellow perch landed in Lake Erie's western basin were fish that had required only three growing seasons to reach a length of 8½ inches (then the legal minimum length in Ohio). By 1959, yellow perch required four growing seasons to attain the same size. By 1964, at least four years were required for most perch to grow to the shorter legal length of 8.0 inches (the minimum legal length in Ohio since May 1, 1964). The declining growth rate in 1959-64 is illustrated in the table of average lengths of perch taken in trawls at the end of each growing season in those years. The decline may be a natural consequence of increased competition for space and food--although from what is known most small forage fishes were maintaining themselves in large numbers in 1959-64. (Just as perch grew faster when the population was less dense, the relatively scarce yellow pike or walleye are now growing far more rapidly than during the years when they were abundant).

The 1961 year-class of yellow perch was only fair, but the hatch in 1962 was unusually large--the largest on record. If the growth rate of those two year-classes had been similar to that of fish living in the lake in the mid-1950's, both would by now have entered the commercial fishery. Actually, only the largest individuals of the 1961 year-class were taken during the spring of 1964. The 1962 year-class had not entered the commercial fishery by midsummer, although large numbers--nearly all less than 8 inches long--were being taken by anglers. It is unlikely that this year-class will be represented in significant numbers during the balance of 1964, in spite of the reduced size limit of Ohio. (The change in regulation has, nevertheless, benefited the fishermen to some extent. About 20 percent of the legal-size perch now being landed in Ohio are less than 8½ inches long. Many of those smaller fish are of the 1961 year-class.)

Average Total Length of Yellow Perch Taken in Trawls in Western Lake Erie at the End of the Growing Season, 1959-64

Seasons of Growth Completed	Year-Class					
	1959	1960	1961	1962	1963	1964
	(Inches)					
1	4.0	3.6	3.6	3.2	3.3	1/ 3.3
2	6.9	6.7	6.4	5.8	1/ 5.8	-
3	7.8	7.5	7.4	1/ 7.2	-	-
4	8.5	8.2	1/ 8.0	-	-	-
5	9.2	1/ 8.8	-	-	-	-
6	1/ 9.6	-	-	-	-	-

1/ Estimated length at end of growing season based on length-frequency data collected in August 1964.

Earlier predictions that the 1962 hatch of yellow perch would begin to enter the fishery by the fall of 1964 will not be realized because of the slower growth rate. Furthermore, experimental trawling during the past year has indicated a heavier natural mortality of perch of that extremely large year-class than was anticipated (undoubtedly due in part to extensive "die-offs" in the western and central basin during the past two summers). The outlook therefore is not as encouraging as it appeared to be earlier, even though large numbers of the 1962 year-class are still present.

Barring catastrophies such as additional severe "die-offs," the yellow perch catch should pick up again in 1965 and improve further in 1966 when the presumed still-strong 1962 year-class is expected to be completely available to the fishery.

Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-20 (August 21-September 1, 1964): Shrimp distribution studies in the Gulf of Mexico were continued during this cruise by the chartered research vessel Gus III of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex. Eight statistical areas were covered and standard 3-hour tows with a 45-foot Gulf shrimp trawl were made.

During this cruise, 34 tows with a 45-foot flat traw, 63 plankton tows, 59 bathythermograph, and 41 Nansen bottle samples were taken. Also, 162 drift bottles were cast at 27 stations, and one 24-hour current meter station was occupied.

Catches were generally spotty and were only fairly productive in three of the areas worked where catches of brown shrimp ranged from 32 to 59 pounds. Area 16 yielded a good catch (48 pounds) of 15-20 count brown shrimp from the over 20-fathom depth range. The other two depth ranges in that area yielded only a scattering of white and pink shrimp.

The largest catch of brown shrimp of the cruise was from area 20--a total of 59 pounds

pounds (mostly 25-30 count) from all three depth ranges. That area also yielded 5 pounds of 15-20 count pink shrimp from the 0-10 fathom depth.

Area 18 accounted for a total of 43 pounds with the largest catch (27 pounds of mostly brown 21-25 count shrimp) from the 10-20 fathom depth. A 14-pound catch from the 0-10 fathom depth range of that area was made up of 8 pounds of 21-25 count white shrimp and 6 pounds of small brown shrimp (68 count).

A total of 21 pounds of white 21-25 count shrimp was taken from 0-10 fathoms in area 17, together with 3 pounds of small brown shrimp. Shrimp catches were small in the three depth ranges of the other areas worked during this cruise.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, October 1964 p. 26.

Gulf States Marine Fisheries Commission

ANNUAL MEETING IN BROWNSVILLE, TEXAS:

The Fifteenth Annual Meeting of the Gulf States Marine Fisheries Commission was held in Brownsville, Tex., October 15-16, 1964. The opening general session on October 15 included an address by the Commissioner, 8th U. S. Coast Guard District, and an address by the U. S. Bureau of Commercial Fisheries Chief Adviser on Oceanographic Research.

At the general session on October 16, the Texas Parks and Wildlife Department gave a progress report on Texas blue crab studies. The U. S. Bureau of Commercial Fisheries presented a film on shrimp explorations in the southwest Caribbean, and gave a progress report on the Commercial Fisheries Research and Development Act (P. L. 88-309).

Industrial Fishery Products

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

Production by Areas, August 1964: Preliminary data on U. S. production of fish oil, and solubles for August 1964 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

U. S. Production[1] of Fish Meal, Oil, and Solubles by Areas, August 1964 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles	Homogenized[3]
	Short Tons	1,000 Pounds	. . . (Short Tons) . . .	
August 1964:				
East & Gulf Coasts	29,605	23,174	12,530	-
West Coast[2]	3,732	2,558	1,871	-
Total	33,337	25,732	14,401	-
Jan.-Aug. 1964 Total	158,966	132,411	65,037	-
Jan.-Aug. 1963 Total	170,779	133,924	67,458	7,134

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

* * * * *

Production, July 1964: During July 1964, a total of 41,663 tons of fish meal and scrap and 31.8 million pounds of marine animal oils was produced in the United States. Compared with July 1963 this was an increase of 3,171 tons in meal, and about 2.8 million pounds in oil production. Fish solubles production amounted to 16,271 tons--an increase of 1,093 tons compared with July 1963.

Menhaden meal production for July 1964 amounted to 33,089 tons--an increase of 1,981 tons compared with July 1963, and menhaden oil totaled 25.9 million pounds--an in-

U. S. Production of Fish Meal, Oil, and Solubles, July 1964[1] with Comparisons

Product	July 1/1964	July 1963	Jan.-July 1/1964	Jan.-July 1963	Total 1963
	. . . (Short Tons) . . .				
Fish Meal and Scrap:					
Herring	3,256	2,320	4,940	2,619	7,537
Menhaden 2/	33,089	31,108	96,110	99,705	181,750
Tuna and mackerel	1,741	1,282	10,207	11,651	26,957
Unclassified	3,577	3,782	14,372	15,569	22,415
Total	41,663	38,492	125,629	129,544	238,659
Shellfish, marine-animal meal and scrap	3/	3/	3/	3/	14,793
Grand total meal and scrap	3/	3/	3/	3/	253,452
Fish solubles:					
Menhaden	14,758	13,096	39,878	40,073	74,831
Other	1,513	2,082	10,758	14,089	25,347
Total	16,271	15,178	50,636	54,162	100,178
Homogenized condensed fish	-	2,531	-	6,372	7,224
	. . . (1,000 Pounds) . . .				
Oil, body:					
Herring	3,086	2,021	5,234	2,515	5,709
Menhaden 2/	25,898	25,391	94,630	90,292	167,635
Tuna and mackerel	499	378	2,257	2,030	5,735
Other (including whale)	2,299	1,200	4,558	3,742	6,748
Total oil	31,782	28,990	106,679	98,579	185,827

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

crease of 507,000 pounds over July 1963. Herring meal production amounted to 3,256 tons--an increase of 936 tons as compared with July 1963. Oil produced from herring amounted to about 3.1 million pounds, an increase of 1.1 million pounds compared with July 1963. Tuna and mackerel meal production (1,741 tons) showed an increase of 459 tons, and tuna and mackerel oil production amounted to 449,000 pounds--up 121,000 pounds.

* * * * *

Major Indicators for U.S. Supply, July 1964: United States production of fish meal in July 1964 was higher by 8.2 percent as compared with July 1963. Production of fish oil was up by 9.6 percent and that of fish solubles decreased 8.1 percent.

Major Indicators for U.S. Supply of Fish Meal, Solubles, and Oil, July 1964

Item and Period	1/1964	1963	1962	1961	1960
	. . . . (Short Tons)				
Fish Meal:					
Production:					
July	41,663	38,492	55,602	63,435	56,262
January-June 2/	83,966	91,052	121,836	102,502	80,231
Year 3/	-	253,452	312,259	311,265	290,137
Imports:					
July	28,863	43,223	25,857	18,710	13,131
January-June	256,429	181,934	140,886	107,826	66,375
Year	-	383,107	252,307	217,845	131,561
Fish Solubles 4/:					
Production:					
July	16,271	17,709	22,207	22,589	18,876
January-June 2/	34,365	42,825	51,507	40,200	36,946
Year	-	107,402	124,334	112,241	98,929
Imports:					
July	1,506	330	306	708	96
January-June	2,051	2,439	4,290	1,219	2,518
Year	-	6,773	6,308	6,739	3,174
	. . . . (1,000 Lbs.). . . .				
Fish Oils:					
Production:					
July	31,782	28,990	47,695	57,239	40,487
January-June 2/	74,897	69,589	95,622	89,026	56,340
Year	-	185,827	250,075	258,118	209,143
Exports:					
July	40,449	29,343	128	4,421	40,603
January-June	56,139	97,806	63,005	68,127	52,820
Year	-	262,342	123,050	122,486	143,609

1/Preliminary.
2/Data for 1964 based on reports which accounted for the following percentage of production in 1963: Fish meal, 95 percent; solubles and homogenized fish, 99 percent; and fish oils, 99 percent.
3/Small amounts (10,000 to 25,000 pounds) of shellfish and marine animal meal and scrap not reported monthly are included in annual totals.
4/Includes homogenized fish.

* * * * *

U.S. FISH MEAL AND SOLUBLES:

Production and Imports, January-July 1964: Based on domestic production and imports, the United States available supply of fish meal for January-July 1964 amounted to 410,921 short tons--56,220 tons (or 15.8 percent) more than during January-July 1963. Domestic production was 3,915 tons (or 3.0 percent) less, but imports were 60,135 tons (or 26.7 percent) higher than in January-July 1963. Peru continued to lead other countries with shipments of 227,325 tons.

The United States supply of fish solubles (including homogenized fish) during January-July 1964 amounted to 54,193 tons--a decrease of 14.4 percent as compared with the same period in 1963. Domestic production dropped 16.4 percent but imports of fish solubles increased 28.5 percent.

U.S. Supply of Fish Meal and Solubles, January-July 1964 with Comparisons

Item	Jan.-July 1/1964	Jan.-July 1963	Total 1963
	. . . (Short Tons). .		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	96,110	99,705	181,7
Tuna and mackerel	10,207	11,651	26,9
Herring	4,940	2,619	7,5
Other	14,372	15,569	37,2
Total production	125,629	129,544	253,4
Imports:			
Canada	34,509	30,752	50,9
Peru	227,325	167,542	291,5
Chile	10,587	19,088	24,2
Norway	-	1,819	1,8
So. Africa Republic	10,738	4,826	12,2
Other countries	2,133	1,130	2,2
Total imports	285,292	225,157	383,1
Available fish meal supply	410,921	354,701	636,5
Fish Solubles:			
Domestic production	50,636	2/60,534	2/107,4
Imports:			
Canada	1,162	1,541	2,0
Iceland	-	105	1
So. Africa Republic	860	191	4
Other countries	1,535	932	4,1
Total imports	3,557	2,769	6,7
Available fish solubles supply	54,193	63,303	114,1

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

* * * * *

MENHADEN CATCHES NORTH OF CHESAPEAKE BAY DECLINE:

A serious decline in menhaden catches c- ing the 1964 fishing season in all areas nor of Chesapeake Bay has had particularly se ous effects on industrial fishery products processors in New Jersey, where the supp has been dwindling for several years. Che peake Bay has been affected also, for altho the total menhaden catch for that region is about the same as in previous years, the northern fleet has moved into Chesapeake B to share that catch.

Industry leaders met this past August w representatives of the U.S. Bureau of Com mercial Fisheries to review the situation a determine what action should be taken. Inf mation presented by the Bureau showed tha no outstandingly successful spawning of me haden has occurred since 1958. The very large groups of fish born in 1958 has been the main support of the fishery since 1959, but those fish have virtually disappeared through the effects of fishing and natural d off. Bureau scientists also have discovere that the Chesapeake Bay and New Jersey fis eries are harvesting the same population o

fish. These menhaden are first taken in the Chesapeake region and move to northern waters as they increase in age, which means the Chesapeake fishery has the advantage of harvesting those fish before they migrate to New Jersey and New England.

Since 1956, the proportion of the total catch taken in the Chesapeake area has increased from 33 to 74 percent. Thus, the declining New Jersey menhaden catch is caused by a combination of temporarily reduced spawning success and increased fishing pressure in the Chesapeake region. The trend is expected to continue and the northern fishery is not likely to improve unless fishing effort in the Chesapeake is reduced substantially. This is a difficult problem to resolve and it can be resolved only by the industry itself, but with all the assistance possible by the Bureau to help bring that industry to a better and more equitable economic level.

* * * * *

U.S. FISH OIL PRODUCTION FORECAST FOR 1964:

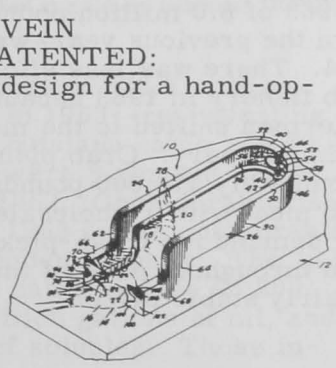
U.S. production of fish oil (including whale and seal oil, but excluding fish-liver oil) is forecast at 200.0 million pounds in 1964. That would be a gain of about 7.6 percent over the 185.8 million pounds produced in 1963. (Fats and Oils Situation, August 1964, U.S. Department of Agriculture.)

Editor's Note: In January-July 1964, U.S. fish oil production totaled 106.7 million pounds, an increase of 8.2 over the 98.6 million pounds produced in the same period of 1963.

Inventions

SHRIMP HEAD AND VEIN REMOVING TOOL PATENTED:

The inventor of a design for a hand-operated tool to remove the head and pull out the sand vein of shrimp in one operation claims a cleaner, more sanitary, and efficient way of heading shrimp. The inventor states that the tool should be constructed entirely of noncorrosive material, preferably stainless steel, but plastics could be used for handles. The tool has been tested. (Patent No. 3,126,576 SIC 3461; granted Bjarne Johannesen, 3349 Drexel Avenue, Port Arthur, Tex.)



Louisiana

FISHERY LANDINGS, 1963:

Summary: The total commercial catch of fish and shellfish landed in Louisiana in 1963 was down 2 percent in quantity, but up 16 percent in value from the previous year. Important gains in the shrimp catch were responsible for the overall increase in value. Menhaden, shrimp, and oysters accounted for 95 percent of the total Louisiana catch in 1963.

Fig. 1 - Southern marine districts are important producers of fish and shellfish.

Shrimp: Louisiana shrimp landings in 1963 were the highest in 10 years and represented 40 percent of the combined shrimp landings from all Gulf States in 1963.

During the winter months of 1963, unfavorable weather conditions were more prevalent than usual. Severe cold fronts repreatedly lashed Louisiana coastal areas. Despite the bad weather, fairly good shrimp catches were landed in the winter of 1963. During that period, there was evidence of a populous small white shrimp crop in areas west of the Mississippi River. The protection given that crop by a closed season was probably responsible for the record May 1963 catch of over 1.0 million pounds of white shrimp.

Fig. 2 - Medium shrimp trawler docked at Westwego, La.

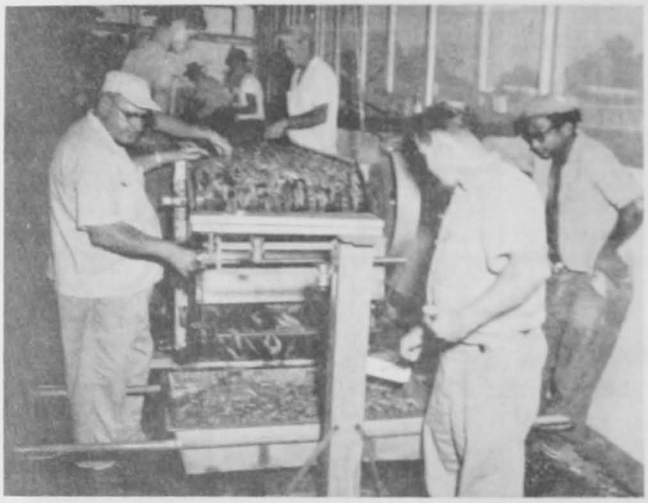


Fig. 3 - Prior to weighing shrimp unloaded from a fishing vessel at Westwego, La., unsuitable shrimp and marine debris are removed from inspection belt prior to weighing. On the scale is a tared weighing bucket.

The Louisiana Wild Life and Fisheries Commission established May 15, 1963, as the opening date for shrimp trawling in the inside waters. A "bumper crop" of brown shrimp had been predicted in the inside waters, and at the opening of the season, brown shrimp were abundant in all areas. The greatest concentrations were found west of the Mississippi River. Landings were so great for several days that the supply exceeded the processing capacity of the canners. Catches leveled off by early June, but continued at an exceptionally good pace until the season closed July 15, 1963.

The fall white shrimp season opened on August 19, 1963, and was even more productive than the spring brown shrimp season. Craft of all sizes, including numerous outboard motor rigs, participated in the harvest. Extremely good catches continued through November. October was the peak production month with white shrimp landings of 10.3 million pounds (heads-off weight).

Canning plants operated at peak capacity during the 1963 shrimp season and shore employment was at a high level. The canners packed nearly 717,000 standard cases--the largest shrimp pack since 1953.

Shrimp prices declined sharply in 1963. In May 1963, ex-vessel prices for small brown shrimp (68 and over count, heads-off weight) averaged approximately $24.50 per 210-pound barrel (heads-on weight) as compared with $49.00 per barrel for the same size-count in May 1962. Prices for large shrimp (15-20 count, heads-off weight) held fairly steady until August 1963.

Oysters: The Louisiana oyster harvest in 1963 yielded 11.6 million pounds of meats valued at $3.7 million. That was the highest catch recorded since 1939 when 13.6 million pounds were reported. Canning plants received the majority of the landings and packed approximately 173,000 standard cases of oysters. The canned pack yield of the 1963 oyster landings was less than expected. There was an unusual tenderness in the texture of the meats during the spring season. That made mechanical shucking difficult and resulted in an abnormal percentage of the meat being broken during processing.

The fresh oyster trade was fairly active in 1963. Large quantities of shell-stock oysters were trucked to processors in other states.

Crabs: Louisiana hard blue crab landings in 1963 of 8.0 million pounds (down 16 percent from the previous year) were the lowest since 1954. There was less effort expended in the crab fishery in 1963 because a number of fishermen shifted to the more profitable shrimp fishery. Crab plants produced approximately 570,000 pounds of fresh-picked crab meat with a wholesale value of $672,000. The demand for fresh-picked crab meat was good throughout most of the year and resulted in fairly stable prices.

Louisiana Fishery Landings, 1962-1963

Species	1963		1962	
	Quantity	Value	Quantity	Value
	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000
Shellfish:				
Shrimp (heads-on):				
Salt-water	80,797.4	19,786.8	43,583.7	14,985.0
Fresh-water	16.6	3.9	1.6	0.2
Oysters (market)	11,563.2	3,720.1	10,159.7	3,316.4
Crabs, blue:				
Hard	7,981.9	447.1	9,522.9	462.5
Soft and peeler	328.7	164.4	343.9	171.9
Crawfish, fresh-water	2,118.4	300.1	3,097.1	408.2
Other shellfish	253.4	132.3	278.3	122.6
Total shellfish	103,059.6	24,554.7	66,987.2	19,466.8
Salt-water Fish:				
Edible fish	2,535.9	358.9	3,017.8	424.3
Menhaden	633,484.3	7,861.9	689,157.4	7,994.2
Unclassified fish for bait, reduction, and animal food	6,970.8	87.4	2,200.0	27.5
Total salt-water fish	642,991.0	8,308.2	694,375.2	8,446.0
Fresh-water Fish:				
Catfish and bullheads	8,665.3	1,766.6	8,826.3	1,800.5
Buffalofish	3,487.6	398.7	3,546.2	419.5
Other fresh-water fish	2,458.7	167.1	2,885.4	200.9
Total fresh-water fish	14,611.6	2,332.4	15,257.9	2,420.9
Total Louisiana landings	760,662.2	35,195.3	776,620.3	30,333.7

Note: Oysters are reported in pounds of meats (8.75 pounds per gallon). All other species are shown in round weight.

Fig. 4 - Menhaden vessel docked at a fishery industrial products plant in Empire, La.

Menhaden: Landings of 633.5 million pounds of menhaden in 1963--representing the second largest Louisiana catch in the history of the fishery--were 8 percent below the record catch in 1962. Considerable fishing time was lost in 1963 due to unfavorable weather on the menhaden grounds. The 1963 Louisiana menhaden catch yielded 66,200 tons of meal, 7.9 million gallons of oil, and 5.0 million gallons of solubles. Those industrial products had a combined value of $13.1 million. The oil market was sluggish in the beginning of 1963 with large stocks carried over from the previous season, but market conditions improved in the summer and continued an upward trend during the remainder of the year.

Edible Finfish: Louisiana landings of finfish for human consumption in 1963 amounted to 17.1 million pounds valued at $2.7 million. Fresh-water species, as usual, accounted for the bulk of the catch. All of the leading fresh-water species registered slight declines in 1963. The market weakened in the spring months and prices to the fishermen were reduced.

Recurrent fish kills in the Mississippi River have aroused much concern. Massive fish kills were reported for the fourth successive year in areas extending from above Baton Rouge to the mouth of the River. Similar kills occurred in the Atchafalaya River, Bayou Grand Caillou, and Bayou Black. Investigations conducted by the Louisiana Wild Life and Fisheries Commission's Water Pollution Control Division indicated that pesticides may have caused the fish kills. In some cases, pollution from industrial operations was believed to have contributed to the fish losses.

Miscellaneous: Louisiana reports a sizable production of fresh-water crawfish. An in-

creasing number of crawfish farms provide a reliable supply for the growing market for that item.

New York City

RELOCATION OF WHOLESALE FULTON FISH MARKET RECOMMENDED:

Comprehensive studies on the relocation of the New York City Wholesale Fulton Fish Market were completed this past summer by that city's Department of Markets. A report on the studies calls for a new wholesale fish market at a cost of about $14.5 million to be located at Hunts Point, Bronx, on a site proposed as an expanded New York City Terminal Market which will also include a produce terminal and a meat distribution center.

The Mayor's Market Advisory Committee at New York City, after studying the Consultant's report on the Wholesale Fulton Fish Market, unanimoulsy approved the project stating that the interests of New York City, as a whole, would be served by the relocation of the existing Wholesale Fulton Fish Market from its present location to new facilities to be constructed by the city on a site large enough to consolidate, but not necessarily limit the markets involved.

The Consultant's report stated that "the Fulton Fish Market has been operating continuously at its present location on the East River, at the foot of Fulton Street for more than 140 years. Housed for the most part in old rundown buildings, there are now more than 90 dealers, wholesalers of fresh and frozen finfish and shellfish, processors and purveyors, located in the market area."

Fig. 2 - A scene in the Fulton Fish Market area, New York City showing the present congested conditions.

The Consultant's report brought out (1) the importance of fishery products receipts at the Wholesale Fulton Fish Market, (2) the importance of vessel fishery landings at New York City, and (3) that the annual per capita consumption of fishery products at New York City is relatively high--about 30 pounds per capita, or about three times more than the national per capita consumption.

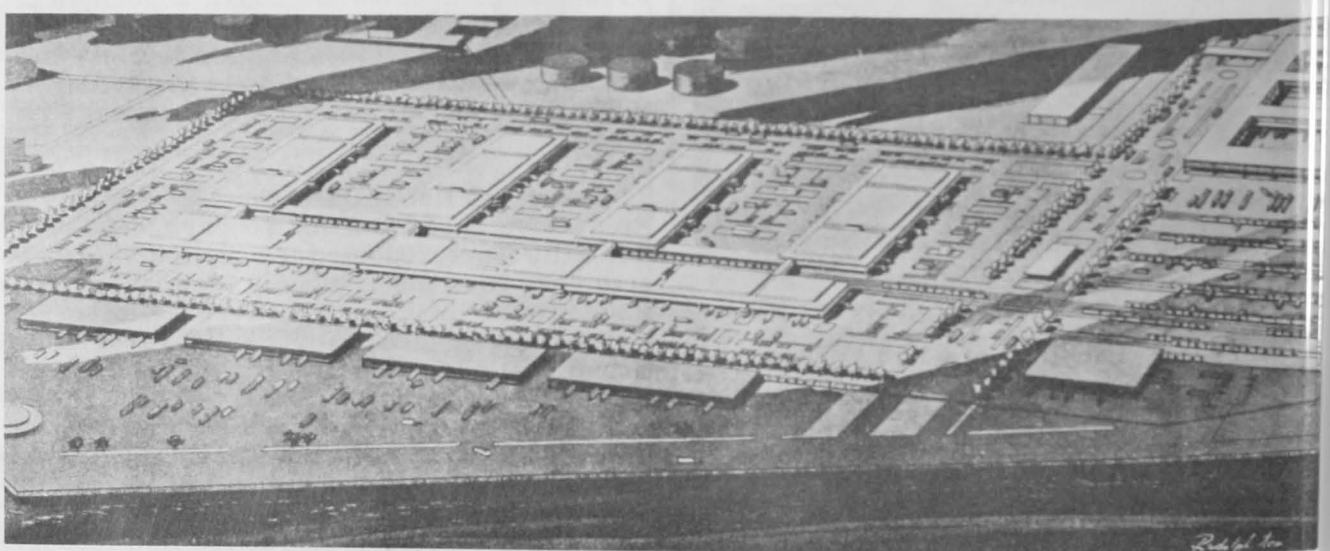


Fig. 1 - Proposed expanded New York City Terminal Market at Hunts Point, Bronx. At the right, is the produce terminal now under construction, with some of its buildings and the railroad team track area shown; in the middle, are the large buildings comprising a proposed meat distribution center, and at the lower left, in the shaded area is a suggested wholesale fish market.

Fig. 3 - A scene inside one of the Fulton Fish Market sheds.

In 1963, total receipts at New York City of fresh and frozen fishery products of both salt-water and fresh-water varieties amounted to 183 million pounds. In addition, 40 draggers in 1963 landed 335 trips at Fulton Fish Market piers with about 8 million pounds of fresh fish and shellfish, including scup (porgy) and sea scallop meats as the principal species.

In describing existing conditions at the Wholesale Fulton Fish Market, the Consultant's report concluded with, "Located astride South Street, a major north-south artery with thousands of vehicle movements daily, it is difficult for buyers to come and go freely. The rundown, unsanitary and inadequate market buildings are hardly attractive to discriminating buyers and certainly do not stimulate increased sales. Furthermore, our studies indicate that little, if anything, can be done to improve conditions at this location. It is in the best interests of the City and market users to relocate rather than rehabilitate."

North Atlantic Fisheries Exploration and Gear Research

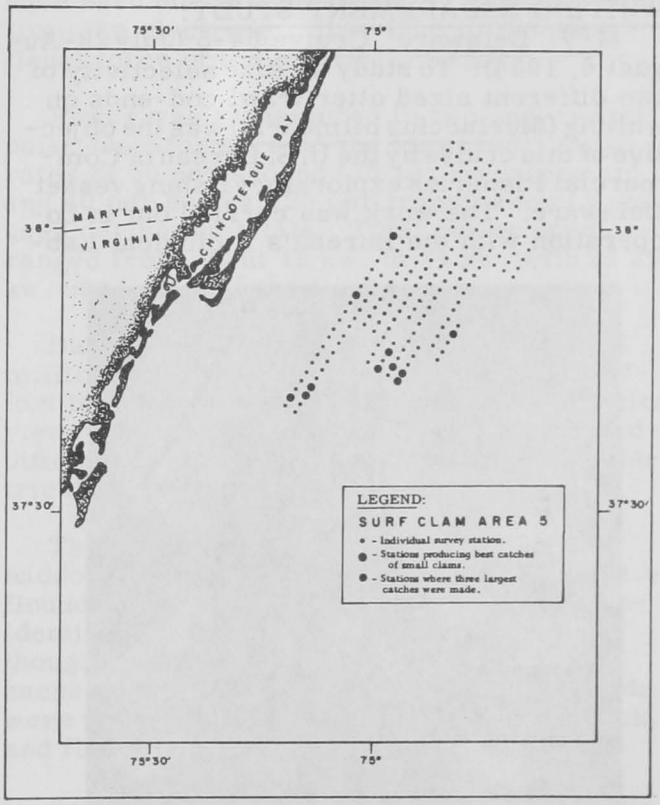
SURF CLAM SURVEY CONTINUED:

A survey of surf clam resources in certain waters off Maryland and Virginia was conducted in June and July 1964 by the U. S. Bureau of Commercial Fisheries research vessel Rorqual. The vessel was continuing an Atlantic surf clam survey begun in the summer of 1963. Survey work in 1963 was conducted in various areas extending from the south shore of Long Island, N. Y., to Maryland.

During June and July 1964, the Rorqual operated in waters off the Maryland and Virginia coasts (see chart). Working in the northern section of that area and following predetermined 1-mile grid lines, the vessel occupied 231 sampling stations. A 5-minute tow with a commercial (40-inch blade) jet dredge was made at each station.

Surf clams were taken in all but 2 of the 231 tows. The catch ranged up to 766 clams per tow (about ten 80-pound bushels). The size of the clams ranged from 0.75 to 7.25 inches in length, with most of them falling in the 5.75- to 6.50-inch size group. Considerable variation was noted both in the number of clams per tow and in the size composition. The 3 largest catches consisted of 184, 198, and 766 clams, having weights of 225, 242, and 781 pounds, respectively.

The surf clam is by far the predominant clam in the waters surveyed in Area 5. There are indications that the density of surf clams



Shows stations occupied in Area 5 and best catches during Rorqual surf clam survey in June-July 1964.

may increase as the survey extends to the south and east. The 3 best catches were made during the last 2 weeks of operation, while working in the more southern section of the survey area.

Surf clams were found to be most abundant in waters where the depths ran between 80 and 110 feet. The largest catch was made at a depth of 102 feet, with other good catches occurring in waters of about the same depth. No notably good catches were made in waters that were less than 80 feet deep, where the bottom was found to be generally much harder.

While running between stations, a clam sounder was usually kept in operation on the bottom. The instrument indicated that surf clams are distributed very extensively at varying densities in the sections between stations and that the species is very well established in the area surveyed.

The Rorqual was scheduled to resume the Atlantic surf clam survey in the fall of 1964.

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

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WHITING ESCAPEMENT STUDY:

M/V "Delaware" Cruise 64-5 (July 28-August 6, 1964): To study the size selectivity of two different sized otter trawl cod-ends on whiting (Merluccius bilinearis) was the objective of this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware. The work was carried out in cooperation with the Bureau's Biological Laboratory, Woods Hole, Mass., as part of the studies of the International Commission for the Northwest Atlantic Fisheries.

During this cruise, vessel operations were carried out for the largest part of the time in areas where the commercial whiting fleet was trawling--off Cape Cod from Nauset Bu to Chatham and in Cape Cod Bay. In additio the vessel spent one day on Georges Bank southwest of Cultivator Shoals.

On this cruise, a 2-inch and a 3-inch me internal stretched mesh cod-end were interchanged on a nylon 60-80 whiting net rigged on the vessel's starboard side and a cotton net of the same design rigged on the port sid In addition, a 1-inch mesh nylon cover was affixed to the top of the 2-inch cod-end during a number of tows of the series.

Trawling was done in random sequences, changing the cod-ends and changing from por and starboard sides of the vessel after every 5 tows. A total of 60 tows was made in which sufficient whiting were taken to give valid information. Each tow lasted from 30 minutes up to one hour.

All fish caught on this cruise were counte and measured for length-frequency data, or where catches of a single species were larg a two-bushel subsample was measured. The fish escaping into the cover on the 2-inch cod-end were measured and recorded separately. Internal mesh measurements of the cod-ends and cover were taken at regular i terval using an I. C. E. S. (International Cou cil for Exploration of the Seas) mesh gauge

Fig. 1 - 1-inch cover (A) over 2-inch cod-end (B).

Fig. 2 - Measuring mesh size with mesh gauge.

Data collected on this cruise has been turned over to the Bureau's Biological Laboratories for computer analysis and interpretation. Depending upon results, further studies may be continued aboard commercial fishing craft.

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ELECTRICAL FISHING TESTS CONTINUED:

M/V "Delaware" Cruise 64-6 (August 17-28, 1964): Underwater observations were made of the action of fish in or near the effective range of an electric field by means of closed circuit underwater television during this 12-day cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware.

Observations during the cruise of fish actions and reactions to the net, without the electric field, are summarized as:

1. The fish do not seem to be panicked or even particularly frightened by a net.

2. At slow towing speeds, the fish swim along (a) in front of the net, (b) within the mouth of the net, or (c) into and out of the net.

3. At higher towing speeds, the fish swim along with the net, but at an increased rate; as towing continued at higher speeds, the fish swim more in the direction in which the net is towing and with less laterial movement. At accelerated swimming rates, the fish tend to drop back into the net with increased frequency as they become tired. Upon occasions, however, they increase their swimming rate in spurts in order to swim out of the net or its path. From time-to-time, fish could be observed going under or between the rollers at the higher towing speeds.

When the electric field was in use, the observed reaction of the fish to the field, in general, were as follows:

1. When within the effective range of the field, the fish were (a) quickly seized by muscular spasms which made swimming behavior ineffective; (b) the spasms were immediately followed by temporary paralysis; (c) if the field was quickly turned off, the fish could recover their swimming ability and escape before they went into the net; (d) if the field was kept on, deep stunning (narcosis) or death followed.

2. When captured by the field, the fish nearly always assumed a position above the bottom, nearly perpendicular to the bottom, with their heads in an upward position and with their belly forward and away from the net.

3. In this stunned and floating position, the fish were overtaken and scooped up by the net.

4. Although the smaller fish usually swam higher off the bottom (when distributed by the net) than the larger fish, they were affected by the field at approximately the same distance from the anode; the strength of the field in front of the anode (where the larger fish were affected) was probably not as great as it was where the smaller fish were taken (the latter were nearer to a vertical position above the anode).

5. At the leading edge of the effective field, the fish were less affected while swimming directly away from the anode than when they attempted lateral movement; this may have been due to a decrease in the distance from the electrode rather than to the directional force of the electrical field.

Power was transmitted to two underwater pulse transformers on the trawl net. Pulse rates of 60 per second (30 per transformer) and 40 per second (20 per transformer) were used during the trials. Total power used ranged from about 18 kw. to 34 kw. with 26.25 kw. used most of the time.

During the cruise, some 4,000 feet of 16 millimeter movie film was exposed in an effort to obtain a permanent record of activities viewed by the underwater TV camera. In addition, a limited footage was taken of the electrical equipment in use.

The species of fish observed included: haddock, cod, halibut, wolffish, dogfish, skate, flounder and sole, and a number of other unidentified fish. The unidentified fish were thought to include either herring or blue-backs and whiting or hake. The film records were made mostly on dogfish, small haddock, and flounder and sole.

Areas (1) in Cape Cod Bay, (2) off of Nausett Beach, (3) at the Southeast Part of Georges

Bank, (4) at the Bight of Clarks on Georges, (5) on Stellwagen Bank, and (6) in Ipswich Bay, were utilized during the cruise in search of unclouded water. Depths ranging from 6 to 32 fathoms were fished in the effort to find fish, good bottom, sufficient light and clear water, all of which were required for making good films.

Artificial illumination was used at times with little if any effect on the fish; neither a scare effect nor an appreciable attraction to the light was apparent.

The maximum limits of visibility encountered during the cruise were about 20 feet near the surface and 12 to 14 feet at the bottom in front of the net being towed.

Note: See Commercial Fisheries Review, September 1964 p. 30; June 1964 p. 20; January 1964 p. 21.

North Atlantic Fisheries Investigations

SUMMER DISTRIBUTION AND ABUNDANCE OF GROUNDFISH SPECIES STUDIED: M/V "Albatross IV" Cruise 64-10 (Part I July 27-August 11; Part II August 6-22, 1964). To determine the summer distribution and relative abundance of groundfish species from

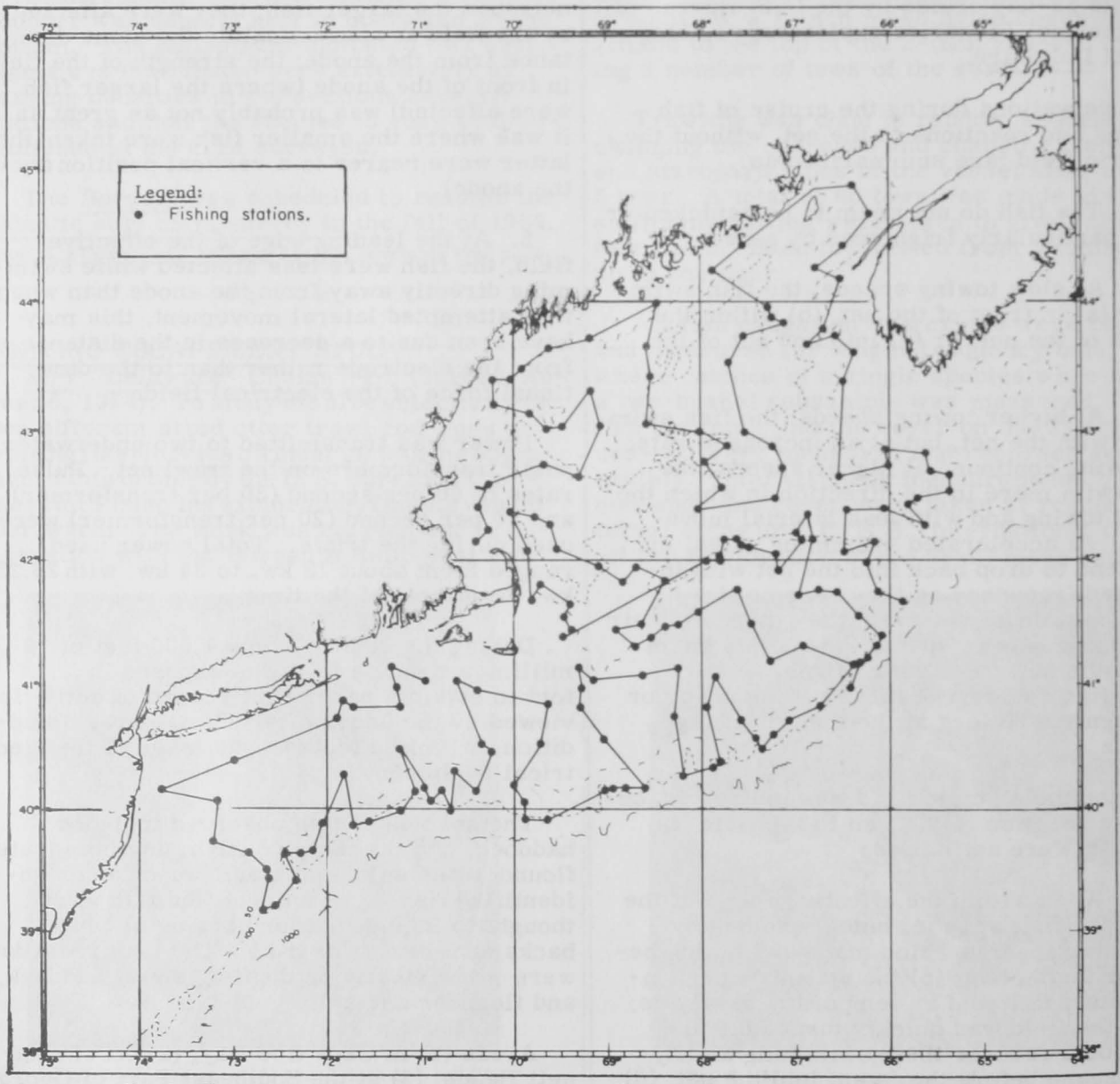

Fig. 1 - Shows fishing stations worked during Albatross IV Cruise 64-10, July 27-August 22, 1964.

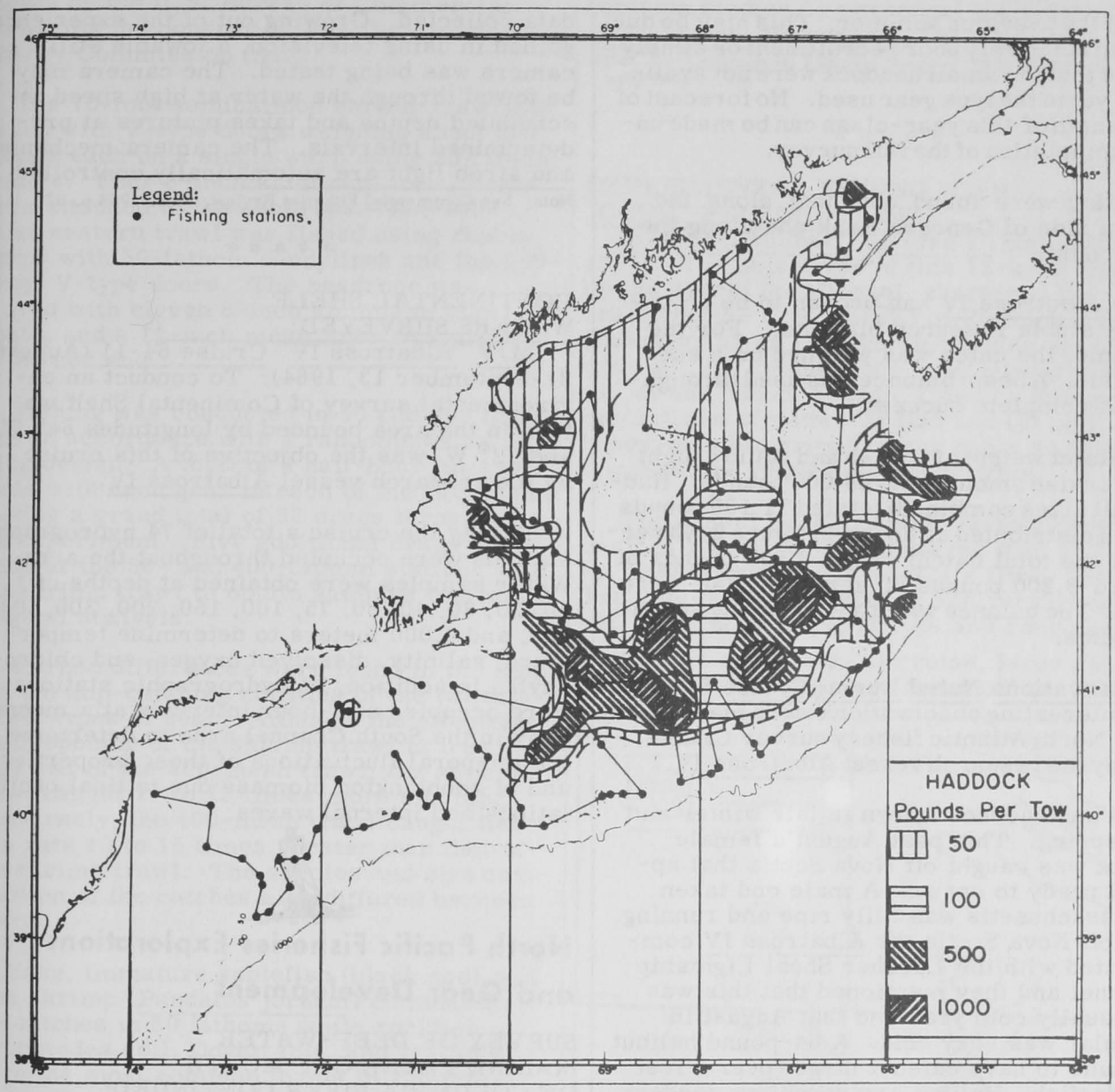

Fig. 2 - Shows amount of haddock taken per tow during Albatross IV Cruise 64-10, July 27-August 22, 1964.

The Bay of Fundy southward to Hudson Canyon was the purpose of this survey by the U. S. Bureau of Commercial Fisheries research vessel Albatross IV.

A total of 180 groundfish survey stations were made on this cruise. All fish were identified and measured, and the total weight by species was obtained from each tow. Stomach contents of 1,781 fish were examined and recorded from 41 species caught throughout the study area. Scale samples were taken from 1,262 haddock and 539 yellowtail flounders. Otoliths were extracted from 380 whiting (silver hake) and 179 butterfish. Also, a sample of sea herring was collected and frozen for the Bureau's Biological Laboratory at Boothbay Harbor, Maine. Samples of red and white hake were frozen for further studies on the life history of those species.

Large quantities of small haddock between 15-30 centimeters (6 to 12 inches) long were caught on Georges Bank in depths between 30 to 50 fathoms. Those were one-plus year old fish originally reported after the 1963 summer and fall groundfish survey Albatross IV (Cruise 63-5). Catches of this year's (1964) year-class of haddock were low. They were absent from some areas where they were a-

bundant the previous summer. This may be due to either relatively poor recruitment or simply indicate that the small haddock were not available as yet to the type gear used. No forecast of the strength of this year-class can be made until the completion of the fall survey.

Whiting were found abundant along the western side of Georges Bank and along the Maine coast.

The Albatross IV has proven to be an unusually stable research platform. For the first time, the catch was weighed on a species basis. A beam balance was used throughout with complete success.

The total weight of all fish and squid caught on this cruise amounted to 49,000 pounds. Haddock (all sizes combined) totaled 21,100 pounds and was distributed as shown in figure 2 (43 percent of the total catch), while 3,500 pounds of cod and 3,200 pounds of spiny dogfish were caught. The balance was divided among 46 other species.

Observations Noted During Cruise 64-10: Some interesting observations were made during the North Atlantic fishery survey Cruise 64-10 by the research vessel Albatross IV.

Cod and haddock spawn in late winter and early spring. This past August a female haddock was caught off Nova Scotia that appeared ready to spawn. A male cod taken off Massachusetts was fully ripe and running. While off Nova Scotia the Albatross IV communicated with the Lurcher Shoal Lightship personnel and they mentioned that this was an unusually cold year and that August in particular was very cold. A 64-pound halibut was found to have eaten a large (over 2 feet long) dogfish. Halibut are voracious feeders, frequently eating big lobsters and large crabs, but the dogfish was a surprise. As anticipated, yearling haddock were unusually abundant. The incoming year-class of haddock was not in evidence during August and any prediction of its strength can not be made until completion of the fall survey cruise. Young haddock are not necessarily on the bottom in August.

Surveying marine fish abundance with the otter trawl is as yet the only feasible technique. The Bureau's Woods Hole Biological Laboratory is continually investigating other techniques in an effort both to increase survey efficiency and to improve the quality of data collected. Growing out of the experience gained in using television, a towable still camera was being tested. The camera may be towed through the water at high speed at scheduled depths and takes pictures at predetermined intervals. The camera mechanism and strob light are automatically controlled.

Note: See Commercial Fisheries Review, Sept. 1963 p. 37.

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CONTINENTAL SHELF WATERS SURVEYED:

M/V "Albatross IV" Cruise 64-11 (August 31-September 13, 1964): To conduct an environmental survey of Continental Shelf waters in the area bounded by longitudes 64° W. and 72° W. was the objective of this cruise by the research vessel Albatross IV.

During the cruise a total of 74 hydrographic stations were occupied throughout the area. Water samples were obtained at depths of 1, 10, 20, 30, 40, 50, 75, 100, 150, 200, 300, 500, 750, and 1,000 meters to determine temperature, salinity, dissolved oxygen, and chlorophyll. In addition, 24 hydrographic stations were occupied at 2-hour intervals at a moored buoy in the South Channel area to determine the temporal fluctuations of those properties, and of zooplankton biomass due to tidal oscillations and internal waves.

North Pacific Fisheries Explorations and Gear Development

SURVEY OF DEEP-WATER MARINE FAUNA OFF MOUTH OF COLUMBIA RIVER CONTINUED:

M/V "Commando" Cruise 11 (August 31-September 17, 1964): The objectives of this cruise on a predetermined trackline southwest of the Columbia River were to: (1) compare the sampling efficiency for demersal fauna of a 70-foot semiballoon shrimp trawl and a 400-mesh eastern otter trawl, (2) collect faunal samples for the U. S. Bureau of Commercial Fisheries Technological Laboratory at Seattle, Wash., and for radiological analysis by the Laboratory of Radiation Biology, University of Washington, and (3) take cores of the substrate for heteroptrophic marine bacteria studies.

This cruise by the exploratory fishing vessel Commando was the 15th in a series con-

ducted by the U. S. Bureau of Commercial Fisheries in cooperation with the Atomic Energy Commission (AEC).

The 70-foot semiballoon shrimp trawl was fished with V-type doors weighing about 850 pounds each on a single warp using 25-fathom bridles. Four 8-inch aluminum trawl floats were attached to the headrope. The 400-mesh eastern trawl was fished using double warps with 50-fathom dandylines and the 850-pound V-type doors. The headrope was buoyed with eleven 8-inch aluminum trawl floats, and a $1\frac{1}{2}$-inch mesh liner was placed in the cod end.

Fishing was conducted in 50 and 100 fathoms in accordance with a randomized sampling design. A total of 8 half-hour tows was made with each gear in each of the two depths making a grand total of 32 drags throughout the experiment. Five additional drags were made at the 50- and 400-fathom stations with the shrimp trawl to obtain samples for radiological analysis.

Marked differences were found in the fish and shrimp-catching abilities of the two different types of gear. Although the effective width opening of the shrimp trawl is less than that of the 400-mesh trawl, the shrimp trawl caught 10 to 15 times more shrimp. Conversely, the 400-mesh trawl caught fish at a rate 10 to 15 times greater than that of the shrimp trawl. The species and size composition of the catches also differed between gear.

Hake, immature sablefish (black cod), and pink shrimp (Pandalus jordani) dominated the catches in 50 fathoms while rockfish (Sebastodes sp.), Dover sole, and rex sole were the most common forms in 100 fathoms. Eight tagged Dover sole (5 in 50 fathoms and 3 in 100 fathoms), which had been tagged and released on the trackline by personnel of the Oregon Fish Commission on previous cooperative Bureau-AEC cruises, were recovered.

Samples of fish and invertebrates were collected and frozen for the Laboratory of Radiation Biology of the University of Washington. Additional samples were collected for the Bureau's Technological Laboratory in Seattle.

A total of 10 cores was taken at 50, 300, and 850 fathoms for heterotrophic marine bacteria studies by personnel from the College of Fisheries, University of Washington.

Note: See Commercial Fisheries Review, April 1964 p. 25; January 1964 p. 23.

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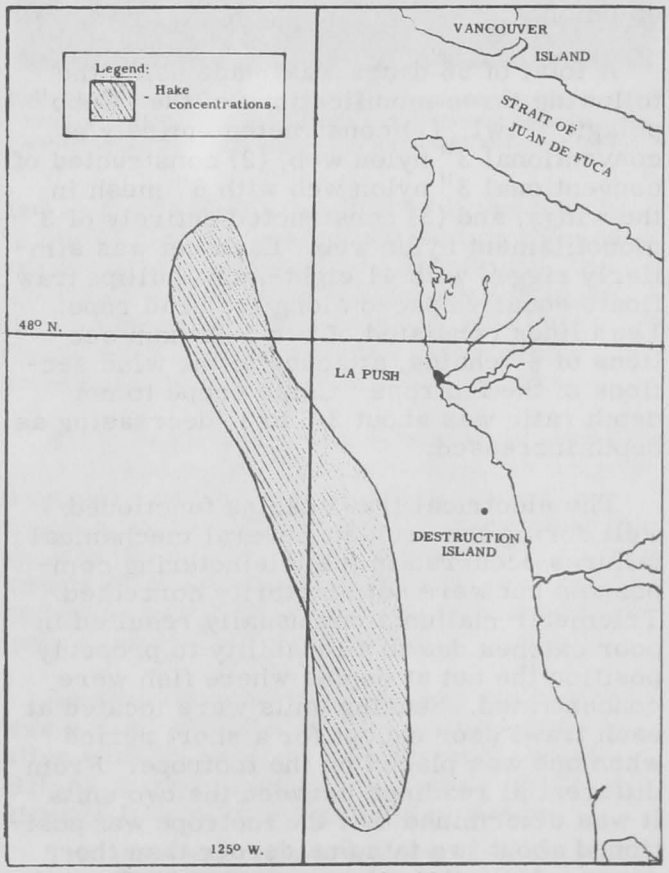
EXPERIMENTAL FISHING WITH "COBB" PELAGIC TRAWL:

M/V "St. Michael" Cruise 2 (May-July 1964): The objectives of this 12-week cruise by the vessel St. Michael, chartered and operated by the U. S. Bureau of Commercial Fisheries as an exploratory fishing vessel, were to: (1) evaluate the commercial potential of the "Cobb" pelagic trawl on known concentrations of midwater fish and (2) test heavy-duty electrical towing cable and depth-temperature recording instruments.

The vessel St. Michael, a 72-foot trawler, carries a crew of 4, is powered with a 353 hp. Diesel engine and mounts a trawl-net reel. The reel facilitates setting and retrieving the net, especially in high winds and rough seas.

On this experimental cruise, large concentrations of hake were found off the Wash-



Shows area of operations during St. Michael Cruise 2.

ington coast between Destruction Island and the Umatilla light-ship. Hake schools, as defined by a high sensitivity white-line echo-sounder, were located from the bottom up to 20 fathoms above the bottom.

Following initial good catches of hake off Washington, the net was fished on commercial fishing grounds in Queen Charlotte Sound off British Columbia, in an attempt to produce large quantities of Pacific ocean perch. Ocean perch catches, however, did not exceed 6,000 pounds an hour. One two-week period was devoted to operations during hours of darkness. Extensive soundings were taken during that period without locating off-bottom fish schools. Poor weather hampered each phase of the cruise and reduced time available for night fishing.

In the later part of the cruise, testing of the gear on known hake concentrations was resumed off Washington where numerous large hake catches were made. The largest single catch was 50,000 pounds in 90 minutes; the highest catch rate was 30,000 pounds taken in 30 minutes of fishing time. Catches in excess of 15,000 pounds in 30 minutes were common.

A total of 56 drags was made using the following three modifications of the "Cobb" pelagic trawl: (1) constructed entirely of conventional 3" nylon web, (2) constructed of conventional 3" nylon web with 6" mesh in the wings, and (3) constructed entirely of 3" monofilament nylon web. Each net was similarly rigged with 41 eight-inch Phillips trawl floats equally spaced along the head rope. Lead lines consisted of two 5-fathom sections of $\frac{3}{8}$" chains, attached to the wind sections of the footrope. Cable scope to net depth ratio was about 3.5 to 1, decreasing as depth increased.

The electrical trawl cables functioned well during the cruise. Several mechanical failures occurred in the telemetering components but were satisfactorily corrected. Telemeter malfunctions usually resulted in poor catches due to an inability to properly position the net at depths where fish were concentrated. Sensing units were located at each trawl door except for a short period when one was placed on the footrope. From differential readings between the two units it was determined that the footrope was positioned about two fathoms deeper than the doors. Also, the net appeared to bank much like an airplane when the vessel turned. Underwater observations made of the nets prior to the cruise indicated the net opening to be about 60 feet square.

Overall results of the cruise were encouraging and all major components operated as designed. Minor additional changes should make the gear suitable for commercial fishing.

Oceanography

LARVAL SPECIMENS OF TUNA, SWORDFISH, AND MARLIN COLLECTED IN THE TROPICAL ATLANTIC:

The collection of larval forms of large pelagic fish was a primary objective of a 21-day cruise (July 24-August 14, 1964) to Bermuda, the Sargasso Sea, and the northeastern Bahamas by the research vessel John Elliott Pillsbury (owned and operated by the Institute of Marine Science, University of Miami). The cruise was sponsored by the National Science Foundation.

Hundreds of larval tuna were taken during the cruise to form one of the most extensive collections of young tuna ever assembled. Other larval specimens taken included white marlin and blue marlin about $\frac{1}{8}$-inch in length, broadbill swordfish as small as $\frac{1}{4}$-inch in length, and many dolphin, barracuda, and gaint ocean sunfish. The tiny marine specimens will help scientists trace the life his-

Fig. 1 - Research vessel John Elliott Pillsbury departs on an oceanographic cruise to the Tropical Atlantic.

Fig. 2 - Working deck of the research vessel John Elliott Pillsbury.

tories, migration patterns, and spawning locations of large pelagic fish.

Plankton collections during the cruise indicate that the major spawning grounds of marlin are located southwest of Bermuda and in the northeast and northwest Bahamas, according to the scientist who directed sampling work aboard the Pillsbury.

In addition to the collection of larval fish, general sampling was carried out with midwater trawls, bottom trawls, and bottom dredges from depths of 3,000 to 6,000 feet. Wire cable up to four miles in length was required on some of the deep-water hauls. Night-light fishing techniques were used to capture lanternfish, dolphin, flyingfish, squid, octopus, and other marine animals.

One interesting catch was a perfectly formed sailfish only $1\frac{1}{2}$ inches long taken in a midwater trawl, and it came aboard alive

Fig. 3 - Putting over a high-speed plankton sampler which can be towed at 8 knots, thereby capturing fast-swimming organisms that avoid regular plankton nets (which are towed at slower speed).

and in good condition. Placed immediately in one of the aquaria maintained on the vessel for photography of live specimens, the little fish swam about vigorously for more than an hour with its miniature sail held erect. Color motion pictures were made of the swimming sailfish for behavior studies.

Many deep-water specimens were captured alive and photographed, including the unusual Argonaut, the octopod that lives in a paper nautilus shell. While being photographed in an aquarium, one Argonaut gave birth to hundreds of microscopic baby Argonauts, complete with pearly, transparent shells less than a millimeter in diameter.

Another unusual catch during the cruise was a deep-water anglerfish which came up alive with its fragile "fishing lure" intact. Before it died, movies were made of the strange fish swimming in an aquarium.

The Pillsbury left Miami on July 24, 1964, and began its scientific collecting on the east-

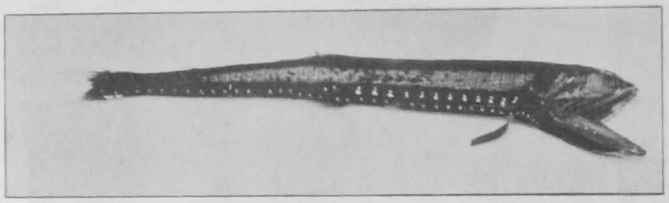


Fig. 4 - Shows an unusual specimen (a Gonostomatid) collected by the research vessel John Elliott Pillsbury. This deep-water fish, only a few inches in length, was captured at a depth of about 4,000 feet. Note the light organs along the underside of the fish.

ern edge of the Gulf Stream near Grand Bahama Island. Then the vessel worked its way north to a point off Charleston, S. C., where she swung east to Bermuda. After two days of inshore and coral reef collecting at Bermuda, the vessel proceeded northeast to a large seamount. Activities were curtailed, however, by gale winds so the Pillsbury moved south to calmer waters. After working off Abaco and around the northern edge of the Little Bahama Bank, the research vessel returned to Miami, Fla., on August 14, 1964.

The Pillsbury left Miami again on August 20, 1964, for an oceanographic cruise to the Caribbean. (Institute of Marine Science, University of Miami, August 19, 1964.)

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EXCHANGE VISITS BY UNITED STATES AND SOVIET OCEANOGRAPHERS:

Six United States oceanographers began a 4-week tour of the Soviet Union on September 14, 1964, as part of an exchange program that will bring a similar delegation of Soviet oceanographers to the United States. This will be the first exchange of oceanographers between the two countries.

The schedule of the United States group called for them to visit 13 Soviet oceanographic installations as well as the Soviet oceanographic vessel Mikhial Lomonosov. Individual visits to an oceanographic submarine, a geochemistry institution, and the Soviet Naval Hydrographic Office were also planned. The tour will take the United States oceanographic delegation to Moscow, Yalta, Gelendzhik, Sevastopol, Leningrad, and Murmansk.

The exchange visits by United States and Soviet oceanographers are sponsored by the Coast and Geodetic Survey, U. S. Department of Commerce.

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SMALL PORTABLE MARINE WORK PLATFORM WITH DERRICK:

A small marine work platform known as the "Hydro-Cat" has been developed by a firm in California. According to its designers, the 18-foot craft with a $10\frac{1}{2}$-foot beam is intended to serve as a stable work platform specifically for use by oceanographers and limnologists

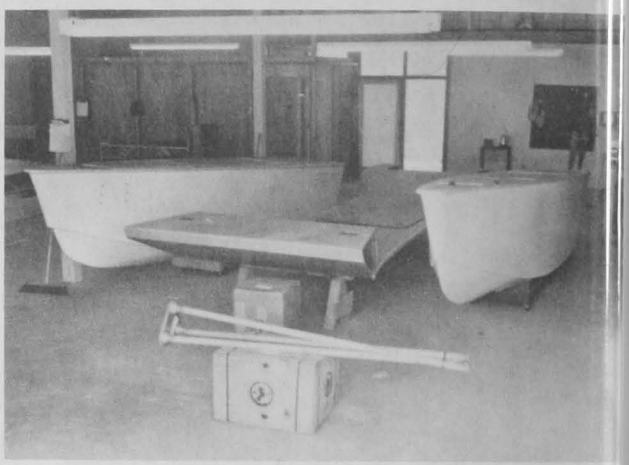


Fig. 1 - Shows Hydro-Cat under construction.

Figs. 2 - Shows completed Hydro-Cat in the water.

Its features include a center-located demountable derrick and instrument hatch for convenient lowering of instruments; ballast tank for rough-weather work; and forepeak and afterpeak collision bulkheads. It can be powered by any outboard motor from 25 to 100 horsepower. The "Hydro-Cat" can be quickly broken down to two hulls and a center section to facilitate transport.

Oregon

METOLIUS SALMON HATCHERY CLOSES AND EXPERIMENTAL HATCHERY STATION OPENS:

The closure on July 31, 1964, of the Metolius River Salmon Hatchery above Pelton Dam was announced by the Oregon Fish Commission in early August 1964. At the same time the Commission announced plans to open a test hatchery unit below Pelton Dam by September 15, 1964.

The Metolius hatchery, located on Spring Creek (a Metolius tributary) some 30 miles above the Pelton-Round Butte dam complex, was established in 1947. Its purpose was to compensate partially for losses of spawning and rearing areas on the Columbia River and tributaries as a result of dam construction.

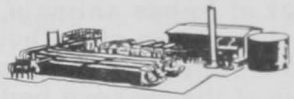
Factors leading to the closure of the Metolius hatchery were the station's limited facilities, difficulties in passing both upstream and downstream migrant salmon over the Pelton-Round Butte dam complex, and low water temperatures in the area, all of which contributed to the relatively high cost of the fish reared to release size at the hatchery. During earlier phases of the Metolius operation, both sockeye and spring chinook salmon were handled at the station but in later seasons efforts were concentrated on spring chinook.

The closure of the Metolius station, however, does not mean the end of hatchery operations in the area. Plans call for an investigation of the potential for artificial propagation of spring chinook, steelhead, and possible other species at the site of the new test hatchery unit immediately below the re-regulating dam at Pelton. The new experimental operation will consist of hatching spring chinook and steelhead eggs from fish taken either from the Deschutes or from the Willamette River system, and rearing the resultant fingerlings for a full year.

Water to operate the test facility will be taken from the forebay of the re-regulating dam, which offers water suitable in quality and temperature for fish cultural purposes. Water temperatures at the dam range between 40° - 60° F. The river flow below the re-regulating dam averages some 3,000 cubic feet per second, which is far above the pilot station's requirements and would be more than adequate for a hatchery with a capacity of $1\frac{1}{2}$ million yearling salmon.

The cost of the small pilot station is reported to be about $10,000 for construction plus an additional $10,000 for equipment and operating expenses during the first year. Expansion of the experimental project to a full-scale production facility, if such course appears feasible, will be much more expensive. A station with a rearing capacity of a million yearling chinook, for example, could be expected to cost $350,000 or more. About half of the money needed for the pilot station is being provided by the electric company which owns the Pelton-Round Butte dam complex.

The Oregon Fish Commission described the closing of the Metolius station and establishment of the pilot hatchery below Pelton Dam as an effort to modernize or replace outmoded facilities. It was pointed out that the Oregon spring chinook hatchery program in the Willamette River system has been highly successful during recent years giving rise to considerable optimism that a successful spring chinook program could be developed on the Deschutes River below the dams.



Oysters

LIGHT STRIKE IN JAMES RIVER SEED BEDS IN 1964:

A light set of oysters in the James River seed area occurred during the first two weeks of September 1964, according to scientists at the Virginia Institute of Marine Science, Gloucester Point, Va. The head of oyster research at the Institute reported that after intensive surveys it is now known that a "light" strike began during the last four days of August and continued with decreasing intensity through September 8.

The Institute scientist said, "The distribution of spatfall this summer was most peculiar. Strings of test shells indicated that spatfall was heaviest on upriver inshore areas. This suggests that the oyster larvae originated from oysters in the seed area rather than from downriver oysters. It is my belief that in normal years most larvae originating in shallow inshore waters are carried downstream and lost."

A check of natural cultch (shell) collected from seed beds in the upper James River was made on September 11. Microscopic examinations of those shells revealed that some spat had collected on all beds from Wreck Shoal to Deep Water Shoal on both sides of the

river, substantiating the observations on test shells put out by the Institute. The scientist emphasized that spat observed on September 11 were very small. Most of those found were about $\frac{1}{25}$th of an inch across and would require a good magnifying glass to be seen readily. He noted that such small spat usually survive very well in the upper river.

Although the 1964 spatfall appears to be quite light in comparison with long-term records from the James River, it will probably be an improvement over the past three years. The upriver location of this spatfall is particularly beneficial because of complete failure there in recent years.

The Institute's oyster research scientist pointed out that quality of cultch often influences the intensity of setting and survival. "We always use clean shells for our weekly test strings in the river," he noted, "But natural cultch varies greatly in quality. The cultch in the upper seed beds this year is fouled with a coat of 'moss animals,' whereas the shells in the middle river beds are cleaner except for some sea squirts. Unfortunately, most of the inshore beds lack cultch and what little is there is badly fouled with sea squirts. The number of spat surviving will be influenced by those factors."

State shell plantings of 1963/64 in the middle of the seed area are reasonably clean of fouling organisms, but are located somewhat downriver from the best of the 1964 spatfall. The location of the State shell plantings was based upon setting records from past years which indicate that normally the best set occurs on the downriver and channelward seed rocks.

From records accumulated over the past 20 years, the scientist indicated that the normal setting season continues until the first of October, but oysters were now spawned out and it was unlikely that much more setting would occur this year. When summer temperatures prevail, free-swimming larvae require a period of 10 to 12 days before setting. The Institute scientist feels that the effect of tropical storms with their high tides is probably harmful to broods of oyster larvae since they are likely to be carried out of the river.

The Director of the Virginia Institute of Marine Science pointed out that this latest information on oyster setting is a direct result of the increased attention being given to James estuary under the Institute's Operation James River which is a study of the physical and biological characteristics of the system. He further said that more careful studies of the setting of oysters and other important larvae are being planned for the 1965 field season.

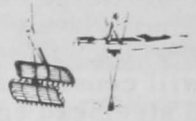
* * * * *

DEVELOPMENT OF DISEASE-RESISTANT OYSTER STRAINS:

Studies on the development of disease-resistant strains of oysters were recently started at Rutgers University in New Jersey; the Virginia Institute of Marine Science, Gloucester Point, Va; Natural Resources Institute of the University of Maryland, Solomons, Md.; University of Delaware Marine Laboratory, Newark, Del. The studies are part of the program under Public Law 87-580 and are being conducted with funds administered by the U. S. Bureau of Commercial Fisheries to determine the resistance of various oyster stocks to MSX mortality.

The Bureau's Milford (Conn.) Biological Laboratory is cooperating in this program by (1) supplying conditioned oyster spawners of Long Island Sound origin; (2) conditioning Chesapeake Bay oysters for comparative studies and spawning; and (3) rearing larvae of presumed resistant stocks for testing of juvenile oysters to MSX exposure at various mid-Atlantic locations. This also involves sending starter cultures of a number of species of algae to both State laboratories to provide food for the larval and juvenile oysters.

Note: See Commercial Fisheries Review, September 1964 p. 36



Pesticides

STRINGENT RULES ORDERED IN USE OF PESTICIDES ON LANDS ADMINISTERED BY DEPARTMENT OF THE INTERIOR:

The issuance of stringent rules regarding use of pesticides on the more than 550 million acres of public lands administered by the Department of the Interior was announced by Secretary Stewart L. Udall, September 4, 1964. The rules were developed after an earlier secretarial directive that the Department's standards should set an example for all others to follow. The new guidelines, which apply to all Interior programs for the

control of pest plants and animals, were developed by Frank P. Briggs, Assistant Secretary for Fish and Wildlife.

The order directs that first priority be given to nonchemical methods in pest control. When chemicals are deemed necessary, safety will be the main consideration. Secretary Udall said, "Prior to the use of pesticides, there must be a determination of anticipated results and possible harmful effects. Only chemicals registered for use on a particular pest may be employed, and instructions for use must be carefully followed. It is of the utmost importance that the proposed controls be limited to the target area to avoid contaminating lakes, streams, fish and wildlife, or adversely affecting other interests in the community."

Secretary Udall directed Interior agencies to inform state and local authorities, if their interests are involved, when proposed Interior pest-control activities are to be conducted. He directed that state and local laws be complied with in such programs.

The guidelines require the use of the most selective chemicals available, minimum dosages with the safest carriers, and application under conditions that leave no reasonable doubt that harmful effects will be minimized. Interior agencies were told to avoid using compounds which are known to concentrate in living organisms, such as DDT, chlordane, dieldrin, and endrin.

Secretary Udall warned that even some of the comparatively safe pesticides, such as malathion, pose hazards to some sensitive species of fish, food organisms, and beneficial insects. He said particular care must be taken to avoid injury to pollenizing insects. He said that while the acute toxic effects of most herbicides are minimal for birds and mammals, the chronic effects are largely unknown. And he noted that some herbicides are highly toxic to fish food organisms. The order requires that advice be obtained from fish and game and health officials before there is any extensive field use of herbicides in close proximity to water areas.

Secretary Udall said that results of chemical pest-control programs carried out by Interior agencies must be appraised by specialists to assure minimum adverse side effects. He thus assigned to the Geological Survey the responsibility of surveillance and study of pesticide effects on water resources of the Department's areas. The Bureau of Sport Fisheries and Wildlife will appraise the effects on fish and wildlife and their food organisms.

Secretary Udall further ordered that all chemical pest-control programs planned by Interior agencies be first reviewed by the Geological Survey, the Bureau of Commercial Fisheries, and the Bureau of Sport Fisheries and Wildlife. The proposed programs then will be forwarded to the Federal Committee on Pest Control, made up of representatives of the Departments of Interior, Agriculture, Defense, and Health, Education, and Welfare. The Federal Committee reviews all chemical control programs that are financed wholly or in part with Federal funds, or are directed or supervised by a Federal agency. Interior's representatives on the Committee are Robert M. Paul, Deputy Assistant Secretary for Fish and Wildlife, and Lansing A. Parker, Associate Director, Bureau of Sport Fisheries and Wildlife.

Secretary Udall said Interior agencies not directly engaged in chemical pest-control programs are required to observe and report any significant contamination of residual accumulations caused by pesticides which may affect the Department's interests.

Preservation

SHELF LIFE OF FROZEN FISH STUDIED:

Freezing is one of the most important commercial methods of preserving fishery products. Since it is known that freezing does not improve the quality of any fishery product above its original quality, the recommendation is always made that only initially high-quality fish should be frozen. Recommendations concerning subsequent frozen storage are more difficult to make, since there is a general lack of information on the combined effects of time of storage in ice prior to freezing and the effects of different constant freezer temperatures upon the frozen storage life of fishery products. The Gloucester (Mass.) Technological Laboratory, U.S. Bureau of Commercial Fisheries, has undertaken a project in which the effects of those variables are being studied.

The first fish species studied was pollock--a fish generally in plentiful supply. Eviscerated pollock, stored in ice at the Bureau's

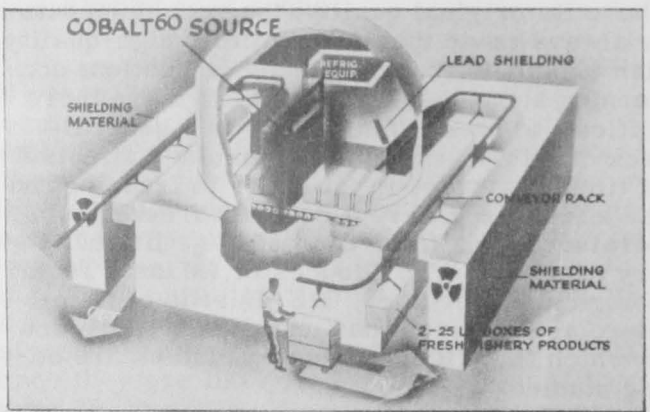
laboratory, was filleted on the 1st, 3rd, 6th, 9th, 13th, and 16th day of ice storage. They were then packaged in commercial type one-pound fillet cartons and in 13½-pound blocks and were frozen in a plate freezer. Frozen one-pound fillet packages were stored at +20°, +10°, 0°, -10° and -30° F., and the blocks at 0° F.

Those products were being tested for acceptance this past summer by organoleptically evaluating them along with freshly frozen controls. The one-pound fillets were tested as a steam-cooked product and the blocks as fried portions. Preliminary results showed average storage life of +10° and +20° F. stored pollock fillets to be 8 and 4 weeks, respectively. Fillets stored at 0° F. reached a stage of borderline acceptance in 15 to 17 weeks' storage. The main causes of quality loss in those products have been discoloration and rancidity. Fried portions made from blocks held in storage up to 22 weeks were found to be acceptable.

Radiation Preservation

ACCEPTANCE TESTS CONDUCTED FOR PETRALE SOLE FILLETS:

Large-scale acceptance tests on radiation-pasteurized petrale sole fillets at Fort Lee, Va., were conducted on September 18 and 25, 1964, by the Seattle Technological Laboratory of the U. S. Bureau of Commercial Fisheries. On both of those days, 300 servings of fish fillets irradiated at 0.3 megarad and 300 servings of unirradiated (control) fillets were judged for acceptability



Sketch of irradiator pilot plant in Gloucester, Mass., adjacent to the U. S. Bureau of Commercial Fisheries Technological Laboratory. The irradiator is a $600,000 Atomic Energy Commission facility to show how the shelf life of fresh marine products may be extended.

using the 9-point hedonic scale. That rating scale reflects varying degrees of "likes" and "dislikes": 9 for "like extremely well" to 1 for "dislike extremely." The test samples were included as part of a regular meal to Army volunteers at Fort Lee. At the time of the tests, the irradiated fish fillet samples had been stored at about 33° F. for 3 and 4 weeks.

Prior to the scheduling of the tests, petrale sole fillets were obtained from three different commercial fish-filleting plants, vacuum packed in No. 10 cans, and irradiated at 0.3 megarad. Those samples were frozen and shipped to the U. S. Army Research Laboratories at Natick, Mass., for toxicity tests and to obtain clearance for the Fort Lee tests.

Similar preference tests had been previously conducted at the Seattle laboratory on irradiated petrale sole fillets. The irradiated samples received preference scores that were generally in the same range as those given the unirradiated samples.

* * * * *

IRRADIATION OF FISH AT SEA PLANNED

The construction by the Atomic Energy Commission (AEC) of a portable cobalt-60 research irradiator which can be used aboard fishing vessels was near completion this past September. This 14-ton irradiator charged with 25,000 curies of cobalt 60 will be capable of processing about 100 pounds of fish an hour at a level of 150,000 rads. Much of the quality loss in fishery products occurs after the fish are caught and before they are landed at the dock. Irradiation at sea will improve the general quality of landed fish whether it is to be sold fresh, frozen, or reirradiated for even further fresh shelf-life extension. In an effort to carry out research in this area, AEC is planning to make this irradiator available to the U. S. Bureau of Commercial Fisheries for use aboard its exploratory fishing vessel Delaware, which operates out of Gloucester, Mass. When the irradiator is installed aboard the vessel, research will be carried out at sea to provide a basis for evaluating the potential of irradiation at sea.

Notes: Rad = The quantity of ionizing radiation which results in the absorption of 100 ergs per gram of irradiated material at the point of interest.

Erg = Unit of energy.

See Commercial Fisheries Review, October 1964 p. 35; September 1963 p. 33.

Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS, SEPTEMBER 1964:

Item and Period	1964	1963	1962	1961	1960
	. . . (1,000 Lbs. Heads-Off) . . .				
Total landings, So. Atl. and Gulf States:					
November	-	13,250	12,177	9,996	14,455
October	-	22,022	15,254	12,696	21,688
September	13,200	18,045	13,012	9,691	18,832
August	15,299	19,769	12,340	10,944	20,441
January-July	53,269	55,675	44,441	41,530	58,521
January-December	-	138,254	105,839	91,395	141,035
Quantity canned, Gulf States 1/:					
November	-	2,495	3,028	2,175	1,535
October	-	4,242	4,054	2,065	2,480
September	1,200	3,697	1,759	598	2,222
August	1,560	3,121	1,355	1,090	4,427
January-July	8,496	13,738	11,089	7,756	14,836
January-December	-	28,468	23,322	14,500	26,394
Frozen inventories (as of end of each mo.) 2/:					
November 30	-	42,142	27,500	20,668	37,264
October 31	-	37,418	21,315	17,811	31,209
September 30	-	27,356	12,843	13,361	24,492
August 31	21,952	24,803	12,754	12,728	20,171
July 31	24,315	25,460	13,677	14,849	17,397
June 30	25,546	24,047	13,796	19,416	15,338
May 31	28,082	24,053	13,904	24,696	17,540
Imports 3/:					
November	-	14,759	17,964	14,852	13,516
October	-	20,153	18,279	16,813	14,211
September	-	10,236	9,696	8,629	8,190
August	-	8,598	7,381	6,743	6,407
January-July	82,330	81,487	72,065	63,803	58,684
January-December	-	151,530	141,103	126,268	113,418
	. . .(¢/lb., 26-30 Count, Heads-Off). . .				
Ex-vessel price, all species, So. Atl. and Gulf Ports:					
November	-	52.3	84.5	73.5	54.0
October	-	53.3	90.0	68.7	53.0
September	4/60-70	57.9	90.9	70.1	52.2
August	4/60-73	59.0	83.6	66.1	52.0
July	4/62-72	63.5	82.1	55.8	54.6
June	66.0	77.0	84.4	53.7	64.1
May	61.1	80.9	83.7	52.8	62.9
April	60.0	83.6	82.2	55.4	60.6
Wholesale price, froz. brown (5-lb. pkg.), Chicago, Ill.:					
November	-	71-78	105-110	89-92	69-73
October	-	67-75	108-115	83-90	69-73
September	79-83	73-77	113-118	87-90	65-70
August	78-84	75-81	110-112	76-91	64-67
July	80-85	77-97	-	70-75	72-77
June	80-85	95-102	102-104	67-72	76-77
May	72-83	100-103	96-103	67-69	74-77
April	72-74	100-105	94-97	69-70	74-75

Pounds of headless shrimp determined by multiplying the number of standard cases by 30.3

Prices headless only; excludes breaded, peeled and deveined, etc.

Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.

Range in prices at Tampa, Fla.; Morgan City, La., area; Port Isabel and Brownsville, Tex., only.

September 1964 landings and quantity used for canning estimated from information furnished daily by the New Orleans Fishery Market News Service. To convert shrimp to drained-on weight multiply by 1.68.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JULY-SEPTEMBER 1964:

A report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for July-September 1964, follows:

Oyster Studies: Shortly after the beginning of the quarter, additional experiments were started on the feeding of oysters with carbohydrates. As in the other experiments, 125 uniform size oysters were put in each of a pair of 12 x 12-foot concrete tanks with the water level set so that they maintained about 1,800 gallons each. Approximately 1,200 gallons of new water was pumped into the tanks each week. In the experimental tank the 125 oysters were fed at the rate of a half pound of blackstrap mollasses to each 1,800 gallons of water (20 mg. per liter). The fed oysters gained weight rapidly during the first two weeks, but for the following month their gain in weight was very slight. Towards the last of the experiment the control oysters suffered a high mortality. It has been suggested that this mortality may have been caused by Dermocystidium which, although not prevalent in South Carolina, is known to occur there. During the period of the experiment the salinity in the tanks ranged from 16.2 p.p.t. (parts per thousand) to 25.3 p.p.t., and the temperature from 25.0° C. to 33.0° C. (77° to 91.4° F.). This range of temperature is not conducive to the best oyster growth.

Without disturbing the individual oysters, the experiments were reversed so that the control oysters, which had suffered the high mortality, were fed with mollasses and the experimental oysters were unfed. Mortality rates declined after reversing the feeding.

In mid-August an additional experiment in feeding, this time using cracked rice, was initiated. The oysters fed with cracked rice in two weeks showed a higher increase in weight than those fed with molasses.

During July almost 30 inches of rain fell over coastal South Carolina. This heavy rainfall interfered seriously with the setting of oysters. The top foot of water in the creeks and rivers remained almost entirely fresh for long periods of time, excepting those areas very near the ocean. This condition either killed the young free-swimming oysters or

drove them to deeper waters of higher salinity. In any event, setting was practically nil. However, by mid-August setting again began on clean shell which had been placed in shell bags under the Laboratories' dock. For commercial planters this record-breaking rainfall worked a serious hardship. Shell cultch planted prior to the rain was badly silted by rain and runoff roiling the water. Most oystermen had not completed their shell-planting program prior to the onset of the rain. This will undoubtedly result in a low set of oysters and a smaller crop two years hence.

Shrimp Studies: In March 1964, based on relative abundance of postlarval brown shrimp in plankton tows, Bears Bluff Laboratories predicted that the commercial shrimp harvest in June and July 1964 would be about the same as last year. The commercial landings of shrimp during June and July 1964 amounted to 1,273,000 pounds. For the same period last year the commercial shrimp catch was 1,278,000 pounds.

Postlarval white shrimp were very scarce in plankton tows in the inshore waters of South Carolina this quarter. This, coupled with a decided shortage in the number of white "roe" shrimp in May and June gave rise to predictions by Bears Bluff Laboratories that the 1964 commercial catch of white shrimp would be poor this year. Both experimental trawling and commercial catch statistics have borne out the correctness of these predictions. In the experimental trawls during this quarter the catch per unit of effort was almost the same as that for the same quarter of last year. The commercial catch for August 1963 was 515,532 pounds; for August 1964, 488,025 pounds. Compare this with the August 1960 catch of 1,157,221!

A late run of white roe shrimp was noted in July and August of this year, and postlarvae resulting from the spawning of those shrimp began to show up in September in fair numbers, along with postlarvae of the spotted shrimp (Penaeus duorarum). The recruitment of those postlarvae was so late in the year that it is unlikely they will reach commercial size before the season closes in December, but if those shrimp can survive the winter, the outlook for 1965 may be improved considerably.

Finfish Studies: No major changes were noted in the abundance of commercial fish during the course of the Laboratories' survey work. Croakers, which have become increasingly plentiful in coastal waters during the past five years, were of almost the same abundance during July-September of this year as during that period of 1963. Spot were also found to be almost as plentiful during the quarter as during 1963.

Average Catch Per Unit of Effort at Eight Regular Shrimp Survey Stations, July-September, 1960-1964

Year	Croaker	Spot	Brown Shrimp	White Shrimp
1964	80.5	24.8	31.1	15.4
1963	80.1	27.1	66.9	13.8
1962	75.9	29.5	23.3	58.4
1961	50.3	20.1	8.4	119.9
1960	26.7	39.3	33.9	131.3

Pond Cultivation: Experiments on the pond cultivation of shrimp continued during this quarter. Three ponds were treated with rotenone during July and the stocking and feeding of shrimp in the ponds was carried on through September. All ponds were to be drained and harvested during October 1964.

Due to the scarcity of postlarval and juvenile shrimp in coastal waters this year, the large one-acre ponds could not be stocked adequately, and a small harvest is expected. One of the one-acre ponds was allowed to stock naturally by tidal flow during the early spring and again in June and July. The remaining one-acre pond was allowed to stock naturally also, but in addition was stocked by hand with 2,309 juvenile brown shrimp during June and July.

A small 1/10-acre pond, however, was stocked heavily with juvenile and postlarval shrimp. Shrimp in that pond have been fed very heavily with chopped fish. During June-September the equivalent of over 1,000 pounds of food per acre was added.

Experiments on feeding and productivity are also being carried out in 3,000-gallon concrete tanks which have been stocked heavily with postlarval shrimp. One of those tanks was stocked with about 500 postlarval shrimp (the equivalent of 150,000 per acre) and those shrimp were fed heavily during June-September (through September 1964 the equivalent of over 3,000 pounds per acre of chopped fish had been fed). The experiments should give useful information on growth rates, effects of feeding on mortality, and productivity.

Experiments on the artificial breeding of shrimp were also continued during the quar-

ith white shrimp (Penaeus setiferus). The carcity of white roe shrimp this year has indered those experiments greatly, and to ate no shrimp have been spawned in the re-ently acquired circular concrete tanks set p at the Laboratories for this purpose. Only out 12 roe shrimp were obtained for the ex-riments and of those only about half had well veloped roe. None of the latter, however, re fertilized and so attempts at spawning re futile. Roe shrimp must be plentiful in astal waters before any success at those periments can be expected. The chance of llecting a mature shrimp which is fertilized d in exactly the right stage of roe develop-ent is slim unless a considerable number of ecimens are available. The experiments ll be carried on with brown shrimp, which rmally spawn during the fall and winter.

Shrimp of the genus Penaeus can withstand arked changes in salinity, but experimental ork at Bears Bluff has indicated juvenile rimp grow faster at high temperatures and gh salinities. The excessive rainfall of July nsiderably lowered the salinity in the ponds. ctually, the excessive rainfall into the ponds d the greatly lowered salinity in the small eek from which the ponds get their water by dal action should have reduced pond salini-es to practically zero. However, construc-n of the ponds is such that the decline in sa-ity was much less than would be expected. ch of the ponds has an overflow which takes ters from the ponds at the surface. Even th a 4½-inch rainfall in 24 hours most of the inwater remained on the surface of the pond l drained out through the overflow. On July when 20 inches of rain had already fallen ing the month, only the top 6 or 8 inches of ponds were fresh, and in the one-acre ds below a depth of 18 inches bottom salini-remained in the 20's. Gradually, of course, ting does occur, but this goes on at a slow e and high salinities can be maintained de-te torrential downpours.

: See Commercial Fisheries Review, May 1964 p. 33.

ropical Atlantic

SULTS OF FISHERY-OCEANOGRAPHIC UDIES IN GULF OF GUINEA:

M/V "Geronimo" Cruise III (January 15-y 15, 1964): Biological and oceanographic dies in the Gulf of Guinea as part of EQUAL-T III were completed in May 1964 by the oceanographic research vessel Geronimo, operated by the Washington, D. C., Biological Laboratory of the U.S. Bureau of Commercial Fisheries. The completion of this cruise ended the field phase of the International Cooperative Investigations of the Tropical Atlantic (ICITA).

Results of the two warm-season surveys made by the Geronimo of the distribution of surface schools of tuna reveal that it is likely that the distribution of those schools is related to upwelling-maturation processes associated, at least in part, with interrelationships among surface currents and coastline configurations. Direct current measurements and other observations made during the EQUALANT III portion of the cruise, have amplified the probable existence of a westerly flowing subsurface current under the easterly flowing Guinea current.

The analyses of stomach samples from tuna collected during this cruise have been completed. Difficulties in identifying the cephalopod component of tuna food were reconciled with the assistance of scientists of the University of Miami.

Identification of scombrid larvae from EQUALANT I was completed this past June. Charts have been prepared showing the distribution of skipjack tuna, yellowfin tuna, black skipjack, auxis, and a group of unidentified scombrid larvae. One interesting aspect was the broad distribution of black skipjack larvae in the pelagic waters of the Gulf of Guinea. Some of the larvae, hitherto unidentified, were tentatively identified at the Bureau's Biological Laboratory, Washington, D. C., by a visiting Japanese scientist, as big-eyed and albacore.

Tuna canneries in Puerto Rico have been visited by a Bureau scientist to arrange for the collection of catch data and biological samples for those tuna caught in the tropical Atlantic and off the east coast of the United States. Those collections are being coordinated with those of the Inter-American Tropical Tuna Commission.

Plans and schedules for Geronimo Cruise IV were completed this past August by scientists of the U.S. Bureau of Commercial Fisheries. The program will essentially be a repeat of seasonal comparison of that carried out during Cruise III.

Note: See Commercial Fisheries Review, July 1964 p. 24; April 1964 p. 47.

United States Fisheries

COMMERCIAL FISHERY LANDINGS, JANUARY-AUGUST 1964:

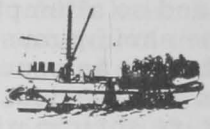
The U. S. catch of fish and shellfish in 1964 mostly for the first 8 months (in some instances various periods through September 18) was down 190 million pounds as compared with the same period in 1963. The decline occurred principally in landings of menhaden (down 161 million pounds) and Maine sea herring (down 44 million pounds), and to a lesser extent Atlantic ocean perch, shrimp, whiting, Pacific and jack mackerel, halibut, and salmon in Washington.

There were increases in landings of salmon in Alaska, tuna, haddock, and Pacific sardines. Based on the Alaska canned pack and sales to Japanese freezerships, Alaska salmon landings amounted to approximately 291 million pounds, 83 million pounds as compared with 1963. However, the increase in salmon landings in Alaska was offset by a sharp decrease in Puget Sound landings.

United States Commercial Fishery Landings of Certain Species for Periods Shown, 1964 and 1963

Species	Period	1/1964	1963	Total 1963
		.....(1,000 Lbs.).....		
Cod:				
Maine	7 mos.	1,700	1,433	1,960
Mass. 2/	8 "	18,300	22,879	31,475
Total cod		20,000	24,312	33,435
Flounder:				
Maine	7 mos.	700	910	1,216
Mass.	8 "	60,700	61,249	91,876
Total flounder		61,400	62,159	93,092
Haddock:				
Maine	7 mos.	1,700	1,378	2,878
Mass. 2/	8 "	87,000	80,255	106,075
Total haddock		88,700	81,633	108,953
Halibut: 3/				
Alaska	8 mos.	15,600	20,571	22,372
Wash. & Oreg.	8 "	8,100	10,538	11,871
Total halibut		23,700	31,109	34,243
Herring, Maine	7 mos.	24,100	68,148	152,317
Industrial fish (Me. & Mass.) 4/	8 mos.	21,900	40,493	47,897
Mackerel:				
Jack 5/	7 mos.	39,800	45,850	98,078
Pacific 5/	7 "	8,000	16,348	36,974
Menhaden	8 mos.	1,162,600	1,323,642	1,779,500
Ocean perch:				
Maine	7 mos.	30,800	38,417	63,905
Mass.	8 "	23,200	34,388	44,387
Total ocean perch		54,000	72,805	108,292
Pollock:				
Maine	7 mos.	700	1,803	2,489
Mass. 2/	8 "	6,000	5,732	10,727
Total pollock		6,700	7,535	13,216
Salmon, Alaska	Year	290,800	208,249	209,000
Sardine, Pacific	to Sept. 18	6,700	-	7,100
Scallops, sea, New Bedford (meats)	8 mos.	9,400	11,734	15,941
Shrimp (heads-on):				
So. Atl. & Gulf	8 mos.	107,700	120,000	219,900
Tuna, Calif.	to Sept. 12	210,700	196,142	285,285
Whiting:				
Maine	7 mos.	19,700	12,976	15,942
Mass.	8 "	33,300	47,185	64,571
Total whiting		53,000	60,161	80,513
Total all above items		2,189,200	2,370,320	3,323,736
Other 6/		437,000	445,881	1,426,409
Grand total		2,626,200	2,816,201	4,750,145

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



U.S. Fishing Vessels

EMERGENCY MEDICAL HELP INSTRUCTIONS FOR FISHERMEN:

Medical assistance available to fishing vessels in the three Pacific Coast States and Alaska is described on cards being distributed by the U. S. Bureau of Commercial Fisheries. However, the same medical assistance is available to all United States fishing vessels.

U. S BUREAU OF COMMERCIAL FISHERIES

California Area
101 S. Seaside
Terminal Island
California

Pacific Region 1
6116 Arcade Bldg.
Seattle, Wash. 98101

Alaska Region 5
P. O. Box 2481
Juneau, Alaska

MEDICAL ASSISTANCE AVAILABLE TO FISHING VESSELS

The U. S. Department of Health, Education, and Welfare through the Public Health Service Hospitals is available to render expert medical advice to the commercial fishing fleet in emergencies involving serious injury or illness of crew members while at sea. A radio telephone call from the Master of the vessel should be placed through a Marine Operator to the U. S. Public Health Service Hospital nearest the vessel's position. If difficulty is experienced in reaching the Marine Operator, the urgent message code word "PAN" repeated three times (PAN — PAN — PAN) should be used to obtain priority.

U. S. Public Health Service Hospitals within radio telephone range of fishing vessels operating out of Washington, Oregon, California, and Alaska are located at:

131 14th Avenue South, Seattle, Wash. Telephone: EAst 5-8000

15th Avenue and Lake Street, San Francisco, Calif. Telephone: SKyline 2-1400

During normal business hours, 8:00 am to 4:30 pm weekdays, address calls to the OUTPATIENT DEPARTMENT.
Nights, weekends, and holidays, address calls to the OFFICER OF THE DAY.

The caller should be thoroughly informed of all circumstances pertinent to the patient's injury or illness. Statements should be confined to facts as found by examination of or related by the patient. Care should be taken not to omit pertinent information.

BEFORE PLACING THE CALL, OBTAIN ANSWERS TO THE FOLLOWING QUESTIONS AND HAVE THIS INFORMATION AVAILABLE IN WRITTEN FORM FOR READY REFERENCE.

1. PATIENT'S NAME AND AGE.
2. STATE OF CONSCIOUSNESS.
3. RESPIRATION RATE AND DIFFICULTY OR PAIN ASSOCIATED WITH BREATHING.
4. PULSE RATE, STRENGTH AND REGULARITY AND TEMPERATURE OF PATIENT.
5. NATURE AND SPECIFIC LOCATION OF PAIN. IS PAIN DULL, SHARP, CONTINUOUS INTERMITTENT CONFINED TO A SMALL AREA, OR WIDESPREAD?
6. CAUSE OF INJURY (BLOW, BURN, FALL, NATURE OF WOUND, CUTS OR BRUISES).
7. DETERMINE AMOUNT OF BLEEDING.
8. DESCRIBE ANY DEFORMITY OR ABNORMAL FUNCTIONING ON THE PART OF THE PATIENT.
9. KNOW WHAT TREATMENT HAS BEEN GIVEN AND HOW THE PATIENT HAS RESPONDED.
10. ARRANGE FOR CARE OF THE PATIENT UPON ARRIVAL AT PORT — GIVE ESTIMATED TIME OF ARRIVAL AND STATE WHETHER AMBULANCE SERVICE IS NEEDED.

ALWAYS STATE THE NAME AND RADIO CALL LETTERS OF YOUR VESSEL, ITS PRESENT LOCATION, AND ESTIMATED NUMBER OF HOURS FOR ARRIVAL AT DESTINATION. GPO

Card describing medical assistance available to fishing vessels distributed by certain U. S. Bureau of Commercial Fisheries offices. Only vessels of 5 net tons or more are eligible.

The cards--8 by 10½ inches--are designed for display on fishing vessels so they may be referred to quickly in an emergency. The cards provide detailed instructions for the placing of radiotelephone calls to U.S. Public Health Service hospitals for advice in caring for seriously sick or injured persons at sea.

In a joint announcement, the Bureau's Regional Directors at Terminal Island, Calif., Seattle, Wash., and Juneau, Alaska, said:

"We hope the information on the cards will never be needed, but if it is, it is the sincere desire of the Bureau that it will be instrumental in saving a life or aiding in the treatment of the sick or injured. We recommend that every fishing boat on the Pacific Coast and Alaska have one of the cards posted in the wheelhouse."

The cards were distributed primarily through fishermen's associations, unions, and fish houses. They also may be obtained by writing to the Bureau of Commercial Fisheries at one of the following offices: 101 S. Seaside Avenue, Terminal Island, Calif.; 6116 Arcade Building, 1319 Second Avenue, Seattle, Wash.; or P.O. Box 2481, Juneau, Alaska.

* * * * *

DOCUMENTATIONS ISSUED AND CANCELLED:

July 1964: During July 1964, a total of 56 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 76 in July 1963. There were 41 documents cancelled for fishing vessels in July 1964, as compared with 47 in July 1963.

Table 1 - U.S. Fishing Vessels--Documents Issued by Tonnage and Area, July 1964 2/

Gross tonnage	New England	Chesapeake	South Atlantic	Gulf	Pacific	Total
	(Number)					
5 - 9	2	1	-	1	5	9
10 - 19	1	-	-	5	7	13
20 - 29	1	-	-	4	6	11
30 - 39	-	-	1	-	2	3
40 - 49	-	-	-	1	1	2
50 - 59	-	-	2	1	2	5
60 - 69	-	-	-	2	-	2
70 - 79	1	-	1	6	-	8
80 - 89	-	-	1	2	-	3
Total	5	1	5	22	23	56

Note: For explanation of footnote, see table 4.

Table 2 - U.S. Fishing Vessels--Documents Issued by Vessel Length and Area, July 1964 2/

Length in feet	New England	Chesapeake	South Atlantic	Gulf	Pacific	Total
	(Number)					
23 - 23.9	1	-	-	-	-	1
26 - 26.9	-	-	-	-	1	1
27 - 27.9	-	-	-	-	2	2
28 - 28.9	-	-	-	-	1	1
29 - 29.9	-	-	-	-	1	1
30 - 30.9	-	-	-	1	2	3
31 - 31.9	-	-	-	-	1	1
32 - 32.9	1	-	-	-	-	1
33 - 33.9	1	1	-	1	1	4
35 - 35.9	-	-	-	-	1	1
36 - 36.9	-	-	-	1	1	2
37 - 37.9	-	-	-	1	-	1
38 - 38.9	-	-	-	3	-	3
39 - 39.9	1	-	-	-	3	4
40 - 40.9	-	-	-	-	1	1
41 - 41.9	-	-	-	1	2	3
42 - 42.9	-	-	-	-	2	2
43 - 43.9	-	-	-	1	-	1
44 - 44.9	-	-	1	-	-	1
45 - 45.9	-	-	-	1	-	1
49 - 49.9	-	-	-	-	4	4
55 - 55.9	-	-	1	1	-	2
58 - 58.9	-	-	-	1	-	1
59 - 59.9	1	-	-	-	-	1
60 - 60.9	-	-	-	1	-	1
61 - 61.9	-	-	1	-	-	1
62 - 62.9	-	-	-	1	-	1
63 - 63.9	-	-	1	-	-	1
65 - 65.9	-	-	-	5	-	5
66 - 66.9	-	-	1	1	-	2
67 - 67.9	-	-	-	1	-	1
68 - 68.9	-	-	-	1	-	1
Total	5	1	5	22	23	56

Note: For explanation of footnote, see table 4.

Table 3 - U.S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, July 1964 with Comparisons

Area (Home Port)	July		Jan.-July		Total
	1964	1963	1964	1963	1963
	(Number)				
Issued first documents 2/:					
New England	5	4	24	14	23
Middle Atlantic	-	4	5	12	18
Chesapeake	1	9	24	31	66
South Atlantic	5	11	30	44	77
Gulf	22	20	142	135	239
Pacific	23	28	103	136	160
Great Lakes	-	-	1	3	5
Hawaii	-	-	1	-	-
Puerto Rico	-	-	1	2	2
Total	56	76	331	377	590
Removed from documentation 3/:					
New England	9	7	20	33	48
Middle Atlantic	3	12	10	39	47
Chesapeake	3	2	11	12	25
South Atlantic	1	3	15	37	53
Gulf	5	14	39	76	118
Pacific	20	9	87	60	87
Great Lakes	-	-	6	9	15
Hawaii	-	-	-	1	3
Total	41	47	188	267	396

Note: For explanation of footnotes, see table 4.

Table 4 - U. S. Fishing Vessels--Documents Issued by Vessel Horsepower and Area, July 1964 2/

Horsepower	New England	Chesapeake	South Atlantic	Gulf	Pacific	Total
			(Number)			
40	-	-	-	-	1	1
61	-	-	-	1	-	1
85	-	-	-	1	-	1
90	-	-	-	-	2	2
125	-	-	-	-	1	1
130 - 139	-	-	-	1	2	3
140	1	-	-	-	-	1
150 - 159	-	-	-	1	2	3
160 - 169	1	-	1	4	3	9
170	-	-	-	2	3	5
185	-	-	-	-	2	2
190	-	1	-	1	-	2
200	-	-	-	1	-	1
220 - 229	2	-	2	5	1	10
230	-	-	-	1	-	1
240	-	-	-	-	1	1
280	-	-	-	-	1	1
300	-	-	-	3	4	7
320 - 329	-	-	2	1	-	3
335	1	-	-	-	-	1
Total	5	1	5	22	23	56

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes 2 redocumented vessels in July 1964 that were previously removed from the records. Vessels issued first documents as fishing craft were built: 43 in 1964; 1 in 1963; 1 in 1962; 1 in 1960; and 10 prior to 1959.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Souce: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

* * * * *

June 1964: During June 1964, a total of 72 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 62 in June 1963. There were 31 documents cancelled for fishing vessels in June 1964, the same as in June 1963.

Table 1 - U.S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, June 1964 with Comparisons

Area (Home Port)	June 1964	June 1963	Jan.-June 1964	Jan.-June 1963	Total 1963
			(Number)		
Issued first documents 2/:					
New England	6	-	19	10	23
Middle Atlantic	-	1	5	8	18
Chesapeake	5	5	23	22	66
South Atlantic	4	6	25	33	77
Gulf	28	18	120	115	239
Pacific	27	30	80	108	160
Great Lakes	-	1	1	3	5
Hawaii	1	-	1	-	-
Puerto Rico	1	1	1	2	2
Total	72	62	275	301	590
Removed from documentation 3/:					
New England	3	2	11	26	48
Middle Atlantic	3	5	7	27	47
Chesapeake	1	-	8	10	25
South Atlantic	4	7	14	34	53
Gulf	7	7	34	62	118
Pacific	13	8	67	51	87
Great Lakes	-	2	6	9	15
Hawaii	-	-	-	1	3
Total	31	31	147	220	396

Note: For explanation of footnotes, see table 4.

Table 2 - U.S. Fishing Vessels--Documents Issued by Vessel Length and Area, June 1964 2/

Length in feet	New England	Chesapeake	South Atlantic	Gulf	Pacific	Hawaii	Puerto Rico	To
				(Number)				
26 - 26.9	1	-	-	-	1	-	-	
27 - 27.9	-	-	-	1	-	-	-	
28 - 28.9	-	-	-	1	1	-	-	
29 - 29.9	-	-	1	1	4	-	-	
30 - 30.9	-	-	-	-	1	-	-	
31 - 31.9	-	1	-	-	4	-	-	
32 - 32.9	2	-	-	-	1	-	-	
33 - 33.9	-	-	-	2	-	-	-	
34 - 34.9	-	-	-	1	-	-	-	
35 - 35.9	-	1	-	-	1	-	-	
36 - 36.9	1	-	-	-	1	-	-	
37 - 37.9	-	2	-	-	2	-	-	
38 - 38.9	-	-	-	1	-	-	-	
40 - 40.9	1	1	-	-	-	1	-	
41 - 41.9	-	-	-	1	1	-	-	
42 - 42.9	-	-	-	-	1	-	-	
43 - 43.9	-	-	-	-	1	-	-	
44 - 44.9	-	-	-	1	-	-	-	
45 - 45.9	-	-	-	-	3	-	-	
46 - 46.9	-	-	-	-	2	-	-	
48 - 48.9	-	-	1	-	-	-	-	
49 - 49.9	1	-	-	-	3	-	-	
51 - 51.9	-	-	-	1	-	-	-	
53 - 53.9	-	-	-	1	-	-	-	
57 - 57.9	-	-	-	1	-	-	-	
60 - 60.9	-	-	-	1	-	-	-	
61 - 61.9	-	-	-	2	-	-	-	
62 - 62.9	-	-	-	2	-	-	-	
63 - 63.9	-	-	-	2	-	-	-	
64 - 64.9	-	-	-	1	-	-	-	
65 - 65.9	-	-	2	7	-	-	-	
67 - 67.9	-	-	-	1	-	-	-	
153 - 153.9	-	-	-	-	-	-	1	
Total	6	5	4	28	27	1	1	

Note: For explanation of footnote, see table 4.

Table 3 - U.S. Fishing Vessels--Documents Issued by Vessel Horsepower and Area, June 1964 2/

Horsepower	New England	Chesapeake	South Atlantic	Gulf	Pacific	Hawaii	Puerto Rico	To
				(Number)				
60	1	-	-	-	-	-	-	
70	-	1	-	-	-	-	-	
80-89	1	-	-	2	1	-	-	
97	-	-	-	1	-	-	-	
100-109	-	-	-	-	6	1	-	
110-119	1	-	1	2	-	-	-	
130-139	-	-	-	2	1	-	-	
140-149	-	-	-	1	2	-	-	
160-169	-	1	1	3	6	-	-	1
170	-	-	-	2	-	-	-	
180	-	-	-	-	1	-	-	
210	-	1	-	-	3	-	-	
220-229	2	2	2	6	-	-	-	1
230	-	-	-	1	-	-	-	
245	-	-	-	1	-	-	-	
250	-	-	-	1	2	-	-	
280	-	-	-	-	3	-	-	
300	-	-	-	5	1	-	-	
330	-	-	-	-	1	-	-	
340	-	-	-	1	-	-	-	
370	1	-	-	-	-	-	-	
1600	-	-	-	-	-	-	1	
Total	6	5	4	28	27	1	1	7

Note: For explanation of footnote, see table 4.

Table 4 - U.S. Fishing Vessels--Documents Issued by Tonnage and Area, June 1964 2/

Gross nnage	New England	Chesa-peake	South Atlantic	Gulf	Pacific	Hawaii	Puerto Rico	Total
	. . . . .(Number).							
5 - 9	1	3	-	1	2	-	-	7
0 - 19	4	2	1	8	12	1	-	28
0 - 29	-	-	-	-	4	-	-	4
0 - 39	1	-	1	2	3	-	-	7
0 - 49	-	-	-	-	3	-	-	3
0 - 59	-	-	-	3	2	-	-	5
0 - 69	-	-	-	3	1	-	-	4
0 - 79	-	-	2	8	-	-	-	10
0 - 89	-	-	-	1	-	-	-	1
0 - 99	-	-	-	2	-	-	-	2
0 - 809	-	-	-	-	-	-	1	1
otal	6	5	4	28	27	1	1	72

cludes both commercial and sport fishing craft. A vessel is efined as a craft of 5 net tons and over.
cludes 2 redocumented vessels in June 1964 that were previously emoved from the records. Vessels issued first documents as fish-ng craft were built: 60 in 1964; 2 in 1963; and 10 prior to 1954.
cludes vessels reported lost, abandoned, forfeited, sold alien, etc.
rce: Monthly Supplement to Merchant Vessels of the United ates, Bureau of Customs, U. S. Treasury Department.

* * * * *

SHERIES LOAN FUND AND OTHER NANCIAL AID FOR VESSELS, LY 1-SEPTEMBER 30, 1964:

From the beginning of the program in 1956 through Septem-30, 1964, a total of 1,532 loan applications for $40,944,229 e received by the U. S. Bureau of Commercial Fisheries, Agency administering the Federal Fisheries Loan Fund. Of total, 811 applications ($18,281,097) had been approved, 509 ,366,919) had been declined or found ineligible, 181 403,905) had been withdrawn by the applicants before be-processed, and 31 ($906,669) were pending. Of the appli-ons approved, 304 were approved for amounts less than ap-d for. The total reduction was $1,985,639.

The following loans were approved from July 1, 1964, gh September 30, 1964:

w England Area: Richard L. Spencer, Stonington, Maine, 0, and Clinton A. Babcock, Wakefield, R. I., $10,000.

lifornia: Giuseppe Pennisi, Pacific Grove, $25,000, and d R. Brown, Santa Rosa, $9,000.

uth Atlantic and Gulf Area: A. Irving Tormala, Fort s, Fla., $2,805; Elton S. Olier, Brownsville, Tex., 00; and Percy L. Wilhelm, Brownsville, Tex., $22,400.

cific Northwest Area: Ralph I. Lund, Bainbridge Island, ., $40,363; Merrill W. Henington, Poulsbo, Wash., 00; Harvey A. Harbaugh & Walter E. Linney, Seattle, ., $56,249; John B. Iverson, Seattle, Wash., $28,000; . Johnson, Seattle, Wash., $7,400; Ernest T. Mathisen, e, Wash., $20,000; and Edwin E. & Donald Reyburn, e, Wash. $6,000.

laska: John Goeres, Cordova, $15,000; Brechan Enterprises, Kodiak, $68,500; Sam E. Franklin, Kodiak, $4,917; Mar-e von Scheele, Kodiak, $47,500; Carl A. Mills, Sitka, 000; and Robert I. Ditman & George W. Hillar, Valdez, 500.

nder the Fishing Vessel Mortgage Insurance Program administered by the Bureau) during the third quarter of 5 applications for $351,637 were received and 1 applica-for $35,483 was approved. Since the program began (Ju-1960), 61 applications were received for $5,508,251. Of otal, 45 applications were approved for $3,005,504 and 10 applications for $1,805,131 were pending as of September 30, 1964. Since the mortgage program began, applications received and approved by area are:

New England Area: Received 12 ($1,314,500), approved 8 ($775,365).

California Area: Received and approved 1 ($557,000).

South Atlantic and Gulf Area: Received 38 ($1,735,727), approved 29 ($1,110,819).

Pacific Northwest Area: Received 7 ($1,846,250), approved 4 ($507,546).

Alaska Area: Received 3 ($54,774), approved 3 ($54,774).

The time for acceptance of applications for emergency fishery disaster loans to fishermen who had fishing vessels or gear lost or damaged in the Alaska earthquake and resulting tidal wave was extended by the Bureau from September 30 to October 31, 1964.

* * * * *

NEW SMALL STERN-TRAWLER "CANYON PRINCE":

Following trials in August 1964, the new small stern-trawler Canyon Prince was delivered to its owners in Point Judith, R. I. The 64-foot vessel was built by the same firm in Warren, R. I., which pioneered the development of small automated stern-trawlers with the launching of the 83-foot Narragansett in January 1963. An automated net-handling system is a prime feature of both vessels. A loaded net can be hauled on board the Canyon Prince by a single deckhand, as was demonstrated by a 17-year old girl during the vessel's trials. All hoists and winches are controlled from the pilothouse which overlooks the deck.

The Canyon Prince has a maximum holding capacity of 100,000 pounds of ice and fish.

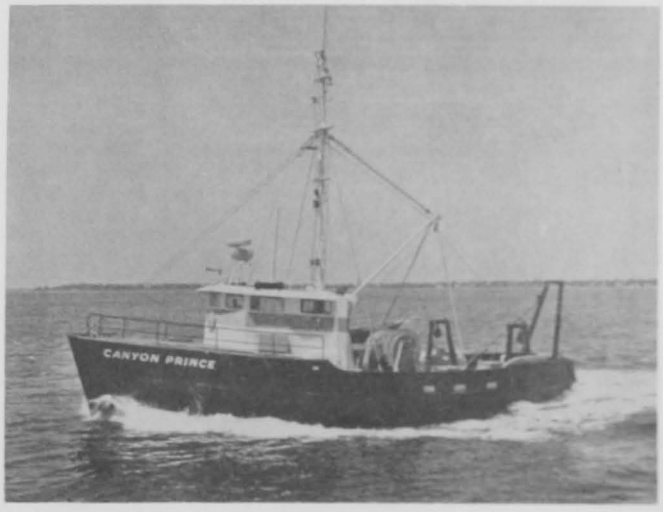


Fig. - 1 New small stern-trawler Canyon Prince. Note the net drum midship.

Fig. 2 - Young girl hauls in bull rope at deck capstan on Canyon Prince, in a demonstration of automated net-handling equipment requiring a single deckhand.

Fig. 3 - Cod-end approaches Canyon Prince; balance of net to the left is hauled by net drun.

Fig. 4 - Cod-end comes over stern chute.

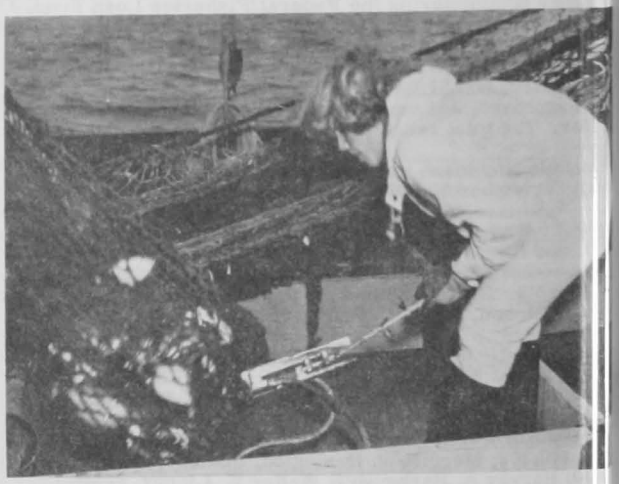


Fig. 5 - Tripping cod-end closer used aboard the Canyon Prin

Power is provided by a Diesel engine of 3 horsepower which drives the vessel at a sp of $11\frac{1}{2}$ knots. Equipped with electronic fis finding and navigating equipment, the vess is particularly suited for trawling in mari canyons on the edge of the Continental She Being a western rig, it can be used for a types of fishing.

Note: See Commercial Fisheries Review, March 1963 p. 34; 1962 p. 32.

. S. Foreign Trade

IRBORNE IMPORTS OF FISHERY RODUCTS, JANUARY-MAY 1964:

Airborne fishery imports into the United States in May 1964 re down 41.9 percent in quantity and 40.7 percent in value m those in the previous month due mainly to smaller shipments hrimp from Venezuela.

Total airborne shrimp imports in May 1964 consisted of 304,917 nds of fresh and frozen raw headless and 16,101 pounds of unclassified shrimp. About 95 percent of the airborne shrimp arrivals in May 1964 entered through the Customs District of Florida. The remainder entered through the Customs Districts of New Orleans (La.), Galveston (Tex.), Los Angeles (Calif.), and New York (N. Y.).

U. S. 1/Airborne Imports of Fishery Products, January-May 1964 with Comparative Data

duct and rigin 2/	1964 May Qty. 3/	1964 May Value 4/	1964 Jan.-May Qty. 3/	1964 Jan.-May Value 4/	1963 Jan.-May Qty. 3/	1963 Jan.-May Value 4/
	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000
h:						
rtugal	-	-	0.1	0.1	-	-
xico	42.1	11.5	150.9	41.9	124.3	38.6
itish Honduras	-	-	1.8	0.4	33.9	8.6
nduras	-	-	-	-	15.5	4.0
pan	-	-	-	-	2.0	8.2
ited Kingdom	0.2	0.4	1.9	3.6	1.3	3.3
an	-	-	-	-	1.2	7.4
ance	-	-	4.3	7.8	0.7	0.6
rael	-	-	1.3	0.8	-	-
nezuela	-	-	4.6	1.7	-	-
eland	0.3	0.3	0.3	0.3	0.8	0.3
nmark	0.1	0.3	0.3	0.4	-	-
nada	-	-	13.2	4.3	-	-
eland	-	-	1.8	1.2	-	-
ain	1.0	0.8	1.8	1.4	-	-
Total fish	43.7	13.3	182.3	63.9	179.7	71.0
imp:						
atemala	-	-	-	-	117.1	62.1
Salvador	15.0	10.4	159.1	96.8	163.5	115.0
nduras	-	-	-	-	22.7	11.9
caragua	16.1	9.6	47.2	27.6	256.8	85.0
sta Rica	14.5	8.3	163.7	90.7	284.0	137.3
nama	77.9	51.9	413.1	248.8	723.5	389.6
nezuela	197.3	105.7	1,726.7	767.0	1,920.2	941.4
ador	-	-	-	-	94.3	32.7
ance	-	-	-	-	2.6	0.9
itish Guiana	-	-	10.5	5.2	-	-
xico	-	-	-	-	5.0	1.8
ain	0.2	0.1	0.2	0.1	-	-
Total shrimp	321.0	186.0	2,520.5	1,236.2	3,589.7	1,777.7
lfish other than shrimp:						
xico	-	-	9.0	4.8	73.0	42.6
ish Honduras	-	-	82.8	50.4	108.9	78.5
Salvador	-	-	-	-	5.0	3.6
duras	4.5	0.8	12.9	9.4	1.9	1.0
aragua	-	-	50.5	40.0	71.3	49.3
Rica	-	-	9.3	9.5	73.8	60.1
ama	-	-	43.6	36.2	47.7	36.8
rlands Antilles	-	-	-	-	32.8	20.9
mbia	-	-	-	-	6.4	15.8
lor	-	-	-	-	2.2	1.8
ia	-	-	-	-	0.8	0.9
ish Guiana	5.9	1.6	14.5	3.2	1.7	0.3
la	-	-	1.2	0.9	128.5	66.3
zuela	-	-	-	-	13.7	6.0
nican Republic	3.8	0.5	7.4	1.1	6.2	5.0
nas	-	-	10.6	6.8	-	-
	1.1	0.5	5.1	2.6	-	-
countries	0.2	0.3	0.4	0.5	2.5	2.1
Total shellfish (excl. shrimp)	15.5	3.7	247.3	165.4	576.4	391.0
Grand total	380.2	203.0	2,950.1	1,465.5	4,345.8	2,239.7

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 shipments is shown.
3/ Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
4/ F.A.S. point of shipment. Does not include U. S. import duties, air freight, or insurance. These data are included in the overall 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, May 1964, U. S. Bureau of the Census.

Airborne finfish imports in May 1964 consisted mainly of fish fillets from Mexico.

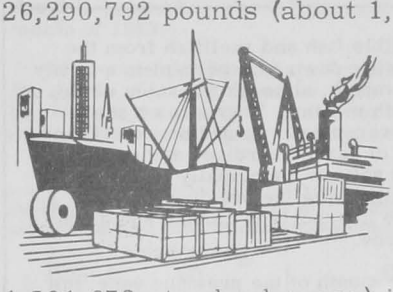
Total airborne fishery imports in January-May 1964 were down 29.8 percent in quantity and 30.5 percent in value from those in the same period of 1963. The decline was due to smaller shipments of shrimp and lobsters.

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 consists of fresh and frozen products.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-August 29, 1964, amounted to 26,290,792 pounds (about 1,251,942 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. This was substantially less (21.3 percent) than the 33,425,128 pounds (about 1,591,673 standard cases) imported during January 1-August 31, 1963.



The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1964 at the 12½-percent rate of duty is limited to 60,911,870 pounds (or about 2,900,565 standard cases of 48 7-oz. cans). Any imports in excess of that quota will be dutiable at 25 percent ad valorem.

* * * * *

PROCESSED EDIBLE FISHERY PRODUCTS, JULY 1964:

United States imports of processed edible fishery products in July 1964 were up 25.3 percent in quantity and 12.6 percent in value from those in the previous month. In July there were much larger imports of groundfish fillets and blocks (increase mainly from Canada) and canned tuna in brine (increase mainly from Japan).

Compared with the same month in 1963, imports in July 1964 were down 6.2 percent in quantity and 5.3 percent in value, due mainly to smaller imports of groundfish blocks and canned tuna in brine. Imports were also down for canned crab meat, canned oysters, and canned salmon. But imports were up substantially for canned sardines not in oil, flounder fillets, sea catfish fillets, and ocean perch fillets.

In January-July 1964, imports were up 3.4 percent in value from those in January-July 1963, but the quantity of the im-

ports was almost the same for both periods. During January-July 1964, there was a sizable increase in imports of groundfish fillets and blocks (increase mainly from Canada and Iceland), flounder fillets, yellow pike fillets, and sea catfish fillets. But there was a considerable decline in imports of canned tuna, canned sardines not in oil, canned crab meat, and swordfish fillets.

U. S. Imports and Exports of Processed Edible Fishery Products, July 1964 with Comparisons

Item	Quantity				Value			
	July		Jan.-July		July		Jan.-July	
	1964	1963	1964	1963	1964	1963	1964	1963
	(Millions of Lbs.)				(Millions of $)			
Fish & Shellfish:								
Imports 1/	48.1	51.3	292.0	292.1	14.3	15.1	87.7	84.8
Exports 2/	2.8	1.8	23.6	18.4	1.4	1.0	10.4	7.6

1/Includes only those fishery products classified by the U. S. Bureau of the Census as "Manufactured foodstuffs." Included are canned, smoked, and salted fishery products. The only fresh and frozen fishery products included are those involving substantial processing, i.e., fish blocks and slabs, fish fillets, and crab meat. Does not include fresh and frozen shrimp, lobsters, scallops, oysters, and whole fish (or fish processed only by removal of heads, viscera, or fins, but not otherwise processed).
2/Excludes fresh and frozen.

Exports of processed edible fish and shellfish from the United States in July 1964 were down 15.2 percent in quantity from those in the previous month, although the value of the exports was the same in both months. There was a sharp decline in exports of the lower-priced canned mackerel, and somewhat lower shipments of canned sardines and canned shrimp. Exports of canned salmon (principally to the United Kingdom) showed little change from the previous month. There was a sharp increase in exports of canned squid due to larger shipments to Greece.

Compared with the same month of the previous year, the exports in July 1964 were up 55.6 percent in quantity and 40.0 percent in value. Larger shipments this July of canned salmon and canned squid more than offset smaller shipments of canned shrimp, canned sardines not in oil, and canned mackerel.

Processed fish and shellfish exports in the first 7 months of 1964 were up 28.3 percent in quantity and 36.8 percent in value from those in the same period of 1963. In January-July 1964 there were much larger shipments of canned mackerel. Shipments of canned salmon, canned sardines in oil, and canned shrimp were also higher, but exports of canned sardines not-in-oil and canned squid were down sharply.

Notes: (1) Prior to October 1963, the data shown above were included in news articles on "U. S. Imports and Exports of Edible Fishery Products." Before October 1963, data showing "U. S. Imports of Edible Fishery Products" summarized both manufactured and crude products. At present, a monthly summary of U. S. imports of crude or nonprocessed fishery products is not available; therefore, only imports of manufactured or processed fishery products are reported. The import data are, therefore, not comparable to previous reports of "U. S. Imports of Edible Fishery Products."
The export data shown are comparable to previous data in "U. S. Exports of Edible Fishery Products." The export data in this series have always been limited to manufactured or processed products.
(2) See Commercial Fisheries Review, Oct. 1964 p. 41.

Wages

NEW MINIMUM WAGES FOR ONSHORE FISHERY WORKERS:

Effective September 3, 1964, the minimum wage for onshore fishery workers, other than cannery workers, advanced to $1.15 an hour, pursuant to the Fair Labor Standards Act, as amended. The minimum wage for those onshore fishery workers will rise to $1.25 per hour on September 3, 1965. Fish cannery workers have been subject to the $1.25 minimum wage rate since September 3, 1963.
Note: See Commercial Fisheries Review, September 1963 p. 1

Washington

SURVEY OF FISH AND WILDLIFE RESOURCES OF PUGET SOUND AND ADJACENT WATERS:

A Fisheries and Wildlife Technical Committee has been formed to make a comprehensive study of Puget Sound and adjacent waters in Washington State. The fish and wildlife study is part of a comprehensive Federal-State review of Puget Sound in which water and associated land resources will be examined to develop a multipurpose plan to meet short and long-term needs of the region.

The Committee will consider all water resource functions including hydroelectric power generation, fish and wildlife conservation and development, irrigation, flood control and drainage, recreation, navigation, and water quality control. The study is scheduled for completion in 1969 when a detailed report will be released.

The Fisheries and Wildlife Technical Committee includes representatives from the Washington State Department of Fisheries, the Washington State Department of Game, and the following Federal Agencies: Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries, both of the Fish and Wildlife Service; Forest Service; Soil Conservation Service; Economic Research Service; Corps of Engineers; Bureau of Outdoor Recreation; and the Public Health Service. Other Federal, state, county, and municipal agencies and groups are expected to contribute materially to the overall study.

The survey will include a study of fish and wildlife populations, distribution, and habitat and a determination of commercial harvest and man days of fishing and hunting. An immediate task will be to determine basic fish and wildlife resource needs in specific basins and to alert water development agencies concerning protective and enhancement measures required in project planning. The primary emphasis during the first part of the study

ill be on the Nooksack, Skagit, and Snohomish ver basins.

eather

ORM WARNING BUOYS
R GULF OF MEXICO:

An open sea weather observation and warn- buoy was established in the Gulf of Mexico nid-August 1964 by the U. S. Coast Guard. own as the MAMOS (Marine Automatic Me- rological Observing Station), the new sta- n will enable the U. S. Weather Bureau to eive advance indications of dangerous rms.

Made of aluminum, the unmanned buoy is feet long, 12 feet wide, weighs $3\frac{1}{2}$ tons, and sts about $250,000. It is capable of oper- ing a full year without attendance. Power the buoy's electronic equipment is sup- ied by storage batteries, charged by wind- iven generators.

Weather measurements taken by the buoy are transmitted at regular intervals to inland receiving stations. Those measurements include air and water temperature, barometric pressure, and wind speed and direction.

A second MAMOS was established in the Gulf of Mexico in late September 1964. Future plans call for a total of 45 of the storm warning buoys.

Wholesale Prices

EDIBLE FISH AND SHELLFISH, SEPTEMBER 1964:

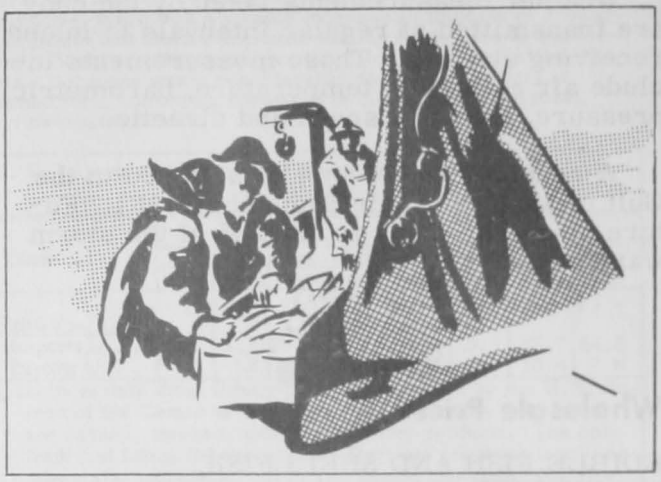
Wholesale prices for most fresh fish and shellfish were higher from August to September 1964 and the overall wholesale price index for September rose 3.9 percent from the previous month. At 109.5 percent of the 1957-59 average, the index this September was 2.2 percent higher than in the same month of 1963.

Prices for all of the major products in the subgroup index for drawn, dressed, or whole finfish were higher this September than in the previous month and the index was up 11.6 percent. The only exception was Lake Superior whitefish with

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, September 1964 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Sept. 1964	Aug. 1964	Sept. 1964	Aug. 1964	July 1964	Sept. 1963
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					109.5	105.4	106.6	107.1
Fresh & Frozen Fishery Products:					113.3	106.9	109.3	110.6
Drawn, Dressed, or Whole Finfish:					127.9	114.6	114.9	125.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.14	.11	110.9	83.3	88.6	98.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.55	.42	153.4	122.7	118.3	128.6
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.98	.93	136.2	129.2	129.2	138.0
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.48	.53	70.9	78.3	78.3	100.7
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.55	.54	90.1	88.4	83.5	99.9
Processed, Fresh (Fish & Shellfish):					107.4	101.1	105.5	104.3
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.44	.36	106.9	86.2	83.8	104.4
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.82	.77	95.5	89.6	98.4	83.2
Oysters, shucked, standards	Norfolk	gal.	7.25	7.00	122.2	118.0	118.0	130.7
Processed, Frozen (Fish & Shellfish):					100.0	100.0	102.5	97.4
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.37	.38	92.5	95.0	95.0	100.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.37	.37	108.5	108.5	108.5	105.5
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.30	.31	103.4	106.9	108.7	117.5
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.81	.80	95.5	94.9	99.0	90.1
Canned Fishery Products:					103.1	103.1	102.2	101.4
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	21.75	22.25	94.8	97.0	97.0	104.6
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.56	11.56	102.6	102.6	102.1	96.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	6.25	6.25	105.9	105.9	105.9	97.5
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.00	9.31	128.3	119.4	113.0	102.1

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.



prices at Chicago down 9.5 percent. The more substantial price increases this September were for ex-vessel large haddock (up 33.1 percent) at Boston and western fresh halibut (up 25.0 percent) at New York City. Fresh halibut from the seasonal Pacific Northwest fishery were scarce in September due to the lower catches throughout most of the season and closure of the main fishing areas. Halibut landings by the end of the 1964 season should be down better than 10 million pounds from the previous year. At New York City, prices for fresh dressed king salmon (up 5.4 percent) were higher than in August, and there was a smaller increase in prices for fresh round yellow pike. As compared with September 1963, the subgroup index for drawn, dressed, or whole finfish this September was 1.8 percent higher because of higher prices for haddock and western halibut. Those higher prices were offset by lower prices for the remaining items in the subgroup.

The subgroup index for processed fresh fish and shellfi rose 6.3 percent from August to September and was highe than in September 1963 by 3.1 percent. Prices this Septe ber for fresh haddock fillets at Boston increased 24.0 per from the previous month as a direct result of higher ex-ve sel haddock prices. South Atlantic fresh shrimp prices (u 6.6 percent) at New York City were considerably stronge September and there was a price increase for shucked st ard oysters (up 25 cents a gallon) at Norfolk. As compare with September 1963, the subgroup index this September 3.1 percent higher largely because of substantially highe prices for fresh shrimp and haddock fillets.

Several price changes this September for items in the processed frozen fish and shellfish subgroup did not affe the subgroup index which at 100 percent of the 1957-59 a age remained unchanged from the previous month. But t index this September was 2.7 percent higher than in Sept ber 1963. Frozen shrimp prices (up 0.6 percent) at Chic in September were up only slightly from August. The sm price increase for shrimp, however, cancelled out price clines for ocean perch fillets (down 3.3 percent) and flou fillets (down 2.6 percent). Prices for frozen shrimp this September were up 6.0 percent and for haddock fillets we up 2.8 percent from September 1963.

Although price changes occurred this September within the subgroup for canned fishery products, the index at 103 percent of the 1957-59 average was the same as in August Prices for canned Maine sardines were up 7.5 percent fro the previous month (and 25.7 percent higher than in Septe ber 1963). Supplies of canned sardines were low and the season pack was far short of normal. Prices for canned salmon were down 2.3 percent from August to September cause of liberal supplies. As of the end of September 196 the Alaska canned salmon pack was 3.5 million cases, of which 1.9 million cases were pinks. As compared with Se tember a year earlier, the subgroup index this September was 1.7 percent higher. September 1964 prices were up f all canned fish products except pink salmon (down 9.4 per cent from September 1963).

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A limited number of free copies of the following Market News Leaflets issued earli in 1964 are still available and will be mailed on request as long as the supplies last:

MNL- 5--Denmark's Fisheries, 1963, and 1964 Trends

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MNL-11--Fishing Industry in Spain, 1963

MNL-14--United Kingdom's Fishing Industry, 1959-1963

MNL-18--Panama's Fishing Industry, 1963

MNL-23--Fisheries of Chile, Part II and Part III - Central and South Chile, 1960-1962

MNL-23 (Supplement)--Fisheries of Chile, Part II and Part III--Central and South Chile, 1961-1963 (Statistics)

MNL-26--Taiwan Fisheries in 1963

MNL-32--Venezuelan Commercial Catch, Foreign Trade, and Major Developments for 1961-1962

MNL-40--Moroccan Fishing Industry, 1962-1963

MNL-44--Iceland's Fishing Industry, 1963

MNL-52--Menhaden Fish Oil Prices--New York City, 1953-1963, and January 1964

MNL-57--Fisheries in the Federal Republic of Germany, Annual Survey 1962

MNL-87--Survey of the Dominant Conditions Affecting the Development of the Cartagena Fishery (Colombi

MNL-88--Japan's Imports and Exports of Fisheries Products, 1961-1962

MNL-89--Peru: Fish Meal and Oil Report, 1963

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