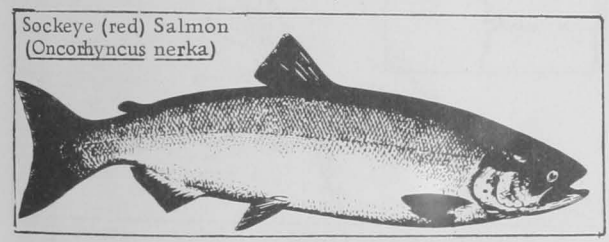
TRENDS AND DEVELOPMENTS

Alaska

BIOLOGISTS PRODUCE LARGE RUN OF YOUNG RED SALMON IN RESEARCH LAKE: A very high survival of red or sockeye salmon fry planted in a study lake was achieved by Alaska Department of Fish and Game biologists at the Kitoi Bay Research Station on Afognak Island, the Commissioner of Fish and Game stated on July 6, 1959.

The Commissioner cited two reasons for this successful lake stocking. First, the lake had previously been cleared of



Sockeye (red) Salmon (Oncorhyncus nerka)

scrap fish, eliminating both predation and competition; secondly, a falls at the lake outlet had barred re-entry of scrap-fish into the lake.

Whereas the usual fingerling survival in runs from natural lakes to the ocean is only about one percent, the spring migration count recorded survival at the Kitoi project of over 35 percent. Over 41,000 fingerling were counted from the 35-acre lake to the ocean.

While it is gratifying to obtain these excellent results and to establish a new run of salmon in a small lake that was previously barren, the knowledge gained will be of great importance in re-establishing some of the runs that have been depleted in large Alaskan lakes, the Commissioner said.

* * * * *

KING SALMON SPORT FISHERIES IN SOUTHEASTERN ALASKA TO BE STUDIED: A new research study on king salmon stocks of the Southeast Alaskan sport fisheries has been started, the Alaska Commissioner of Fish and Game stated on July 15, 1959.

This highly prized salt-water sport fish has shown signs of decline in various areas of the Pacific Coast and as a result a coastwise study has been called for, under the sponsorship of the Pacific Marine Fisheries Commission, which is an organization of representatives from state fisheries agencies.

In cooperation with the Commission's proposal, the Alaska Fish and Game Department is seeking to determine how many king salmon are being taken in the recreational fisheries and the location of the home streams of the various races.

It is known that king salmon taken in Alaskan waters come from rivers far to the south as well as from local streams, the Commissioner stated. It is necessary to have information on how many fish from each race are being harvested, in order to do an effective job of regulation.

It is expected that the new study will be financed in part from Federal Aid Dingell-Johnson funds.

* * * * *

RECORD NUMBER OF TAKU RIVER KING SALMON CAPTURED BY FISH WHEEL: Approximately 1,700 king salmon had been captured by June 16, 1959, by means of a fish wheel and 1,600 tagged by the Alaska Department of Fish and Game biologists at the Department's Canyon Island Research Station on the Taku River. This is almost three times as many as ever taken in a previous season.

In the nine years that the fish wheel has been in operation by the Department, 600 king salmon is the largest number ever taken in one season. This indication of a good escapement, plus general-

ly good fishing by the gillnetters on Taku Inlet, is an encouraging step in the maintenance of an adequate run of kings in the Taku River system.

Alaska research biologists are undertaking the tagging operation on the king salmon at the station, supplemented by a spawning ground survey on the upper Taku tributaries. This work will help determine several phases of the life history of the king salmon. An estimate of total escapement will be made. Scale samples, along with body measurements and sex ratios taken from the gill-net fishery, the fish wheel, and the spawning grounds will enable the biologists to ascertain the age and size composition of the run. (Alaska Department of Fish and Game news release, June 16.)

California

AERIAL CENSUS OF COMMERCIAL AND SPORT FISHING CONTINUED: Airplane Spotting Flight 59-9-Crab: Coastal waters from Monterey to the California-Oregon border were surveyed from the air (May 15-16, 1959) by the Department's Cessna 180 to determine the fishing localities and relative fishing intensity of the central and northern California crab fleet. Excellent visibility and flying conditions prevailed and all crab fishing areas within the survey area were adequately scouted.

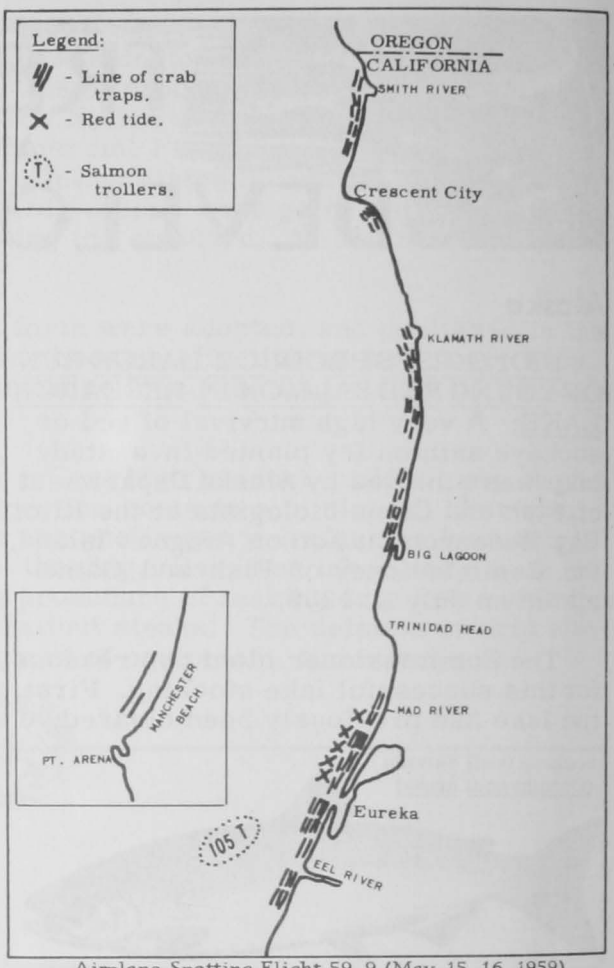
A total of 74 lines of crab gear were counted in the area bounded by False Cape and the Oregon border. This was a notable increase over the March and April counts for the same area. This increase is attributed to improved visibility and the use by fishermen of fewer units of gear per trap line to facilitate fishing operations in shallow depths. Concentrations of gear were found in the area between the Klamath River and Big Lagoon, as well as between the Mad and Eel Rivers.

Two lines of crab gear were noted between False Cape and Pt. Arena. These were set in moderate depths off Manchester Beach.

A total of 26 lines of crab gear was observed in the area between the Russian River and Half Moon Bay. The majority was set in moderate depths between San Francisco and Pt. San Pedro.

One line of gear was sighted off Moss Landing in Monterey Bay.

Pelagic fish schools varying in size from small to large were observed between San Francisco and Pt. San Pedro and in Monterey Bay. They were identified as anchovies. A partial census in Monterey Bay revealed 91 schools in the area between the Pajaro River and Monterey and 2 to 3 miles offshore.



Airplane Spotting Flight 59-9 (May 15-16, 1959).

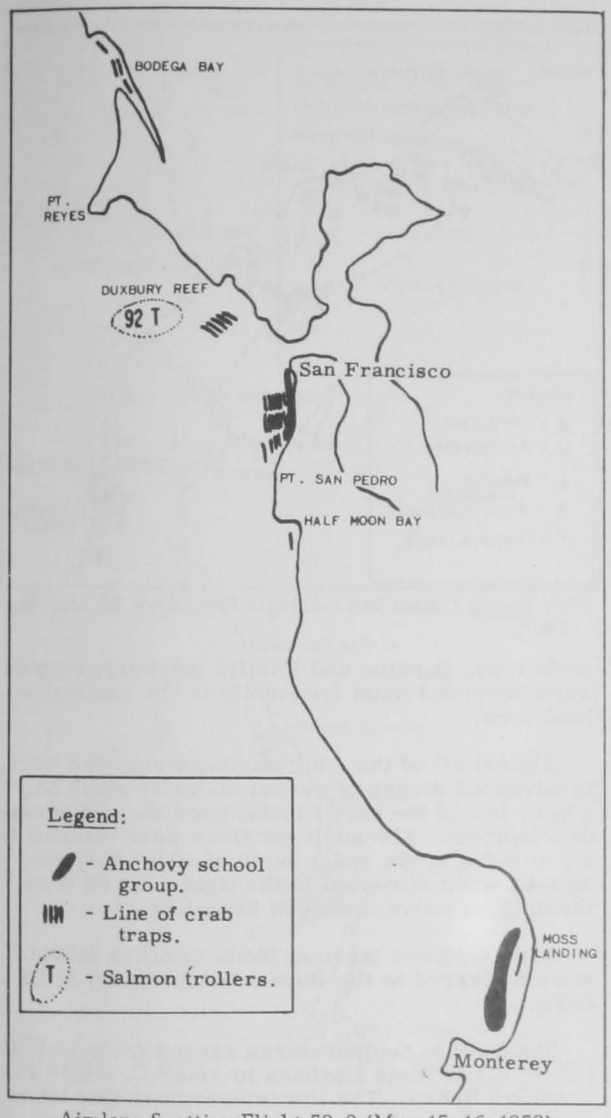
Red-tide conditions were present in the limited area from Eureka north to the Mad River.

Salmon trollers were concentrated 5 to 10 miles off the Eel River on the north coast and off Duxbury Reef in central California. Respective counts were 105 and 92 for the two areas.

Airplane Spotting Flight 59-10-Abalone: The shore line from Ano Nuevo to Ft. Bragg was surveyed (May 24, 1959) by the Department's Cessna 180 to estimate the number of abalone fishermen during a very low minus tide falling on a weekend.

Favorable conditions prevailed both for observation and for the abalone fishermen. Because of optimum conditions more people were observed on the beaches than on any previous aerial count. In most areas crowds were too dense for individuals to be counted. Only estimates could be made and at some locations only the automobiles could be counted with any degree of accuracy.

It is difficult from the air to determine exactly what animals are being taken by people in and among the rocks. In some locations, such as Bolinas Lagoon, it was obvious that the people were digging for clams; in others, they were fishing from rocks but the majority of fishermen appeared to be searching for abalone.



Airplane Spotting Flight 59-9 (May 15-16, 1959).

* * * * *

BARRACUDA AND WHITE SEA BASS SURVEY OFF BAJA CALIFORNIA AND SOUTHERN CALIFORNIA CONTINUED (M/V N. B. Scofield Cruise 59S3-Barracuda-White Sea Bass): The coastal waters off Baja California and southern California from Pta. Canoas north to Santa Catalina Island were surveyed (May 6-24, 1959) by the California Department of Fish and Game research vessel N. B. Scofield to tag and release barracuda and white sea bass, and to make incidental fish collections.

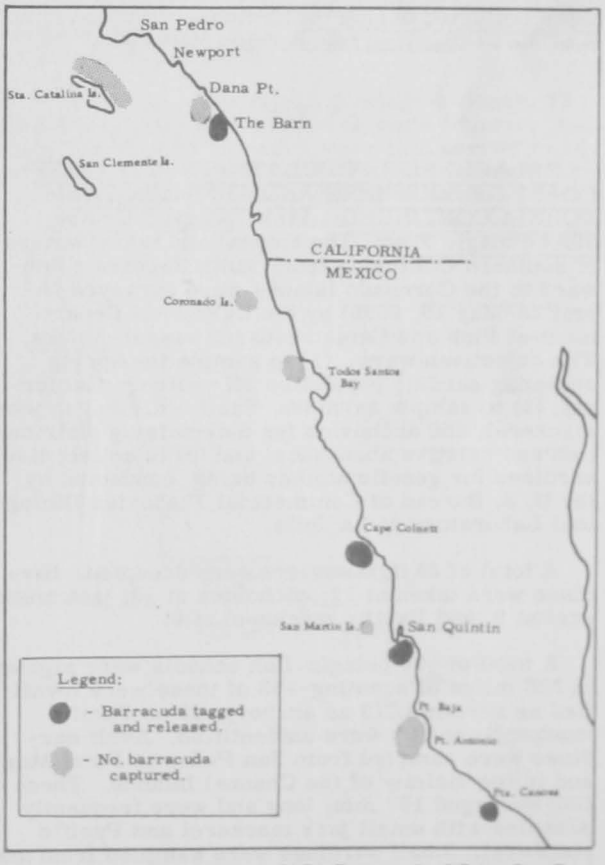
In all, 2,450 barracuda ranging in length from 450 to 1,003 mm. were tagged with spaghetti loop tags and released--2,300 in Mexican waters and 150 off southern California. No white sea bass were caught.

Barracuda were captured, tagged, and released on 12 of 17 fishing days in five areas. The largest catches were made where surface water temperatures ranged between 15° C. (59° F.). Thirteen fish were released at Pta. Canoas, 591 in the vicinity of Hondo Canyon, 375 off Camalu Point, 1,282 in Colnett Bay, and 150 off "The Barn" between Oceanside and San Clemente.

Fishing at the Coronados Islands, San Carlos Bay, Geronimo Island, Point Baja, Todos Santos Bay, San Martin Island, San Catalina Island, San Mateo Point, and Dana Point failed to produce barracuda.

Schools of barracuda were located by trolling four lines through areas where the fish were most likely to be. The lines, attached to outriggers, were set to fish at various depths with several types of bone and metal lures.

After locating barracuda, they were captured either by still-fishing or pole-trolling--using 18-foot bamboo jack-poles. For still-fishing, a small feather lure was attached to a wire leader and moved back and forth at the surface along the side of the boat. When pole-trolling, the same pole was used but a metal or bone lure was employed in place of the feather. The pole was held by hand from the stern of the vessel which moved at a speed of two to four knots. The means of capture depended upon the behavior of the fish. When a great number of barracuda could be lured to the boat by chumming with live bait, they were still-fished. When the fish were scattered, a condition apparently associated with the presence of large



M/V N.B. Scofield Cruise 59S3-Barracuda-White Sea Bass (May 6-24, 1959).

amounts of natural food in the water, the pole-trolling method was used.

As the fish were captured, they were placed in the vessel's live bait wells and held until fishing slowed down or stopped completely or until the wells were filled to capacity. The largest of the three bait wells has a capacity of 3,000 gallons and held almost 300 barracuda. The two smaller wells, each with a capacity of about 2,500 gallons, held between 200 and 250 barracuda. Morality in the tanks was between 1 and 1.5 percent. During the early part of the cruise, only the 3,000-gallon tank was available, but as the live bait was used up, the two smaller wells were freed for use as holding tanks.

The advantages of holding the fish rather than tagging them as they were caught were: (1) no fishing time was lost while waiting for the fish to be tagged; (2) the fish could be handled more carefully at all stages; (3) weak fish died in the tanks; and (4) the chance that the tagged fish would pull the rest of the school away from the boat was eliminated. Tagging was usually done in a different location from where the fish were caught--either on the way to the night anchorage or at the anchorage.

Two teams were used during the tagging operations, including two taggers, two fish holders, one recorder, and one man for brailing the fish from the tanks. The time required to tag each fish was approximately 20 seconds.

Besides barracuda, 11 other species of fish were collected during the cruise.

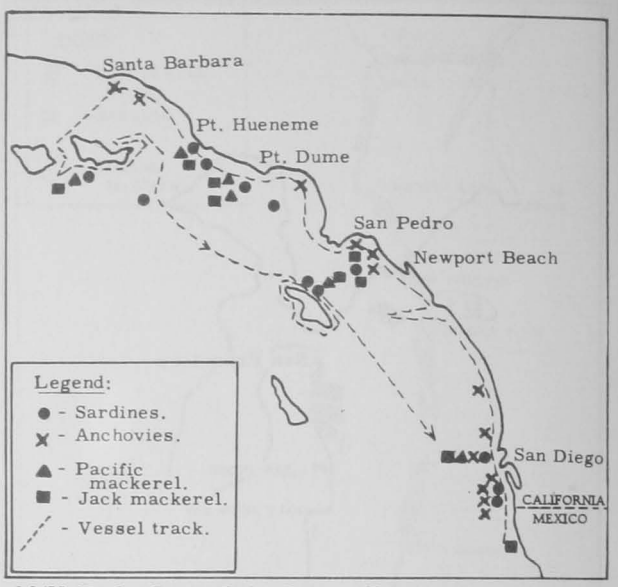
Note: Also see Commercial Fisheries Review, March 1959, p. 29.

* * * * *

PELAGIC FISH POPULATION SURVEY OFF COAST OF SOUTHERN AND CENTRAL CALIFORNIA CONTINUED: M/V "Alaska" Cruise 59A4-Pelagic Fish: The coastal and island waters of southern California from Santa Barbara southward to the Coronado Islands were surveyed (April 28-May 18, 1959) by the California Department of Fish and Game research vessel Alaska. The objectives were: (1) to sample the spring spawning sardine population off southern California; (2) to sample sardines, Pacific mackerel, jack mackerel, and anchovies for determining distribution and relative abundance; and (3) to collect live sardines for genetic studies being conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory at La Jolla.

A total of 88 light stations were occupied. Sardines were taken at 12, anchovies at 13, jack mackerel at 9, and Pacific mackerel at 6.

A total of 120 pelagic fish schools were sighted in 386 miles of scouting--33 of these were identified as sardines, 13 as anchovy, 46 as Pacific mackerel, and 28 were unidentified. Adult sardines were sampled from San Pedro to Point Mugu and in the vicinity of the Channel Islands. These fish averaged 197 mm. long and were frequently schooled with small jack mackerel and Pacific mackerel. Small sardines were sampled from the Mexican border northward to La Jolla. These fish ranging from 130 to 160 mm., were schooled with



M/V Alaska Cruise 59A4-Pelagic Fish (April 28-May 18, 1959).

anchovies. Sardine and Pacific mackerel schools were observed most frequently in the Channel Island area.

Almost all of the adult sardines sampled were in advanced stages of sexual maturity while only a very few of the small individuals showed sexual development. The adult sardines were difficult to sample due to the great depth at which they remained when attracted to the light. Lures were the only effective means of sampling.

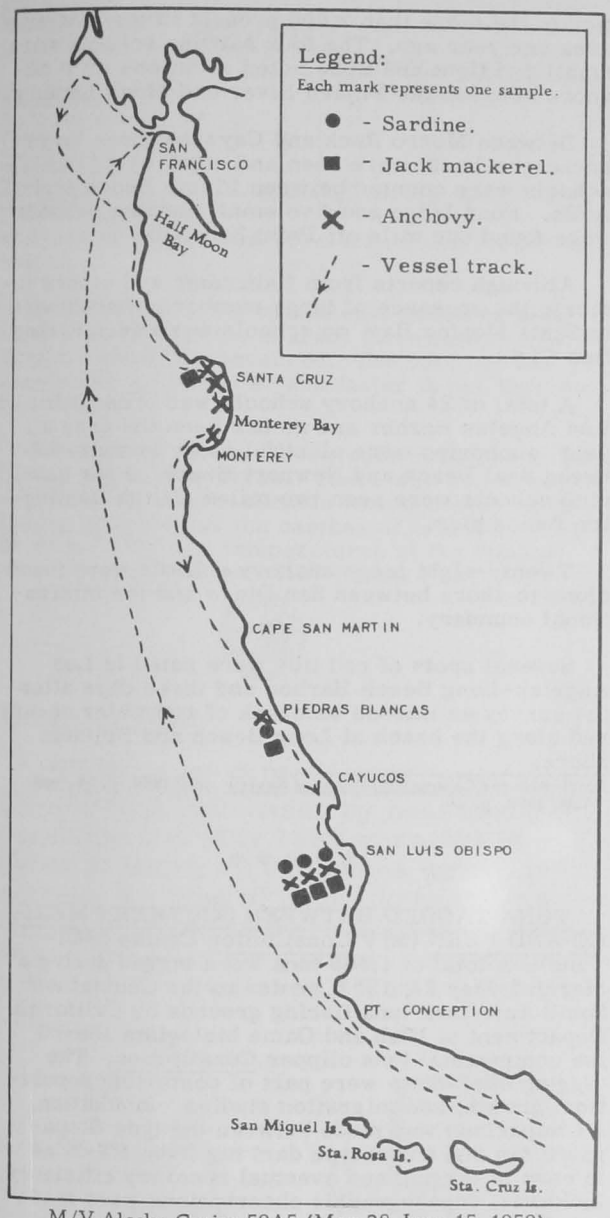
Live sardines taken at Santa Catalina Island were delivered to the Bureau's laboratory at La Jolla.

Sea surface temperatures ranged from 11.6° C. (52.9° F.) at Santa Barbara to 19.2° C. (66.6° F.) near San Pedro. The low temperature was taken following three days of gale-force winds. Red crabs (Pleuroncodes planipes) were present at light stations as far north as the northern Channel Islands.

M/V "Alaska" Cruise 59A5-Pelagic Fish: The coastal waters off central California, from Pt. Reyes southward to Pt. Conception, were surveyed (May 28-June 15, 1959) by the Department's research vessel Alaska to sample the sardine spawning population off central California; to sample sardines, Pacific mackerel, jack mackerel, and anchovies for determining their distribution and relative abundance; and to collect live sardines for genetic studies being conducted by the U. S. Bureau of Commercial Fisheries at La Jolla.

A total of 46 night light stations was occupied. Ten of the stations (22 percent) yielded one or more of the four pelagic species (sardines, Pacific mackerel, jack mackerel and anchovies). Anchovies were sampled at 9 stations (20 percent), jack mackerel at 5 (11 percent), and sardines at 4 (9 percent).

Three of the four sardine samples originated in San Luis Obispo Bay and one in San Simeon Bay.



M/V Alaska Cruise 59A5 (May 28-June 15, 1959).

The sardines ranged in standard length from 168-216 mm., with an average length of 204 mm. Almost all of the female sardines examined were in early stages of egg development but none was in a spawning condition.

A total of 252 miles was scouted at night and 308 fish schools were observed. Of these, 282 were identified as anchovies, 5 as sardines, and the remainder (21) were unidentified. Fish schools were concentrated in two general areas--in Monterey Bay and off Pt. Buchon. Off Pt. Buchon they were so numerous that 61 schools of anchovies and 2 of sardines were counted between 0400 and 0430 on May 30. A dark night and bright bioluminescence made visual scouting conditions excellent at that time.

Live anchovies and jack mackerel obtained in Long Beach Harbor were delivered to the Steinhart Aquarium at San Francisco for use in experimental studies.

Airplane Spotting Flight 59-8-Pelagic Fish: The inshore area of California between La Jolla and Ano Nuevo Point was surveyed from the air (May 11-13, 1959) by the Department's Cessna 170 (1359 D) to assess the distribution and abundance of pelagic fish schools.

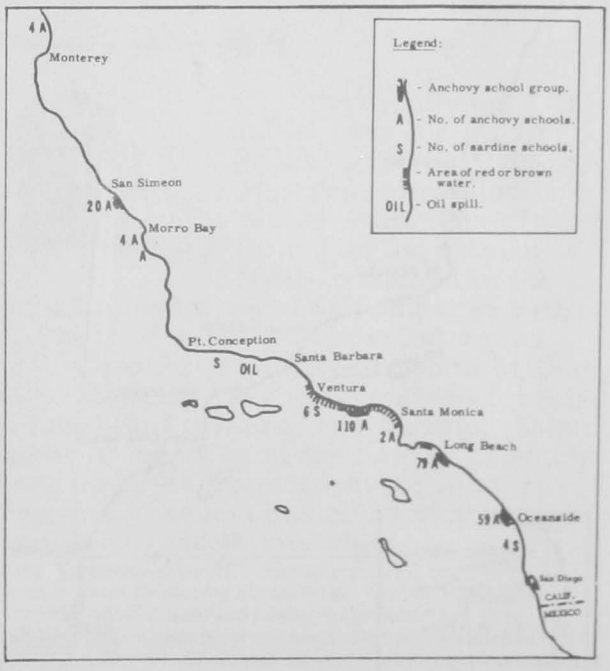
Weather conditions north of Santa Monica Bay were unfavorable for the third consecutive month, but south of Santa Monica Bay conditions were good.

Pelagic fish were again scarce north of Point Conception and only 29 anchovy schools were observed. Four small schools were present one mile off Moss Landing, 20 large dense schools one to two miles off Cambria Pines, four small schools just north of Point Buchon near the surf line, and one small school at Pecho Rock near Avila.

A total of 11 sardine schools and 250 anchovy schools were counted south of Point Conception. One sardine school was present two miles south of Gaviota, six were one to two miles offshore at Point Mugu, and the remaining four were about three miles west of Encinitas.

A large concentration of "breezing" anchovies was seen near Point Dume. A total of 110 schools were counted and it was apparent many more were in the area. The late hour (1800 P. D. T.) and the limited offshore range of the airplane made it impossible to accurately determine the extent and magnitude of the group.

Between Seal Beach and Huntington Beach, 79 dispersed schools of anchovies were counted. As usual, the fish in this area were in a narrow band extending from the surf line to about one-quarter mile offshore. A small group of 59 schools was



Airplane Spotting Flight 59-8 (May 11, 12, and 13, 1959).

present close to shore between the Santa Margarita River and Oceanside.

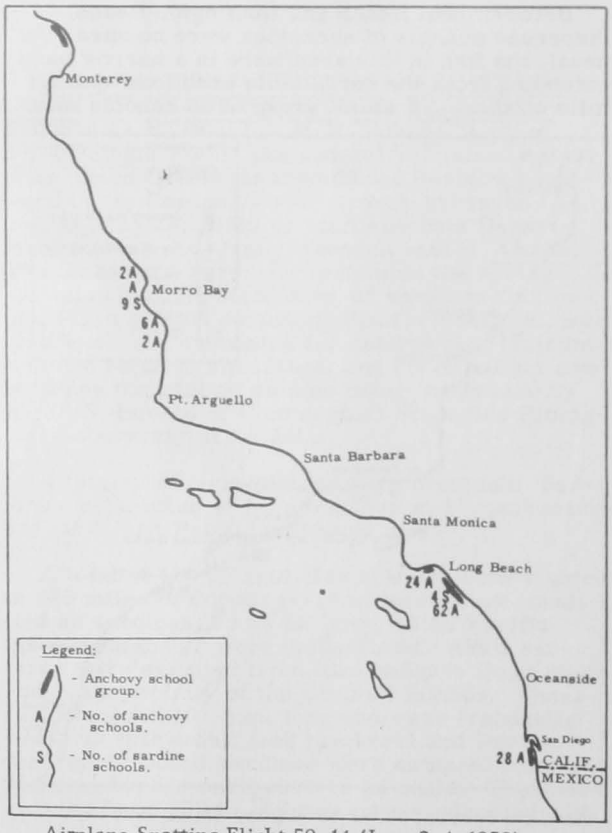
Dirty water was prevalent in the southern portion of the State, with several outbreaks of red tide. From Ventura to Santa Monica the inshore water was extremely dirty ranging in color from yellow to brown to deep red. In the vicinity of Point Mugu the organisms responsible for the red water had converged into drifts or "windrows" aligned parallel to the shore. Minor occurrences of red tide were also seen off Cambria Pines, in Los Angeles Harbor and near Oceanside.

One large oil spill was seen near Elwood. Although this is one of the natural oil seepage areas, the large slick in question originated at the buoys and pipeline off the Elwood pumping station.

Airplane Spotting Flight 59-11-Pelagic Fish: The inshore area between the Mexican Border and Pigeon Point was surveyed (June 2-4, 1959) by the Department's Cessna 170 (1359D) to determine the distribution and abundance of pelagic fish schools.

A heavy overcast hampered observations in the Monterey area, but during periods of clearing adequate coverage was achieved.

For the first time this year, fish schools were seen in Monterey Bay. Most of the schools were anchovies, but four sardine schools were also seen. All but six of these were between Santa Cruz and the Salinas River. They were seen as far offshore as three miles and in very shallow water near the beach. During two afternoons of scouting, only 141 schools were counted. This was but a small fraction of the more than 2,000 present in the Monterey area one year ago. The four sardine schools were small and tight and were noted about one mile offshore between the Pajaro River and Moss Landing.



Airplane Spotting Flight 59-11 (June 2-4, 1959).

Between Morro Rock and Cayucos three large anchovy schools were seen and eight similar schools were counted between Pismo Beach and Avila. Four large and five small sardine schools were found one mile off Point San Luis.

Although reports from fishermen and others indicate the presence of large numbers of anchovies in Santa Monica Bay, no schools were seen during this flight.

A total of 24 anchovy schools was present in Los Angeles Harbor and as has been the case all year, anchovies were plentiful close to shore between Seal Beach and Newport Beach. Four sardine schools were seen two miles off the Huntington Beach pier.

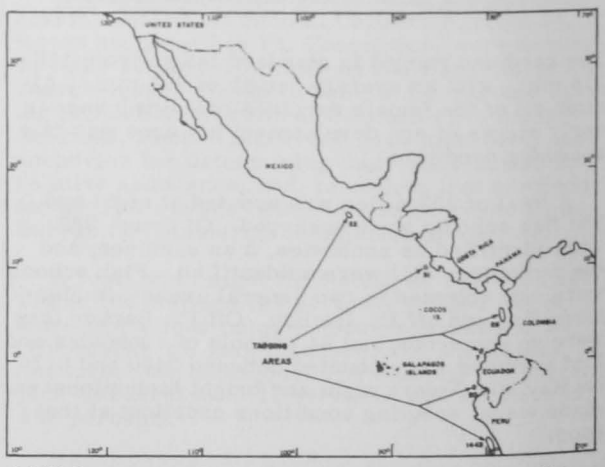
Twenty-eight large anchovy schools were found close to shore between San Diego and the international boundary.

Several spots of red tide were noted in Los Angeles-Long Beach Harbor and three days after the survey an intense outbreak of red water occurred along the beach at Long Beach and Belmont Shore.

Note: Also see Commercial Fisheries Review, July 1959, p. 25, and Aug. 1959, p. 18.

* * * * *

TUNA TAGGED BETWEEN SOUTHERN MEXICO AND PERU (M/V Constitution Cruise 59C1-Tuna): A total of 1,569 tuna were tagged during a March 5-May 23, 1959, cruise to the Central and South American tuna fishing grounds by California Department of Fish and Game biologists aboard the commercial tuna clipper Constitution. The tagging operations were part of continuing population, growth, and migration studies. In addition, a comparison was made between the type G spaghetti tag and a new type dart tag (type FT-2) as to ease in tagging and eventual recovery efficiency. Incidental oceanographic observations were made



M/V Constitution Tuna Tagging Cruise 59C1-Tuna (Mar. 5, 1959-May 23, 1959).

Table 1 - Number of Tuna Tagged by Type of Tag and Area of Release

Locality	Type G Spaghetti Tag (Yellow) X-270-I Secured with a Knot			Type FT-2 (Yellow) Dart Tag		
	Yellowfin Tuna	Skipjack	Total	Yellowfin Tuna	Skipjack	Total
Tehuantepec . . .	11	0	11	11	0	11
Central America	22	4	26	24	1	25
Panama	11	2	13	12	1	13
Ecuador	1	2	3	2	2	4
Guayaquil Gulf . .	3	7	10	3	7	10
Peru (north)	1	695	696	5	742	747
Total	49	710	759	57	753	810

and marine organisms were collected from 34 live-bait hauls.

During the tagging operations, yellowfin tuna were measured to the nearest $\frac{1}{2}$ centimeter, but skipjack were not measured. The dart tag was found to be much easier and faster to use than the type G tag.

Sea surface temperatures were recorded at all fishing and baiting areas. There was no obvious relationship between surface temperatures at the fishing grounds and the catches of tuna (74.1° F.-86.5° F.). Surface temperatures at the baiting areas ranged between 65.5° F. and 77.3° F.

Canned Fish

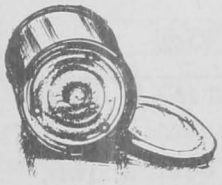
CONSUMER PURCHASES, MAY 1959: Canned tuna purchases by household consumers in May 1959 were 919,000 cases of which 42,000 cases were imported. By type of pack, domestic-packed tuna purchases were 221,000 cases solid, 556,000 cases chunk, and 100,000 cases grated or flakes. The average

purchase was 1.9 cans at a time. About 30.0 percent of the households bought all types of canned tuna; only 1.7 percent bought the imported product. The average retail price paid for a 7-oz. can of domestic solid or fancy was 34.2 cents and for a $6\frac{1}{2}$-oz. can of chunk 28.0 cents. Imported solid or fancy was bought at 30.3 cents a can. May purchases were higher than the 847,000 cases bought in April by 8.5 percent; retail prices in most cases were slightly lower.

During May, household consumer purchases of California sardines were 43,000 cases; and 32,000 cases imported sardines. The average purchase was 1.7 cans at a time for California sardines and 1.9 cans for imported. Only 1.6 percent of the households bought canned California sardines and 2.1 percent imported. The average retail price paid for a 1-lb. can of California sardines was 23.9 cents, and for a 4-oz. can of imported 26.0 cents. Retail prices were slightly higher for both California and imported canned sardines. Because of the liberal stocks of canned California sardines, there has been a steady increase in purchases since October 1958.

Canned salmon purchases in May 1959 were 223,000 standard cases, of which 114,000 cases were pinks and 52,000 cases reds. The average purchase was 1.2 cans at a time. About 14.9 percent of the households bought all types of canned salmon; 7.2 percent bought pinks. The average retail price paid for a 1-lb. can of pink was 56.7 cents and for red 86.5 cents. May purchases were down about 2.2 percent from the 228,000 cases bought in April.

Cans--Shipments for Fishery Products, January-May 1959

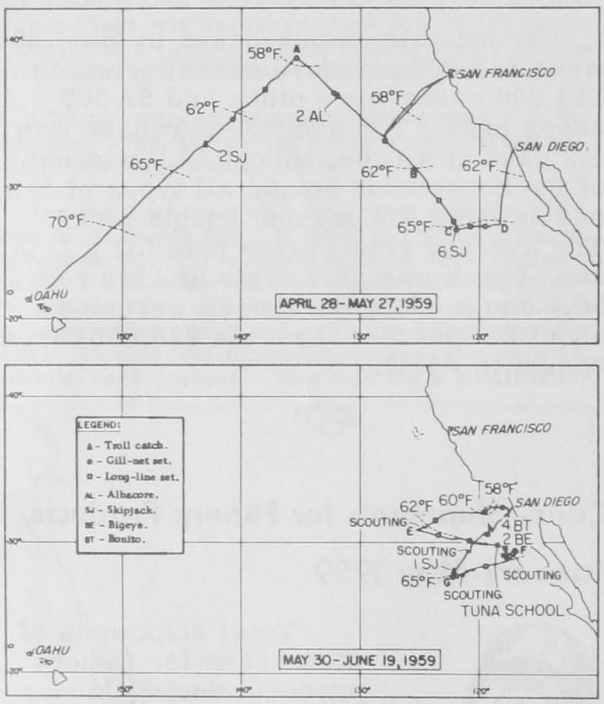


Total shipments of metal cans for fishery products during January-May 1959 amounted to 43,034 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 37,809 tons in the same period a year ago. Canning of fishery products in January-May this year was confined largely to tuna, Gulf oysters, and shrimp. Shipments of metal cans for fishery products were up by 24.3 percent from April to May this year and higher by 65.0 percent from May 1958 to this May.

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

Central Pacific Fisheries Investigations[1/]

ALBACORE TUNA MIGRATIONS IN NORTH PACIFIC STUDIED BY M/V "HUGH M. SMITH" (C-52): Tracing the movements of albacore tuna in the North Pacific between Hawaii and southern California before the commercial fishing season started was the objective of the final cruise (April 28-June 19, 1959) of the research vessel Hugh M. Smith of the U. S. Bureau of Commercial Fisheries. The California Department of Fish and Game research vessel N. B. Scofield also cooperated in the study.



M/V Hugh M. Smith Cruise 52 (April 28-June 19, 1959).

In recent years it has been shown, through recovery of tagged fish, that the albacore migrate seasonally between Japanese and American waters. These commercially-important tuna leave American waters in the fall and spend the winter in Japanese waters, returning to Southern California waters during the spring months. The location and time of entry of the albacore into California waters are being sought.

The results of this joint cruise, with the N. B. Scofield indicate: (1) that there were no albacore in the primary portion of the survey area (east of 125° W.), and (2) that the spring migration of albacore into the west coast occurred to the north of this primary survey area, where the N. B. Scofield of California caught a number of albacore on trolling gear.

A total of 26 stations were fished from the Hugh M. Smith during the cruise (gill net 13, long-line 9, and scouting 4) and resulted in the capture of 17 tuna. Two albacore and 3 skipjack were captured by trolling (8 lines). All except 1 skipjack were tagged with dart tags and released in good condition. A total of 6 skipjack were netted in the 10 shackles of gill net fished at each station. Two big-eyed were captured on the 20-basket, 12-hook long-line gear especially adapted to fish at depths of 2, 4, 8, and 16 fathoms. Four bonito were captured in the gill net. In addition to tuna, 43 sharks were taken on the gill net and long-line gear. A school of tuna was sighted during the cruise but the species could not be identified.

Photometer stations (37) were occupied at noon of each day except during rough seas. Stations immediately following the gill-net sets were attempted, but were abandoned because of an insufficiency of sunlight. Secchi disc and Forel color measurements were made simultaneously with photometer readings. Carbon-14 samples (43) were usually taken coincident with the noon photometer readings and 8 additional stations were placed in the cruise area where conditions changed abruptly. Eighteen tows of C-14 samples were made for the University of Hawaii.

Surface plankton hauls were made each night with a 1-meter net except when the gill net (anchored to the vessel) was fished or seas were rough. Night-light stations of 1-hour duration were made coincident with each gill-net set.

Bathythermograph (BT) casts were made every 6 hours when running and on all stations. On station both 900-ft. and 450-ft. or 200-ft. casts were made. Surface salinity samples were collected with each BT. Phosphate samples were collected and frozen on each station and every 90 miles along tracks between Oahu and 125° W. Eastward of this longitude they were taken every 30 miles;

1/ These investigations prior to the August 1959 Commercial Fisheries Review were listed under Pacific Oceanic Fisheries Investigations.

that is, coincident with each BT cast. The thermograph was operated continuously during the cruise. Four weather observations were made and transmitted each day.

A number of the albacore caught during the cruises by the two vessels were tagged in the hope that their recovery would shed light on the development of concentrations in commercial quantities.

The Hugh M. Smith has been based at and operated by the Bureau's Biological Laboratory at Honolulu. For this cruise the vessel left Honolulu on April 28, but instead of returning to its home port it docked at San Diego, Calif., since it has been transferred to the Bureau's California area office. The vessel will be leased to the Scripps Institution of Oceanography, La Jolla, Calif., for oceanographic and marine biological research.

* * * * *

BEHAVIOR STUDIES OF SKIPJACK TUNA TO BE MADE DURING HAWAIIAN SUMMER FISHERY: During June 1959, biologists of the Honolulu Biological Laboratory of the U. S. Bureau of Commercial Fisheries were busy preparing for the behavior studies to be conducted during the period of the Hawaiian summer skipjack fishery. The program involves studies both from vessels at sea and of captive tuna held in tanks at the Honolulu Laboratory's dock-site facilities.

The first behavior studies of skipjack in their natural environment and under actual fishing conditions were made from the M/V Charles H. Gilbert in 1956 by an observer equipped with an aqualung. In 1957, an overside "dry" chamber with observing ports was installed. Because of cavitation and resulting bubbles obscuring the underwater view from the ports of the "dry" chamber, a chamber was installed in the hull of the vessel. This installation, completed in late June, has been tested and found to be free from effects of cavitation. The chamber is sufficiently spacious for the observer to use various types of movie and still cameras for photographing the behavior of the fish during normal fishing operations and under experimental conditions.

* * * * *

TAGGING RETURNS INDICATE SKIPJACK TUNA MIGRATE INTO HAWAIIAN WATERS FROM THE WEST: Skipjack tuna tagged in Hawaiian waters by biologists of the U. S. Bureau of Commercial Fisheries Central Pacific Fisheries Investigation continued to be recovered during June. One skipjack, released near the Hawaiian island of Kauai in May 1958, was recovered to the southeast of the nearby island of Lanai. The second recovery was a skipjack released in March 1959 south of the island of Niihau and was recovered to the east near Penguin Banks. These two recoveries of fish tagged and released from the M/V Hugh M. Smith are among the few instances of skipjack that were tagged outside of the fishery and later moved into the fishery. These results tend to support the evidence recently accumulated that the skipjack each spring move into the Hawaiian area from the west.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE CANNED SALMON REQUIREMENTS FOR FISCAL YEARS 1960 AND 1961: Anticipated requirements of canned salmon by the Military Subsistence Market Centers

of the U. S. Department of Defense for the use of the armed forces are as follows: fiscal year 1960 (July-June), 4,578,000 pounds; and fiscal year 1961, 3,135,000 pounds. All purchases for both fiscal years will be made between July and December.

Stocks of canned salmon on hand as of June 30, 1959, amounted to 1,338,000 pounds and estimated stocks on hand as of June 30, 1960, will be about 1,942,000 pounds.

* * * * *

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-JUNE 1959: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the De-

partment of Defense, 2.2 million pounds (value $1.2 million) of fresh and frozen fishery products were purchased in June 1959 by the Military Subsistence Market Centers. This exceeded the quantity purchased in May by 10.8 percent, but was 3.2 percent under the amount purchased in June 1958. The value of the purchases in June 1959 was higher by 13.0 percent as compared with May, but was down 10.4 percent from June 1958.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, June 1959 with Comparisons

QUANTITY				VALUE			
June		Jan.-June		June		Jan.-June	
1959	1958	1959	1958	1959	1958	1959	1958
(1,000 Lbs.)				($1,000)			
2,212	2,285	11,346	11,595	1,170	1,306	5,987	6,600

Prices paid for fresh and frozen fishery products by the Department of Defense in June 1959 averaged 52.9 cents a pound, 1.1 cents more than the 51.8 cents paid in May, but 4.3 cents less than 57.2 cents paid during June 1959.

Canned Fishery Products: Sardines were the principal canned fishery product purchased for the use of the Armed Forces during June. During January-

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, June 1959 with Comparisons

Product	QUANTITY				VALUE			
	June		Jan.-June		June		Jan.-June	
	1959	1958	1959	1958	1959	1958	1959	1958
	(1,000 Lbs.)				($1,000)			
Tuna	-	513	1,832	1,783	-	250	868	890
Salmon	5	73	12	1,400	4	44	9	768
Sardine	160	9	669	42	28	3	100	15

June 1959 purchases of the three principal canned fishery products were lower by 22.1 percent from the purchases made from January-June 1958. Purchases of canned tuna were up by 2.7 percent and about 15.0 percent for sardines, but canned salmon purchases were down sharply from the same period in 1958.

Note: Armed Forces installations generally make some local purchases not included in the data given, actual total purchases are higher than indicated, because it is not possible to obtain local purchases.

Fisheries Loan Fund

LOANS APPROVED THROUGH JUNE 30, 1959: As of June 30, 1959, a total of 587 applications for fisheries loans totaling $18,902,173 had been received. Of these, 317 ($7,713,233) have been approved, 213 ($5,780,484) have been declined or found ineligible, 42 ($1,678,906) have been withdrawn, and 26 ($3,101,534) are pending. Several of the pending cases have been deferred indefinitely at the request of the applicants. Sufficient funds are available to process new applications when received.

The following loans have been approved between April 1 and June 30, 1959.

New England Area: Alexis Fagonde, Jr., Beals, Me., $3,000; Murray Pinkham, Boothbay Harbor, Me., $4,000; Frederick P. Elwell, St. George, Me., $2,000; Elizabeth N. Corporation, Fairhaven, Mass., $36,830; Tripolina Bramamte, Medford, Mass., $35,000; C & F Fishing Corporation, New Bedford, Mass., $46,000; George P. Berry, Port Norris, N. J. $15,000.

South Atlantic and Gulf Area: Milton A. Danberg, Key West, Fla., $10,000; Sidney J. Clopton, Pensacola, Fla., $14,800; W. D. Coons & A. E. Moorer, Mt. Pleasant, S. C., $17,000.

California: Wm. Howard Day, San Diego, $19,950; Wm. G. Huston, San Diego, $7,000; Salvatore Tarantino, San Francisco, $2,500.

Pacific Northwest Area: Kenneth E. Staffenson, Agate Beach, Oreg., $3,500; Clayton C. Howe, Anacortes, Wash., $2,000; Ernest R. Soeneke, Neah Bay, Wash., $20,000; Alex C. Prankard, Olympia, Wash., $6,232; Axel & Perry Buholm, Seattle, Wash., $14,000; Earl E. McCarthy, Seattle, Wash., $29,600; Ora L. Olson, Snohomish, Wash., $29,524.

Alaska: Douglas R. Freed, Elfin Cove, $2,500; Edward K. Haffner, Juneau, $5,600; Sig Dale, Ketchikan, $3,305; Victor Edenso, Ketchikan, $6,000; Arne Iverson, Ketchikan, $10,500.

Hawaii: Sea Queen Fishing Co., Honolulu, $20,000.

Fishing Vessel and Gear Developments[1/]

EQUIPMENT NOTE NO. 1--NEW ALL-ALUMINUM SALMON GILL-NET BOATS BUILT FOR ALASKA FISHERY: Ten all-aluminum gill-net vessels for use in the salmon gill-net fishery of Cook Inlet, Alaska, have been designed and constructed recently by a Seattle, Wash., company. The vessels measure 32 feet in over-all length, 11 feet 6 inches in beam, and have a 31-inch draft. They have a displacement of approximately 9,200 pounds and a fish-hold capacity of approximately 27,000 pounds.

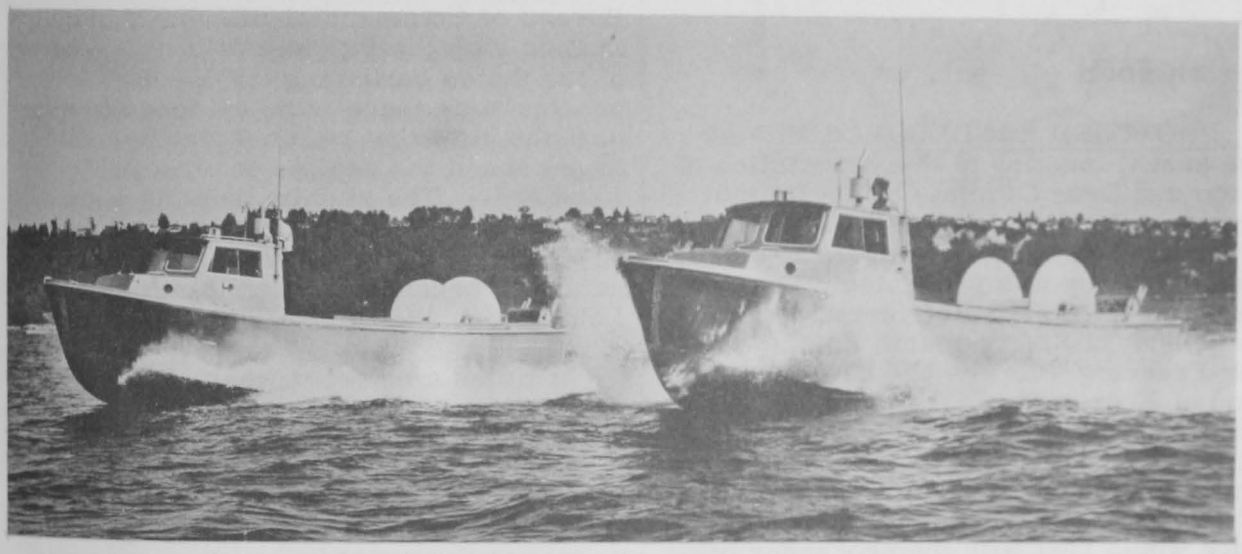


Fig. 1 - Two of the ten all-aluminum gill-net boats recently designed and constructed for the Cook Inlet salmon fishery.

The hull is an all-welded structure of $\frac{3}{16}$-inch aluminum plate with longitudinal framing. Use of outside framing on the bottom facilitates efficient unloading and cleaning of the fish hold. Integral aluminum buoyancy tanks, capable of keeping the vessel afloat when swamped, are built into the bow and stern sections. The house is of combination welded and riveted $\frac{1}{8}$- and $\frac{3}{16}$-inch plate. This weathertight construction eliminates the leakage problem common to wooden houses.

Each vessel is powered with a 165 horsepower gasoline engine used with a 2:1 hydraulic reduction gear to provide a speed of 15 knots--an increase of 7 or 8 knots over the speed of most conventional gill-net boats. Two engine control stations are provided, each consisting of a throttle and hydraulic clutch control, one at the pilothouse and one in the fishing cockpit. The pilothouse control is arranged so that it may be operated from inside the house or from the main deck immediately abaft the house.

The galvanized steel fuel tank of 140-gallon capacity is installed under the fishing cockpit, and a 15-gallon fresh-water tank and an 8-gallon aluminum stove-oil tank are mounted in the house top. All piping consists of nylon tubing.

The forecastle contains 2 bunks, an oil stove for cooking, and a stainless steel sink measuring 10 by 12 inches. The increased spaciousness of this area affords much better accommodations than has been customary on conventional boats in the gill-net fishery.

The 10 vessels are equipped with gill-net reels measuring 5 feet in diameter and can be adapted readily for methods of gill-net hauling involving the following equipment: hydraulically-driven stern rollers; hydraulically-driven gill-net reels; or davit mounted, hydraulically-driven, Puretic power blocks.

Use of lightweight aluminum for small-boat construction has many advantages. It tends toward low maintenance costs because the cabin and hull require no paint or caulking and because corrosion and dry rot are not problems. In addition,

1/ This article is the first of a series concerned with new developments or improvements in gear, vessels, and related subjects that will be published under the heading "Fishing Gear and Equipment Developments."

aluminum construction permits greater freeboard, 50 percent greater fish capacity, and higher speeds than conventional designs of the same size. Bacteria and odors cannot penetrate the hold, and consequently better quality fish are assured.

Construction of the all-aluminum gillnet boats follows the successful employment of aluminum purse-seine boats in the Atlantic Coast menhaden fishery.

--By Fred Wathne, Fishery Methods & Equipment Specialist
Branch of Exploratory Fishing & Gear Research
Division of Industrial Research & Services
Seattle, Wash.

Frozen Food

PROPOSED HANDLING CODE: At the annual meeting of the Association of Food and Drug Officials of the United States (AFDOUS), held in Boston, Mass., a proposed handling code for the Frozen Food Industry was presented. The code involves (1) Retail Refrigeration Equipment and (2) Refrigeration Equipment for Freezing, Storage and Transportation of Frozen Foods. Each of these sections of the over-all code, as read at the meeting, calls for frozen foods to be maintained at 0° F. or lower at all times. The responsibility for compliance would rest with the processor of the product. Receivers at warehouses, for transportation firms, and for retail establishments would not be permitted to accept shipments if the internal temperature exceeded 0° F. U. S. Bureau of Commercial Fisheries and industry advisors serving on the subcommittees which wrote the code realize that present refrigeration equipment, especially in the retail and transportation industries, cannot immediately meet the 0° F. requirement. Therefore, an administrative tolerance was established in the temperature requirements and also in the time needed to fully comply with the code.

The adoption of this Frozen Food Handling Code by AFDOUS, of course, does not automatically make it mandatory. However, it is intended as a strong recommendation to state and municipal legislative bodies and regulatory agencies in writing their local laws. A prime purpose of AFDOUS is to foster uniformity in food and drug laws in the several states. It is predicted that quite a number of states will very soon be considering laws or administrative regulations based on the AFDOUS Code.

Great Lakes

PICKEREL FLUCTUATIONS BEING STUDIED: The serious problem of drastic fluctuations in the occurrence of pickerel and other important Great Lakes fish is being studied by biologists of the U. S. Bureau of Commercial Fisheries in cooperation with the fish and wildlife agencies of the States bordering the Lakes. At the present time there is no evidence to support the view that commercial fishermen have caused the decline of pickerel in Lake Erie. The studies thus far show that the important species of fish in Lake Erie, including the pickerel, fluctuate naturally because of uncertainties in the Lake itself.

At times a complete loss of the reproduction of the important species leaves a dearth of the fish in the Lake for a period of years. Sometimes these same conditions which cause drastic declines in the abundance of one species act favorably upon the reproductive processes of other species and the result is that there is a natural waxing and waning of many of the fish populations in Lake Erie. Studies on Lake Erie over the past 50 years have shown substantially the same picture. These fluctuations in abundance appear to be caused by the shallow nature of Lake Erie and its position with respect to the prevailing winds which affect the temperature and lake stratification in both summer and winter.

Even though there is no evidence that the commercial fisheries of Canada or of the United States have affected these valuable sport fisheries, the International Great Lakes Fishery Commission is now studying this problem.

* * * * *

SEA LAMPREY CONTROL STUDIES: To save lake trout and other fish from the predatory sea lamprey and, therefore, preserve the livelihood of many fishermen, the U. S. Bureau of Commercial Fisheries, the Great Lakes States, and Canada conduct research and test control measures against sea lampreys. Success in developing and testing selective toxicants that destroy lamprey larvae without significantly harming fish and other aquatic organisms made possible full-scale chemical control operations in streams tributary to the south shore of Lake Superior throughout fiscal 1959. By the end of the year the toxicant had been successfully applied to half of the United States tributaries that will require treatment.

Electrical barriers are still operated on Lake Superior to prevent lamprey reinfestation of treated tributaries and to provide a measure of results from chemical control. The lamprey research and control program is carried out under contract with the Great Lakes Fisheries Commission, established by treaty with Canda in 1956.

Great Lakes Fisheries Exploration and Gear Research

EXPLORATORY FISHING IN LAKE ERIE CONTINUED (M/V Active Cruise 2): To obtain information on the seasonal distribution and commercial availability of smelt and other fish stocks in west central Lake Erie between Sandusky and Cleveland, Ohio, surface-scouting and echo-sounding operations were conducted on a 15-day (June 2-24) exploratory cruise by the U. S. Bureau of Commercial Fisheries chartered vessel Active.

Forty-five tows were completed, using a standard 50-foot two-seam balloon trash-fish trawl, with a $1\frac{1}{4}$-inch mesh bag. Gear damage to trawls was light. Due to the absence of surface schools of fish, no seine fishing was tried.

Commercial concentrations of smelt were found over the area from Huron to Cleveland, at depths greater than 7 fathoms. The best catches were made northeast of Lorain, where up to 500 pounds of smelt, 12 to 18 to the pound, were taken per half-hour tow. Trawl tows near Cleveland produced mixed catches up to 100 pounds of yellow perch, sheepshead, white bass, and smaller smelt, averaging 35 to 40 to the pound.

M/V Active Cruise 2 (June 2-24, 1959).

With few exceptions, at depths beyond 10 fathoms, smelt were found at midwater levels above the reach of bottom-trawl gear. With the approach of seasonal stratification of the lake, smelt have, in the past, tended to remain within the thermocline or in areas where bottom temperatures are considerably below surface temperatures. Surface temperatures ranged from 66° F. to 75° F. Bottom temperatures ranged from 60° F. at 5 fathoms to 44° F. at 13 fathoms.

The cruise was interrupted June 8 to 12 to demonstrate trawling operations to interested commercial fishermen at Sandusky, Huron, Vermilion, and Lorain, Ohio.

The M/V Active was scheduled to leave Sandusky, Ohio, about July 6, on a third 15-day exploratory fishing and gear research cruise. The area of operations was to be Cleveland to Conneaut, Ohio.

Note: Also see Commercial Fisheries Review, June 1959, p. 36.

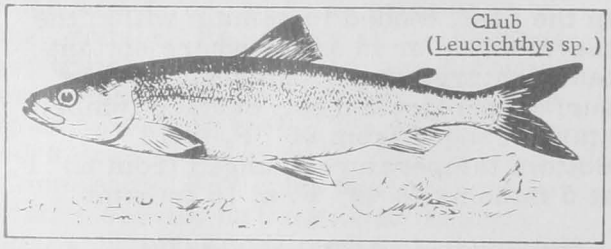
Great Lakes Fishery Investigations

SURVEY OF SOUTHEASTERN LAKE SUPERIOR BY M/V "CISCO": Studies on the life history of fish in southeastern Lake Superior were begun by the U. S. Bureau of Commercial Fisheries research vessel Cisco. The primary objectives of the work by the Cisco during 1959 will be to determine the abundance, composition, and distribution of the fish stocks, with emphasis on lake trout and chubs. Much of the life-history and population studies of lake trout in 1953 by the Cisco will be repeated this year to determine what changes have taken place during the past 6 years of severe sea-lamprey infestation.

Cruise 1 (May 19-June 2, 1959): The first cruise of the 1959 season covered the southeastern area of Lake Superior from Marquette to Whitefish Bay. A major portion of the cruise was spent fishing gill nets. Some trawling and hydrographic work was done.

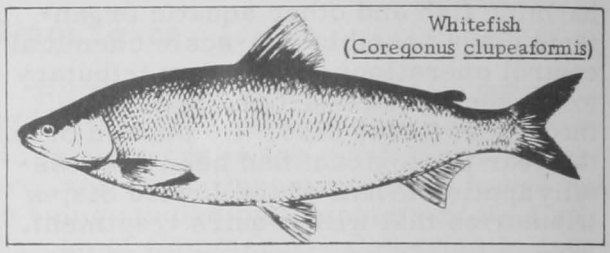
The gill nets used this year are made to fit, as closely as possible, the standards established for this type of gear by the several agencies investigating the fisheries of the Great Lakes. Ordinarily, the gangs which the Cisco will set include a "standard gang," also used by the research vessel Siscowet in the western end of Lake Superior, plus some additional mesh. A standard gang will be as follows: 150 feet each of $1\frac{1}{4}$- and $1\frac{1}{2}$-inch mesh; 200 feet of 2-inch mesh; and 300 feet each of $2\frac{1}{2}$-, $2\frac{1}{2}$-, 3-, $3\frac{1}{2}$-, 4-, $4\frac{1}{2}$-, 5, $5\frac{1}{2}$-, and 6-inch mesh. The length of each mesh may be varied, however, to assure a representative catch of fish vulnerable to each mesh size.

Standard gangs were set at $2\frac{1}{2}$ and 36 fathoms in Munising Bay, at 25, 50, 75, and 100 fathoms off Grand Marais, and at 13, 25, 50, and 70 fathoms in Whitefish Bay. A smaller gang (100 feet each of 2- and $2\frac{1}{2}$-inch mesh and 300 feet of $3\frac{1}{2}$-inch mesh) was also set at 36 fathoms in Munising Bay. The greatest numbers of chubs (Leucichthys sp.) were


Chub
(Leucichthys sp.)

taken at 50 and 75 fathoms off Grand Marais and at 50 fathoms in Whitefish Bay. L. reighardi, which was near the end of its spawning season, predominated off Grand Marais (of 152 chubs caught at 75 fathoms, 95 were L. reighardi) and together with L. hoyi made up the bulk of the chub catches in most other sets. Other chubs included L. kiyi (44 off Grand Marais at 75 fathoms, a few elsewhere) and L. zenithicus (very few).

Lake herring were fairly numerous in the 13-fathom set in Whitefish Bay, but only a few were taken in other sets. A total of 17 lake trout was caught in the gill nets--all but one in 50-fathom nets. They ranged in length from 11.5 to 21.8 inches. One of the trout carried a tag indicating it was a hatchery fish. Whitefish were taken only in Munising Bay, 73 in the 36-fathom sets and 1 in the $2\frac{1}{2}$-fathom nets. Twenty menominee (round) whitefish were caught in the 13-fathom set in Whitefish Bay and in the $2\frac{1}{2}$-fathom gang in Munising Bay, but they were scarce or lacking in other sets. Other species taken in the gill nets were burbot (a few at all depths), longnose suckers (47 in the $2\frac{1}{2}$-fathom set in Munising Bay, 2 in the 13-fathom gang in Whitefish Bay), white suckers (26 at $2\frac{1}{2}$ fathoms in Munising Bay), smelt (27 at 25 fathoms in Whitefish Bay, uncommon elsewhere), alewives (2 in the 50-fathom set in Whitefish Bay), and lake northern chubs (15 at $2\frac{1}{2}$ fathoms in Munising Bay).


Whitefish
(Coregonus clupeaformis)

Trawls were towed at several depths ranging from 8 to 36 fathoms off Laughing Fish Point, in Munising Bay, and off Grand Marais. Most catches were extremely light and nothing was taken in some tows. Species represented were ninespine sticklebacks, trout-perch, smelt (mostly yearlings), slimy sculpins, deep-water sculpins, L. kiyi, and whitefish (the latter two species taken at 25 to 34 fathoms in Munising Bay).

Hydrographic information (water samples for oxygen, pH, alkalinity, and other chemical determinations, bottom and plankton samples, Secchi-disc readings, bathythermograph tracings) was collected at 45 fathoms off Grand Marais and 70 fathoms in Whitefish Bay. Similar data were collected from the former area in 1953 by the Cisco.

Lake Superior water was very cold during this cruise, averaging about 2° C. (35.6° F.) away from shore. Extremes recorded were 1.5° C. (34.7° F.) and 9.2° C. (48.6° F.). The water was generally homothermous vertically, but at some stations slight warming in the upper levels was apparent. On a few occasions bathythermograph tracings showed colder water in the upper strata than below.

Cruise 2 (June 9-23): During this cruise, the Cisco operated in that portion of southeastern Lake Superior between Munising and Keweenaw Bay, Mich.

Standard gangs of gill nets were set at 15 fathoms in Shelter Bay, and at 25, 38, 50 (2 gangs), 75, and 100 fathoms off Marquette, and at 25, 38, 50, and 80 fathoms in Keweenaw Bay. The 15-fathom net in Shelter Bay yielded only 4 fish, all lake herring. Chub catches off Marquette were light at 25 fathoms (only 2) and 100 fathoms (43), and moderate at 38 fathoms (116), 50 fathoms (average of 105 per gang), and 75 fathoms (212). Leucichthys reighardi made up 84 percent of the catch at 38 fathoms and constituted the bulk of the catch together with L. hoyi at 50 fathoms and L. kiyi at 75 and 100 fathoms. A few each L. zenithicus, L. nigripinnis, and lake herring were also taken. Most L. reighardi has spawned, but a few ripe and gravid ones remained. Four lake trout were caught at 25 fathoms, 6 at 38 fathoms, 7 to 50 fathoms (both gangs), and 4 at 75 fathoms. The latter 4 were siscowets, 5 to 7 pounds

each. All lake trout in good condition were marked with spaghetti tags and released. Of special interest was a brook trout taken in the 100-fathom nets. Other species caught in the gill nets off Marquette were burbot (all depths--the smaller ones in deeper water) and deep-water sculpins (75 and 100 fathoms only).

Chub catches in Keweenaw Bay were light at 25 and 80 fathoms (64 and 47 respectively), and moderate at 38 and 50 fathoms (236 and 164 respectively). L. hoyi was the most common species at 38 and 50 fathoms, especially at the former depth where it made up 81 percent of the catch. L. zenithicus was the most numerous of the chubs at 25 fathoms and L. reighardi at 80 fathoms. L. reighardi appeared at all depths in fair numbers. Lake herring were taken at all depths except 50 fathoms, but were not numerous except at 25 fathoms. L. kiyi was absent at 38 fathoms and scarce at all other depths. Other species were lake trout (1 at 25 fathoms, 2 at 38 fathoms, one of the latter a fin-clipped hatchery trout), smelt (a few in the small mesh at 25 fathoms), burbot (1 at 50 fathoms), pygmy whitefish (2 at 38 fathoms) and sauger (a $1\frac{1}{2}$-pound specimen at 38 fathoms, a rather unusual catch).

Trawls were towed at several depths from 14 to 35 fathoms in Shelter Bay, 8 to 20 fathoms near Traverse Island in Keweenaw Bay, and 24 to 46 fathoms near Pequaming Point in Keweenaw Bay. The trawling in Shelter Bay yielded a few slimy sculpins, ninespine sticklebacks, small smelt, small coregonids, trout-perch (rare), and pygmy whitefish (17 fathoms and deeper). No baby lake trout were caught, although they were fairly numerous in the area at this time of year in 1953. No lake trout were taken off Traverse Island either, but this area was somewhat more productive than Shelter Bay in other species. Slimy sculpins were numerous and ninespine sticklebacks fairly common from 8 to 15 fathoms, and 2- to 4-inch smelt (probably yearlings) were abundant from 8 to 12 fathoms. Pygmy whitefish were taken at 15 fathoms (8) and 20 fathoms (5). Other species were menominee whitefish (a $4\frac{1}{2}$-inch one at 8 fathoms), 2- to 3-inch coregonids (mostly at 15 fathoms), and trout perch (rare 15-20 fathoms).

In the tows off Pequaming Point catches were by far the largest. A total of 19 lake trout were caught, of which 15 (about 8 inches in length) were recently stocked in Keweenaw Bay. The others were natural stock. Twelve of the trout were caught in a single 10-minute tow from 40 to 28 fathoms. On the basis of the rather scanty evidence at hand, the natural stock of small lake trout in Keweenaw Bay seems appreciably smaller than at this time in 1953. The trawls in the Pequaming Point area brought up large numbers of L. hoyi (635 in a 10-minute tow at 35 fathoms). Nearly 4,000 small (3- to 4-inch) unidentified coregonids, probably mostly hoyi, were caught in a tow at 25 fathoms. The other species of chubs were present in much smaller numbers. As many as 148 pygmy whitefish were caught per tow. Adult smelt were common at 25 fathoms, and some were caught as deep as 40 fathoms. Ninespine sticklebacks and slimy sculpins were common at all depths. Trout-perch were rare. A few deep-water sculpins were caught at depths greater than 40 fathoms.

Hydrographic data and samples were collected in Shelter Bay (15 fathoms), off Big Bay Point (45 fathoms), and in Keweenaw Bay (30 fathoms). The station off Big Bay Point was visited regularly in 1953. Drift bottles were released at 5 locations between Big Bay Point and Keweenaw Bay.

Surface-water temperature had risen considerably since Cruise 1, and thermal stratification was evident in all but the deepest areas visited. The surface temperature range was 2.9° C. to 14.1° C. (37.2° F. to 57.3° F.).

Note: Also see Commercial Fisheries Review, July 1959, p. 31.

* * * * * *

WESTERN LAKE ERIE BIOLOGICAL RESEARCH CONTINUED (M/V "George L." Cruises 3 and 4): Cruise 3 (May 1959): The first of three "Index" cruises slated for 1959 was completed by the U. S. Bureau of Commercial Fisheries research vessel George L. Seven stations in the western end of Lake Erie were visited, and fish were collected by trawl, gill net, and small tow nets. Perch and spottail shiners were the most common fish taken in the trawls. Other less abundant species were smelt, sheepshead, and emerald shiner. Yellow perch and sheepshead were the most common species taken in the gill nets. Small gizzard shad and alewives, abundant in trawl catches late in 1958, have not been taken by trawl or gill net this year. Only one yellow pike (walleye) was taken during the cruise.

Tow nets, used to capture fish fry, caught mostly yellow perch and smelt. Yellow perch fry were found in all areas of western Lake Erie but were taken in greatest numbers in Sandusky Bay and near Middle Bass Island. Smelt were also found at nearly all stations. Yellow perch and smelt fry were usually found near the bottom and at midwater in the open lake. A few yellow pike fry were taken in Sandusky Bay.

Yellow Pike
(Stizostedion vitreum vitreum)

In late May, Bureau biologists cooperated with the Ohio Division of Wildlife in conducting a study of the behavior of movement of stocked yellow pike fry in the open waters of Lake Erie. Previous to the stocking east of Middle Bass Island, tow nets were used to determine the abundance and species composition of fry already present in the area to be stocked. Yellow perch sac fry were found to be abundant. No yellow pike fry were taken. Two and one-half million yellow pike sac fry were then stocked in a 1-acre area, marked with buoys, over a mud bottom in 22 feet of water. Tows at all depths in the marked area and surrounding waters shortly after stocking caught yellow pike fry, but the total catch of all fry increased by only 28 percent. A large percentage of the fry taken was near the bottom. Three hours after stocking few yellow pike

fry were captured although perch fry were still taken in large numbers. Tows in the area one week later caught no yellow pike, but perch fry were still present.

Limnological and meteorological data collected at each index station included bottom organisms, plankton, water temperatures, turbidity, water quality, oxygen, weather and sea conditions, water currents. . .. Water temperatures were much higher in 1959 than during the same period in 1958. In late May of 1958 and 1959 surface water temperatures in the western basin averaged about 62° F. and 70° F., respectively.

Diatoms were common in Lake Erie water in early May but were much less abundant in late May when Entomostracans, principally Daphnia, Leptodora, and Diaptomus, became concentrated at midwater and bottom depths.

Cruise 4 (June 1959): Much of the month was spent locating young fish and measuring their relative abundance in the western basin and Sandusky Bay. Eighty 10-minute trawl hauls were made by the George L. and Madtom in the Sandusky Bay, Bass Islands, and Port Clinton areas between June 15 and July 1.

Young yellow perch appeared in large numbers in almost all waters west of Huron, Ohio, but were most abundant in Sandusky Bay. Young perch were about 1 inch long by mid-June and about 1.5 inches long by the end of the month.

Smelt
(Osmerus mordax)

Young smelt were common in all catches but appeared to be most abundant in water over 20 feet deep. Young white bass and gizzard shad were caught in fairly large numbers by the end of the month in Sandusky Bay but only a few had been taken from the lake proper. Young spot-tail shiners and trout-perch were found at almost all stations--young sheepshead were taken in Sandusky Bay only. The first hatches of emerald shiners were observed during the last week of June.

Catches of young yellow pike were made in Sandusky Bay, in the immediately adjacent lake area, and in the bay between Catawaba Point and Port Clinton. Their lengths ranged about mean of 2½ to 3 inches. In the main lake most young yellow pike were taken over both mud and sandy bottoms in water between 10 and 20 feet deep. Only one young yellow pike was taken in the Island area.

The food habits of some of the fish were observed during the period. Yearling white bass 4-6 inches in length fed almost entirely upon young perch. Young spot-tail shiners, white bass, smelt, and walleye, and adult spot-tail and emerald shiners were also found in white bass stomachs.

Food of the baby yellow pike consisted almost entirely of young fish about 1-inch long, most of which appeared to be young yellow perch. Large sheepshead, yellow perch, and channel catfish occasionally gorged on young fish, although the bulk of their food consisted of non-fish items.

Note: Also see Commercial Fisheries Review, July 1959, p. 32.

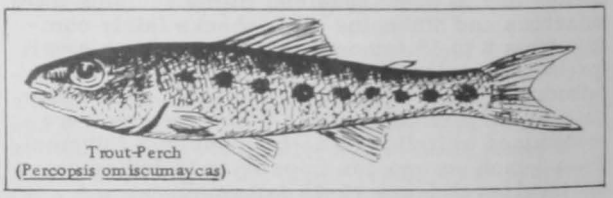
* * * * *

WESTERN LAKE SUPERIOR FISHERY SURVEY CONTINUED (M/V Siscowet Cruise 2): Environmental conditions were studied at three index stations, two of which were established by the U. S. Bureau of Commercial Fisheries research vessel Siscowet during the 1958 season. These index stations are located (1) southeast of Stockton Island, (2) northeast of Bear Island, and (3) east of Pike's Bay. The station east of Pike's Bay replaces a previous station located north of Little Girl's Point, Mich.

At each index station standard gill-net gangs (1" to 5" by ½" intervals) were fished. From one to three trawl tows were made at each station with a 30-foot semi-balloon trawl. Water temperatures, water samples for chemical analyses (dissolved oxygen, total alkalinity,. . .), plankton and bottom samples, Secchi-disc readings, and observations of currents were also recorded.

In addition, various types of experimental gear were fished northwest of Michigan Island, east of Oak Island, west of Bear Island, and east of Raspberry Island. The gear consisted of small-mesh trawls and gill nets, ½-meter plankton nets (32 grit cloth), ⅛- and ¼-inch mesh minnow traps, and standard 300-hook bait lines.

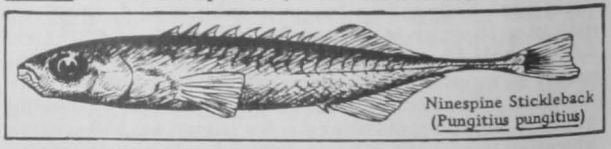
Gill-net catches southeast of Stockton Island (25 fathoms) took small numbers of lake trout, whitefish, menominee whitefish, longnose suckers, and burbot. Trout-perch dominated the catch from three trawl tows. Other species taken in the trawl



Trout-Perch
(Percopsis omiscumaycas)

were chubs (Leucichthys hoyi), pygmy whitefish, smelt, ninespine stickleback, slimy muddler, lake herring, and lake trout. A 12-inch diameter plankton net (No. 0 mesh) attached to the trawl took one fish larva, tentatively identified as smelt.

Gill nets set northeast of Bear Island (38 fathoms) took 558 L. hoyi with lesser numbers of L. zenithicus, L. kiyi, lake herring, and lake trout. One adult alewife, the first encountered by the Siscowet in Lake Superior, was also taken in this set.



Ninespine Stickleback
(Pungitius pungitius)

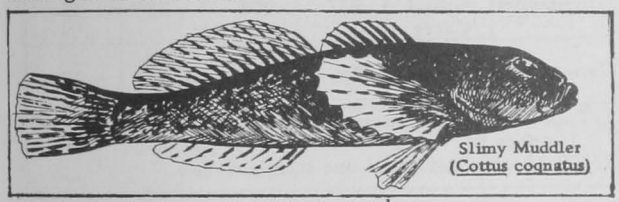
L. hoyi dominated the catch from two trawl tows. Other species taken were L. zenithicus, smelt, ninespine stickleback, slimy muddler, spoonhead muddler, and herring. The 12-inch diameter plankton net took one unidentified fish larva.

The gill nets east of Pike's Bay (22 fathoms) took 408 smelt, 106 L. hoyi, and 22 lake trout.

Lesser numbers of longnose suckers, lake herring, and trout-perch were also captured. One trawl tow captured 276 smelt, 59 L. hoyi, 7 lake trout, and 1 whitefish. Large numbers of trout-perch and a few slimy muddlers and ninespine sticklebacks were also taken.

One 300-hook line baited with small chubs (L. hoyi) was set between Madeline and Stockton Islands. The line was lifted 3 days later, and the catch consisted of 3 burbot and one small lake trout.

Six wire minnow traps were set southeast of Stockton Island and northwest of Michigan Island. At each location a trap was set at 1, 5, 10, 15, 20, and 30 fathoms. Some of the traps were baited with bread, crackers, and cheese. Others were unbaited. A very few slimy muddlers and sticklebacks were the only species taken at both the Stockton and Michigan Island sets.



Slimy Muddler (Cottus cognatus)

A set of three gill nets (1-, $1\frac{1}{2}$-, and 2-inch mesh) east of Oak Island (15-27 fathoms) took mostly smelt and L. hoyi. Lesser catches of L. zenithicus, lake herring, and lake trout were taken.

Trawl tows east of Raspberry Island were made at 5 fathoms and 16 fathoms. The tow at 5 fathoms took 900 ninespine sticklebacks with lesser catches of slimy muddlers, smelt, menominee whitefish, and lake herring. The tow at 16 fathoms took 15 smelt with lesser catches of trout-perch, sticklebacks, slimy muddlers, and lake herring.

Trawl tows west of Bear Island were made at 6 fathoms and 13 fathoms over a sandy bottom. The catch at 6 fathoms was dominated by ninespine sticklebacks. A few small smelt, and slimy muddlers were also taken. At 13 fathoms the slimy muddlers dominated the catch. Several fish larvae and 4 yearling lake herring were taken at this depth.

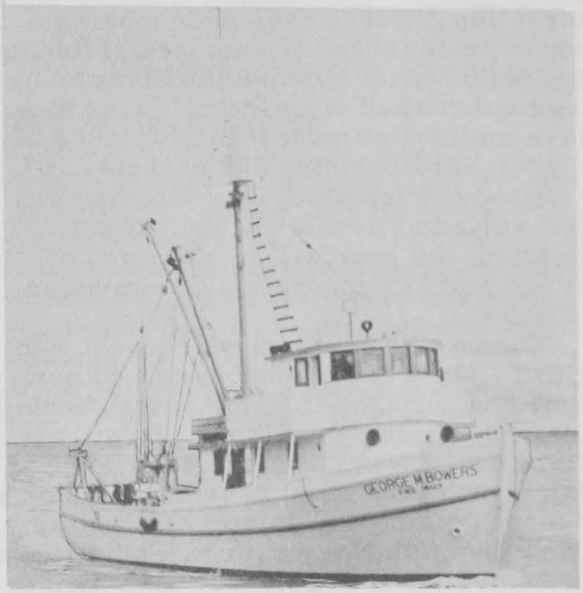
Surface temperatures varied from 40.2° F. northeast of Bear Island to 56.7° F. west of Bear Island. Bottom temperatures varied from 40.5° F. southeast of Stockton Island (40 fathoms) to 42.8° F. at Pike's Bay (20 fathoms). Slight thermal stratification appeared east of Pike's Bay.

Note: Also see Commercial Fisheries Review, July 1959, p. 32.

Gulf Exploratory Fishery Program

UNDERWATER OBSERVATION OF SHRIMP TRAWL (M/V Charles M. Bowers Cruise 20): Underwater observations of the operation of a 40-foot flat shrimp trawl were made by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers June 2-23. The work was carried out in the vicinity of Eleuthera Island, Bahama Islands, an area characterized by clear water conditions and smooth white sand bottom, at depths of 30 and 40 feet.

The observations were made from a diving sled manned by two SCUBA divers while being towed by the vessel. Motion pictures of the trawl and trawl boards were obtained with underwater cameras mounted on the sled.



U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers.

This is the first of a scheduled series of cruises to obtain photographic records of the performance of the various designs of trawling gear used in the United States' shrimp fishery.

Gulf of Mexico

INDUSTRIAL FISHERY STUDIES: The heaviest industrial fishing in the Gulf of Mexico occurs in Mississippi Sound and off the Mississippi River Delta in waters less than 20 fathoms deep. This was revealed by studies conducted by the U. S. Bureau of Commercial Fisheries Galveston, Tex., Biological Laboratory. The fish caught by the Gulf industrial fishery are used for pet food, fish meal for hog and poultry feed, frozen mink food, and fish oils. There are 104 species, comprising 55 families, represented in the

catches. Croakers, spots, white trout, and porgies account for about 75 percent of the catch.

Iowa

REGULATIONS ON COMMERCIAL FISHING ON THE MISSISSIPPI RIVER ENFORCED: Since June 15, Iowa conservation officers have been making a concentrated check of commercial fishing equipment on the Mississippi River along the southern half of the State. So far they have confiscated more than 200 pieces of illegal gear (including 200 baskets, 107 hoop nets, 7 trammel nets, and one gill net) valued at $4,000-$5,000. If not claimed, the gear will be disposed of by the State Conservation Commission.

The new regulations which went into effect July 4 are of importance to persons now engaged in commercial fishing. Owners of fishing equipment must have a $15 owner's certificate and anyone using such gear must have an operator's license costing one dollar, obtainable from the State Conservation Commission in Des Moines. A pole-and-line fisherman can have one trot line and one fish trap without an operator's license, but must pay a dollar per trot line and trap. Copies of the revised laws are available from the Des Moines offices of the Iowa Conservation Commission and from conservation officers of the counties bordering the Mississippi and Missouri rivers.

Maine Sardines

CANNED STOCKS, JUNE 1, 1959: Distributors' stocks of Maine sardines totaled 197,000 actual cases on June 1, 1959--down 40,000 cases or 17 percent from the 237,000 cases on hand June 1, 1958. Stocks held by distributors on April 1, 1959, amounted to 254,000 cases, and on January 1, 1959, totaled 268,000 cases, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on June 1, 1959, totaled 272,000 cases (100 3¾-oz. cans), an increase of 37,000 cases (16 percent) as compared with June 1, 1958, and a decrease of 69.5 percent (619,000 cases) from the 891,000 cases on hand January 1, 1959.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, June 1, 1959, with Comparisons 1/

Type	Unit	1958/59 Season			
		6/1/59	4/1/59	1/1/59	11/1/58
Distributors	1,000 Actual Cases	197	254	268	312
Canners	1,000 Standard Cases	272	474	891	1,037
Type	Unit	1957/58 Season			
		7/1/58	6/1/58	4/1/58	1/1/58
Distributors	1,000 Actual Cases	237	293	230	184
Canners	1,000 Standard Cases	235	476	1,111	386

1/ Table represents marketing season from November 1-October 31.
2/ 100 3¾-oz. cans equal one standard case.

The total supply at the canners' level (packing season beginning April 15, 1958, and ending December 1, 1958) as of June 1, 1959, amounted to 2,434,000 standard cases, about 4.3 percent less than the total supply of 2,543,000 cases as of June 1, 1958. The carryover on April 15, 1959, was about 420,000 cases. No appreciable quantity of sardines was canned April 15-June 1, 1959.

The packing season opened on April 15, 1959, but packing did not start until about June 1. The early catches were made up of fish too large for canning.

* * * * *

MASSACHUSETTS SCHOOLS' WORKSHOP MORNING SESSION DEVOTED TO MAINE SARDINES: Maine sardines played a major role in the 25th Annual Workshop of the State of Massachusetts educational system, held at Fitchburg in mid-July. One entire morning program, attended by several hundred school-lunch supervisors and home economists, was devoted to canned Maine sardines.

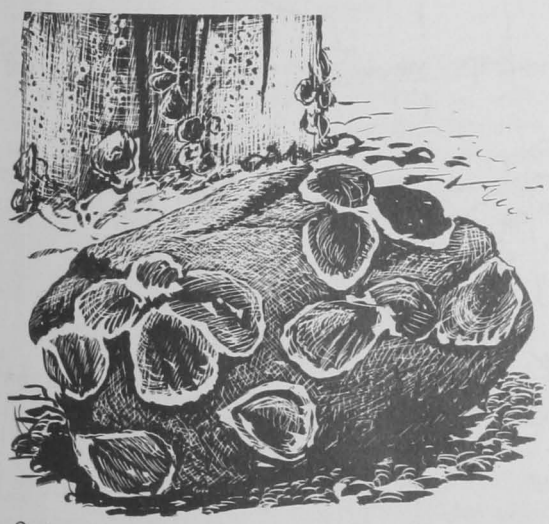
The showing of a film on the Maine sardine industry was followed by an hour-and-a-half demonstration on the uses and preparation of canned Maine sardines in school lunches.

The Maine Sardine Council said that, "This is the kickoff of a major effort to promote the use and sale of Maine sardines in the vast national school-lunch program."

He said that Massachusetts alone served more than 45 million school lunches a year and participation in the Workshop came after the Council had held acceptability tests in a number of that State's schools. According to the Council, school authorities are looking for low-cost, nourishing fish products for school-lunch programs and it appears that sardines have a great opportunity to develop a major new market in this type of promotion.

Maryland

OYSTER SPAT COUNT ON TEST SHELLS, 1959 SEASON: Biologists of Maryland's Chesapeake Biological Laboratory are studying the number of oyster spat found on 20 clean faces of shells exposed in small wire bags for approximately 1-2 week intervals to determine the intensity of the oyster set in Maryland's waters. Most of the spat are of microscopic size since new shells are used for each exposure.

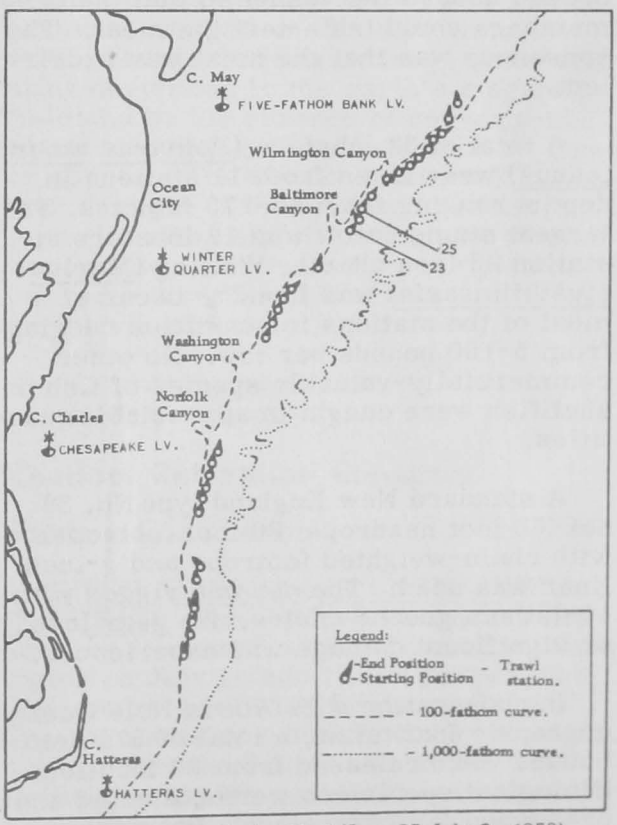


Oyster spat (magnified many times) on small pebble.

Water temperatures high enough to initiate spawning were reached in all collecting areas during late May and early June. A few spat appeared at some stations in early June. Mid-June was marked by a cool spell that dropped water temperatures by as much as 10° F. During late June water temperatures rose into the eighties. An onset of fair setting occurred in St. Marys River, Holland Straits, and Smith Creek during the first week of July. The attachment of fouling organisms to the cultch was light up to the early part of July.

North Atlantic Fisheries Exploration and Gear Research

PROMISING CATCHES OF THE DEEP-WATER RED CRAB MADE BY M/V "DELAWARE" (Cruise 59-7): Promising quantities of red crabs (Geryon quinquedens) were found between Cape Hatteras, N. C., and Cape May, N. J., in depths of 200-350 fathoms during an exploratory fishing cruise by the U. S. Bureau of Commercial Fisheries vessel Delaware.



M/V Delaware Cruise 59-7 (June 25-July 2, 1959).

The crab exploration began at Norfolk on June 25 and ended July 2, when the Delaware reached Gloucester, Mass.

In the course of the cruise, 30 exploratory trawl stations were made to investigate the commercial potential of red crabs, the presence and abundance of which were reported by W. C. Schroeder (1955) following explorations in 1952-53. The depths trawled ranged from 60-350 fathoms. Red crabs were caught at 21 stations; the most productive stations were in depths of 200 fathoms or more. A total of 1,375 crabs were taken (the estimated weight was 2,073 pounds).

The largest single catch of crabs was made east of Ocean City, Md. (see chart, station 25). The red crab catch at this station was 386 crabs in a 70-minute tow; the estimated weight of this catch was 558 pounds. This was the only station from which crabs were taken in near commercial quantities. Further investigations may define areas of local concentration where commercial exploitation could be feasible.

Several hundred red crabs were steam-cooked aboard the vessel so that the crew members could taste-test the meat. The consensus was that the meat was excellent.

A total of 32 lobsters (Homarus americanus) were taken from 11 stations in depths ranging from 60-275 fathoms. The largest single catch was 12 lobsters at station 23 (see chart). Whiting (Merluccius bilinearis) was found to occur at most of the stations in quantities ranging from 5-100 pounds per tow. No other commercially-valuable species of fish or shellfish were caught in appreciable quantities.

A standard New England type No. 36 net (60-foot headrope, 80-foot footrope) with chain-weighted footrope and $\frac{1}{4}$-inch liner was used. The net was rigged with 10-fathom ground cables. No gear loss or significant damage was experienced.

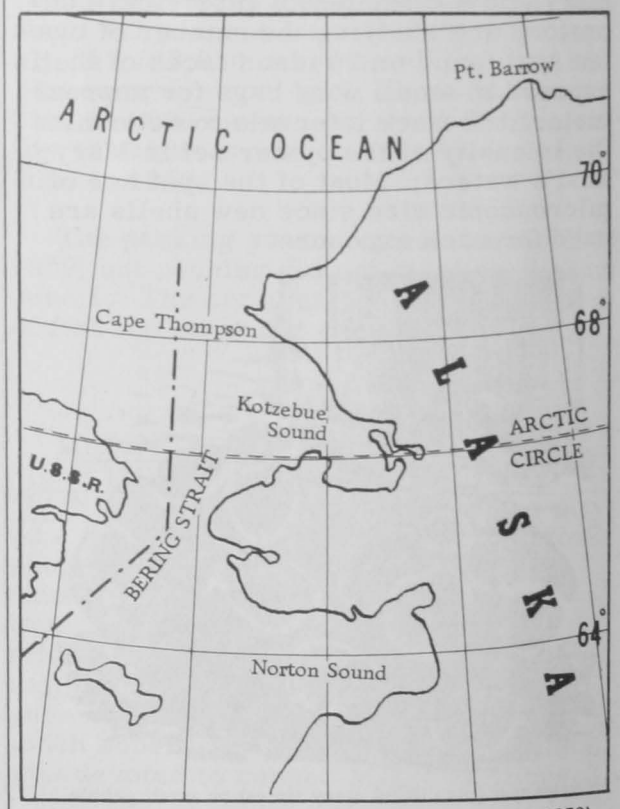
In cooperation with Woods Hole Oceanographic Institution, a total of 576 drift bottles were released from 96 locations. Biological specimens were collected and preserved for later study. Bathythermograph casts were taken along with other hydrographic data.

The M/V Delaware left Gloucester, Mass., for cruise 59-8 on July 8, 1959. After loading television equipment at Woods Hole, Mass., the vessel was expected to conduct closed circuit underwater television operations off Cape Cod.

Conditions permitting, kinescope recordings were to be made showing the operation of various portions of the trawl net in operation.

North Pacific Exploratory Fishery Program

EXPLORATORY FISHING VESSEL TO ASSESS FISHERY POTENTIAL AND COLLECT OCEANOGRAPHIC DATA IN ARCTIC OCEAN'S CHUKCHI SEA (M/V John N. Cobb Cruise 43): The U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb departed from Seattle on July 23 for a 60-day cruise which will take the vessel 3,300 miles to



M/V John N. Cobb Cruise 43 (July 23-Sept. 15, 1959).

Chukchi Sea in the Arctic Ocean. The investigation in the Chukchi Sea, which will be a cooperative study carried out by the Bureau and the U. S. Atomic Energy Commission (AEC), will be the farthest that

the vessel has operated from Seattle since its launching in 1950. She will return to Seattle, Wash., about September 15.

The John N. Cobb is scheduled to carry out explorations in the area from Bering Strait north to the Arctic ice field. The vessel will carry out investigations contiguous to the coast of northwest Alaska and westward to the United States-Soviet treaty line of 1867.

The objectives of the cruise are to carry out detailed studies of the varieties, quantities, and distribution of fish, shellfish, marine mammals, and birds inhabiting the Chukchi Sea region and to acquire information on the physical and chemical properties of these Arctic waters. The information obtained concerning the concentrations of fish and shellfish will be used to assess the commercial fishing potential of the region, and to provide the AEC with data to evaluate the possible biological damage which might occur in the event nuclear devices are detonated in the area. The Commission is studying the possibility of detonating several atomic devices to determine the feasibility of using nuclear energy for excavating harbors, canals, etc. Oceanographic information will be used to supplement data being acquired by the University of Washington oceanographic vessel Brown Bear.

The Bureau's vessel will be equipped with perhaps the widest variety of sampling devices ever taken on an exploratory fishing expedition. Sampling gear which will be aboard will include standard mesh otter trawls, small mesh trawls, biological dredges, gill nets of various mesh sizes, fish traps, long-line gear, beach seines, and a midwater trawl. Skin divers will also be aboard the vessel. Evaluation of the marine fauna will be approached in a three-phase program. The first phase will entail a study of the bottom fish fauna which will cover an area from Bering Strait to 70° north latitude. During this phase approximately 50 stations will be sampled. The second phase will constitute an intensive study of the fish fauna in the immediate vicinity of the Cape Thompson or Ogotoruk Creek site proposed for the AEC excavation tests. During the last phase sampling of pelagic fish life will be carried out throughout most of the Chukchi Sea region. It is anticipated that more than 100 sites will be investigated during the 30 days in the Arctic.

Personnel chosen to accompany the John N. Cobb will include several Seattle scientists from the Bureau and the University of Washington College of Fisheries.

In carrying out the operations in the Chukchi Sea, the John N. Cobb's work will be closely integrated with studies being conducted by the University of Washington oceanographic vessel Brown Bear. The cruise patterns and objectives of both vessels have been designed so that maximum benefits can be derived from the Arctic studies. Both vessels will be in constant radio contact with each other and with the shore camp at Ogotoruk Creek.

The major difficulty anticipated in operating in the Chukchi Sea will be that of accurate navigation. Navigation in the area is made difficult by large and fluctuating deviations in the earth's magnetic field and by the absence of conventional electronic fixing techniques such as loran or shoran. The almost continuous summer daylight of the area and persistent fog will make celestial navigation almost impossible. Both vessels anticipate using radio direction-finders and radar to fix their positions.

Outdoor Recreation Resources Review Commission

FIRST ADVISORY COUNCIL MEETING HELD: The Outdoor Recreation Resources Review Commission met in Washington on July 16 and 17 for the purpose of consulting with the Advisory Council. The Commission consists of 15 members, 4 each from the Senate and House Committees on Interior and Insular Affairs, and 7 appointed by the President, including Chairman Laurance Rockefeller. The Advisory Council consists of 25 representatives of various phases of natural resources, including commercial fisheries.

The 25 were selected out of a group of 500 considered by the Commission.

The commercial fishery representative (Charles E. Jackson, General Manager of the National Fisheries Institute), made a brief statement calling the Commission's attention to the vital importance of the food fisheries. He noted the fact that the United Nations is considering the breadth of the territorial-sea issue which might result in a change of the present 3-mile limit accepted by many of the nations of the world. He pointed out that whatever the decision it is highly important that the United States now consider means of improving and increasing its production of coastal inshore fisheries. He requested the Commission to give this matter serious study with a view of recommending a research program in inshore areas, looking toward an increased production of fish to meet not only domestic food needs but the increasing requirements of anglers. He said it was necessary to know more about the possibilities of fish farming in estuaries along the coasts.

Oysters

LONG ISLAND SOUND STUDIES: As in previous years, the U. S. Bureau of Commercial Fisheries Biological Laboratory at Milford, Conn., is conducting systematic observations on spawning and setting of oysters and starfish. The same locations as in the past will be used for the 10 major sampling stations. In addition, auxiliary stations, needed for other studies, will be established at the mouths of several rivers.

The Milford Laboratory will keep the members of the oyster industry and marine biologists informed as to the progress of the biological events occurring in Long Island Sound waters. These will deal principally with the intensity of setting of oysters and starfish in various areas and the survival and growth of these organisms. Other observations of interest will be included.

The bottom water temperature recorded on July 13 varied from 16.6° C. (61.9° F.) at Station No. 3 at a 30-foot depth in the Bridgeport area to 21.8° C. (71.2° F.) in the shallow water of New Haven Harbor. Examination of gonads showed that some of the oysters have spawned, but no larvae have yet been found in the plankton samples. This, however, is not abnormal for Long Island Sound. For example, last year when one of the heaviest oyster sets in the history of the Connecticut shellfish industry occurred, larvae were not found in any of the 200-gallon plankton samples taken regularly at sampling stations until July 24, when a few young ones were recorded; yet, a heavy setting began only four days later. Thus, because of the peculiarities of the occurrence and distribution of larvae in Long Island Sound waters, many aspects of which are still not understood, predictions as to the time and intensity of setting cannot be made from observations on number and age of larvae.

No setting of oysters had occurred by July 13, and it is assumed that it will take place somewhat later than usual because of the relatively low water temperature.

Examination of collectors showed that setting of starfish began on July 2, occurring at most of the stations. The initial set was comparatively light, the maximum being nine starfish per 40 shells at Station 10. The bags collected on July 10 showed that setting continued, and that while no setting had taken place since July 6 at Stations 4 and 5, its intensity at Station 8 in the Bridgeport area considerably increased, the count being 28 starfish spat per 40 shells. The collectors examined on July 13 showed a general decrease in the intensity of the setting with Stations 3, 6, and 7 being free of any set, while only 2 spat were found on 40 shells brought from Station 10. (Observations on Spawning and Setting of Oysters and Starfish in Long Island Sound, Bulletin 1, July 17, 1959.)

* * * * *

RAFT-GROWN TYPE GROW FAST: Studies in Oyster River, Chatham, Mass., showed oysters grown on rafts grow faster and are healthier than those grown on bottoms. The oysters suspended below a

raft are expected to reach marketable size by the fall of 1959, when they will be two years old. If they had been bottom-grown instead of raft-grown, they would have required 4 or 5 years to reach that size. The mortality of raft-grown oysters was 17 percent in 1958 and over 90 percent in bottom-grown oysters. The studies are being conducted by the U. S. Bureau of Commercial Fisheries.

SETTING UNDER ARTIFICIAL CONDITIONS: In an artificial pond on Long Island, successful sets of American oysters were obtained by releasing ready-to-set larvae in the pond. Light sets of European oysters, Ostrea edulis, and Japanese clams, Tapes semidecussata, also were obtained in that pond.

Salmon

PROGRESS REPORT ON NORTH PACIFIC RESEARCH: Salmon studies in the offshore and inshore areas of the North Pacific Ocean by the U. S. Bureau of Commercial Fisheries Seattle, Wash., Biological Laboratory for the International North Pacific Fisheries Commission (formed by Canada, the United States, and Japan) have progressed steadily. Two chartered vessels completed 78 gill-net sets in the North Pacific and Bering Sea during the spring and the summer of 1958. The catch of 5,462 salmon included 1,190 reds or sockeye, 3,877 chums, 194 pinks, 175 silvers, and 26 kings. Compared with the catches in 1957, catches in 1958 reflect a marked decline in the abundance of pink salmon. Chum salmon were in comparable numbers both years.

The widespread salmon sampling program throughout the North Pacific Ocean and adjoining seas and coastal areas featured increased sampling coverage off the Asian coastline. Red, chum, and pink salmon samples collected by the United States, Canada, and Japan for racial studies totaled 21,632 whole salmon and 2,319 salmon blood samples. Extensive catches are also being made during the current 1959 season.

The second season of experimental work on guiding seaward migrant fingerling salmon with electricity at the Lake Tapps, Green River, Wash., field site is in progress. Results show at least 90 percent of the yearling and two-year-old silver salmon moving through the area are diverted into bypass traps by the electrical barrier which is operating at an economic power consumption level. These findings also indicate the probability of future reductions in electrical and mechanical instrumentation and show that under certain circumstances electricity can be efficiently used to divert migrating fingerling salmon.

Surveys of the Yakima River system indicated the chinook salmon escapement in 1958 was slightly less than half that in 1957. The downstream migrant trapping project at Prosser resulted in counts of 145,000 chinook and silver salmon from April 1 to June 1, 1959. Surveys above Rocky Reach Dam indicated fish passed that dam through temporary fish passage facilities without noticeable bad effects.

In Alaska efforts are being made to predict the number of adult salmon which will return from the Pacific Ocean to the streams to spawn. Pink salmon fry in Southeastern Alaska and in Prince William Sound were dyed with neutral red stain, released, and trapped downstream. In the Bristol Bay area, the commercial catch was sampled for age composition, adult red salmon were enumerated from towers, and downstream migrating red salmon smolts enumerated with fyke nets.

Studies to determine the fresh-water survival of salmon in Alaska continued. At Little Port Walter a count was made of upstream migrating adult pink salmon and downstream migrating fry. Experiments with young pink salmon in the stream gravel were conducted to measure their survival rate. Research at Brooks Lake concerned the factors affecting the survival of red salmon in the Lake.

Shad

ATLANTIC COAST STUDIES: Observations on the Hudson River and the Connecticut River shad populations were continued in the spring of 1959 by biologists of the U. S. Bureau of Commercial Fisheries Beaufort, N. C., Biological Laboratory. The studies indicate that the Connecticut River population is approaching its 1941-1946 size when the best recorded catches were made. This increased population abundance resulted from an increased number of shad which were allowed to escape the fishery and spawn as a result of state regulations based on the recommendations of the Bureau's biologists. The fishway on the Connecticut River at the Hadley Falls Dam, Holyoke, Mass., passed some 15,000 shad during the 1959 shad run.

Research on managing the Atlantic coast shad resources centered on the St. Johns River, Fla., during the 1958-59 shad run. Through use of catch, effort, and tagging data a method was devised to determine the shad population in that river for each year in which such data are obtained.

Shrimp

STAINS USED TO MARK SHRIMP FOR MIGRATION STUDIES: Techniques for marking shrimp with vital stains which permit them to molt and retain the mark have been developed by the U. S. Bureau of Commercial Fisheries, Galveston, Tex., Biological Laboratory. Using this method, the Laboratory scientists stained juvenile pink shrimp in the protected bays of the Everglades National Park and recaptured them four months later in the Tortugas shrimp fishery. They had tripled their weight and traveled more than 100 miles. Stained brown shrimp recaptured in Galveston Bay had traveled up to 25 miles a week.

* * * * *

TEXAS VESSELS DISPUTE OVER WAGES SETTLED: A dispute which reportedly tied up approximately 90 percent of the 500 to 600 shrimp boats operating between Brownsville and Port Isabel, Tex., was settled on July 10. The dispute affecting the $15 million a year shrimp industry in that area reportedly stemmed from a wage cut for shrimp crews. The shrimp producers reportedly recently cut the money paid to shrimp crews by about 4 cents per pound per crew member.

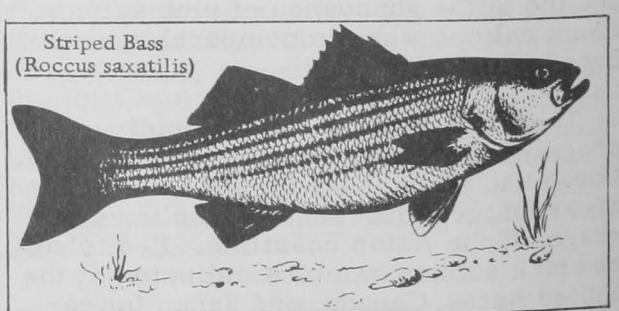
The Texas producers had contended that producers elsewhere on the Gulf coast and in the East had been selling shrimp cheaper than the local vessels can produce them. Negotiations involving the fishermen and the producers were in progress for about 10 days.

The Brownsville Shrimp Exchange, owners of 20 boats, reported that they had worked out a 60-40 arrangement with the crews. The boat owners will get 60 percent of the catch and the shrimp crews 40 percent. Other shrimp crews sought the same sort of agreement.

Reports indicate that some shrimp fishermen are interested in possible affiliation with AFL-CIO. Representatives of the AFL-CIO met with the executive committee of the Rio Grande Shrimpers Assoc., but no decision was reached.

Striped Bass

EAST COAST RESEARCH: Roanoke River Studies: Dams and pollution in the Roanoke River, Albemarle Sound, N. C., threaten sustained abundance of



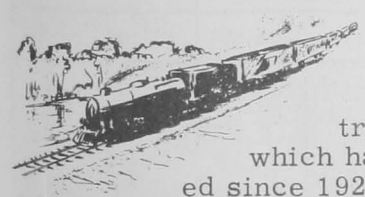
the striped bass population. To resolve these problems, a cooperative study for developing this river basin by scientific means began in 1955. Research on the population and spawning status of striped bass in Roanoke River in relation to in-

dustrial development and water released from power dams upon the spawning grounds has been completed.

Potomac River Studies: In the spring of 1959, the U. S. Fish and Wildlife Service, Maryland, and Virginia concentrated research on the striped bass on Chesapeake Bay. They tagged 2,200 striped bass in the Potomac River as a part of the research planned to determine seasonal, annual and age-specific migrations, estimates of population size and mortality rates, size and age-class composition, and homogeneity of races.

Transportation

NEW RAILWAY EXPRESS AGENCY CONTRACT APPROVED BY RAILROADS: The 178 railroads participating in the present Railway Express Agency contract have given their unanimous approval to a reorganization plan to be submitted to the Interstate Commerce Commission for approval. The most significant change is to give the Express Agency complete freedom to route express traffic without reference to a historical distribution pattern which has been followed since 1920. This change is expected to result in improved service to shippers and improved financial conditions. Another important change is that future payments to the railroads will be based upon an average rate in each regional group "per car-foot mile of line-haul service rendered by each carrier." The present contract calls for distribution among the railroads of their pro rata share of revenue remaining after the Agency's expenses have been deducted. Future excess funds will be divided equally between the Agency and the carriers, thus providing the Agency with funds to re-invest in the business. The Agency's share of gross revenue on carload shipments will also be increased slightly.



Application will be made shortly for the Commission's approval of the new contract, which will be effective the first of the month following the Commission's approval and will continue in force through December 1973. The New York Central announced that it will rescind its notice to withdraw from the Express Agency and will participate in the new plan, but the Chicago & Northwestern Railway said that it would withdraw from the Agency, sell its stock, but continue to make its facilities available to handle express shipments.

The Railway Express Agency has once more petitioned the Commission for special permission to publish a blanket increase on less-than-carload express rates of 25 cents per 100 lbs., minimum 25 cents per shipment, in all territories except within Mountain Pacific and Eastern territories, where the increase sought is 35 cents per 100 lbs., minimum 35 cents per shipment. This is equivalent to approximately a 6 percent increase and will not apply on accessorial charges. It is alleged that this increase is necessary to offset higher operating costs, including railroad retirement and unemployment insurance taxes.

United States Fishery Landings, January-May 1959

Landings of fish and shellfish in the United States during the first five months of 1959 increased 17 percent as compared with the same period of the previous year.

Menhaden landings with a sharp rise of 124 million pounds accounted for most of the increase. Landings of those fish along the Atlantic Coast and in the Gulf States rose 70 million and 54 million pounds, respectively

On the Pacific Coast, landings of tuna were up 5 million pounds, while halibut, increased 3 million pounds as compared with the 1958 landings. In New England, haddock and ocean perch landings declined 9 million pounds each. Landings of whiting were down 3 million pounds. The yield of shrimp in the South Atlantic and Gulf States also dropped--only 35 million pounds were landed during the first five months of 1959 as compared with 43 million pounds for the same period in 1958.

Table 1 - United States Fishery Landings of Certain Species For Periods Shown, 1959 and 1958 1/

Species	Period	1959	1958	Total 1958
		(1,000 Lbs.)		
Anchovies, Calif.	5 mos.	1,300	3,474	8,148
Cod:				
Maine	4 mos.	800	788	2,735
Boston	5 "	7,100	6,124	16,183
Gloucester	5 "	1,300	1,192	3,189
Total cod		9,200	8,104	22,107
Haddock:				
Maine	4 mos.	1,300	1,749	3,997
Boston	5 "	34,200	45,372	81,509
Gloucester	5 "	8,500	6,132	9,798
Total haddock		44,000	53,253	95,304
Halibut 2/:				
Wash. & Oreg.	5 mos.	5,900	4,883	16,200
Alaska	5 "	6,100	4,431	19,814
Total halibut		12,000	9,314	36,014
Herring, Maine	4 mos.	-	36	170,977
Industrial Fish, Me. and Mass. 3/	5 "	25,600	25,603	108,869
Mackerel, Calif.:				
Jack	5 "	8,800	5,906	21,698
Pacific	5 "	5,300	9,466	24,624
Menhaden	5 "	250,400	126,338	1,544,700
Ocean perch:				
Maine	4 mos.	19,700	21,146	71,068
Boston	5 "	1,600	1,085	2,625
Gloucester	5 "	16,500	24,977	74,951
Total ocean perch		37,800	47,208	148,644
Scallops, sea (meats)	5 mos.	6,100	5,513	15,253
Shrimp (heads-on):				
South Atl. & Gulf	5 "	34,700	43,409	195,808
Oregon	4 "	854	213	1,550
Squid, Calif.	5 "	9,700	2,400	4,864
Tuna, Calif.	5 "	109,200	104,236	307,378
Whiting:				
Maine	4 mos.	-	1	23,577
Boston	5 "	39	49	596
Gloucester	5 "	2,500	5,640	58,927
Total whiting		2,539	5,690	83,100
Total all above items		557,493	450,163	2,789,038
Others (not listed)		201,307	198,358	1,926,962
Grand total		758,800	648,521	4,716,000

1/ Preliminary. 2/ Dressed weight. 3/ Excluding menhaden.

Table 2 - United States Fishery Landings by States for Periods Shown, 1959 and 1958 1/

Area	Period	1959	1958	Total 1958
		(1,000 Lbs.)		
Maine	4 mos.	28,000	29,877	316,955
Massachusetts 2/:				
Boston	5 mos.	50,100	61,836	123,764
Gloucester	5 "	50,300	47,678	230,218
New Bedford	5 "	42,800	43,056	111,669
Provincetown	5 "	4,600	4,448	25,754
Total Mass.		147,800	157,018	491,405
Rhode Island 3/	2 mos.	5,800	5,452	103,452
New York 3/	4 "	12,700	13,567	40,886
New Jersey 3/	5 "	23,900	20,660	49,813
North Carolina 3/	5 "	28,100	28,560	54,866
South Carolina 3/	5 "	3,000	3,581	15,358
Georgia	5 "	4,700	4,209	19,992
Florida 3/	4 "	46,000	51,650	153,832
Alabama	3 "	1,800	1,495	10,343
Mississippi 3/	4 "	2,500	3,001	84,988
Texas 3/	4 "	8,600	11,598	66,112
Ohio (Mar.-May)	5 "	10,300	10,371	19,145
Oregon 2/	4 "	9,400	13,771	57,800
Washington 2/	3 "	20,100	23,655	166,000
California:				
Certain species 4/	5 mos.	134,300	125,482	581,200
Other	2 "	15,300	13,805	82,708
Total Calif.		149,600	139,287	663,908
Rhode Island, Middle Atlantic, Chesapeake, South Atlantic, and Gulf States (menhaden only)	5 mos.	250,400	126,338	1,540,867
Alaska (halibut 5/)	5 "	6,100	4,431	19,814
Total all above items		758,800	648,521	3,875,536
Others not listed		6/	6/	840,464
Grand total		6/	6/	4,716,000

1/ Preliminary.
2/ Landed weight.
3/ Excluding menhaden.
4/ Includes catch of anchovies, jack and Pacific mackerel, tuna, and squid.
5/ Dressed weight.
6/ Data not available.

Note: Data principally represent weight of fish and shellfish as landed except for mollusks which represent the weight of meats only.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, MAY 1959: Imports of edible fresh, frozen, and processed fish and shellfish into the United States during May 1959 decreased by 8.3 percent in quantity and 0.4 percent in value as compared with April 1959. The decrease was due primarily to lower imports of groundfish fillets (down 3.0 million pounds) and frozen albacore and other tuna (down 6.8 million pounds), and to a lesser degree, a decrease in the imports of canned tuna in brine and canned salmon. The decrease was partly offset by a 2.1-million-pound increase in the imports of lobster and spiny lobster.

United States Foreign Trade in Edible Fishery Products, May 1959 with Comparisons

Item	Quantity			Value		
	May		Year	May		Year
	1959	1958	1958	1959	1958	1958
	(Million of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish: Fresh, frozen, & processed[1/] . . .	82.5	72.4	956.8	25.8	22.3	278.4
Exports:						
Fish & shellfish: Processed only[1/] (excluding fresh & frozen)	5.2	1.4	41.2	1.2	0.3	15.6

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

Compared with May 1958, the imports in May this year were up by 13.9 percent in quantity and 15.7 percent in value due to higher imports of frozen tuna other than albacore (up 7.6 million pounds) and frozen shrimp (up 2.6 million pounds). Compensating, in part, for the increases was a drop of about 2.0 million pounds in the imports of fillets other than groundfish and canned salmon (down 1.1 million pounds).

United States exports of processed fish and shellfish in May 1959 were about unchanged in quantity, but were 9.1 percent higher in value as compared with April 1959. Compared with the same month in 1958, the exports this May were higher by 266.9 percent in quantity and 300.0 percent in value. The higher exports in May this year were due to increased exports of canned California sardines and canned salmon.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA AS OF JULY 4: The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1959 at the 12½-percent rate of duty is 52,372,574 pounds. Any imports in excess of the quota will be dutiable at 25 percent ad valorem.

Imports for January 1-July 4, 1959, amounted to 21,992,914 pounds, according to data compiled by the Bureau of Customs. For January 1-July 5, 1958, a total of 20,407,245 pounds had been imported. The quota for 1958 of 44,693,874 pounds was reached on November 20, 1958.

* * * * *

GROUNDFISH FILLET IMPORTS, JUNE 1959: Imports of groundfish (including ocean perch) fillets and blocks into the United States amounted to 9.3 million pounds--a drop of 1.2 million pounds (11 percent) as compared with the same month of 1958. As a supplier, Canada led all other countries with 5.8 million pounds--a decline of 2.5 million pounds as compared with the corresponding month of last year. Iceland was second with 1.4 million pounds--839,000 pounds greater than in June 1958. Denmark followed with 1.3 million pounds (up 121,000 pounds).

During the first six months of 1959, imports of cod, haddock, hake, pollock, cusk, and ocean perch fillets (including blocks) amounted to 83.9 million pounds. Compared with the first six months of 1958, this was an increase of 16.1 million pounds, or 24 percent. Canada (33.5 million pounds) supplied 40 percent of the six months total. Imports from Iceland (27.8 million pounds) made up 33 percent of the total, while Denmark (10.4 million pounds) and Norway (8.6 million pounds) supplied 12 and 10 percent, respectively. The remaining 5 percent was supplied by West Germany, Miquelon and St. Pierre, the Netherlands, Greenland, the United Kingdom, Ireland, and Japan.

Note: See Chart 7 of this issue.

U. S. Production of Fish Sticks and Portions, April-June 1959

The United States production of fish sticks in the second quarter of 1959 was 14.1 million pounds and fish portions 8.3 million pounds. This was an increase of 283,000 pounds, or 2 percent for fish sticks and 3.1 million pounds, or 59 percent, for portions as compared with the same quarter of last year.

Table 1 - U. S. Production of Fish Sticks by Months, April-June 1959[1/]

Month	Cooked	Raw	Total
	(1,000 Lbs.)		
April	4,591	362	4,953
May	4,308	313	4,621
June	4,222	273	4,495
Total 2nd quarter 1959	13,121	948	14,069
Total 2nd quarter 1958	12,288	1,498	13,786
Total first 6 months 1959	29,246	2,555	32,401
Total first 6 months 1958	27,911	2,797	30,708

1/Preliminary.

Table 2 - U. S. Production of Fish Sticks by Areas, April-June 1958 and 1959

Area	1959[1/]		1958[2/]	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	22	12,185	22	11,452
Interior and Gulf States	5	994	3	1,173
Pacific Coast States	9	890	11	1,161
Total	36	14,069	36	13,786

1/Preliminary.
2/Revised.

Cooked fish sticks (13.1 million pounds) made up 93 percent of the fish-stick production. The remaining 7 percent (948,000 pounds) consisted of raw fish sticks. A total of 7.6 million pounds of breaded fish portions (of which 6.7 million pounds were raw) and 0.7 million pounds of unbreaded portions were processed during the second quarter of 1959. Compared with the same period of 1958, this was an increase of 61 percent in breaded portions and 36 percent in unbreaded portions.

The Atlantic Coast was the principal area for the production of fish sticks with 12.2 million pounds, while the inland, Gulf, and Pacific Coast States led in the production of fish portions.

During the first six months of 1959, a total of 32.4 million pounds of fish sticks was produced--an increase of 6 percent as compared with the corresponding period of 1958. Fish portions (17.2 million pounds) were 73 percent greater than in the same six-months period of last year.

Table 3 - U. S. Production of Fish Sticks, by Months, 1955-1959

Month	1959[1/]	1958[2/]	1957	1956	1955
			(1,000 Lbs.)		
January	6,316	5,471	4,261	4,862	5,345
February	6,394	5,925	5,246	5,323	5,794
March	5,622	5,526	5,147	6,082	7,205
April	4,953	4,855	4,492	3,771	5,953
May	4,621	4,229	3,380	3,873	4,879
June	4,495	4,702	3,522	3,580	5,392
July	-	4,574	3,821	3,153	4,340
August	-	4,358	4,643	4,166	4,520
September	-	5,328	4,861	4,085	4,535
October	-	5,485	5,162	5,063	5,261
November	-	5,091	4,579	4,585	4,946
December	-	5,359	4,014	4,019	4,876
Total	-	60,903	53,128	52,562	63,046

1/Preliminary.
2/Revised.

Table 4 - U. S. Production of Fish Portions by Months and Type, April-June 1959[1/]

Month	Breaded			Unbreaded	Total
	Cooked	Raw	Total		
			(1,000 Lbs.)		
April	398	1,993	2,391	217	2,608
May	228	2,098	2,326	257	2,583
June	323	2,583	2,906	231	3,137
Total 2nd quarter 1959	949	6,674	7,623	705	8,328
Total 2nd quarter 1958	800	3,933	4,733	517	5,250
Total first 6 months 1959	2,631	13,190	15,821	1,371	17,192
Total first 6 months 1958	1,718	7,245	8,963	985	9,948

1/Preliminary.

Table 5 - U. S. Production of Fish Portions by Areas, April-June 1958 and 1959

Area	1959[1/]		1958	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	21	3,808	18	3,028
Inland, Gulf, and Pacific Coast States	11	4,520	7	2,222
Total	32	8,328	25	5,250

1/Preliminary.

Table 6 - U. S. Production of Fish Portions by Months, 1958-1959		
Month	1959 1/	1958
January	2,665	1,973
February	2,996	1,254
March	3,203	1,471
April	2,608	2,268
May	2,583	1,478
June	3,137	1,504
July	-	2,161
August	-	1,516
September	-	1,566
October	-	2,560
November	-	1,979
December	-	2,060
Total	-	21,790

1/Preliminary.

Vessels

MARKET FOR UNITED STATES-BUILT FISHING VESSELS IN MEXICO AND PERU POOR: The market for United States-built fishing vessels in Mexico and Peru (the expansion of the fisheries in both countries has been rapid in recent years) is practically non-existent. Prior to mid-1958 there was a good market for United States-built shrimp trawlers in Mexico, but at present, due to vessel-building subsidies and a protective policy for Mexican shipyards, this market came to an end in the last half of 1958. Peru is also capable of building vessels to add to or replace its present fleet.

Mexico: The largest group of wooden shrimp vessels purchased in the United States the spring and early summer of 1958 were 58 feet in length and cost about US$33,000 each, plus an additional cost of $2,400 for delivery to Salina Cruz. Comparable vessels built in Mexico now cost between $34,000-$36,000, however, the price of Mexican-built shrimp vessels is rising.

The tendency in Mexico is towards steel rather than wooden shrimp vessels. The principal reason for this is that Mexican lumber is not kiln-dried and imported lumber, unless in a free port, is expensive. One owner, who is having two 56-foot wooden vessels constructed in a free port from imported United States pine lumber, estimates that his cost for fully-equipped double-rig boats (with the exception of sonic depth finders) will be about $32,000. The boats will have 120 hp. Diesel engines and the electric plant will be gasoline-powered.

The chief reasons given for purchasing shrimp vessels in the United States were:

(1) The reliability and rapidity of delivery dates of United States as compared to Mexican shipyards. United States delivery dates were from 3-4 months whereas the Mexican deliveries at the time those orders were placed, were about one year away and the Mexican purchasers wanted their vessels as soon as possible.

(2) Of less importance was the fact that better lumber could be secured in the United States.

Table 1 - Costs and Details of Construction of Steel Shrimp Trawlers in Mexico					
Item	Company A	Company A	Company B	Company C	Company C
Cost to Buyer	$38,800	$40,800	$45,200	$40,000	$44,000
Length	58'	62'	65'	55'10"	60'
Beam	16'	17'6"	18'6"	NS.	NS.
Fuel capacity	3,435 gals.	4,490 gals.	5,547 gals.	NS.	NS.
Oil capacity	53 gals.	53 gals.	66 gals.	NS.	NS.
Fresh water capacity	792 gals.	925 gals.	1,320 gals.	NS.	NS.
Hold capacity 1/	21 M.T.	30 M.T.	22-24 M.T.	NS.	NS.
Motor	150 hp.	182 hp.	182 hp.	100 hp.	10 hp.
Delivery time	NS.	NS.	7 mos.	NS.	NS.
Penalty clause	None	None	620 daily	NS.	NS.

1/Capacity in terms of crushed ice.
NS--Not specified.

Prices on steel vessels built in Mexico vary somewhat between companies, and the type of motor also causes variation in price. The customary practice is to quote prices of vessels equipped with motor, mast, booms, winch, light plant, radiotelephone, and sonic depth finder (see table).

The vessels of Company C, whose prices run higher than the others, are equipped with Diesel electric plants whereas the other shipyards furnish gasoline-powered motors. This company claims that it is the only one in Mexico that meets the requirements for the highest class set by the American Bureau of Shipping and for this reason vessels from this yard are more costly, but they pay smaller insurance premiums.

One company prefers about 30 percent payment on signing of the contract and within 15 days of this date the purchaser is required to establish sufficient credit to provide for the purchase of the motor, transmission, power take-off, radiotelephone, sonic depth-finder, winch, and whatever other equipment may be specified in the contract. Within 60 days of signing, providing the vessel is ready for sheathing, about 10 percent of the purchase price is to be paid. Within 90 days about another 10 percent, provided the hull is completely sheathed; within 120 days, about another 10 percent, provided the hull is in the water; and on delivery, the remainder which also amounts to about 10 percent of the sales price.

Another shipyard prefers a down payment of about 20 percent; another payment within 30 days to cover the cost of the motor; a payment of about 20 percent when the hull is ready for sheathing; 20 percent when the hull is sheathed and the remainder, which usually runs around 15 percent, when the hull is completed.

There have been no recent purchases of shrimp vessels in the United States due to a decree issued in March of 1958 which makes it difficult to obtain vessels from the United States.

In addition to the above decree the Mexican Government recently granted local shipyards certain subsidies for boats falling within the size range of the usual shrimp boat.

The most recent purchase of vessels, other than shrimp trawlers, was that of two used menhaden seiners for a fish-meal plant, now under construction at Ciudad del Carmen, Campeche. So far as can be determined in recent months, no new fishing vessels have been purchased in the United States for use in Mexico.

Peru: Peruvian fishing-boat construction has been booming owing to increased interest in fish-meal production. Most of the vessels under construction are about 50 feet in length and are equipped for fishing with purse seines for anchovies. It is understood that the sizes of boats being built in Peru are increasing. One source recently reported a 90-foot fishing boat under construction.

No information is available as to any recent Peruvian purchases of fishing vessels from the United States. It is believed that very few, if any, new fishing vessels have been purchased recently in the United States for use in Peru. Peru is constructing practically all, if not all, of her own fishing vessels.

Virginia

BIOLOGISTS EXPERIMENT WITH MESH SIZE OF CRAB POTS: The shellfish biologists of the Virginia Fisheries Laboratory, Gloucester Point, are trying to find a crab pot that will catch only 5-inch wide legal-size blue crabs, and will allow smaller crabs to escape. The biologists have constructed dozens of pots from wire of different mesh openings, and are comparing the catches of the pots.

The pot that has been most efficient will catch the same number of legal crabs as the pot now used by Virginia's crab fishermen, but catches only one-half as many under-size crabs.

The Virginia biologists are also tagging hundreds of blue crabs in the York River to learn the direction and speed of

movement of crabs, and to obtain estimates of the amount of the commercial fishing effort.

Whaling

PACIFIC COAST WHALING SEASON OPEN: The 1959 season for United States whaling began May 1. For six months after that date, in accordance with regulations issued by the U. S. Department of the Interior, the taking of baleen whales is permitted from licensed land stations; sperm whales may be taken during eight months beginning April 1.

As in 1958, the only United States whaling companies licensed are two California companies which take whales just outside San Francisco. These companies use a total of five catcher vessels. Two secondary stations assist in the preparation of products. The 261 whales taken in 1958 produced meat, oil, and meal valued at nearly one million dollars.

Wholesale Prices, July 1959

There was practically no change in wholesale prices of fishery products from June to July. But prices this July were substantially lower than in 1958 principally because of a sharp drop in shrimp prices. The July 1959 edible fish and shellfish (fresh, frozen, and canned) wholesale price index was down 0.4 percent from June and lower by 6.2 percent from the same month in 1958.

Because of the continuing shortage of large haddock and very light supplies of certain fresh-water fish (yellow pike and Lake Superior whitefish), the price index this July for the drawn, dressed, and whole finfish subgroup was up 8.3 percent from June. Price declines from June to July of 1.5 percent for fresh western halibut, 2.6 percent for large and medium king salmon, and 9.3 percent for round Great Lakes whitefish at New York City failed to offset the higher prices for the other items in the subgroup. The wholesale price index for the subgroup this July as compared with July a year ago was higher by 6.1 percent due to higher prices for all the subgroup items except fresh West Coast halibut prices which dropped 16.3 percent.

The fresh processed fish and shellfish subgroup wholesale price index dropped about 10 percent from June to July this year. Although fresh haddock fillets at Boston were up by 7.9 percent and shucked oysters up 2.2 percent, a 21.9-percent drop in fresh shrimp prices at New York City from June to July more than offset the increases. About the same situation accounted for the 17.7 percent decline in wholesale prices for this subgroup from July a year ago to this July. Fresh shrimp prices in July this year were down 33 percent when compared with the same month in 1958.

Box of iced carp on Fulton Market, Chicago, Ill.

From June to July this year, a decrease of 2 cents a pound in the average price of 26-30 count frozen white and brown shrimp at Chicago was responsible for the 1.2 percent decline in the frozen processed fish and shellfish subgroup index. Wholesale prices for frozen fillets were unchanged during this period. The drop (11.3 percent) in the wholesale price index from July of last year to this July was even more pronounced due mostly to a sharp drop of 19.4 percent in frozen shrimp prices. Average white and brown wholesale frozen shrimp prices (26-30 count) in mid-July this year were down 17 cents a pound from the price of 94 cents a pound reported in July 1958, but last year shrimp supplies and stocks were comparatively light.

The canned fish wholesale price index in July 1959 was fractionally higher when compared with the preceding month due only to an increase of 3-cents a case for the New York City delivered price of Maine sardines. This increase was due to higher transportation charges from the Maine cannery plants to New York City. But the canned fish index this July was lower by 4.0 percent from July a year ago. Canned tuna prices dropped 7.3 percent and canned California sardine prices dropped 35.2 percent from July 1958 to July 1959 because of liberal stocks. These declines were partially offset by higher canned salmon and canned Maine sardine prices. At the end of July this year most of California bait boat tuna fleet was still tied-up in port due to a dispute over ex-vessel prices. The Maine sardine pack in July picked up sharply from June when packing for this season actually started, but the two-months pack total was still below the pack as of July 31, 1958. Stocks of California sardines on hand were all from the August 1-December 31, 1958, packing season. California sardines in tomato sauce are almost sold out, but there is still a good supply of sardines packed natural. Although the sardine fishing season officially opened in Central California on August 1, the 1959 California sardine packing season was unlikely to start because of the lack of agreement between the fishermen and the canners on the ex-vessel price for sardines. The canned salmon pack as of the end of July 1959 was considerably less than last year and indications point to a very light supply for the 1959/60 marketing season.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, July 1959 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			July 1959	June 1959	July 1959	June 1959	May 1959	July 1958
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					123.0	123.5	121.7	131.2
Fresh & Frozen Fishery Products:					139.0	139.9	138.1	150.0
Drawn, Dressed, or Whole Finfish:					160.2	147.9	145.5	151.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.17	.11	169.5	109.1	97.0	131.6
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.34	.34	103.6	105.2	107.0	123.8
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.76	.78	171.3	175.8	174.1	169.1
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.61	.57	151.2	140.1	192.1	132.6
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.79	.88	159.8	177.0	192.1	126.4
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.81	.68	190.0	158.3	140.7	164.1
Processed, Fresh (Fish & Shellfish):					123.0	136.7	136.4	149.4
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.41	.38	139.5	129.3	117.4	134.4
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.66	.85	104.3	133.5	136.7	156.4
Oysters, shucked, standards	Norfolk	gal.	5.88	5.75	145.4	142.3	139.2	142.3
Processed, Frozen (Fish & Shellfish):					120.9	122.4	119.8	136.3
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	102.1	102.1	100.8	103.4
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.34	.34	105.2	105.2	103.6	105.2
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.28	.28	112.8	112.8	112.8	114.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.77	.79	118.4	121.1	117.6	145.1
Canned Fishery Products:					100.5	100.4	98.6	104.6
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	23.50	23.50	122.6	122.6	117.4	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.80	10.80	77.9	77.9	77.9	84.0
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.25	7.15	85.1	83.9	83.9	131.3
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.25	8.22	87.8	87.5	88.8	82.2

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.

KILLING WHALES WITH CARBON DIOXIDE SHELLS

A new Norwegian invention for hunting whales using carbon dioxide (CO_2) will be tried out in practice in whale hunting off Iceland. The new idea, experimented with by a Norwegian engineer, is that when the harpoon hits the whale the shell releases 2.5 m^3 (88 cu.ft.) of CO_2, which spreads through the whale's body and kills it in 2 seconds. It then causes the whale to float to the surface without air having to be pumped into it (Food Manufacture, September 1957).