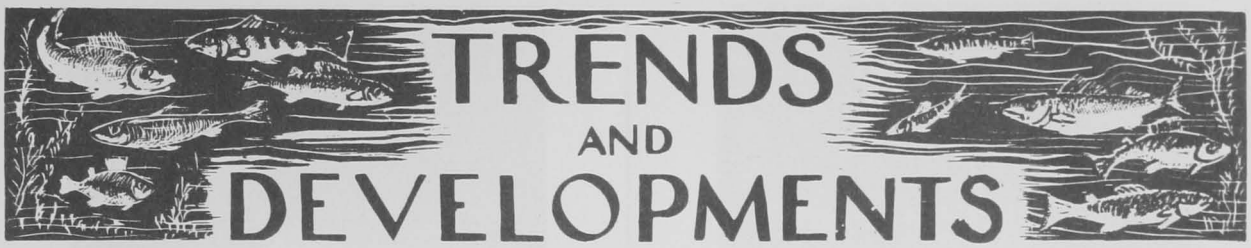


Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 4-- A METHOD OF MAKING ELECTRICAL TRAWL CABLE TERMINATIONS AND CONNECTIONS:

The use of a depth-sensing unit, electrical trawl cable, and a shipboard indicator to telemeter measurements of the operational depth of midwater trawls has been described previously (McNeely 1958, 1959). Correspondence subsequently received at the U. S. Bureau of Commercial Fisheries Seattle Exploratory Fishing and Gear Research Base indicates a growing interest by marine scientists in the use of electrical cables which can tow fishing gear and sampling devices and transmit measurements of (1) performance characteristics, and (2) physical properties of the water masses through which the devices pass. Detailed descriptions of methods of making cable terminations and connections have been requested frequently.

This was prepared to answer these requests. It describes and illustrates workshop techniques and materials tested and found reasonably reliable as a result of use aboard the Bureau's exploratory fishing and gear research vessel John N. Cobb. The general procedure and materials shown can be used to make similar terminations and connections with cable types and marine instruments other than those indicated.

CABLE TERMINATION

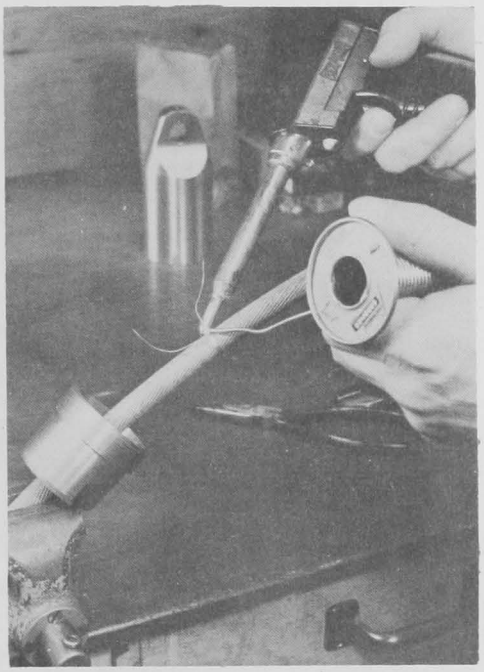


Fig. 1 - Operation 1. Slip the socket section of the sensing-unit housing onto the cable to a position 10 to 12 inches from the cut end. Wind several turns of small-diameter tinned seizing wire around the cable to form a band approximately one-eighth inch wide, 7 inches from the same end. Twist the ends together, solder, and clip off excess wire at the twist. DO NOT ATTEMPT TO SOLDER THE BAND TO THE CABLE.

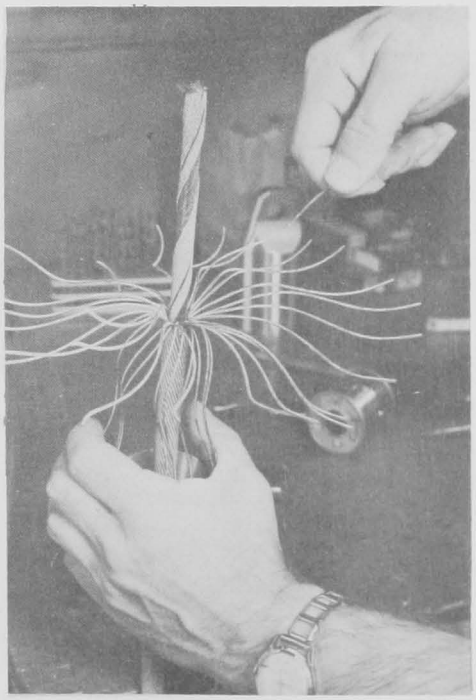


Fig. 2 - Operation 2. Clamp the cable upright in a vise and unwind the outer layer of steel strands--one by one. Bend the strands at the seizing band until each is perpendicular to the cable. Unwind the inner layer of steel strands--one by one--and bend each of these strands sufficiently to pass down between the outer strands.

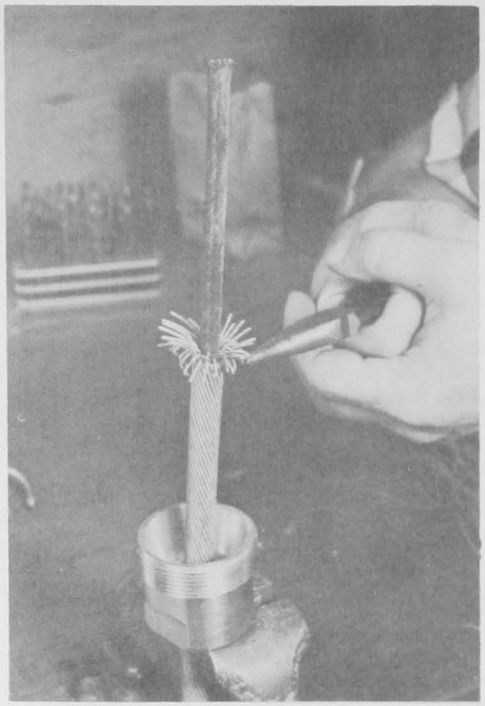


Fig. 3 - Operation 3. Clip off the strands of both layers approximately seven-eighths of an inch from the seizing band. Using a pair of "needle-nose" pliers, bend a right-angle hook on each strand one-quarter inch from the end.

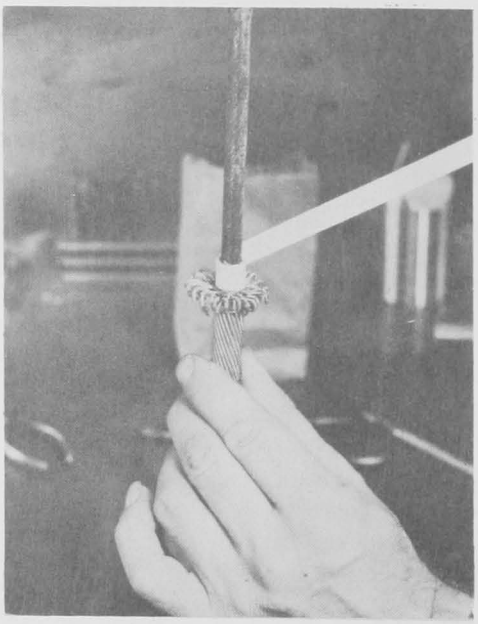


Fig. 5 - Operation 5. Wind successive layers of $\frac{1}{2}$-inch fiberglass tape around the conductor section to a thickness of about one-eighth inch. Butt the edge of the tape firmly against the sealing compound. Build a second section of successive layers of tape to a thickness of one-sixteenth inch directly above the first. Wind any extra tape around the remaining unprotected conductor section and secure the end.

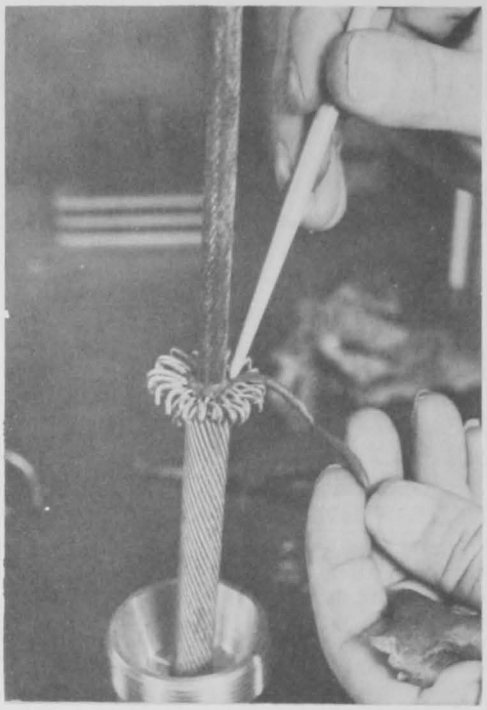


Fig. 4 - Operation 4. Roll out a small thread of sealing compound and tamp it in around the conductor section of the cable.

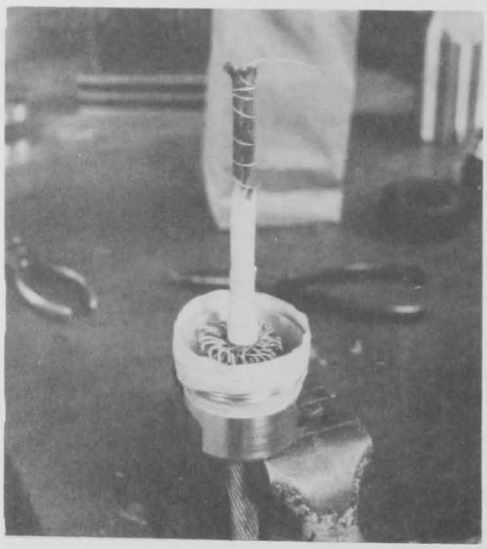


Fig. 6 - Operation 6. Move the socket on the cable until it rests firmly against the bent strands. Pack sealing compound around the cable at the bottom of the socket by tamping it with fingers or other blunt object. Figure 9 shows the sealing compound around the cable. Clamp the cable upright in a vise at a position which will allow the socket to be moved a short distance away from the bent ends of the cable strands. The bent ends should not protrude above the threaded edge of the socket. Wind several layers of glass tape around the threaded edge of the socket, allowing about three-sixteenths of an inch of the tape to form a rim above the edge of the socket.

Fig. 7 - Operation 7. Heat a sufficient amount of babbitt in a ladle until it becomes molten and will blacken a splinter of dry wood. Pour the molten babbitt into the socket in one continuous stream until it rises one-sixteenth to one-eighth of an inch above the threaded edge.

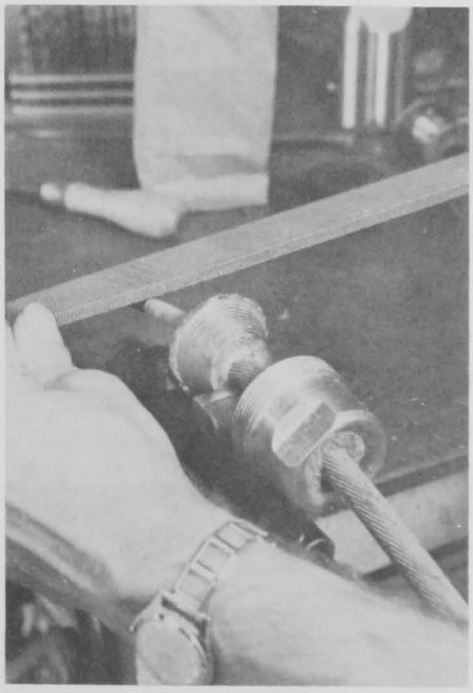


Fig. 9 - Operation 9. File the excess babbitt from around the edge, leaving a shoulder one-sixteenth of an inch wide. Do not remove the glass tape from the conductor section until this operation is complete.

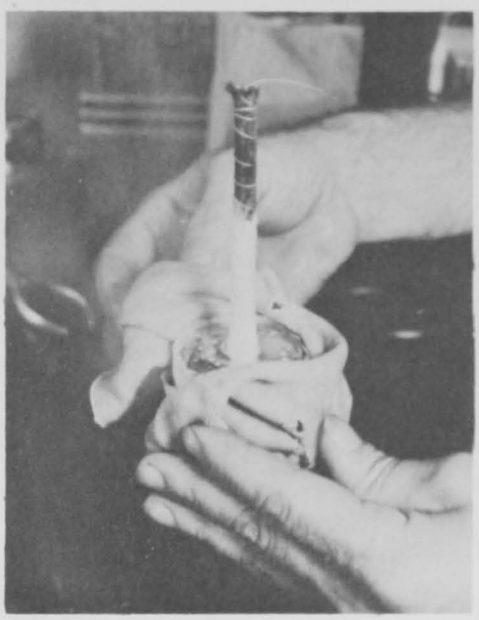
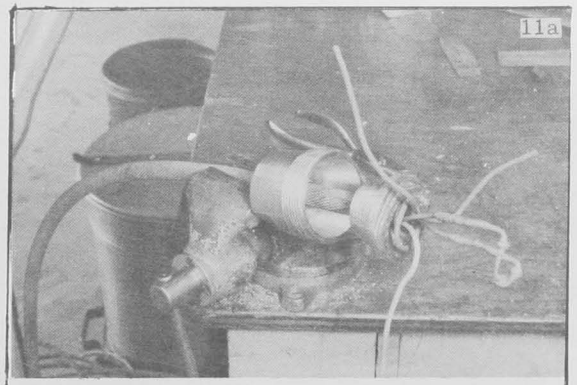
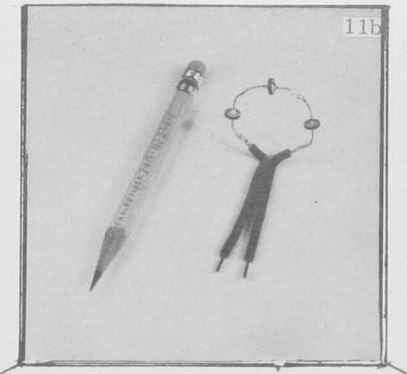


Fig. 8 - Operation 8. This operation is one of the most important of the series. The molten babbitt must be cooled IMMEDIATELY. A pail of water containing a rag should be provided for this purpose. Place the wet rag around the socket until the surface of the babbitt appears to solidify. Remove the babbitted socket from the vise and plunge it into the water for further cooling. When cool, remove it from the water and pull the socket away. The babbitted section is shown in figure 9.

Fig. 10 - Operation 10. Remove the glass tape. Roll back and carefully cut off the nylon sheath covering the conductor section. Separate the conductors and the fillers. Cut away the fibrous fillers and the rubber center filler. Cleanse the conductors with a rag dampened in solvent.

SENSING UNIT CONNECTIONS





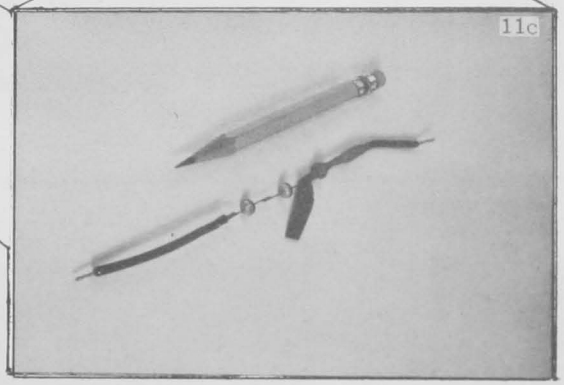


Fig. 11 a, b, c. - Operation 11. Designate one of the conductors number 1. Number the remaining conductors in clockwise rotation for easy identification. Seal the conductors not used with self-vulcanizing rubber tape and coil them. If temperature-sensing thermistors (fig. 11b, 11c) are to be used, cut the two appropriate conductors $1\frac{1}{2}$ inches from the babbitt face and remove the rubber insulation one-quarter of an inch from the ends. Solder the leads of the temperature-sensing unit to the conductors. Insulate the soldered joints with self-vulcanizing rubber tape that has been cut into $\frac{1}{4}$-inch-wide strips. When applying the insulating tape, stretch it until it becomes quite thin and many rounds are required to cover the joint and adjacent areas.

Fig. 12 - Operation 12. Insert necessary conductors into feed-through holes in the sensing-unit housing. Place the thermistor unit inside the base in a manner that will allow the babbitted section to move forward without pinching or cutting the conductors. Grease the babbitt plug and the threads of the socket. Tighten the socket firmly. DO NOT TURN THE BASE--as this will twist the conductors.

Fig. 13 - Operation 13. Place a rubber "O" ring and a feed-through nut on each conductor. Lubricate "O" rings and nuts lightly with silicone grease. Work the "O" ring down into the threaded hole so that the top thread is exposed. Start the nut and tighten it lightly while keeping an upward and counter-clockwise pull on the conductor. This prevents severing the conductor by allowing it to work within its insulation. Tighten the nut carefully until at least two complete threads are engaged. The nut should be snug at this point with optimum seal. Any further tightening may sever the wires without apparently damaging the rubber insulation.

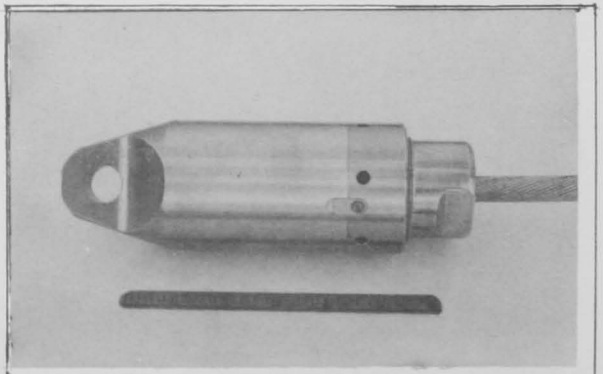


Fig. 14 - Operation 14. Apply a light film of silicone grease to the "O" ring and threads of the base. Install the "O" ring in the groove of the base and screw on body. Insert the key and secure screw. The instrument is now ready for use.

After the feed-through nuts are in place, solder a terminal to each conductor end and connect to the pressure potentiometer.

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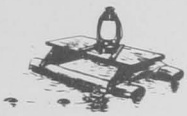
1959. A Practical Depth Telemeter for Midwater Trawls. Modern Fishing Gear of the World, Fishing News (Books), Ltd., London, pp. 363-368.

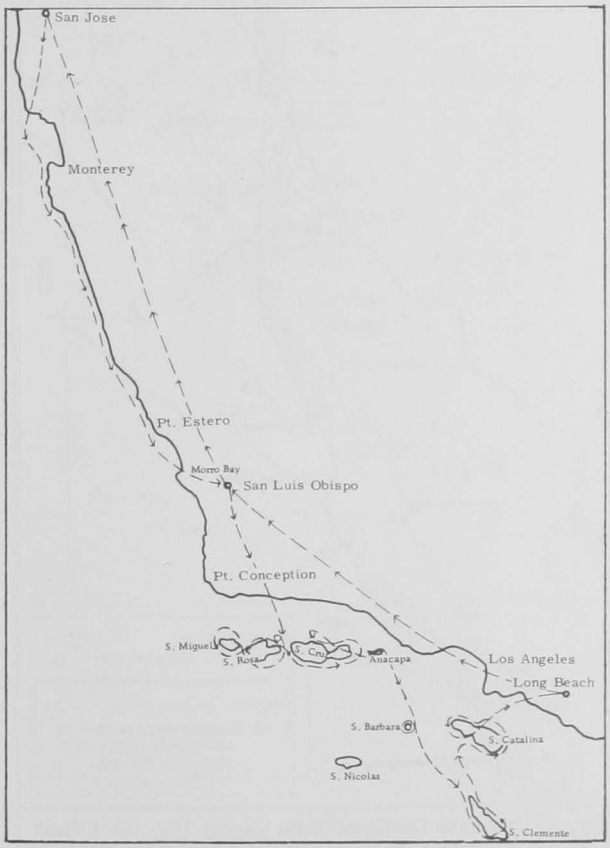
--By Richard L. McNeely, Electronic Scientist,
Branch of Exploratory Fishing,
Division of Industrial Research,
Seattle, Wash.



California

AERIAL CENSUS OF COMMERCIAL ABALONE FISHING CONTINUED:

Airplane Spotting Flight 60-6-Abalone: The shoreline from Monterey to Morro Bay and the Channel Islands of San Miguel, Santa Rosa, Anacapa, Santa Barbara, San Clemente, and Santa Catalina was surveyed from the air on March 16, 1960, by the California Department of Fish and Game Twin Beechcraft to locate specific areas of commercial diving on the opening day of the abalone season.



Airplane Spotting Flight 60-6 (March 16, 1960), to locate specific areas of commercial diving on opening day of abalone season.

From Monterey south to Morro Bay the water was dirty and the ground swells were high. However, one boat was operating just north of Pt. Estero. Among the Channel Islands the weather was better, the swells were diminished and the water clearer. Two boats were observed operating at Santa Barbara Island.

Kelp apparently has maintained itself among the Channel Islands. Conditions appeared to be about the same as when observed on December 5, 1959. Along the mainland, north of Morro Bay, the kelp beds were still present although some showed signs of deterioration from the winter storms.
Note: Also see Commercial Fisheries Review, March 1960, p. 16.

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CRAB FISHING AREA AND INTENSITY STUDIES CONTINUED:

Airplane Spotting Flight 60-2-Crab: The commercial dungeness crab fishing areas from Monterey to the California-Oregon border were surveyed from the air on January 20-21, 1960, by the California Department of Fish and Game Cessna 182 to determine the fishing localities and the relative density of crab gear of the northern California crab fleet.

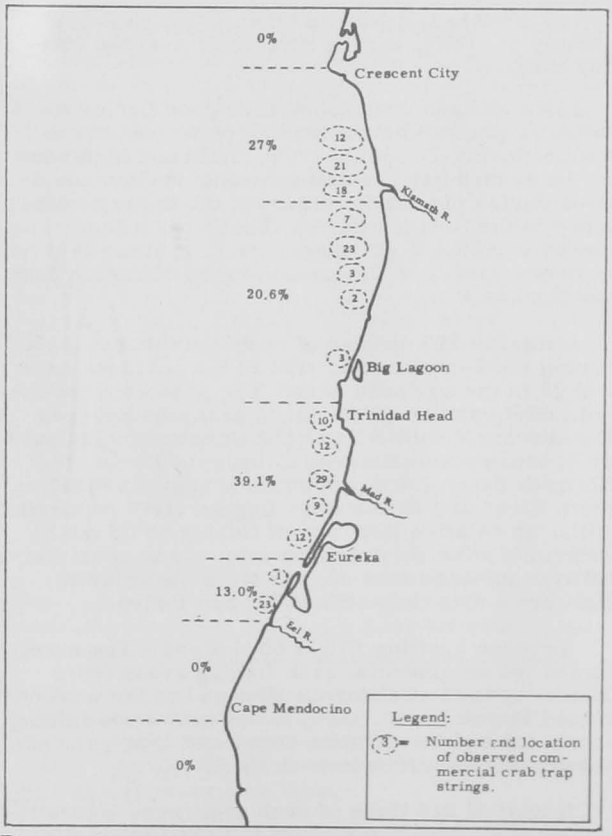

Fig. 1 - Airplane Spotting Flight Cessna 182, 60-2 Crab (January 20, 1960), to study crab fishing areas and intensity of fishing.

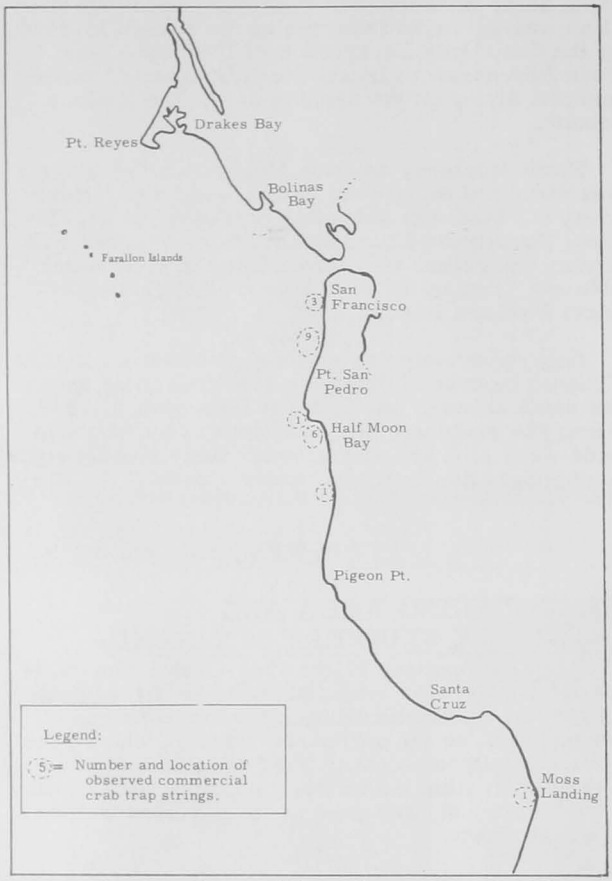

Fig. 2 - Airplane Spotting Flight Cessna 182, 60-2-Crab (January 21, 1960), to study crab fishing areas and intensity of fishing.

Light and sea conditions were good during the northern part of the survey--Cape Mendocino to the California-Oregon border. Rain and high seas on the second day created poor observation conditions during the southern part of the survey--Monterey to the Russian River. These conditions forced eventual flight cancellation, limiting the southern survey to the area between Monterey Bay and Drakes Bay.

A total of 207 strings of crab gear was counted during the 2-day survey: 184 in the northern area and 23 in the southern area. The greatest concentration of gear in the northern area was between Eureka and Trinidad Head (39.1 percent) with lesser concentrations between Crescent City and the Klamath River (27.7 percent) and between the Klamath River and Freshwater Lagoon (19.0 percent). Although relative intensity of fishing could not be determined for the southern area due to poor visibility, concentrations of gear were observed at Half Moon Bay and north of Pt. San Pedro.

Airplane Spotting Flight 60-4-Crab: The survey of the commercial crab fishing areas from Monterey to the California-Oregon border was continued March 14-15, 1960, to determine the fishing localities and the relative density of crab gear of the northern California crab fleet.

A total of 310 lines of crab gear were counted during the 2-day survey, 122 (39 percent) in the southern fishery and 188 (61 percent) in the north-

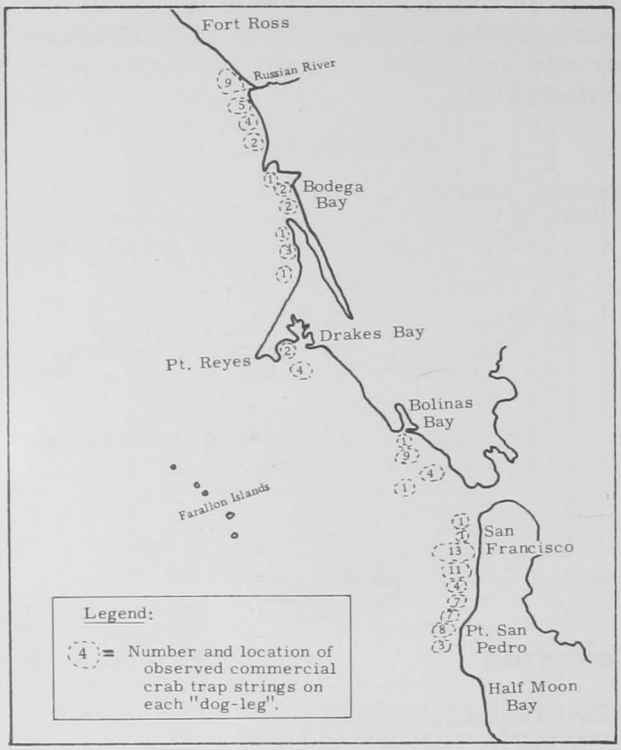

Fig. 3 - Airplane Spotting Flight Cessna 182, 60-4-Crab (March 14, 1960), to study fishing areas and intensity of fishing.

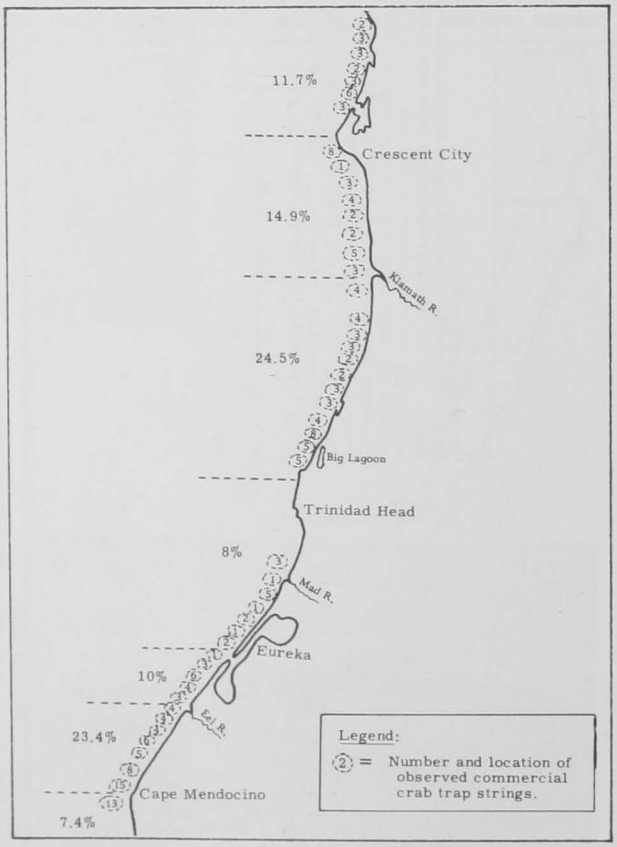

Fig. 4 - Airplane Spotting Flight Cessna 182, 60-4-Crab (March 15, 1960), to study fishing areas and intensity of fishing.

ern fishery. In the southern crab fishery most of the trap strings (51.6 percent) were observed between the Golden Gate and Pillar Pt.

In the northern fishery about half of the gear was north of Trinidad Head and half south. Shifts in gear had taken place since the January 20 flight and there were fewer sets--down 31 percent off Eureka and more--up 31 percent--south of the Eel River. There was also an apparent shift of gear to the area north of Crescent City--up 12 percent--from the Klamath River-Crescent City area--down 13 percent.

Note: Also see Commercial Fisheries Review, May 1960, p. 15.

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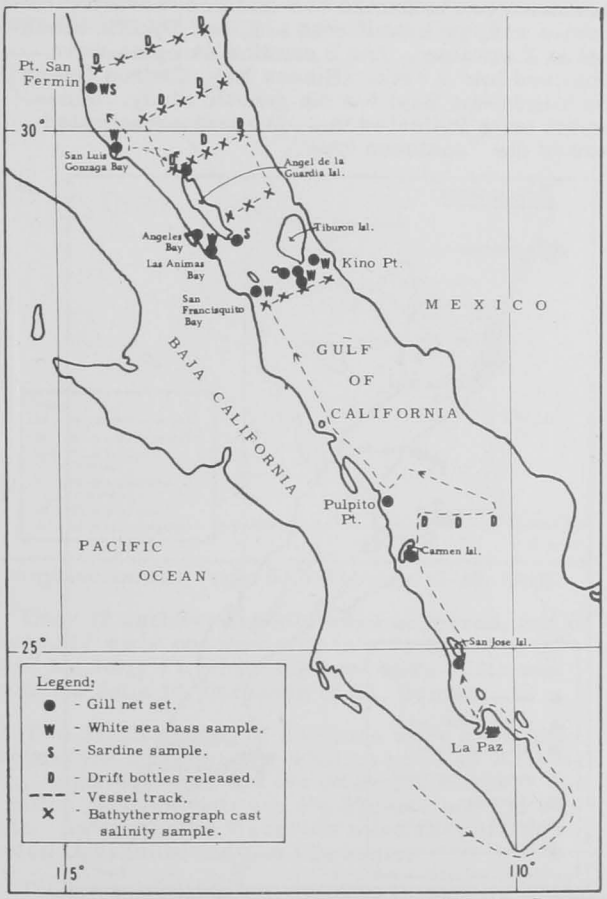
BARRACUDA AND WHITE SEA BASS SURVEY CONTINUED IN GULF OF CALIFORNIA, MEXICO:

M/V "Alaska" Cruise 60A1-Barracuda-White Sea Bass: The Gulf of California, Mexico, area was surveyed (January 19-February 9, 1960), by the California Department of Fish and Game research vessel Alaska: (1) to explore for and collect specimens of white sea bass, Cynoscion nobilis; (2) to make oceanographic observations; (3) collect sardines; (4) to give general assistance to the University of California at Los Angeles field party; and (5) to collect live oysters and other shellfish for possible transplanting into southern California waters.



M/V Alaska Cruise 60A1-Barracuda-White Sea Bass (January 10-February 9, 1960).

Weather, a primary factor of all field expeditions, was of a generally favorable nature, permitting accomplishment of all the basic objectives. Only one of three major disturbances hampered operations. The other two storms occurred en route to and from the Gulf. On a few occasions strong winds restricted fishing to protected bays. Short winter days and great distances limited activities.

SEA BASS--OCEANOGRAPHIC OBSERVATIONS: Gill nets were the major fishing or sampling tool used in the search for white sea bass. An average of five nets per night (range 3 to 8) were fished at 14 different localities from San Jose Island in the south to Punta San Fermin in the north, including Angel de la Guardia, San Esteban and Tiburon Islands. In all 68 gill nets were set, at various depths ranging from 75 fathoms several miles from land to shallow waters close to shore. At each location nets were set in as many different habitats as time and equipment permitted.

A total of 20 white sea bass was taken in gill nets at Tiburon Island, was along the western side of the Gulf from San Francisquito Bay northward. The coastal waters along the Mexican mainland were not fished. Sport and commercial fishermen, however, report taking them along the mainland coast from Guaymas north. All the fish were taken close to shore in depths ranging from 3 to 15 fathoms. The water temperatures, at point of capture, ranged from 14.3° to 16.0° C. (57.7° to 60.8° F.). A catch of 13 sea bass near Monument Point, Tiburon Island was the exception to the generally solitary catches in the other areas. These fish were of medium to large size ranging from 746 to 1,385 mm. total length (29.3 to 54.5 inches). In general, the larger individuals were taken in the northern and warmer sections: San Luis Gonzaga Bay and Pt. San Fermin. The gonads were in various stages of development, up to and including a running ripe female. Attempts to fertilize the eggs from this ripe fish proved futile, perhaps due to the lack of mature sperm.

Morphometrics were taken of all the white sea bass while in the fresh state. These data will be used for comparison with the original description of Cynoscion nobilis. Eleven of the 20 fish were frozen for detailed comparisons with specimens from California waters. Scales of all were saved for age analysis. Of 11 stomachs examined, all were empty.

South of the Gulf's mid-section, below San Francisquito Pt., fishing in 3 widely separated localities did not yield white sea bass or any other sciaenids, although many are known to inhabit these waters.

A fish trap was baited and set in rocky habitat at 8 localities. No white sea bass were taken with this gear. Hook and line fishing at each anchorage and from a skiff at various places also failed to produce sea bass.

Hydrographic observations were limited to: water temperatures taken with recording and bucket thermometers, thermarine recorders and a Hubbs' casting thermometer, and water samples for salinity determinations.

The surface water temperatures registered 19.0° C. (66.2° F.) in the vicinity of La Paz, grad-

ually cooled to a low of 13.6° C. (56.5° F.) in the Gulf's mid-section and warmed slightly to 16.0° C. (60.8° F.) in the upper Gulf off Pt. San Fermin. Vertical temperatures of the upper Gulf from bathythermograph tracings were relatively uniform at 14° to 16° C. (57° to 61° F.). Around Angel de la Guardia, San Esteban and Tiburon Islands, areas influenced by strong currents, a large deep body of water of even temperature was also evident; however, it was slightly colder than the waters to the north ranging from 13° to 15° C. (55.4° to 59.0° F.). In general, these observations agree with predictions of the situation in the upper Gulf for this time of the year. A more refined analysis will be available with the processing of the salinity samples by the Scripps Institution of Oceanography.

To aid the Scripps Institution of Oceanography's study of the surface currents, 96 drift bottles were released at various points, primarily in the upper Gulf where the white sea bass were found.

The above ecological observations indicate that a major portion of the upper Gulf is available, temperaturewise, to the white sea bass population for at least part of the year. Recent studies by Scripps indicate that favorable thermal habitat is available throughout the year in the central areas.

SARDINES: Sardines were found at 2 localities, off the southeast end of Angel de la Guardia Island on January 23 and at Pt. San Fermin on the night of January 31-February 1. In neither instance was it possible to obtain live fish, and samples of about 25 fish each were preserved for the Pelagic Fish Investigation's racial studies. The school of sardines at Angel de la Guardia Island was small and wild and remained under the night light only for a short period. These fish were collected with hook and line using Paulas' lures. The presence of sardines at Pt. San Fermin was not detected until about midnight when a small sampling gill net was hauled from under the night light. These fish were mixed with other species, including grunion and jack smelt. The surface water temperatures in both places at time of collection was similar, ranging from 15.7° to 16.6° C. (60.3° to 61.9° F.).

UNIVERSITY OF CALIFORNIA AT LOS ANGELES: The UCLA field party of four, and a biologist of the California Department of Fish and Game joined the cruise at San Luis Gonzaga Bay on January 22 and left at the same place on January 30. They were transported to the central islands, where four major collecting sites were occupied; 2 on Angel de la Guardia Island, Puerto Refugio and the southeast end; 1 at San Esteban Island and 1 at Tiburon Island. Good collections of fish were made at each locality, utilizing gill nets, hook and line, trawl gear, and rotenone.

OYSTERS: No live oysters or other shellfish suitable for transplanting into southern California waters or the Salton Sea were found. In fact the only oysters observed were fossils, having expired about 20,000 years ago.

BARRACUDA: The different activities yielded a wide variety of fish besides the white sea bass. Of prime interest to the project was the capture of a number of barracuda, Sphyraena sp., at several widely separated localities between San Jose Island and San Luis Gonzaga Bay. It appears that this small undescribed barracuda is the only one in the Gulf, for Sphyraena argentea has not been taken here and S. ensis is reported only from the very southern end. Sphyraena sp. also occurs on the outer coast of Baja California at least as far north as Cedros Island.

Note: Also see Commercial Fisheries Review, January 1960, p. 28.

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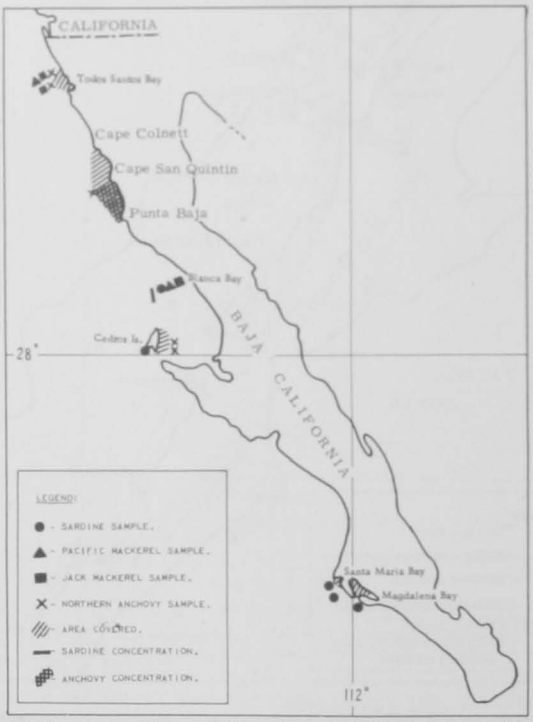
PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 60A2-Pelagic Fish: The coastal waters off Baja California from Todos Santos Bay southward to Magdalena Bay, were surveyed (February 18-March 3, 1960) by the California Department of Fish and Game research vessel Alaska to collect samples of sardines for genetic studies in cooperation with the U. S. Fish and Wildlife Service. The genetic studies include (a) serological tests to delimit the ranges of sardines possessing northern and southern blood "types." (The "northern type" was found off central California and the "southern type" off southern California prior to the fishing season. Since the 1959 season opened in September, sardine samples all have been of the northern type); and (b) detailed morphometric studies, on the above fish, to find morphological characters which may be related to genetic types. Other objectives were to collect sardine specimens for fecundity studies; and to make incidental collections requested by other investigations.

A total of 47 night light stations was occupied. Sardines were collected at 5 stations, northern anchovies at 5, jack mackerel at 3, and Pacific mackerel at 2 stations. The 5 sardine samples were combined into 3 areas (Blanca Bay, Cedros Island and Magdalena Bay) for the genetic study. Serological tests indicated that all sardines sampled were of the "southern type".



M/V Alaska Cruise 60A2-Pelagic Fish (February 18-March 3, 1960).

Approximately 100 large sardine schools were observed 30 miles NNW. of Cedros Island. Very few sardines were seen in any other areas.

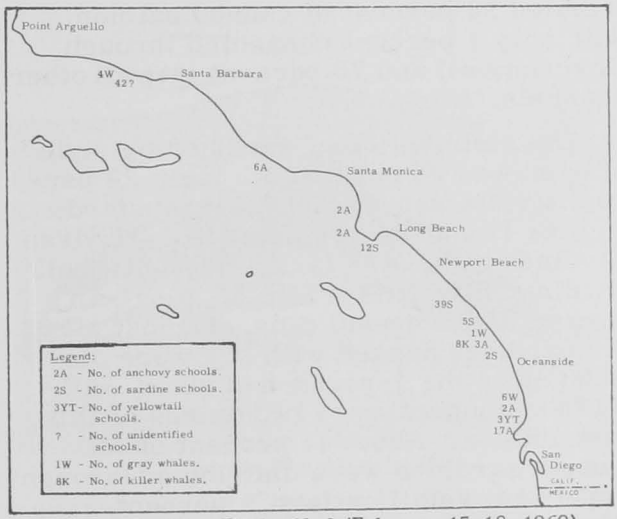
Small anchovies were observed scattered on the surface continuously from Punta Baja to Cape San Quintin, a distance of about 25 miles. Concentrated schools were interspersed within these scattered anchovies. Some fish were caught by holding a brail over the side while under way. In this area anchovies would "flip" and disappear the instant the night light was turned on. However, one light station attracted fish and 4,500 were captured in one blanket net set.

Sea surface temperatures ranged from 12.4° C. (54.3° F.) at San Quintin Bay to 17.15° C. (62.9° F.) at Magdalena Bay. In general, surface temperatures were cooler than those observed in 1959.

Airplane Spotting Flight 60-3-Pelagic Fish: The inshore area from the California-Mexico border north to San Francisco Bay were surveyed from the air (February 15-18, 1960) by the Department's Cessna 180 (3632C) to determine the distribution and abundance of pelagic fish schools.

Weather and visibility conditions were perfect for the first three days but a storm on the fourth day made over-water observations impossible.

No large concentrations of schools were seen in the area surveyed and none was found north of Pt. Arguello. Good coverage of Monterey Bay and the area between Monterey Bay and San Francisco was possible but not a single school was found.



Airplane Spotting Flight 60-3 (February 15-18, 1960).

Only 32 anchovy schools were observed, and of these, 17 were concentrated in a "school group" near La Jolla Pt. while the rest were scattered from La Jolla to just north of Pt. Dume.

Two small groups of sardines were seen, the largest (39 schools) was 4 miles south of Abalone Pt., Laguna Beach, and the other (12 schools) was 2 miles offshore between Pt. Vicente and Pt. Fermin. An additional 7 schools were scattered between Oceanside and San Clemente.

Twelve migrating gray whales in various places, 8 killer whales off Camp Pendelton and 3 schools of yellowtail off La Jolla Pt. were seen.

A group of 42 large, deep, unidentified schools was seen near Coal Oil Pt., Santa Barbara. It is presumed that these schools were composed of sardines or Pacific mackerel but positive identification was not possible.

The water in the area surveyed was generally clean and blue-green in color. Many birds and large amounts of floating kelp were observed in southern California. Kelp beds appeared to be in particularly poor condition.

Airplane Spotting Flight 60-5-Pelagic Fish: The The aerial survey was continued (March 14-16, 1960) along the inshore area from the Mexican border to San Francisco Bay, by the Department's Cessna 180 (3632C) to determine the distribution and abundance of pelagic fish schools.

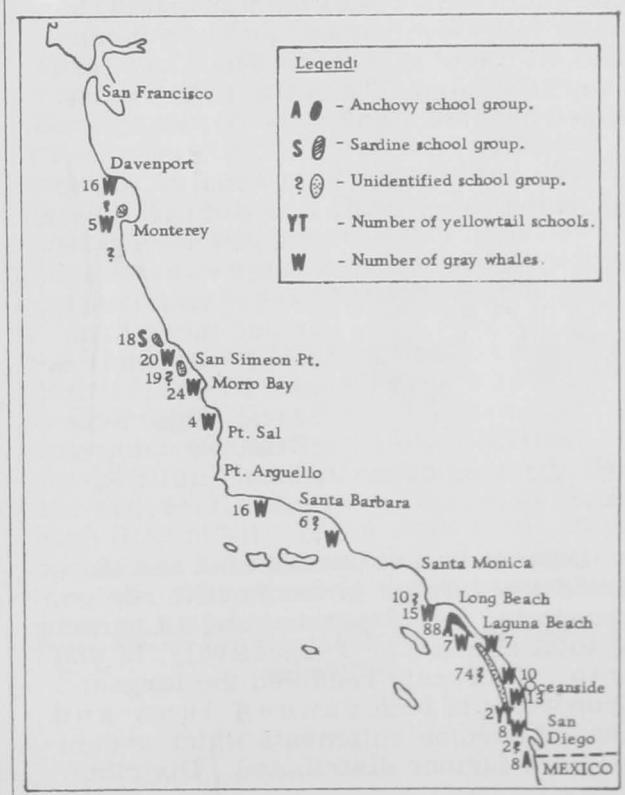
Weather, visibility, and water conditions were generally very good. A total of 244 schools of fish was observed during the flight. Of these, 96 were identified as anchovies, 18 as sardines and 2 as yellowtail. The remainder was not positively identified.

Anchovies were found between Huntington Beach and Laguna Beach (88 schools) and off Pt. Loma (8 schools).

The 2 yellowtail schools were seen off La Jolla Point in almost the exact spot where 3 schools of yellowtail were observed during the February flight.

A small group (18 schools) of sardines was found just north of San Simeon, 2 miles off Sierra Nevada Point.

The majority of the identified schools (74) was seen while flying a straight course between La



Airplane Spotting Flight 60-5 (March 14, 15, and 16, 1960).

Jolla and Laguna Beach, approximately 5 miles offshore. Although not positively identified, these schools behaved in a manner typical of sardines or mackerel. Ten, large, deep, purple-colored spots were seen about 2 miles off Point Vicente. Large quantities of jack mackerel were taken in this general area a few days after the survey. Only 16 schools were seen in Monterey Bay; they were quite deep and remained unidentified.

Migrating California gray whales were observed from Monterey Bay to San Diego. They occurred singly or in groups of up to 10. A total of 131 was counted and all were moving up the coast.

Note: Also see Commercial Fisheries Review, March 1960, p. 17.

Canned Fish

DISTRIBUTION OF CANNED TUNA, SALMON, AND SARDINES:

A shipper survey of canned tuna, salmon, and sardines was recently finished by the U. S. Bureau of the Census for the U. S. Bureau of Commercial Fisheries. The purpose was to obtain data on the (1) geographic location of the market; (2) the commodities that are moving, including number of cases by can size and type, and the class of customer; (3) how much of the pack moves into multi-unit retail food channels, how much into Government, and how much into all other channels. The data are based on shipments in the 12 months ended June 30, 1959.

The study shows that about 23 million standard cases of canned fish were shipped during the twelve months. Canned tuna comprised more than half of the total--about 13 million cases. Shipments of canned salmon and sardines accounted for 5 million cases each.

Distribution of canned tuna and sardines was largest in the Pacific region, accounting for 27 percent and 16 percent of total shipments, respectively, in that area. California received the largest proportion of both canned tuna and canned sardine shipments which eventually are further distributed. Distribution appeared largest in this region because there is a movement from canner to warehouses in the case of tuna and sardines, and for export from California for sardines.

The East North Central Region (Ohio, Indiana, Illinois, Michigan, and Wisconsin) received 23 percent of total shipments of canned salmon. On the West Coast, Washington received 13 percent of total shipments.

Chunk style tuna accounted for 61 percent of total tuna shipments. The one-half pound ($6\frac{1}{2}$-7 oz. net weight of contents) can pack represented 85 percent of tuna shipments. About 39 percent of total tuna pack moved into multi-unit retail food channels, 3 percent channeled through Government, and 58 percent into all other channels.

Red and pink salmon, in almost equal amounts, comprised about 67 percent of total salmon shipments. The one-pound can was the most popular pack for salmon, representing 65 percent of distribution. The multi-unit purchasers distributed 23 percent of canned salmon, with only 1 percent channeled through Government, and 76 percent into all other channels.

The distribution of sardines by style of pack was 38 percent oil pack; 24 percent tomato sauce; 6 percent mustard, and the remainder unidentified. Keyless sardines accounted for 93 percent of all sardine shipments with 56 percent packed in one-pound cans. Almost all of the sardines packed with key were distributed in the $\frac{1}{4}$-pound-can sizes, with oil pack amounting to two-thirds of this distribution. About 17 percent of all canned sardines were distributed through multi-unit retail outlets, 1 percent through Government, and the remainder through other channels.

Cans--Shipments for Fishery Products, January-February 1960

Total shipments of metal cans during January-February 1960 amounted to

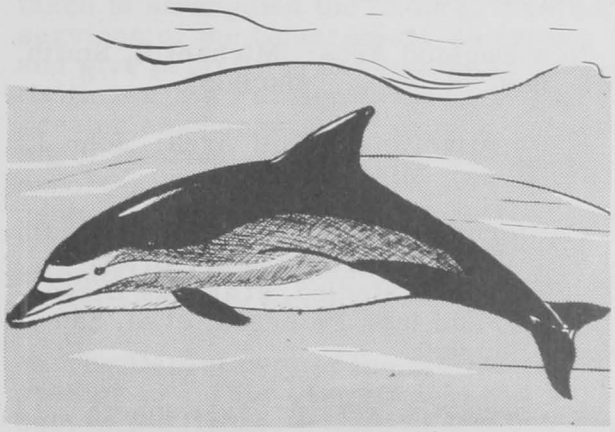
13,609 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 12,445 tons in the same period a year ago. Canning of fishery products in January-February this year was confined largely to tuna, shrimp, Gulf oysters, plus a substantial increase in the canned pack of jack and Pacific mackerel.

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 Fishery Investigations

ALTERATIONS OF RESEARCH VESSEL "CHARLES H. GILBERT":

An underwater observation chamber has been installed in the bow of the research vessel Charles H. Gilbert of the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu. Use was made of the bow chamber in observing porpoises riding the vessel's bow wave. Their posture while riding the bow wave was a curious one--a rigid arc with both head and tail depressed. This was quite different from the suggested posture where the tail is turned upward in the bow wave; in fact, the observed posture seemed most inappropriate for its apparent function, that of utilizing a pressure wave at the vessel's stern for a free ride.



Dolphin (Delphinus bairdi).

Shipyard alterations of the Charles H. Gilbert were completed on April 18, 1960, at Portland, Oreg. These alterations included a new main engine, new quarters and laboratory space, a new pilothouse, the installation of a trawling winch and provisions for handling large trawls overside, and the underwater observation chamber.

* * * * *

HAWAIIAN SKIPJACK TUNA RESEARCH TRENDS, MARCH 1960:

Skipjack size measurements made by biologists of the Honolulu Laboratory of the U. S. Bureau of Commercial Fisheries showed two weight groups to be present in the catch. The most abundant group had a mode at 25 pounds; the other had a mode at 8 pounds. There was also an ill-defined group with a mode at 4.5 pounds.

The estimated March total Hawaiian landings of 310,000 pounds of skipjack were slightly above average for the month. The 1960 data show that the landings through March were composed of small to very large fish. Approximately 50 percent of the catch was fish of less than 10 pounds; 30 percent, fish of more than 22 pounds. This comparatively high percentage of large fish is somewhat typical for the January-March period.

The captive skipjack continue to thrive. Five 2-pound skipjack captured on February 27 and one 6-pound skipjack captured on February 15 are actively feeding on frozen shrimp and squid. With the successful maintenance of these tuna in captivity, plans were made during the month for construction of larger tanks in order that the conditioned response studies may be accelerated.

Note: Also see Commercial Fisheries Review, January 1960, p. 30.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-MARCH 1960:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.9 million

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, March 1960 with Comparisons

QUANTITY				VALUE			
March		Jan.-Mar.		March		Jan.-Mar.	
1960	1959	1960	1959	1960	1959	1960	1959
(1,000 Lbs.)				($1,000)			
1,934	2,023	5,248	4,949	1,081	1,179	2,730	2,800

pounds (value $1.1 million) of fresh and frozen fishery products were purchased in March 1960 by the Military Subsistence Supply Agency. This exceeded the quantity purchased in February by 6.4 percent, but was 4.4 percent under the amount purchased in March 1959. The value of the purchases in March 1960 was higher by 18.5 percent as compared with February, but 8.3 percent less than for March 1959.

During the first three months of 1960 purchases totaled 5.2 million pounds (valued at $2.7 million)--an increase of 6.0 percent in quantity, but lower by 2.5 percent in value as compared with the similar period in 1959.

Prices paid for fresh and frozen fishery products by the Department of Defense in March 1960 averaged 55.9 cents a pound, about 6.1 cents above the 49.8 cents paid in February but 2.4 cents less than the 58.3 cents paid during March 1959.

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

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, March 1960 with Comparisons

Product	QUANTITY				VALUE			
	March		Jan.-Mar.		March		Jan.-Mar.	
	1960	1959	1960	1959	1960	1959	1960	1959
	(1,000 Lbs.)				($1,000)			
Tuna	252	116	1,269	869	122	58	573	387
Salmon	-	-	-	-	-	-	-	-
Sardine	15	228	46	265	6	27	20	40

during March this year. In the first three months of 1960, purchases of canned tuna were up 46.0 percent in quantity and 48.1 percent in value, but purchases of canned sardines were down about 82.6 percent in quantity and 50 percent in value as compared with the same period in 1959. No canned salmon was purchased during January-March 1960 and 1959.

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

Fisheries Loan Fund

LOANS APPROVED MARCH 1-31, 1960:

As of March 31, 1960, a total of 735 applications for fisheries loans totaling $22,657,331 had been received since the program was started. Of these, 395 ($9,105,588) have been approved, 249 ($6,891,314) have been declined or found ineligible, 58 ($2,505,756) have been withdrawn by applicants before being processed, and 33 ($3,116,722) 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 during March 1960:

New England Area: Michael B. Smith, New Bedford, Mass., $60,000.

South Atlantic and Gulf Area: John J. Ross, Biloxi, Miss., $40,142.

California: Darrel W. Furber, Arcata, $4,672; Bernard Ostfeld, Fort Bragg, $13 000; Frank Medina, et al, San Diego, $110,000; and Inez Peterson, et al, San Diego, $80,000.

Pacific Northwest Area: Kenneth Knaak, Newport, Oreg., $23,700; Harvey Benedict, Olympia, Wash., $4,000; Donald A. Simson, Seattle, $6,000; and Richard S. King, Tacoma, Wash., $8,470.

Great Lakes Area: Clare A. Thomas, Unionville, Mich., $7,200.

Alaska: William Spaulding, Auke Bay, $4,000; William H. Dore, Douglas, $6,500; W. H. James, Halibut Cove, $5,200; Moss Brothers, Homer, $3,400; Ernest O. Rude, Juneau, $3,500; Ben H. Fleenor, Ketchikan, $3,500; John R. Malutin, Kodiak,

$7,600; Oscar Dyson and Seldon Nelson, Kodiak, $18,000; Howard Ulrich, Pelican, $2,500; Marion L. Frink, Petersburg, $15,000; James R. Post, Petersburg, $11,670; and Robert O. Brown, Sitka, $4,000.

Fishery Export Trade Promotion Meeting Announced

A fishery export promotion conference, sponsored by the U. S. Department of the Interior in cooperation with the Department of Commerce, was scheduled for June 20, 1960, in the Interior Building, Washington, D. C. The meeting is a part of a series of conferences being held with private trade interests under the Executive Department's program to promote the expansion of United States exports. Various Government departments have been asked to improve their services in the development of new markets overseas and to enlist the efforts of private business in expanding sales abroad. Among other things, steps will be taken to strengthen the trade promotion services of the Government, to expand and give priority to the commercial activities of the Foreign Service, to place greater emphasis on the prompt reporting of information useful to American exporters, to establish new overseas centers, and make full use of trade fairs, trade missions, and other means of stimulating the interest of foreign buyers in United States products.

The Department of the Interior is seeking to get the views and active support of the fishing industry. At the meeting, consideration was given to the present export situation. Advice was obtained of representatives from the fishing industry as to specific moves the Government might undertake to give maximum assistance to increasing sales of fishery commodities abroad. The objective was to identify specific impediments to increased export trade and to attempt to evaluate the additional sales that might result if those impediments were removed or modified.

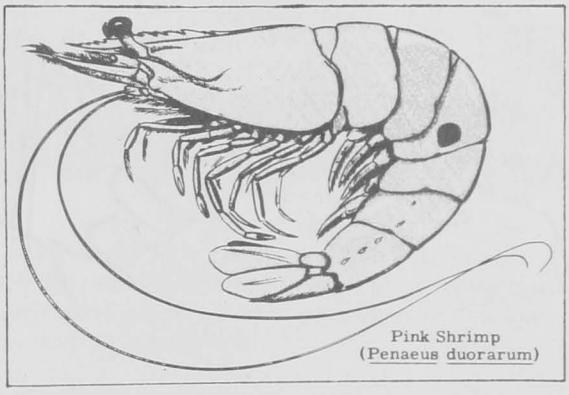
Also requested were suggestions for specific reductions in tariffs imposed by foreign countries which will be of the greatest benefit to exporters of fishery products. Considerable progress has already been made in the relaxation of quantitative trade controls, exchange restrictions, and other barriers to the flow of American goods abroad, but advice on specific problems in individual countries was sought from industry sources. Suggestions from industry will be helpful to those responsible for developing instructions to U. S. representatives at tariff negotiations and international meetings dealing with trade restrictions.

Florida

PINK SHRIMP--MOST VALUABLE COMMERCIAL FISHERY:

The pink shrimp, Florida's most valuable commercial fishery, is the subject of an interesting report of the results to date of shrimp research conducted by The Marine Laboratory of the University of Miami. This research was started in 1952 and is sponsored by the Shrimp Association of the Americas, the U. S. Fish and Wildlife Service, and the Florida State Board of Conservation.

Much of the knowledge sought in the research is produced through tagging operations on the fishing grounds from catches of commercial fishing craft. It has been found that the female pink shrimp have an estimated winter growth of five counts per pound per month, while the males grow seven counts. Counts signify the number of shrimp per pound with heads off. Also, considerable was learned of the migrations of the shrimp. One shrimp from the experiment at Flamingo was recovered just north of Key West. It had been out 123 days and had traveled about 60 miles in a straight-line distance from where it had been tagged. The importance of this recovery lies in the support it provides to the theory that the Everglades National Park estuary is the nursery ground which supplies the Tortugas grounds.



Pink Shrimp
(Penaeus duorarum)

The majority of the recoveries of tagged shrimp is made within 10 miles from the point of tagging. The majority of recoveries of both sexes is made within 50 days. It has been found that the net movement of shrimp is generally northwesterly on the Tortugas grounds.

Figures on shrimp catches in Florida reveal that the State is second in production in the United States, being exceeded only by Texas. In 1958, latest year for which complete data are available, the shrimp fishermen of Florida produced 51 million pounds of all types of shrimp.

The value of the shrimp catch was $18,518,000 as compared with $29,353,000 for the total value of all of Florida's salt-water fisheries landings.

The principal grounds for the pink shrimp is an area of about 1,500 miles immediately west of the tip of Florida between Key West and Dry Tortugas. There are other species of shrimp on the Tortugas grounds besides the pink shrimp, but the pink shrimp is the only species that is at all common in the catches made there.

Shrimp fishing on the Tortugas grounds is by otter trawls and the principal ports at which the catches are landed are Key West, Marathon, Naples, and Fort Myers. The larger shrimp are taken for food, but there is also a considerable fishery for smaller shrimp which are used as bait, mainly by anglers.

The research conducted is designed to learn about the life history of the shrimp, including knowledge of its early life and feeding habits, growth and mortality, spawning behavior, migration, and about the fish predators that feed on it. Only by ascertaining such data can proper management of the shrimp fishery be undertaken.

The Tortugas shrimping grounds are bounded on the south and west by deep water which appears to be a natural barrier to their movement in those directions. To the east the shallow waters of Florida Bay contain small shrimp and from this area the majority of pink shrimp is believed to migrate to the Tortugas grounds. To the north is an area which is largely untrawlable, probably providing protection to the main population of pink shrimp.

Frozen Fish

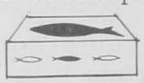
RESTAURANT CHAINS USE HALF-BILLION POUNDS OF FROZEN FOOD A YEAR:

Chain restaurants are using more frozen foods than ever before in history,

according to a survey made by the Restaurant Editions of Chain Store Age magazines. Questionnaires returned to Chain Store Age by top food service executives in the chain drug, chain variety store, chain restaurant, and chain employee feeding fields reveal that 129,410,520 pounds of frozen meat, 179,923,920 pounds of frozen vegetables, 83,563,596 pounds of frozen fruit, and 96,440,504 pounds of frozen fish were used yearly by a total of 16,036 chain food service installations around the United States.

Forty major restaurant chains operating a total of 2,916 units reported to Chain Store Age that frozen fish was used in 2,666 units.

The most popular types of frozen fish, according to the Chain Store Age survey, are haddock (used in 2,028 out of 2,666 units reporting), fillet of sole (1,187 units), shrimp (794), halibut (562), trout (373), scallops (282), cod (169), swordfish (144), and ocean perch (116).



Fur Seals

PRICES FOR ALASKA FUR-SEAL SKINS AT SPRING AUCTION:

At the semi-annual auction sale of Alaska fur-seal skins held in St. Louis on April 9, 1960, a total of 22,561 United States-owned fur-seal pelts was sold for $2,293,580 for the account of the United States Government. The skins are products of the sealing operations of the U. S. Bureau of Commercial Fisheries on the Pribilof Islands.

U. S.-owned fur-seal skins offered and sold at this auction were 1,457 skins less than the number sold at the last sale (October 23, 1959) with the total value of the skins down by 7.5 percent, and average price per skin lower by about 1.5 percent. At the 1959 spring auction held on April 10, 24,578 United States-owned fur-seal skins were sold for $2,451,562 and the average price per skin was $99.75.

The auction's average prices for the skins by types were: dark-brown or matara $99.34 per skin, black $104.43, and the dark shade kitovi $102.00.. The average for all United States skins was $101.66 per skin, or 2.0 percent per skin higher than the average price paid per skin at the 1959 spring auction. Japanese Government Alaska fur-seal skins sold: black $105.81, matara $97.47, total average $99.99. All South Africa fur-

seal skins averaged $45.98. Uruguay skins averaged $50.18.

The sales of all fur-seal skins at this spring auction yielded $3,656,706.50.

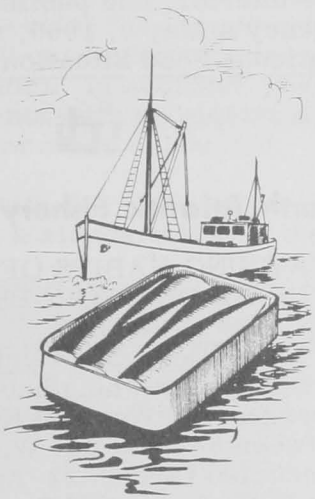
Note: Also see Commercial Fisheries Review, December 1959 p. 49, and June 1959 p. 35.

Maine Sardines

CANNING SEASON FOR 1960 OPENS WITH NO SIGNS OF FISH:

The 1960 Maine sardine canning season legally opened on April 15, but no factories were in operation nor were likely to be until the latter part of May.

Veteran canners and fishermen saw no signs of sardine herring showing up along the coast for several weeks. This has been the pattern for the last few years. In 1959 the first fish in sizable volume were not taken until early June.



The Maine Sardine Council's Executive Secretary said that the same 31 plants that operated along the coast in 1959 from Portland to Robbinston were being put into readiness.

He said that the industry had a production goal of about 2,000,000 cases versus the 1959 short pack of 1,750,000 cases which was caused by a scarcity of fish.

The industry's inventory situation is a favorable one with many types and varieties of pack completely sold out. Prices and demand for the 1959 production have remained firm for the past several months, the Executive Secretary stated.

He said that there had been an increased demand for institutional and military-type packs as a result of sales and promotional work by the Council. Further increases in the demand for these packs are expected in 1960.

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ADVERTISING AIMED AT YOUTH EDUCATION:

The romantic story of Maine's $20 million sardine industry is now being told in comic book format by the Maine Sardine Council.

This activity, aimed at school children as an educational feature, consists of several hundred thousand, eight-page, four-color booklets.

Appropriately entitled "Ricky and Debbie in Sardineland," the drawings take two attractive big city youngsters for a tour of the fishing grounds and canneries as well as a look into the past and future of the industry.

The Executive Secretary of the Council states that the booklets would be dis-

tributed free through schools, supermarkets, and other outlets.

"This is but one phase of a youth education program which we started last year in an effort to interest children in our industry and its products," the Secretary stated.

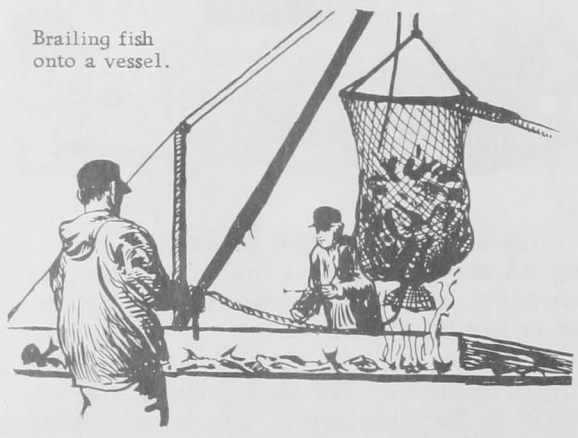
Other activities include a film strip on the industry and the use of home economists to introduce nutritious, low-cost sardine recipes in the school-lunch programs.

Marketing

EDIBLE FISHERY PRODUCTS MARKETING PROSPECTS, SPRING-EARLY SUMMER 1960:

United States civilian per capita consumption of fishery products this spring and early summer is expected to be about the same as a year earlier. Some increase is likely for the fresh and frozen products, offsetting a prospective reduction for the canned. Retail prices of fishery products as a group are expected to continue lower than last year because of a likely reduction for the fresh and frozen products.

Total commercial landings of fish and shellfish as of May 1 were well on the seasonal uptrend, and should continue to expand into the summer. Supplies of canned fishery products will remain below those of a year earlier at least until late summer when marketings of the seasonally packed items--such as salmon and sardines--are at a high level. Canned tuna stocks currently are well below those of a year earlier, but this product is packed throughout the year. Cold-storage holdings of edible frozen fishery products were a little larger this April 1 than last. Such stocks usually are at the year's low-point in mid-spring, and then start building up seasonally.



Brailing fish onto a vessel.

Imports of edible fishery products are expected to continue at a high level. In 1959 they were equivalent to half of our total domestic production of food fish and shellfish.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the former agency's May 9, 1960, release of The National Food Situation (NFS-92).

North Atlantic Fishery Investigations

SPAWNING HABITS OF HADDOCK STUDIED ON GEORGES AND BROWNS BANKS:

M/V "Delaware" Cruise 60-4: A survey of the spawning habits of haddock on Georges and Western Nova Scotia Banks between 64° and 67° W. longitude was conducted (March 23-April 2, 1960) by the U. S. Bureau of Commercial Fisheries research vessel Delaware.

Surface and oblique plankton tows were made at 32 stations, primarily to assess the distribution of cod and haddock eggs. Samples of eggs collected were incubated to determine species composition. Trawling operations with the No. 36 trawl and the Breidfjord floating trawl were conducted at 4 stations. Bathythermograph casts and standard oceanographic observations were made.

On Georges Bank about 1,000 eggs a tow were taken and to the eastward about 200 a tow. Most eggs appeared to be about 7-10 days old. On Browns Bank about 95 percent of early stage eggs appeared dead or dying.

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North Pacific Exploratory Fishery Program

MODIFIED OTTER-TRAWL EXPERIMENTS CONTINUED:

M/V "John N. Cobb" Cruise 45: Fishing gear development experiments were conducted by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb for 52 days. Tows were made on commercial trawling grounds off Destruction Island to Cape Flattery, Wash. The vessel returned to port on April 15, 1960. The work was a continuation of the otter-trawl modification project initiated in February 1959. Two types of modified otter trawls were tested: one, a "free-wing trawl," designed to increase the horizontal opening; and the other, a "blanket trawl" designed to increase the vertical opening. The experimental trawls were tested alternately on commercial fishing grounds with a standard 400-mesh Eastern trawl over the same bottom. In addition, preliminary experiments with an electrical catch-load-indicator were conducted.

In 22 tows (11 with the "free-wing trawl" and 11 with a standard trawl) the

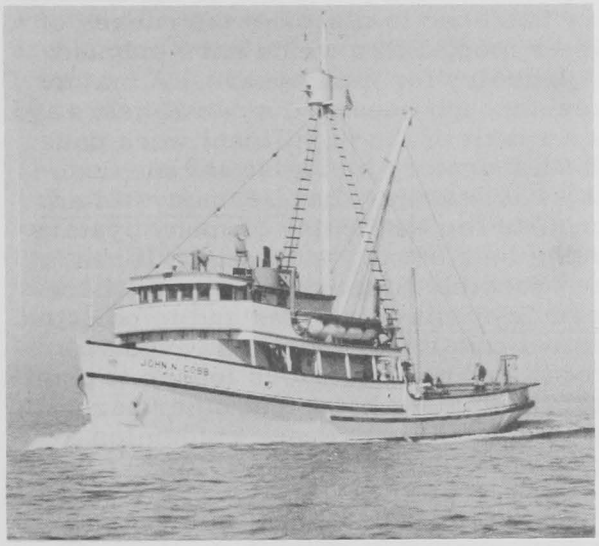

Fig. 1 - The U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb.

experimental gear did not produce significantly greater catches of flatfish. Modifications to the experimental gear late in the trip improved catches considerably; however, there was insufficient time for an adequate number of comparative tows. Towing speeds varied from 1.6 to 2.8 knots (ground speed).

The "blanket" modification was compared on 13 tows--7 tows with the experimental gear and 6 with a standard trawl. Apparently the fish were capable of avoiding the "blanket trawl" since catches were consistently considerably lower than those with the standard gear. These tows were made on commercial rockfish grounds. Ground speeds ranged from 1.8 to 3.0 knots.

During the frequent periods of stormy weather offshore, instrumentation experiments were performed in the sheltered waters of the Straits of Juan de Fuca. Using the electrical trawl cable and accessory gear, tests were conducted to determine the feasibility of using instrumentation to provide a continuous catch-magnitude indication. These trials indicate that an electrical dynamometer placed on the cod end will indicate on an ammeter the progressive build-up of catch, the lack of catch, or a loss of catch.

Note: Also see Commercial Fisheries Review, June 1959 p. 44.

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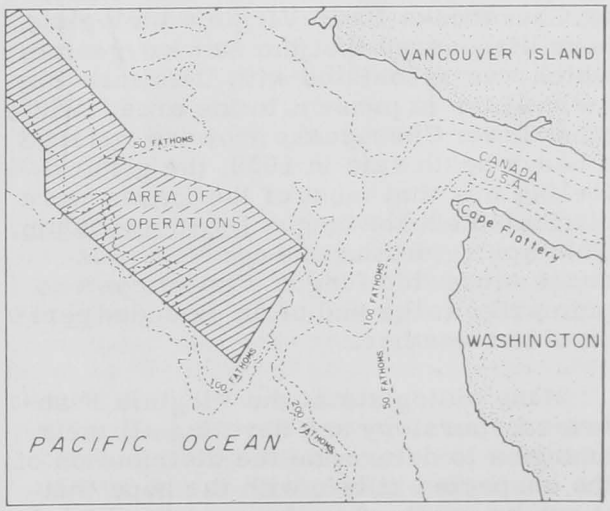
EXPLORATORY BOTTOM-FISH TRAWLING OFF COAST OF WASHINGTON AND VANCOUVER ISLAND PLANNED:

M/V "John N. Cobb" Cruise 46: Bottom-fish trawling is the purpose of the cruise scheduled for the U. S. Bureau of



Operational Area - Cruise 46 - M/V John N. Cobb.

Commercial Fisheries exploratory fishing vessel John N. Cobb during May and June. The vessel left May 2 for eight weeks of exploratory fishing off the Washington and Vancouver Island coasts.

Oceanic Bacteria

UNIVERSITY OF MIAMI GRANTED FUNDS FOR EXTENSION OF RESEARCH:

A grant of $30,000 has been made to The Marine Laboratory of the University of Miami by the National Institutes of Health to cover the costs of a four-year extension of studies of bacteria found in the ocean.

These bacteria, some of a distinct orange and red coloration, are toxic to fishes and sometimes kill them in large numbers. The studies concern the general biology of these bacteria which are found in the sediments and plant and animal waste in the ocean. The research is designed to ascertain just what part they play in the life contained in the ocean.

Oysters

HEAVY LOSSES DISCOVERED IN LOWER CHESAPEAKE BAY:

Early in April this year, oysters were dying heavily in certain parts of the lower Chesapeake Bay. Virginia biologists have discovered that the same organism which was associated with Delaware Bay mortalities is present in the area. While some lower Chesapeake growers suffered a heavy death rate in 1959, the general feeling was that most of the losses were attributable to the fungus Dermocystidum. This spring deaths are not from this cause since this fungus attacks oysters primarily at the end of an extended period of hot weather.

Many biologists at the Virginia Fisheries Laboratory are devoting all their energies to determine the distribution of the suspected killer, with the hope that it can be confined to the area in which it is currently known to exist.

There has been a great deal of speculation among the people in all the Chesapeake area. Since the area of high mortality is located in areas of relatively high salinities it is hoped that the lower salinity beds will not be attacked.

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VIRGINIA BIOLOGISTS USE AUTOTECHNICON TO SPEED UP RESEARCH:

Automation at the Virginia Fisheries Laboratory, Gloucester Point, is now allowing scientists to examine oysters twice as fast as in the past. A newly-installed Autotechnicon mechanically processes slides of oyster tissue, leaving the technicians free to prepare more oysters for the Autotechnicon to process.

According to the chief marine microtechnician, who has personally prepared about 2,000 slides of 1,500 oysters during the past year, "The Autotechnicon frees me from much of the drudgery of slide preparation. The two of us should be able to prepare oyster tissues for the scientist to read twice as fast as I could do it alone."

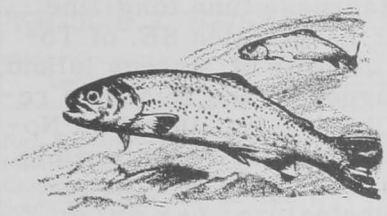
One of the most important though time-consuming problems of the Laboratory has been to discover the causes of oyster mortalities which have plagued the industry for many years. A major breakthrough occurred several years ago as a result of the significant work done by a Laboratory biologist and his associates in learning that Dermocystidium accounts for the deaths of many oysters during long hot dry summers. It has been possible to mark out areas where Dermocystidium is found and to point out natural conditions which will favor its growth and cause serious losses to planters. Biologists know that other parasitic plants and animals cause epidemics among shellfish at times.

The newly-established Microbiology-Pathology section of the Laboratory hopes to pin down other organisms involved in diseases of marine animals. Careful and rapid microtechniques are essential to these studies. With the new labor-saving Autotechnicon, the mortality research program will be greatly improved.

Salmon

KING SALMON ESCAPEMENT TO COLUMBIA RIVER SPAWNING GROUNDS GOOD:

The number of chinook or king salmon counted at Bonneville Dam on the Columbia River as they moved upstream is higher this year than by the same date last year, indicating good escapement for the spring chinook salmon run in the river, the Director of the Washington State Department of Fisheries reported on May 5, 1960.



As of May 2, a total of 40,875 chinook had been counted over the Dam, compared to 35,000 by the same date last year. Salmon were moving over the Bonneville fishway at the rate of 5,000-6,000 a day.

The chinook catch in the commercial gill-net fishery, which opened April 30, has been generally poor. Most catches were made in the lower river, where fish are larger. Upstream catches have been less and fish are smaller, running only 10 to 15 pounds.

Early in May the river was dropping and clearing, making for good conditions for fish movement upstream. The Columbia River commercial gill-net salmon fishery, which was open until noon May 27, was conducted chiefly at night because of clear water.

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MIGRATION STUDIES IN NORTH PACIFIC TO BE CONTINUED:

To continue studies of salmon migration on the high seas, two research vessels of the University of Washington College of Fisheries left early in April on a 5-months salmon-tagging voyage along the entire length of the Aleutian Islands from Unimak Pass to Attu.

The cruise is part of a long-range salmon migration study in the North Pacific conducted by the Fisheries Research Institute of the University. Now in its fifth year, the project will be conducted with two chartered purse-seiners, the Commander and the Renown, under a $256,000 contract with the U. S. Bureau of Commercial Fisheries.

The vast sea area centered around the Aleutian Islands is a "nursery" where many North American salmon go to mature before beginning their long journey back to their native rivers. In previous years, some of the tagged fish have been recovered in the rivers of Russia and Japan and have been found as far south as Oregon.

From a scientific standpoint, the long-term project is providing important new information on the life history of salmon. The results also will have an important effect on methods of conserving the valuable salmon runs. (University of Washington News Service, April 7, 1960.)

Note: Also see Commercial Fisheries Review, August 1957 p. 39; April 1958 p. 35; and September 1959 p. 41.

Transportation

STUDY OF EFFECTS OF NEW TRANSPORTATION EQUIPMENT ON FOOD QUALITY URGED:

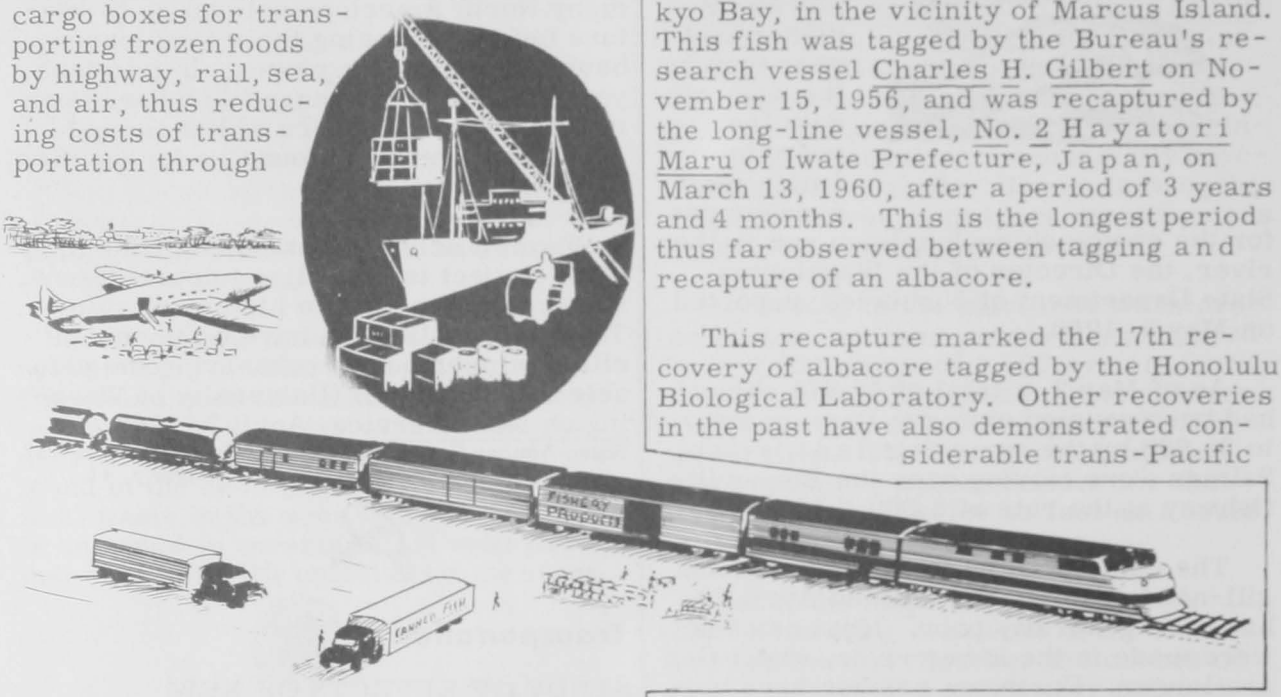
Research to determine the effect on food quality of new equipment, such as mechanically-refrigerated trucks and railroad cars and thermostatically-equipped ice-bunker cars was advised by members of the U. S. Department of Agriculture's Transportation Research and Marketing Advisory Committee at its annual meeting in Washington, February 23-25, 1960.

Shippers need to know if they can increase load size without affecting quality with the new equipment now in service, the Committee noted. It specifically recommended that researchers seek to determine the effect of improved temperature control and air circulation on product quality, and the effect of load size and pattern on temperature, air circulation, bruising, and subsequent quality.

Development of a standard method of rating refrigerator cars that would allow

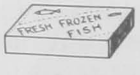
railroads to specify and manufacturers to measure the ability of a refrigerated railroad car to maintain required inside temperatures was also suggested. Such a system has been recently developed and adopted by the trucking industry for motortruck trailers.

The committee also recommended development of portable refrigerated cargo boxes for transporting frozen foods by highway, rail, sea, and air, thus reducing costs of transportation through the reduction of multiple handling of packages.



Research on the traffic-flow of trucks not regulated by the Interstate Commerce Commission that are carrying food from farms to marketplace should be expedited, according to the committee. Information is lacking on the exact scope and extent of this important movement of food in unregulated trucks.

Other important transportation research needs the committee listed are: (1) development of improved methods of loading perishable commodities on railway cars and trucks so as to reduce bruising and spoiling; (2) studies to improve protection of food against insect damage during transportation.



Tuna

ALBACORE TAGGED OFF CALIFORNIA RECAPTURED BY JAPANESE:

An albacore tagged and released off San Francisco, Calif., by biologists of the Honolulu Biological Laboratory, U. S. Bureau of Commercial Fisheries, was recaptured by Japanese tuna long-line fishermen about 1,000 miles SE. of Tokyo Bay, in the vicinity of Marcus Island. This fish was tagged by the Bureau's research vessel Charles H. Gilbert on November 15, 1956, and was recaptured by the long-line vessel, No. 2 Hayatori Maru of Iwate Prefecture, Japan, on March 13, 1960, after a period of 3 years and 4 months. This is the longest period thus far observed between tagging and recapture of an albacore.

This recapture marked the 17th recovery of albacore tagged by the Honolulu Biological Laboratory. Other recoveries in the past have also demonstrated considerable trans-Pacific movements extending from the United States west coast to the vicinity of Tokyo Bay, indicating that there is probably a single population of this valuable tuna species in the North Pacific.

According to the Director of the Laboratory, much valuable information is obtained whenever there is a tag recovery. "Not only do we learn about migratory movements, but also about albacore age and growth. Although scientists tag the fish, we are dependent upon fishermen for the recoveries. This is an excellent example of the cooperation between fishermen and scientists, who are both interested in learning more about albacore," he said.

United States Fishing Fleet[1/] Additions

MARCH 1960:

A total of 24 vessels of 5 net tons and over were issued first documents as fishing craft during March 1960--a decrease of 5 vessels as compared with the same month in 1959. The Pacific area led with 9 vessels, followed by the Gulf area with 6, the South Atlantic with 4, and the Great Lakes with 2 vessels. The New England, Middle Atlantic, and Alaska areas accounted for the remaining 3 vessels.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, March 1960

Area	March		Jan.-Mar.		Total
	1960	1959	1960	1959	1959
	(Number)				
New England	1	3	3	5	15
Middle Atlantic	1	3	5	3	12
Chesapeake	-	8	9	21	106
South Atlantic	4	6	14	18	76
Gulf	6	9	13	25	135
Pacific	9	-	18	8	97
Great Lakes	2	-	3	3	6
Alaska	1	-	1	2	32
Total	24	29	66	85	479

Note: Vessels assigned to the various areas on the basis of their home ports.

During the first three months of 1960, a total of 66 vessels were issued first documents as fishing craft--19 less than were reported during the same period of last year. Most of this decline occurred in the Chesapeake and Gulf areas, each of which showed a drop of 12 vessels compared with the 1959 three-months period.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft By Tonnage, March 1960

Net Tons	Number
5 to 9	8
10 to 19	9
20 to 29	4
30 to 39	2
40 to 49	1
Total	24

1/Includes both commercial and sport fishing craft.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, FEBRUARY 1960:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during February 1960 decreased by 23.1 percent in quantity and 17.3 percent in value as compared with January 1960. The decrease was due primarily to lower imports of frozen albacore and other tuna (down 9.8 million pounds), and to a lesser degree, a decrease in the imports of canned tuna in brine (down 2.6 million pounds), canned salmon (down 2.2 million pounds), and frozen shrimp (down 1.1 million pounds). The decrease was partly offset by increases of less than 1 million pounds in the imports of groundfish fillets, fresh and frozen salmon, and canned sardines in oil.

United States Imports and Exports of Edible Fishery Products, February 1960 with Comparisons

Item	QUANTITY			VALUE		
	February		Year	February		Year
	1960	1959	1959	1960	1959	1959
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish: Fresh, frozen, & processed[1/]	62.8	72.8	1,070.5	20.5	21.3	309.6
Exports:						
Fish & shellfish: Processed only[1/] (excluding fresh & frozen)	5.3	3.3	68.0	1.3	1.0	22.8

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

Compared with February 1959, the imports in February this year were down 13.7 percent in quantity and 3.8 percent in value due to lower imports of frozen tuna other than albacore (down 10.5 million pounds), and canned tuna in brine (down 1.4 million pounds). Compensating, in part, for the decreases was an increase of about 2.6 million pounds in the imports of groundfish fillets and fresh and frozen lobsters (up 0.9 million pounds).

United States exports of processed fish and shellfish in February 1960 were lower by 19.7 percent in quantity and 27.8 percent in value as compared with January 1960. Compared with the same month in 1959, the exports this February were higher by 59.1 percent in quantity and 30.0 percent in value.

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FISH MEAL AND SCRAP IMPORTS, 1940, 1950, 1955-59:

Imports of fish meal and scrap into the United States during 1959 amounted to 132,955 short tons--an increase of 32,603 tons or 32.5 percent as compared

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, April 1960 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			Apr. 1960	Mar. 1960	Apr. 1960	Mar. 1960	Feb. 1960	Apr. 1959
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					123.3	123.4	121.8	122.7
Fresh & Frozen Fishery Products:					136.7	137.6	134.9	139.6
Drawn, Dressed, or Whole Finfish:					144.3	148.5	147.2	141.9
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.06	.12	60.8	116.9	120.9	76.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.30	.29	92.8	90.3	90.3	102.1
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.80	.78	179.2	174.7	172.5	171.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.98	.79	241.7	195.8	185.9	241.7
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	1.05	.72	212.5	144.7	136.6	217.4
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	1.00	.78	234.5	181.8	170.0	166.5
Processed, Fresh (Fish & Shellfish):					137.1	142.2	134.5	136.5
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.28	.35	93.6	117.4	139.5	97.0
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.78	.81	123.2	127.2	112.2	137.4
Oysters, shucked, standards	Norfolk	gal.	6.63	6.75	164.0	167.0	163.9	142.3
Processed, Frozen, (Fish & Shellfish):					116.2	109.1	110.2	128.3
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	99.5	98.1	98.1	103.4
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.27	.29	84.8	89.5	97.3	111.4
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.29	.29	116.8	114.8	110.8	118.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.77	.68	118.0	104.5	104.1	128.1
Canned Fishery Products:					104.8	103.8	103.8	99.0
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	117.4
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.10	10.80	80.0	77.9	77.9	79.3
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.00	8.00	93.9	93.9	93.9	82.2
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	87.5

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.

ECOLOGY OF SHRIMP STUDIED

Research on a typical nursery area is being continued by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries. This work shows promise of defining the complex ecology of the shrimp nursery grounds and will show when the brown and white shrimp larvae arrive from the sea and then depart to the offshore waters as the season progresses. The Laboratory staff will try to determine the physiology, tolerance, and response of shrimp to various conditions and their nutritional requirements.