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OBSERVATIONS ON THE COMMERCIAL FISHING POTENTIALITIES IN THE OFFSHORE WATERS OF NORTH CAROLINA (JANUARY-FEBRUARY 1950)

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INTRODUCTION

A series of fishing cruises off the coast of North Carolina were conducted to determine primarily the trawlability of unexplored bottom and to find the distribution and abundance of fish and shellfish in these waters. These cruises were conducted from January 16 to February 21, 1950, by the research vessel Albatross III of the U. S. Fish and Wildlife Service's North Atlantic Fishery Investigations.^{1/} In addition to actual fishing operations, records were kept of physical factors, such as, water temperatures, salinities, bottom conditions, depths, and accurate positions on all courses run. Attempts to determine the location of schools of fish with recording fathometers were made, and tagging of several species for migratory studies was carried out.

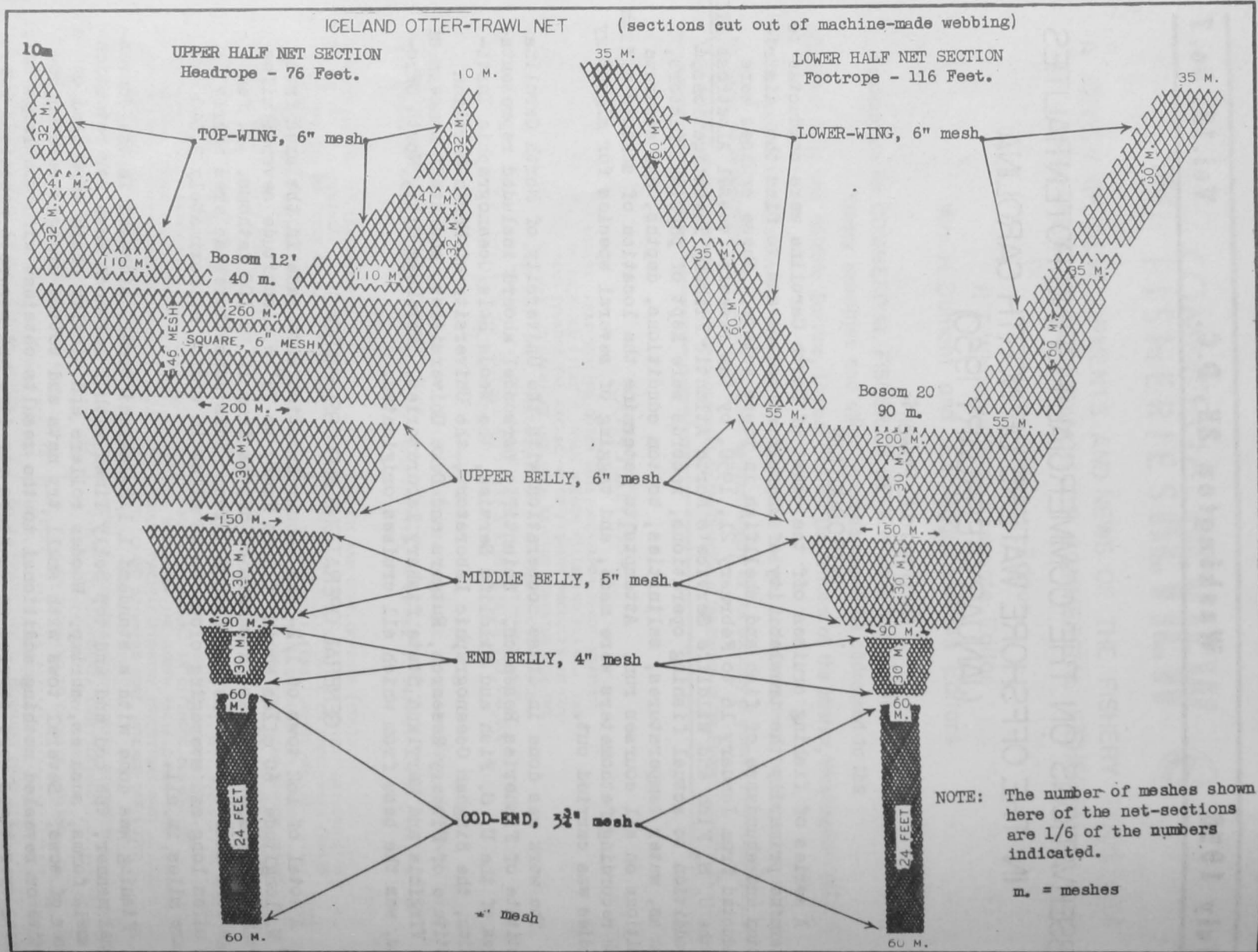
The work was done in close cooperation with the University of North Carolina Institute of Fisheries Research. Scientific personnel aboard included representatives of the U. S. Fish and Wildlife Service, the Woods Hole Oceanographic Institution, the Bingham Oceanographic Laboratory, the University of North Carolina Institute of Fishery Research, Rutgers and Duke Universities, and staff members of the Virginia and Maryland State fishery laboratories. Morehead City, North Carolina, was the base from which all cruises originated.

GENERAL OPERATIONS AND OBSERVATIONS

A total of 162 tows of 1/2- and 1-hour duration were made in the area from 78° W. longitude, 60 miles south of Cape Fear, to 75° W. longitude several miles northeast of Cape Hatteras in waters of depths from 10 to 100 fathoms. A few drags were made beyond the 100-fathom curve. This constitutes an area nearly 200 miles long and averaging close to 15 miles in width, approximately 3,000 square miles in all.

Fishing was done with a standard 1 1/2-Iceland trawl, side-set in the conventional manner, the cod end and top belly lined with 1 1/2-inch mesh for retention of small forms, such as, shrimp. Wooden rollers and tickler chain were used on a number of tows. Several tows with small try nets and bottom dredges were unproductive or revealed nothing additional to the results obtained with the large net. Fishing operations were carried on 24 hours per day, and accurate positions were obtained by use of Loran.

Fishery Engineer, Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Seattle, Washington, and observer aboard the Albatross III from January 16 to February 21, 1950.
/ See Commercial Fisheries Review, April 1950, pp. 39-43.



Numerous fish and invertebrates were taken in the catches, including many tropical and semi-tropical forms, a fact not surprising considering the high temperature of the water. Many catches contained in excess of 30 species of fish. Positive identification of the less common fish is yet to be made from type specimens submitted to the U. S. National Museum.

This summary report is concerned only with those fish which are considered to be of actual or potential marketable value to the commercial fishery. De-tailed biological and oceanographic reports will be forthcoming at a later date. 2/

GENERAL OBSERVATIONS ON COMMERCIAL FISHING POTENTIALITIES

In general, from the commercial fisheries aspect, results were poor. Very few catches contained marketable species of sufficient size or quantity to make commercial fishing operations economically practical. Exceptions were rare catches of small scup, croaker, and spot--up to 1,500 pounds, and smaller hauls of good-sized gray sea trout (weakfish), snappers, groupers, king whiting (sea mullet), sea bass, and others.

The following is a list of food fish taken in these operations which might have commercial possibilities if caught in enough numbers:

Common Name	Scientific Name
Croaker	(<u>Micropogon undulatus</u>)
Scup (Northern porgy).....	(<u>Stenotomus chrysops</u>)
Gray sea trout (weakfish)..	(<u>Cynoscion regalis</u>)
Spot.....	(<u>Leiostomus xanthurus</u>)
Sea bass.....	(<u>Centropristes striatus</u>)
Red porgy.....	(<u>Pagrus pagrus</u>)
Red snapper.....	(<u>Lutianus campechanus</u>)
Vermilion snapper.....	(<u>Rhomboplites aurorubens</u>)
Butterfish.....	(<u>Poronotus triacanthus</u>)
King Whiting (sea mullet)..	(<u>Menticirrhus americanus</u>)
Fluke (flounder).....	(<u>Paralichthys dentatus</u>)
Whiting (silver hake).....	(<u>Merluccius bilinearis</u>)
Black grouper.....	(<u>Mycteroperca bonaci</u>)
Red grouper.....	(<u>Epenephelus morio</u>)

The fishing was accomplished in four cruises. In the results by cruise, which follow, only tows which yielded significant catches are specifically mentioned.

RESULTS BY CRUISE

CRUISE 31A--(January 16 to 24): For the first cruise, 24 fishing stations were laid out in a corridor extending from 76° 30' W. longitude, south of Cape Lookout, to 75° 15' W. longitude off Cape Hatteras, in waters from 20 to 100 fathoms depth.

A total of 46 tows were completed, including several made north and east of Cape Hatteras for the purpose of obtaining croakers for tagging. Rollers and tickler chain were used on all tows. One very bad tear-up at Station 10, tow 1, (34° 33.8' N. lat.--75° 54.3' W. long.) and two smaller ones doing minor damage

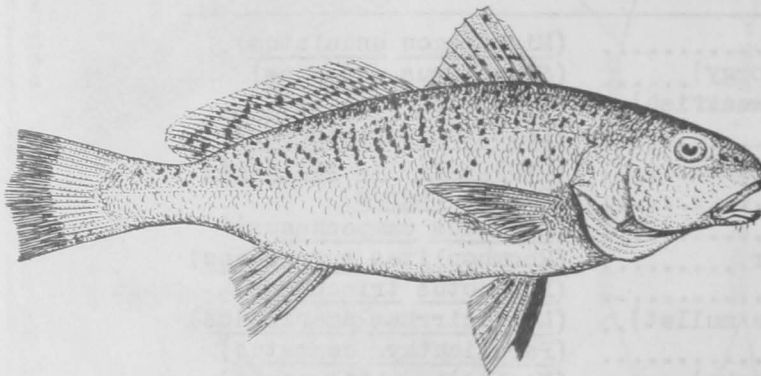
2/ A report on the biological phases of these cruises will be published in the near future by the Service's Branch of Fishery Biology. A report on the oceanographic phases of these cruises probably will be published by the Woods Hole Oceanographic Institution.

occurred; aside from these three instances, no obstructions to trawling with rollers were encountered. Two fishing days were lost because of strong northeast winds and rough seas on January 17 and 20.

Catches were generally poor, containing many small tropical fish. Commercial species were scarce. Up to 700 pounds of small filefish of no value were taken along with bottom trash, such as, sponges, small coral, etc. An average catch contained a bushel of assorted species.

Tow 2 in Station 10 ($34^{\circ} 30'$ N. lat.-- $75^{\circ} 51.5'$ W. long.) produced 61 red porgy averaging 12 to 14 inches in length and weighing over a pound each. These were excellent fish, and constituted the best commercial prospects to that point. Tow 1 at Station 18 caught 6 red snapper weighing 22, 20, 9, 6, 12, and 11 pounds. Small numbers of scup, butterflyfish, sea bass, triggerfish, king whiting (sea mullet), groupers, and amberjack were taken of marketable size and quality, but never in quantities which would pay off for a commercial boat.

Several tows made in the waters north and east of Cape Hatteras produced catches of croaker up to several hundred pounds. These were on grounds already being fished by trawlers, and the fish were used for tagging purposes. Most were quite small, barely above marketable size (averaging 24 cm.--less than 10 inches in length).



VERY FEW OF THE CATCHES MADE BY THE ALBATROSS 111 IN THE OFFSHORE WATERS OF NORTH CAROLINA EARLY THIS YEAR CONTAINED MARKETABLE SPECIES OF SUFFICIENT SIZE OR QUANTITY. EXCEPTIONS WERE RARE CATCHES OF CROAKER (MICROPOGON UNDULATUS).

At Station 24, tow 1, 1,899 croaker, weighing 450 pounds were caught. In tow 1 at Station 22, 83 gray sea trout (weakfish) weighing 40 pounds were caught.

Miscellaneous species also occurring on this trip included spotted hake, tomtate, small flounders, whiting (silver hake), angel shark, sand shark of several hundred pounds, small squid, blue shark, sting rays, a few brown and coral shrimp, and numerous other tropical and semitropical forms.

Water temperatures were high, ranging from 69° to 75° F. at the surface. Bottom temperatures varied from 71° in the shallower waters to 52° near the 100 fathom curve. Catches made in the deeper, colder water produced no more, and in some cases less, fish than those in shallow, warmer water.

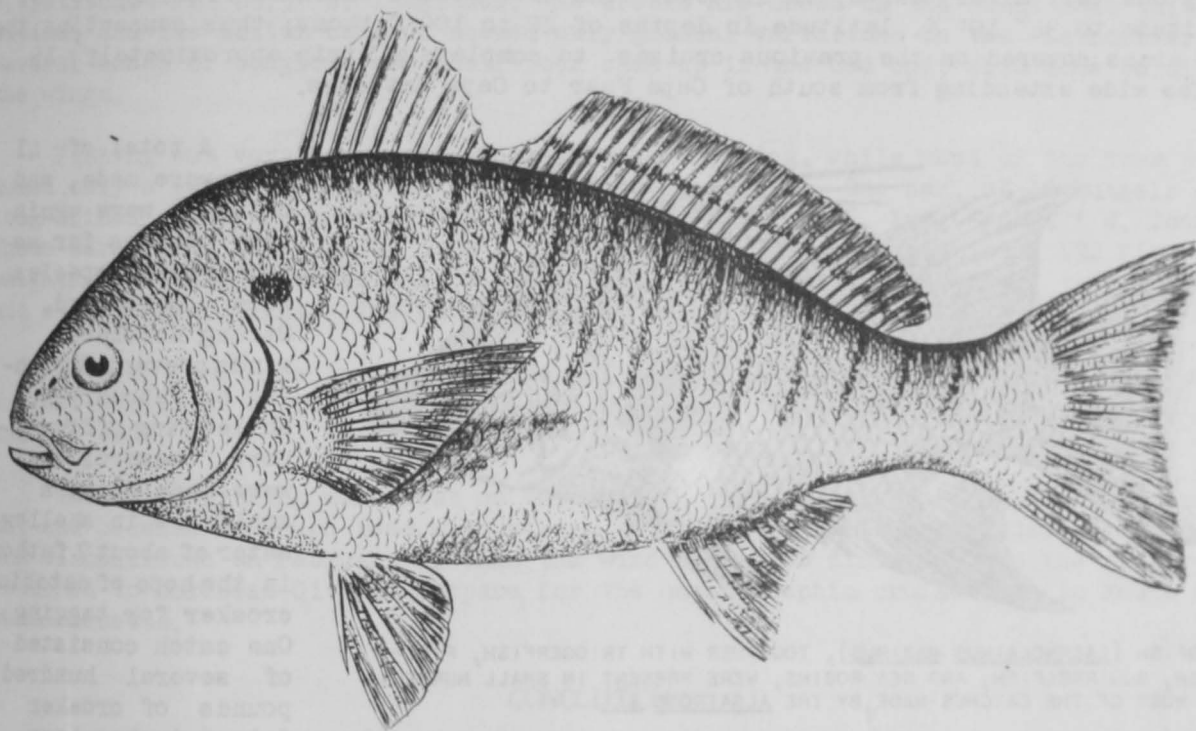
CRUISE 31B--(January 27 to February 2): On this cruise, 51 tows were made at 22 stations to the south of Cape Fear from 78° W. longitude to $76^{\circ} 50'$ W. longitude and from the 100-fathom curve into depths of less than 20 fathoms. A strong northeast wind and rough seas prevented fishing on January 27 and 28, and shelter was sought off Southport in the lee of Cape Fear.

First tows were made in the early morning of January 29 with rollers in waters of 14 to 50 fathoms south of Frying Pan Shoals. The catch in Station 1 was predominantly rays (19 spotted eagle rays and 1 giant butterfly ray) plus 6 fair-sized fluke, and several miscellaneous species. Stations 2 to 7 produced catches of scup

(northern porgy) up to 6,000 fish per tow, weighing 1,500 pounds. These were quite small fish, from 6 to 8 inches in length, and although below normal marketing size, local fishermen expressed the opinion that they might have commercial value at times when the market was very good. Several hundred were tagged.

Tomtate (Bathystoma rimator), sometimes called redmouth grunt were also taken with the scup up to amounts of 1,450 fish, weighing 362 pounds. These were also small fish, but in excellent condition, and if of a larger size and found in greater numbers, could be a good commercial prospect.

Red porgy, vermilion snapper, triggerfish, sea bass, groupers, gray sea trout (weakfish), pinfish, and white grunt, were caught in smaller numbers. One grouper (or jewfish) weighing 240 pounds was taken in tow 3 at Station 7.



SPOT (LEIOSTOMUS XANTHURUS) WERE TAKEN IN SOME CATCHES BY THE ALBATROSS III, TOGETHER WITH CROAKER AND SMALL SCUP, IN WHAT WOULD BE TERMED "SIGNIFICANT QUANTITIES."

Tows made in Stations 8 to 11 in deeper waters from 60 to 92 fathoms were very unproductive, averaging only 13 pounds of various species per tow. The rollers were taken off after completing 11 stations and fishing was resumed in the area already covered with rollers, as a test of trawlability. No snags were encountered, and no appreciable difference in the catch was noted.

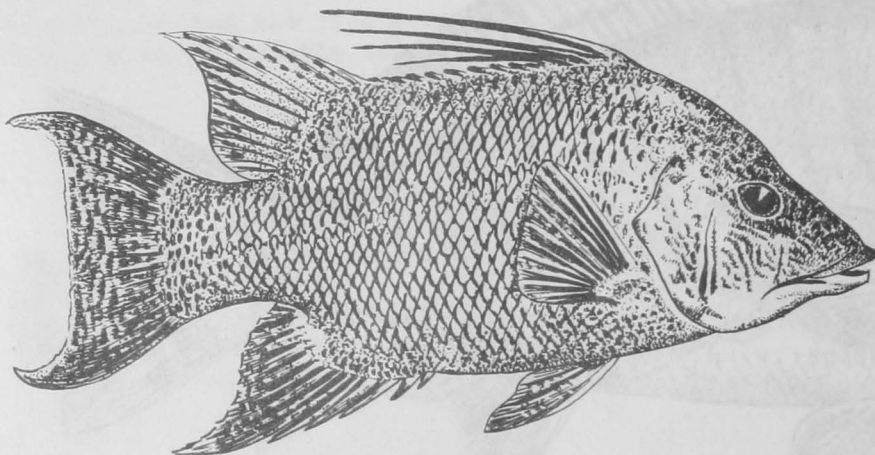
Stations 12 to 14 east of Frying Pan Lightship yielded very small catches, occasionally nothing coming up in the net. The largest catch was 500 pounds of small tomtate, scup, pinfish, triggerfish, and others. Several bottom hazards were met in this region. A bad tear-up occurred at Station 17, tow 2, (33° 17.5' N. lat.--77° 16' W. long.), destroying both wings and tearing the belly of the net. A small tear in one wing resulted at Station 18, tow 2. These tear-ups occurred when operating without rollers.

Rollers were put back on the footrope, and fishing resumed. At Station 20, tow 1, northeast of Frying Pan Lightship ($33^{\circ} 41'$ N. lat.-- $77^{\circ} 29'$ W. long.), the net was lost on a very bad snag, only the doors and 15 floats being recovered.

Two tows in the shallow waters of Onslow Bay, made for the purpose of obtaining croakers for tagging, were unproductive.

Scup and tom-tate appeared to be the best prospects on this cruise. Water temperatures were high-- 68° to 72° F. at the surface. Bottom water varied from 70° in 21 fathoms to 52° in 107 fathoms.

CRUISE 31C--(February 7 to 12): All tows at 14 stations on this cruise were made without rollers or tickler chain. No serious bottom hazards were encountered; only one very minor tear-up in 41 tows. The area worked extended from $33^{\circ} 30'$ N. latitude to $34^{\circ} 10'$ N. latitude in depths of 20 to 100 fathoms; thus connecting the two areas covered on the previous cruises to complete a strip approximately 15 miles wide extending from south of Cape Fear to Cape Hatteras.



HOGFISH (LACHNOLAIMUS MAXIMUS), TOGETHER WITH TRIGGERFISH, FILE-FISH, SQUIRRELFISH, AND SEA ROBINS, WERE PRESENT IN SMALL NUMBERS IN MOST OF THE CATCHES MADE BY THE ALBATROSS III.

which were too small for tagging. A few menhaden, up to a foot in length were mixed in this catch.

As on the previous cruise, small scup and tom-tate were common, occurring in catches in various amounts up to 200 pounds, but averaging only 6 to 7 inches in length. Several times the cod end contained nothing, and the average catch was less than a bushel per tow. Triggerfish, hogfish, filefish, squirrelfish, sea robins, and other tropical species were present in small numbers in most catches.

A few red snapper, red porgy, grunts, and black grouper (weighing 20 to 25 pounds) were caught in commercial sizes, but never more than 8 or 9 per tow. One amberjack, weighing 19 1/2 pounds, was taken at Station 7, tow 3.

Probably the best commercial possibilities were found in several catches of vermilion snapper, taken in amounts up to 120 fish, weighing 64 pounds. These were prime fish, ranging from 10 to 14 inches in length and some exceeded over a pound in weight. It seems likely a ready market could be found for these fish if

A total of 41 tows were made, and catches were again very poor as far as commercial species were concerned. Strong northeast winds prevented fishing on February 8. While lying off Southport, several tows were made with a small net in shallow water of about 7 fathoms in the hope of catching croaker for tagging. One catch consisted of several hundred pounds of croaker 5 to 6 inches long,

they could be caught in profitable numbers. Station 8, tow 1, resulted in a minor tear-up in a top wing, which could have been due to fouling of the gear rather than a bottom hazard. There were small amounts of sponges and coral in some catches.

Several tows with the small try net in shallow water close to Cape Lookout caught nothing. Water temperatures were again high-- 70° to 73° F. at the surface. Preliminary examination of bathythermograph slides showed little change of temperature with depth in shallower waters (50 fathoms or less) but temperatures in deeper waters ranged between 55° and 65° F.

CRUISE 31D--(February 16 to 21): Fishing on this cruise was done without rollers in the area which was covered on Cruise 31A with rollers. A total of 24 tows at 6 stations were made and one snag was encountered, resulting in bad tears in the belly and wings of the net. This happened at Station 3, tow 1, at a position $34^{\circ} 11.5'$ N. latitude-- $76^{\circ} 06.5'$ W. longitude. No wrecks are shown on the chart near this position, and the bottom contour showed only gradual variations on the fathometer. Several hunks of conglomerate shell rock came up in the cod end, also some coral in the wings.

Fishing was very poor; some tows produced nothing, while most of the tows produced only a few pounds of scrap fish and bottom trash. One haul of 13 bushels of long-spined porgy was made at Station 4, tow 3, ($34^{\circ} 18'$ N. lat.-- $76^{\circ} 17'$ W. long.). These were small fish again, 5 to 6 inches long, one bushel containing 492 fish weighing 61 pounds. Occasional whiting (sea mullet), fluke, sea bass, triggerfish, and others were caught. The water was very warm, 68° to 71° F. at the surface.

Several tows made in shallow water with the large net, bottom dredge, and small try net southwest of Cape Lookout caught nothing except a few starfish, sand dollars, and one crab.

Two days' fishing were lost on this trip due to difficulties with the Loran set and because of rough seas with strong southwest to northeast winds. Fishing was discontinued on February 21 when the wind failed to diminish, and the Albatross III returned to Morehead City to prepare for the oceanographic cruise back to Woods Hole, Massachusetts.

CONCLUSION

Although catches during the entire operation were disappointing from the commercial viewpoint, the information gained concerning the trawlability of the bottom is of much value in determining the possibilities of expanding the trawl fishery in these waters. In a total of 162 tows, only 4 bad snags were encountered. Thus it can be seen that a large percentage of the bottom is free of trawling hazards and could be fished effectively if fish were found to move into the area at other seasons.

The high-water temperatures encountered may be connected with the fact that the month of January was extraordinarily warm in North Carolina, being the second warmest January in 79 years in that State. It is possible, on fishing this area in an ordinary year when colder temperatures prevail, that different results from those recorded here would be obtained.

