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## THE OREGON'S FISHERY EXPLORATIONS IN THE GULF OF MEXICO, 1950

(A Preliminary Report)

By Stewart Springer\*

### INTRODUCTION

Recognition of the need for more knowledge of the fishery resources of the Gulf of Mexico led to the formation of the Gulf States Marine Fisheries Compact and the development of a program for fishery explorations and research. The U. S. Fish and Wildlife Service is the primary exploratory and research agency for the Gulf States Marine Fisheries Commission.

To conduct the exploratory phases of the program, the M/V Oregon, a conventional steel hull Pacific Coast purse seiner, owned by the Fish and Wildlife Service and operated by the Exploratory Fishing and Gear Development Section of the Branch of Commercial Fisheries, was transferred to the Gulf in January 1950. (Figure 1)

Guided by the recommendations submitted by the Commission, the vessel's initial explorations for tuna, red snapper, and shark were combined with a general reconnaissance of fishing conditions near the continental shelf from Dry Tortugas to the lower coast of Texas. Following these initial explorations, intensive explorations for grooved shrimp were undertaken and are now in progress.

The fisheries of the Gulf of Mexico produce a substantial portion of the fishery products consumed in the United States. With the exception of the red snapper fishery on the Campeche



FIGURE 1 - USFWS OREGON ON AN EXPLORATORY CRUISE IN THE GULF OF MEXICO.

\*FISHERY ENGINEER, GULF EXPLORATORY FISHERY PROGRAM, EXPLORATORY FISHING AND GEAR DEVELOPMENT SECTION, BRANCH OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, PASCA-GOULA, MISSISSIPPI.

Banks and near the continental shelf and some hand-line fishing for grouper or bottom fish in scattered localities, the Gulf fisheries are confined to depths of less than 25 fathoms. With the varied fisheries conducted only in a narrow band along the Gulf Coast and only a scattered hand-line fishery elsewhere, it is not surprising that knowledge of the Gulf's offshore marine resources is scanty (see Figure 2, p. 3).

The fish and shellfish of the inshore waters are relatively well known and support a large and varied industry. Important fisheries for menhaden and mullet are carried on exclusively in very shallow water or in protected bays and estuaries while commercial catches of Spanish mackerel, king mackerel, bluefish, pompano, and blue runner are generally made within sight of land. Fishing for some of these species may be expected to remain primarily a shallow-water activity, but production periods are seasonal and the extent of populations in offshore waters is not known.

Along with the technological developments in the freezing and handling of shrimp and the expansion of markets for this product, the composition of the shrimp fishing fleet has changed in recent years. Small boats of very shallow draft still operate in protected waters and rarely move far from the home base, but larger trawlers capable of extended trips into the open Gulf are now numerous, some roving over the entire Gulf in order to work on fishing grounds of maximum productivity throughout the year. The range of the important shrimp fishery in the Gulf at the beginning of 1950 extended outward to depths of 25 fathoms in parts of the north and northwest Gulf. Formerly this fishery was based exclusively on the white shrimp or green-tailed shrimp (Penaeus setiferus), but for several years the industry has made increasing use of the grooved shrimp (Penaeus aztecus) and the spotted or pink-grooved shrimp (Penaeus duorarum).

The fishing information gathered by the Oregon is cumulative and results from a short period of operation are necessarily tentative or refer only to limited areas covered by intensive fishing. Fishing activities of the Oregon are recorded in detail for future analyses. Furthermore, whether the activity is a shrimp-trawl drag, a drift-net set, or an operation of any other type, it is carried out with a view to comparison with another operation. Information on the rate of catch in pounds-per-hour with different kinds of gear in different localities at different seasons is being accumulated and modifications of methods used in fishing or modifications of the gear are tried out as soon as possible. The explorations undertaken follow a comprehensive plan but for more immediate practical results special emphasis has been put on certain phases of the work briefly reported here.

## TUNA

Little tuna (Euthynnus alletteratus) were found by the Oregon distributed near the continental shelf from Aransas Pass, Texas, to Tortugas, in the late spring and summer. They were not observed in cruises in the north and northwest Gulf in November and December. Characteristically, the fish were found in scattered schools with only a few showing in each school. In aggregate, the stocks of little tuna in the Gulf appear to be very large but whether they occur regularly in schools compact enough to make purse-seining practical remains to be demonstrated. The Service plans to make purse-seine tests for little tuna in the near future.

Other species of tuna are reported in the Gulf from time to time but reports are not frequent and only a few have been substantiated by captures. Three observations of large tuna were made by the Oregon at sufficiently close range to permit field identification. One specimen taken near the mouth of the Mississippi River

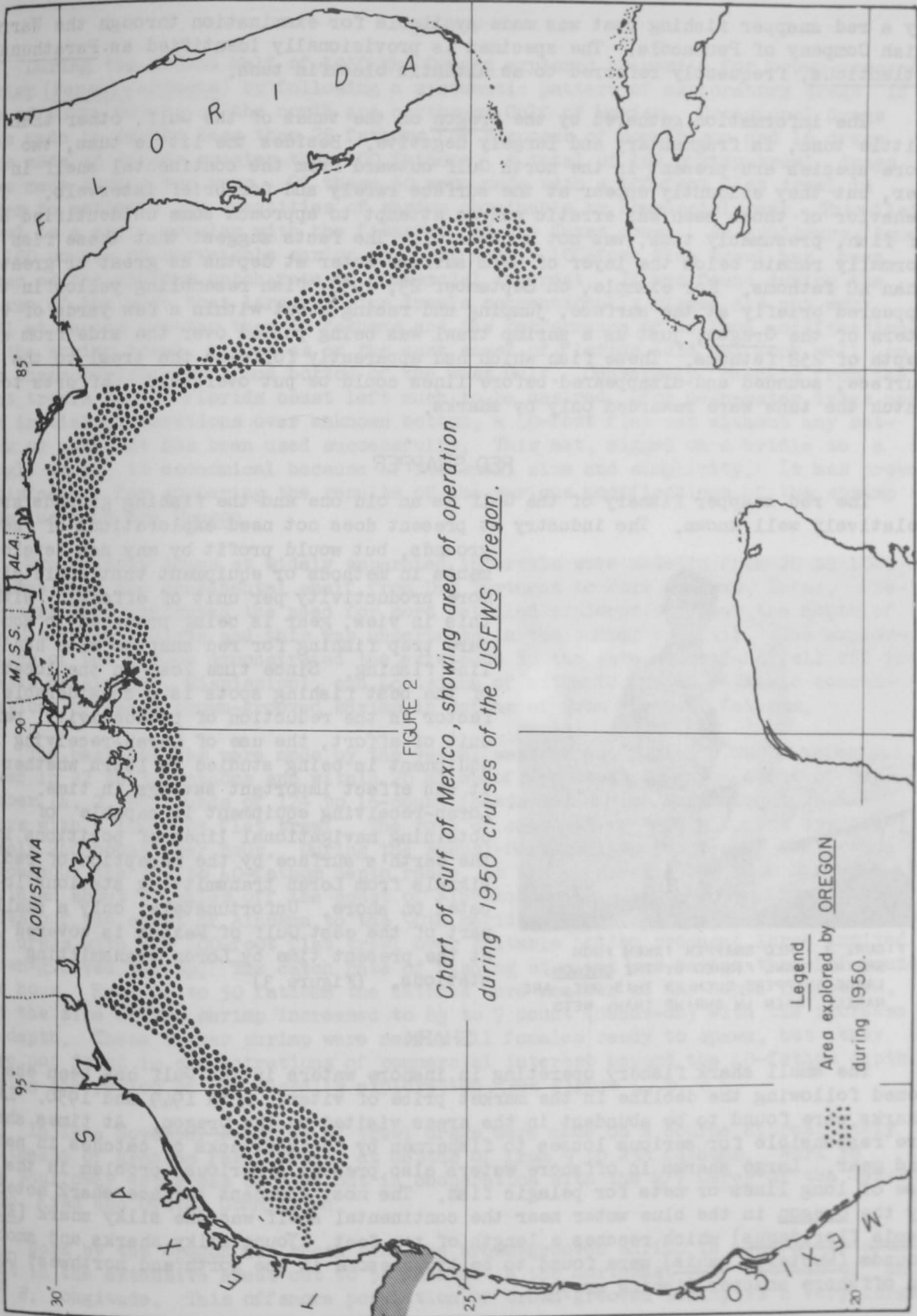


FIGURE 2  
Chart of Gulf of Mexico, showing area of operation  
during 1950 cruises of the USFWS Oregon.



by a red snapper fishing boat was made available for examination through the Warren Fish Company of Pensacola. The specimen is provisionally identified as Parathunnus atlanticus, frequently referred to as Atlantic blackfin tuna.

The information gathered by the Oregon on the tunas of the Gulf, other than the little tuna, is fragmentary and largely negative. Besides the little tuna, two or more species are present in the north Gulf outward from the continental shelf in summer, but they evidently appear at the surface rarely and for brief intervals. The behavior of those seen was erratic and an attempt to approach some unidentified school of fish, presumably tuna, was not successful. The facts suggest that these fish normally remain below the layer of warm surface water at depths as great or greater than 40 fathoms. For example, on September 23, 1950, fish resembling yellowfin tuna appeared briefly at the surface, jumping and racing about within a few yards of the stern of the Oregon, just as a shrimp trawl was being pulled over the side from a depth of 258 fathoms. These fish which had apparently followed the trawl to the surface, sounded and disappeared before lines could be put overboard. Efforts to catch the tuna were rewarded only by sharks.

### RED SNAPPER

The red snapper fishery of the Gulf is an old one and the fishing grounds are relatively well known. The industry at present does not need explorations of new grounds, but would profit by any new developments in methods or equipment that would give more productivity per unit of effort. With this in view, gear is being prepared to compare trap fishing for red snapper with hand-line fishing. Since time lost in the location of the best fishing spots is a considerable factor in the reduction of productivity per unit of effort, the use of Loran-receiving equipment is being studied to learn whether it can effect important savings in time. Loran-receiving equipment is capable of obtaining navigational lines of positions in the earth's surface by the reception of radio signals from Loran transmitting stations located on shore. Unfortunately, only a small part of the east Gulf of Mexico is covered at the present time by Loran transmitting stations. (Figure 3)

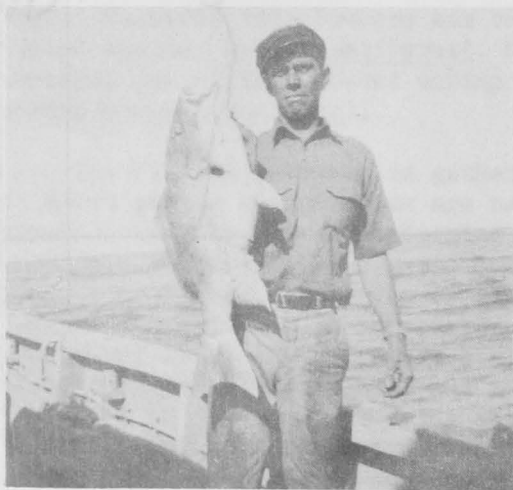


FIGURE 3 - RED SNAPPER TAKEN FROM SHRIMP TRAWL FISHED BY THE OREGON. LARGE SNAPPERS, SUCH AS THIS ONE, ARE RARELY TAKEN IN SHRIMP TRAWL NETS.

### SHARK

The small shark fishery operating in inshore waters in the Gulf has been abandoned following the decline in the market price of vitamin A in 1949 and 1950. Large sharks were found to be abundant in the areas visited by the Oregon. At times sharks are responsible for serious losses to fishermen by their attacks on catches in nets and gear. Large sharks in offshore waters also present a serious problem in the use of long lines or nets for pelagic fish. The most abundant surface shark noted by the Oregon in the blue water near the continental shelf was the silky shark (Eulamia floridanus) which reaches a length of ten feet. Young silky sharks and smooth hounds (Mustelus canis) were found to be troublesome in the north and northwest Gulf on offshore snapper fishing grounds.

## SHRIMP

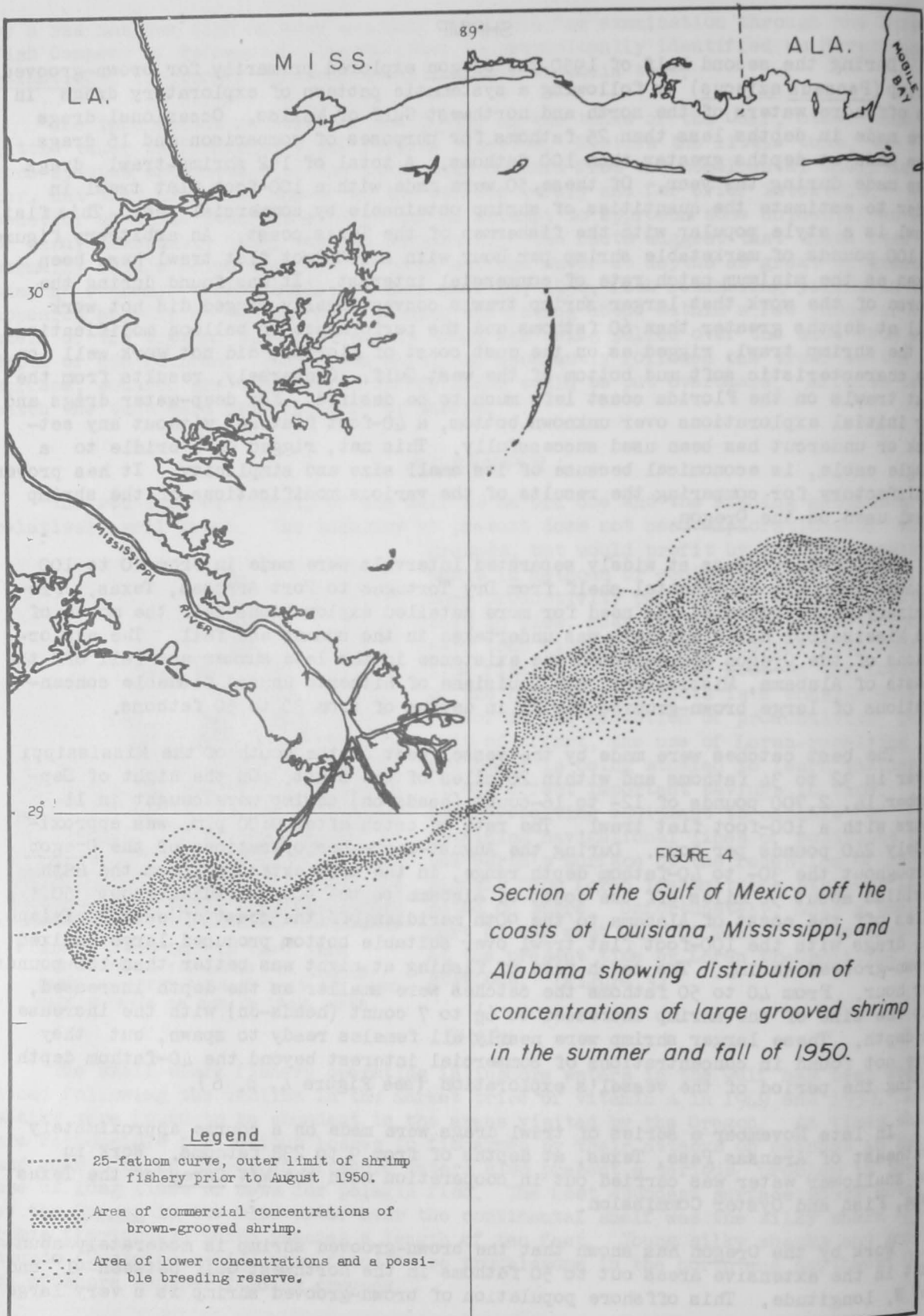
During the second half of 1950 the Oregon explored primarily for brown-grooved shrimp (Penaeus aztecus) by following a systematic pattern of exploratory drags in the offshore waters of the north and northwest Gulf of Mexico. Occasional drags were made in depths less than 25 fathoms for purposes of comparison and 16 drags were made at depths greater than 100 fathoms. A total of 162 shrimp-trawl drags were made during the year. Of these, 50 were made with a 100-foot flat trawl in order to estimate the quantities of shrimp obtainable by commercial gear. This flat trawl is a style popular with the fishermen of the Texas coast. An arbitrary figure of 100 pounds of marketable shrimp per hour with a 100-foot flat trawl has been taken as the minimum catch rate of commercial interest. It was found during the course of the work that larger shrimp trawls conventionally rigged did not work well at depths greater than 60 fathoms and the performance of balloon modifications of the shrimp trawl, rigged as on the east coast of Florida, did not work well on the characteristic soft mud bottom of the west Gulf. Conversely, results from the flat trawls on the Florida coast left much to be desired. For deep-water drags and for initial explorations over unknown bottom, a 40-foot flat net without any setback or undercut has been used successfully. This net, rigged on a bridle to a single cable, is economical because of its small size and simplicity. It has proven satisfactory for comparing the results of the various modifications of the shrimp trawl used on the Oregon.

Exploratory drags at widely separated intervals were made in from 20 to 100 fathoms near the continental shelf from Dry Tortugas to Port Aransas, Texas. Preliminary work indicated the need for more detailed explorations near the mouth of the Mississippi River and this was undertaken in the summer and fall. The explorations of the Oregon demonstrated the existence in the late summer and fall off the coasts of Alabama, Mississippi, and Louisiana of hitherto unused fishable concentrations of large brown-grooved shrimp in depths of from 30 to 50 fathoms.

The best catches were made by the vessel west of the mouth of the Mississippi River in 32 to 34 fathoms and within 20 miles of the coast. On the night of September 14, 2,700 pounds of 12- to 16-count (heads-on) shrimp were caught in 11 hours with a 100-foot flat trawl. The rate of catch after 9:00 p.m. was approximately 240 pounds per hour. During the August-September operations of the Oregon throughout the 30- to 40-fathom depth range, in the area extending from the 88th meridian about 50 miles off the coast of Alabama to the 90th meridian about 50 miles off the coast of Alabama to the 90th meridian off the coast of east Louisiana, all drags with the 100-foot flat trawl over suitable bottom produced large unmixed brown-grooved shrimp. The catch rate of fishing at night was better than 100 pounds per hour. From 40 to 50 fathoms the catches were smaller as the depth increased, but the size of the shrimp increased to  $6\frac{1}{2}$  to 7 count (heads-on) with the increase in depth. These larger shrimp were nearly all females ready to spawn, but they were not found in concentrations of commercial interest beyond the 40-fathom depth during the period of the vessel's exploration (see Figure 4, p. 6).

In late November a series of trawl drags were made on a course approximately southeast of Aransas Pass, Texas, at depths of from 9 to 238 fathoms. Work in the shallower water was carried out in cooperation with the M/V Carey of the Texas Game, Fish and Oyster Commission.

Work by the Oregon has shown that the brown-grooved shrimp is moderately abundant in the extensive areas out to 50 fathoms in the northwest Gulf between  $91^{\circ}$  and  $96^{\circ}$  W. longitude. This offshore population of brown-grooved shrimp is a very large



one. In each of 18 widely-scattered drags made in this area at night between 20 and 55 fathoms, brown-grooved shrimp were taken at rates varying from 5 pounds to 150 pounds per hour. Although work in this area was limited to a few drags and no very extensive concentrations of shrimp were located, it should be noted that the amount of trawlable bottom probably exceeds 5,000 square miles and that all of the sample drags produced some shrimp.

This exploration is not yet complete and additional work is planned to cover the rest of the Gulf waters adjacent to the United States and to obtain rough determinations of the seasonal fluctuations in concentrations of brown-grooved shrimp. The pink-grooved shrimp (P. duorarum) was not observed in the Oregon's catches in the north and northwest Gulf outward from depths of 30 fathoms and negligible numbers of white or green-tailed shrimp (P. setiferus) were taken.



FIGURE 5 - READYING A 100-FOOT SHRIMP TRAWL FOR FISHING ABOARD THE OREGON.

A few shrimp trawlers have worked in the deeper waters near the Mississippi River mouth since the fall of 1950. It seems probable, however, that profitable fishing in deeper waters of some areas in northwest Gulf will be dependent on the development of trawling gear better adapted to work in very soft mud. The trial of gear designed for use under these special conditions is planned.

Thirteen drags were made in the north and northwest Gulf in 60 to 160 fathoms. In general, the results at these depths have been poor. Few shrimp, and none of commercial interest, were taken and damage to gear was great, partly because of rough bottom and partly because of excessive loading by heart urchins. Five drags made in 200 to 250 fathoms near the mouth of the Mississippi and southeast of Aransas Pass, Texas, were of interest because catches were not only larger than in the 60- to 150-fathom range but included a much greater variety of forms. One species of shrimp, Hymenopus robustus, was taken in sufficient quantity to be of possible commercial interest; for example, a 45-minute drag with a 40-foot trawl produced 60 pounds of 28-count (heads-on) shrimp and 61 pounds of scrap. The largest of these shrimp were about 14 to the pound, heads on, but the lots taken by the Oregon were of mixed sizes averaging about 28 count. They resemble boiled shrimp in color when taken from the water. These shrimp have good flavor and texture but have a lobster-like taste quite different from the shrimp now marketed.

#### MISCELLANEOUS OBSERVATIONS

Analysis of catches made with shrimp trawls by the Oregon have shown the presence of relatively large stocks of low value but marketable kinds of fish in depths from 25 to 60 fathoms. Among these are butterfish, harvestfish, scup or porgy, and king whiting. Croaker and their allies, the dominant group in less than 25 fathoms, are less frequent in the deeper waters and even in deeper waters average too small to market under present conditions. In three drags made in depths from 60 to 150 fathoms over sand and shell bottom, a few specimens of tilefish and flounder (Paralichthys squamilentus) were taken. Information obtained incidental to further work



with shrimp trawls will probably provide data on the range of these fish, but trawling with fish trawls will be necessary to learn the possibilities for commercial use of these stocks.

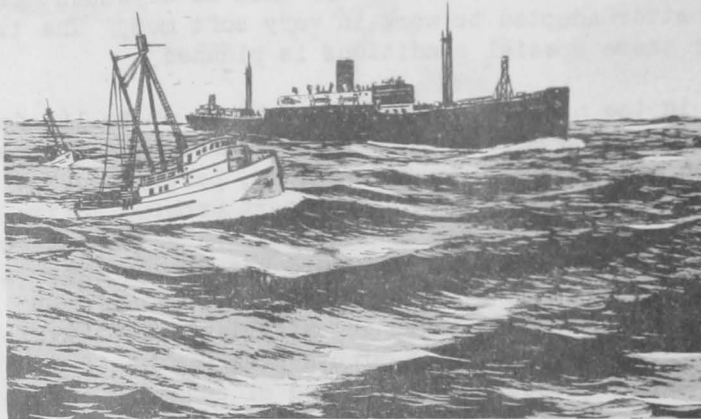
NOTE: A MORE COMPREHENSIVE REPORT OF THE OREGON'S 1950 GULF OF MEXICO FISHERY EXPLORATIONS WILL BE PUBLISHED AT A LATER DATE BY THE SERVICE AS A FISHERY LEAFLET.



## "S.S. PACIFIC EXPLORER"

### Part IV—Personnel and the Movement of Materials

The tuna in southern Pacific waters are taken chiefly by either of two methods, purse seining or live-bait fishing. Purse seines are huge encircling nets varying from 325 to 425 fathoms in length and 450 to 700 meshes (4 $\frac{1}{2}$ -inch mesh by stretched measure) in depth depending



ing on the size of the vessel. The net is set about a school of tuna and the bottom is closed or "purse" to surround the fish in a "bowl" of netting. As the seine is hauled aboard, the fish become sufficiently concentrated within a small area to be removed by brailing with power-operated dip nets.

Hook-and-line gear is used in the live-bait method of

fishing. A supply of live bait is captured near shore in foreign or domestic waters. After capture, the bait is transported to the fishing grounds where it is thrown overboard in the immediate vicinity of schools of tuna, thereby attracting and exciting them. Simultaneously, either artificial lures or baited hooks, attached to stout bamboo poles by lines and leaders, are thrown overboard by the crewmen working individually or in teams to capture the tuna. The live-bait system of tuna fishing is responsible for the major proportion of the production, but the purse-seine method is becoming of increasing importance.

--Fishery Leaflet 326