points of view regarding practical problems and for the fishermen to get some insight into the purpose and methods of the biologist's work, which is to their mutual advantage. The principal objects of study have been the spawning of blue cod and flat-fish species, the location of spawning "grounds," and the migrations of the early stages in the life of these fishes. Preliminary studies of the growth and age-distribution of some of the flat-fish species have been made, chiefly by means of the examination of the zones of growth that are shown on the otoliths (ear-bones). A report on this work is now being written. Periodical examinations of toheroa have been made to determine the incidence of spawning, size at first maturity, rate of growth, feeding-habits, and migrations. Some quantitative surveys of toheroa populations have also been made, together with observations on the physico-chemical character of the water on the beaches they inhabit. In January, 1939, the Marine Biologist attended the meetings of the Australian and New Zealand Association for the Advancement of Science at Canberra, where he was afforded the opportunity of hearing papers and discussions by Australian fishery-research workers, and later was enabled to visit the new Research Station of the Fisheries Section of the Commonwealth Council for Scientific and Industrial Research at Cronulla, to make a trip on a deep-sea trawler from Sydney, and to make an inspection of some of the rock-oyster farms of New South Wales. For their kindness in granting facilities for our Marine Biologist to obtain these very educative experiences we would express our obligation to the officials of the Commonwealth and the State of New South Wales and to the members of the fishing and oyster industries concerned.

Fresh-water Research.

In last year's report reference was made to Mr. Hobbs's work on the reproduction of trout and quinnat salmon, on which he had been engaged prior to his appointment to the staff of the Marine Department, and to the publication, as Fisheries Bulletin No. 6, of his first report on this work which covered observations made over a period of three years. During the past year data from additional waters in the Dominion have been collected for a second paper, which is nearing completion. From this study of material from a series of typical river systems in both Islands further light has been thrown on the general significance of natural reproduction in the maintenance of stocks. The general indications are that attempts to establish trout in various river systems have been successful or otherwise in relation to the extent of suitable spawning-ground available. It is proposed that the publication of the more technical aspects of this work should be followed by a second paper, for which data are now being assembled, in which past and present stock-maintenance practices in this country will be reviewed in the light of present knowledge. Data from the examination of the stomach-contents of large numbers of fishes are also being assembled which will provide material for a first report on the food of young trout and salmon and of certain indigenous fishes.

A gratifying and beneficial consequence of the publication of Fisheries Bulletin No. 6 has been the keen interest that Mr. Hobbs's work has evoked from fishery biologists in other countries. This has led to the interchange of views by correspondence, and has widened our circle of exchange of research literature, which has been decidedly to the benefit of our staff and of the work they are developing in this country. The handicap of our geographical remoteness from the most important centres of fishery research is thus being overcome. The visit of Mr. Hobbs in January last to the Science Congress in Australia, previously mentioned, also served the very useful purpose of enabling him to make personal contacts and exchange ideas with other biologists engaged in research on fisheries or associated subjects. He was also able, in the field, to widen his experience of fishery problems by observation of the conditions in some Australian rivers, which provide educative contrasts with those prevailing in New Zealand waters.

The investigation of the biology of fresh-water eels, begun last year by Mr. Cairns, as outlined in the last annual report, was carried on and extended considerably until June, 1938, when he left the service of the Department. With laudable enthusiasm and energy he has continued the study as a spare-time occupation, and has rounded off an important phase of this investigation so that a report will be available for publication in the near future.

As a preliminary to more general investigations on the growth of trout by means of scale examinations, a detailed study has been made of scales from yearling fish taken from two contrasting types of stream in the Inchbonnie district—Jim's Creek, a large spring creek with a short course, and Waterfall Creek, which drains a steep bush-clad hillside and is subject to frequent freshes. The first has a fairly uniform temperature, records taken over a twelve-month period showing a range of from 10·5° C. to 12·5° C. The temperature of the latter shows variations throughout the year from 1·3° C. to 18·5° C. The laboratory assistant, Miss V. K. Lawrey, has collaborated with Mr. Hobbs in this work, which will be carried to a further stage as opportunities permit. So far as it has gone it has furnished a significant and detailed picture of the characteristics of scale-development during the first year of life in two streams of contrasting type, which will facilitate the interpretation of scale markings in connection with general age investigations.

In December, 1938, Mr. K. R. Allen, B.A. (Cantab.), joined the Department as Fresh-water Biologist, having for the previous three years worked as a member of the staff of the Fresh-water Biological Association of the British Empire at their laboratory at Lake Windermere. Besides conducting investigations on the fishes of the English lakes, Mr. Allen has carried out investigations and published papers on the food and growth of young salmon in English and Scottish waters. His training and experience render him particularly well qualified to render valuable service in connection with the fresh-water-fishery problems of New Zealand. He is now engaged upon an intensive study of the relationship between the abundance and growth of the trout population of a stream and the abundance and character of its food-supply—a biological complex that is fundamentally involved in the problem of stock-maintenance, a subject that has often been discussed with a maximum of interest