

Mr. Edgar R. Waite, Curator of the Canterbury Museum, accompanied the expedition in the interests of that institution for the purpose of collecting specimens of the various species of fish caught, and as far as possible to make a biological survey of the areas worked. Mr. Waite worked under considerable difficulties on board, as, the vessel being built and fitted up entirely for the purpose of fishing, there was very little space available for storing collecting-tanks, gear, &c., and no convenience for examining and preparing specimens. Notwithstanding these difficulties, Mr. Waite worked energetically and enthusiastically throughout the cruise, and succeeded in making a large collection of specimens and obtaining a great amount of very valuable information with regard to the feeding and breeding habits both of the edible and also of the coarse fishes caught. A full report from Mr. Waite, apart from its scientific importance, would be of very great practical and economic value, and I would recommend that arrangements should be made to have it published.

GENERAL ACCOUNT OF, AND REMARKS ON THE RESULT OF, THE CRUISE.

As already stated, the charter of the "Nora Niven" commenced on the 5th June. On that date I inspected the vessel at Wellington, and found that she was equipped with trawl-nets, fishing-gear, and in all other respects as required by the charter-party, and she sailed the same evening for Stewart Island, in order to commence at the furthest-south point and work north.

The Department did me the honour of placing me in charge of the expedition, and I superintended the work from Stewart Island to Otago Heads; but owing to an accident received on board I was compelled to leave the vessel on arrival at Dunedin. Mr. Anderton, Curator of the Marine Hatchery at Portobello, was appointed by the Department to take charge of the work in my place, and continued on board until the expiration of the first charter, on the 4th September.

A summary of the work done on each section is given under separate headings. The report on the first section, from Stewart Island to Otago Heads, is supplied by myself, and the report on the others by Mr. Anderton.

On account of the very large extent of ground which the Department instructed should be tested during the three-months charter (about a thousand miles of coast-line from Stewart Island to Mercury Islands, besides working the Chatham Islands) it was impossible to devote as much time as was necessary to thoroughly test each section, or to go very far off to look for off-shore banks.

During the three months the vessel was out she fished on forty-eight days. Thirteen of the remaining forty-three days were Sundays, on which the crew did not work; and fourteen days were occupied in steaming long distances at the commencement and end of the cruise, and to and returning from the Chatham Islands; and the remaining sixteen days were taken up with coaling, blowing down boilers, and bad weather, when no work could be undertaken.

The total distance covered during the cruise was 4,312 miles, and of this distance the trawl-net was towed 514 miles. One hundred and six hauls of the trawl-net were made. The depth of water in which the hauls were made ranged from 4 to 120 fathoms; and the time occupied by each haul varied from one to two and a half hours, but as a rule one-and-a-half-hour hauls were made. About four hundred soundings were taken with the hand-lead and Lord Kelvin deep-sea sounding-machine for the purpose of testing the depth and nature of the bottom.

The range of depth in which the greatest variety of fish-life was found to exist was from inshore out to 30 fathoms, and no flat-fish of any value were taken over that depth. These results correspond with those obtained during the cruise of the "Doto" in 1900 and 1901. In the report of the "Doto's" cruise in 1901 it is stated that "the experience of this year's cruise was similar to that of last year's in one respect—viz., that wherever the coast-line was prospected the best results were obtained in from 5 to 25 fathoms, and there appears to be no exception to this rule," &c. Hapuka, kingfish, and ling were taken at any depth and out to over 100 fathoms, and tarakihi and schnapper were frequently in large quantities out to 60 fathoms, and on one occasion in 100 fathoms.

One of the reasons why the cruise was undertaken in the winter season was for the purpose of ascertaining the winter habitat of the flat-fish, as they generally disappear from the inshore trawling-grounds during that season. The general opinion of fishermen is that they either go out to deep water or migrate to off-shore banks which were supposed to exist. The result of the work done during this cruise would seem to negative both theories, as no flat-fish of any value were obtained beyond the depths at which they were taken at other seasons, and no off-shore banks were found to exist within the 100-fathom line, and beyond that all the soundings taken showed a sudden drop down to great depths. It is probable that the disappearance of flounders and soles off the known fishing-grounds at certain seasons is due to weather and temperature conditions and spawning habits, and, like the soles and plaice in the Northern Hemisphere, they partly bury themselves in the sand on the bottom. In this way the trawl-net would pass over them. In the North Sea it is a common practice with trawlers at certain seasons to put on a chain instead of a foot-rope for the purpose of moving the flat-fish out of the sand and mud on the bottom.

As the migrations of fish are affected by food, temperature, and other causes, the value of the fish-supply in any locality can only be ascertained correctly by having each locality fished at different seasons; so that areas mentioned in this report as showing good trawling-bottom but with only a moderate or even poor supply of fish at the time they were tested, may at another season prove to be prolific fishing-grounds.

In considering this report it should be remembered that in prospecting new fishing-grounds the work has to be carried out in quite a different manner from that in which a vessel fishing for market would work, so that the results obtained cannot be judged by the quantity of fish brought in. In fishing known grounds a trawler would work continuously in the locality and depth at which fish were known to be most plentiful at that season; whereas in prospecting new grounds a