

for 1901¹ (published 1905) contains, in addition to the summary report (published in 1902), a report on the Klondike goldfields, by R. G. McConnell, 1905; a report on an exploration of Ekwan River, Sutton Mill Lakes, by D. B. Dowling, 1904; Dr. Barlow's elaborate report on the nickel and copper deposits of the Sudbury mining district, 1904; and other papers. Both volumes are illustrated and accompanied by separate portfolios of maps. The volume for 1902-3 contains the summary reports for 1902 (published in 1903) and for 1903 (published in 1904). There is also a report on the coalfield of the Souris River, East Assiniboia, by D. B. Dowling, and the "Section of Mines" annual report for 1902.

SCIENTIFIC FISHERY INVESTIGATIONS.

IN the unavoidable absence of the Chancellor of the Exchequer, Mr. R. M'Kenna received a deputation at the Treasury on December 18 in support of the application of the Marine Biological Association for a grant to continue the scientific fishery investigations which are at present being conducted in the North Sea and English Channel. The deputation was introduced by the Right Hon. Austen Chamberlain, M.P., ex-Chancellor of the Exchequer, and among those present were Prof. E. Ray Lankester (president of the Marine Biological Association), Sir Michael Foster, Sir William Ramsay, Mr. A. E. Shipley (chairman of the council), Sir Charles Eliot, Mr. Chas. Hellyer, Mr. J. A. Travers, Dr. Chalmers Mitchell, Prof. E. A. Minchin, and Dr. H. R. Mill.

In introducing the deputation, Mr. Austen Chamberlain stated that, as a former Chancellor of the Exchequer, it had been his duty to review the work which had been done by the Marine Biological Association, and he had come to the conclusion that it was most necessary, and that it had been efficiently performed. He considered that British Governments of both parties should do more to support both science and art. Prof. Lankester gave a brief account of the history of the Marine Biological Association, and explained the circumstances in which the association undertook, at the request of His Majesty's Government, to carry out the English portion of the international scheme of fishery investigations. He directed attention to the fact that the present application of the association for funds to continue their researches had received the special support of the Royal Society, which recorded in a strong minute its appreciation of the value and efficiency of the work being done.

Mr. A. E. Shipley said the Government has gained directly and in money by entrusting the North Sea work to the Marine Biological Association. He referred to the importance of extending over a sufficient period of years the kind of investigation which the association is making. Only so can the effects of secondary causes and exceptional fluctuations be eliminated from the essential, primary, normal factors. While time advances in an arithmetical progression so does the value of the results increase in a geometrical ratio. Mr. Shipley gave a short *résumé* of the work accomplished, and because it has furnished the problems of most pressing importance he confined his remarks chiefly to the plaice. During the last four years the association has devoted much hard work to tracing the life-history and the distribution of this species throughout the North Sea, with the result that many important facts concerning it have been established. Similar investigations have been carried on, but not yet so thoroughly, into the life-histories, the distribution, the migrations, and rate of growth of many of the other food fishes, the cod, the haddock, the sole, the turbot, and others. Special experiments have been made on the *Huxley* to determine the vitality and the extent of injury inflicted upon trawl-caught fish by the operations of trawling. The hydrographic observations and the investigations into the minute organisms which crowd the surface of the waters and form the ultimate food of fish have been efficiently carried on in accordance with the programme laid down by the international conferences. In this work especially, the Plymouth steamer, the *Oithona*, has supplemented

and helped the *Huxley*. The association asked for a continuation of the grant which for the last five years the Government has made towards the expense of carrying on the English part of the North Sea international investigations. A grant of 6000l. a year is needed to continue the international work, and a grant of 2000l. for the work on the south coast, making a total grant asked for of 8000l. Next spring, for the first time, the International Congress has been invited to meet in England. There will be gathered together in London some thirty or forty of the leading men of science from Russia, Finland, Sweden, Norway, Denmark, Germany, Holland, and Belgium. It will be a pitiful thing, and also a deep humiliation, if we have to greet these gentlemen with the tidings that England, who takes from the North Sea far more than all the other eight countries together, more, in fact, than 90 per cent. of the total yield, is too impoverished to continue to do her share of this important work.

Sir Michael Foster, speaking on behalf of the British Science Guild, considered that the money asked for ought to be regarded as of the nature of an investment, and not as expenditure. He believed that scientific investigation was the only sound foundation upon which fishery legislation could be framed, and that experimental legislation, which was the only possible alternative to experimental research, would involve the country in far greater expenditure than the small sum required by the Marine Biological Association.

Mr. Charles Hellyer, chairman of committees of the National Sea Fisheries Protection Association, speaking as a practical man connected with the fishing industry, emphasised the importance to the industry of the knowledge being accumulated by the scientific investigations now in progress.

Mr. J. A. Travers, in the absence of the Prime-Warden, referred to the support which the Fishmongers' Company had always given to the work of the Marine Biological Association in the belief that an increase of scientific knowledge was bound to be advantageous to the best interests of the fishing industry.

Dr. H. R. Mill spoke of the very valuable results which had been obtained from the hydrographical work carried out in the North Sea and adjacent waters during recent years, and expressed the view that the time was not far distant when it would be possible to predict the movements of the migratory fishes from a knowledge of the hydrographical conditions of the sea.

Mr. M'Kenna, in reply to the deputation, stated that after what had been said there could be no question as to the value of the work upon which the Marine Biological Association was engaged. But the demands upon the national Exchequer were very heavy, and as a matter of experience they found that the satisfaction of one demand led to a number of others being brought forward. He promised to lay the views expressed by the deputation before the Chancellor of the Exchequer, who would, he had no doubt, give them his most careful consideration.

AGRICULTURAL RESEARCH.

IN concluding a course of Cantor lectures at the Society of Arts on Monday, on the subject of "Artificial Fertilisers," Mr. A. D. Hall, director of the Rothamsted Experiment Station, pointed out that only by continued investigation and experiment can a knowledge be obtained of the conditions necessary to make the maximum profit out of the land, crops, and stock. The teacher can only hand on what is already known; and much yet remains unknown about the growth of our commonest crops and the action of standard fertilisers. Adequate provision for scientific investigation of agricultural matters is of national importance, as the following remarks made by Mr. Hall show; but though a few counties and other local bodies are carrying out demonstrations, Rothamsted, with its comparatively small endowment, remains practically our only experiment station where problems in agricultural science are studied with the object of making new knowledge, and State aid for research amounts only to a few hundred pounds a year for the whole country.

The grants of our Board of Agriculture for agricultural

¹ "The Annual Report of the Geological Survey of Canada for 1901." (1905.) With separate folio of maps. The Annual Report of the Geological Survey of Canada, vol. xv., 1902-3. (1906.)