

MARINE FISHERIES INVESTIGATION STATION.

SIR,—

I have the honour to submit the report of the Portobello Marine Investigation Station for the year ending 31st March, 1931.

At the date of the last annual report Mr. David H. Graham had been acting as biologist for three months, and was very active and enthusiastic in his work. Unfortunately, in June he met with an accident to his left knee while out collecting, and, not realizing at first the risk he ran, he continued his work until lameness compelled him to lie up. Medical examination showed that prolonged rest, and ultimately one or two operations, were required to restore him to his work, but under restricted conditions, and his lameness has seriously handicapped him. In spite of this unfortunate accident he has accomplished a considerable amount of work, which is detailed in the course of this report.

EUROPEAN LOBSTERS.

The stock of lobsters in the ponds now consists of fifteen males and fourteen females; two—a male and a female—died from injuries received during the year. When examined early in November twelve females were found to be carrying full batches of eggs. These began to hatch out early in December, and the last lot were hatched in the latter part of January. It is estimated that about 200,000 larvæ were liberated.

It may be remembered that during the 1908–9 season the late Mr. Anderton made an attempt to rear young lobsters in the tanks and Macdonald jars. Out of 3,000 larvæ placed in these receptacles only twelve survived at the end of five months. Young lobsters from their first to their fourth stage—a period of about twenty-two days—moult every five days on the average, and when newly moulted they are liable to be at once attacked and eaten by their fellows, as they are soft and quite unable to defend themselves. When eight months had elapsed only six were alive, at twelve months only three, and at seventeen months only one. This little lobster continued to live in the tanks till it was four years and four months old, which is easily a record for tank-reared lobsters. It apparently died in one of its moulting efforts.

Mr. Graham renewed the attempt to rear young lobsters in captivity, and for this purpose had fifty boxes made and fitted into larger tank boxes, and the whole connected with the main water-supply of the station. About 170 larvæ were obtained and were divided among the compartment boxes. These were fed with macerated cockles and plankton. Unfortunately, a rusty pipe had been fitted into the supply, and this was only discovered when the fine netting in the boxes was found to be badly choked with rust. The supply was at once changed and brought by rubber hose direct from the reservoir, but the mischief had been done, the larvæ began to die, and eventually only one survived. This little lobster is still alive and active at the time of writing this report. It is evident that larvæ liberated direct from the ponds have to run the gauntlet of great numbers of small fish (mullet, sprats, kokopuru, &c.) before they reach the stage at which they sink to the bottom of the sea. At the same time, to rear them in any quantity at the station would require a larger staff than is available, as the amount of undivided attention required in feeding and cleaning is very great.

The adult lobsters in the open tanks at the station suffer from the muddy bottom and from the abnormal growth of algae due to the shallow water and its exposure to strong light. Mr. Graham had several gravid females moved to the wharf pond, which has a concrete bottom and is comparatively shaded. These appear to be much freer from weed, and to carry larger and cleaner batches of eggs.

HYDROGRAPHIC WORK.

The collection of water-samples for salinity tests, and the recording of temperatures of air, pond, bay, and ocean were regularly carried on throughout the year, the three former daily and the latter on every possible occasion. Mr. Scofield, who was transferred from Cape Saunders to Puysegur Point Lighthouse last year, has continued to collect water-samples regularly. These, together with those from the station are sent direct to the Government Analyst's office in Dunedin, and the results are duly recorded. The whole of this work, which in time can be increased indefinitely, is essential for the future scientific development of the fisheries of this Dominion. Meanwhile the taking and keeping of the records is continuous, but the results can only be developed in the future when sufficient material has been obtained.

BIOLOGICAL WORK.

Shortly after his appointment Mr. Graham commenced the establishment of a reference collection of the zoological life of the harbour and the adjacent sea, with special reference to its bearing on fishery problems.

Observations have been made on some eighty species of fishes, of which sixty-seven either are preserved in stock or have been collected and examined. Some of them are rare—e.g., *Eleotris radiata* Quoy and Gaimard, and *Tripterygium segmentatum* McCulloch and Phillipps; while *Notothenia purpuriceps* Richard is new to New Zealand seas. *Auchenoceros punctatus*, found in the stomach of a red cod, is a new record for Otago. The identifications were made by Mr. Graham himself, except for a few small specimens which were reported on by Mr. L. T. Griffin, of the Auckland Museum. Observations and information obtained from fishermen have been recorded for future reference.

Over one hundred species of mollusca have been collected, and these were identified by Mr. A. W. Powell, Conchologist to the Auckland Museum. In addition, observations on the spawning of several nudibranchs have been obtained.