

we found them harassed by raids of the neighbouring Kachins and torn by internecine war. Now they are clamouring for roads which will enable them to bring their produce to the railway. It will be interesting to watch how long this almost idyllic social state remains unaffected by the pressure of commercialism.

Mrs. Milne's account of their home life and industries is clear and comprehensive; and the value of her book is increased by an excellent collection of photographs. It is certain to survive as the standard account of a most interesting people recorded at a time when they were little affected by external influences.

BELGIUM'S CONTRIBUTION TO THE PLAICE PROBLEM.¹

THE plaice problem still occupies a prominent position in the foreground of the international investigations. The reason is not that the plaice is the sea-fish which contributes most wealth to the countries concerned. In respect of total value landed the fish is surpassed in England by the haddock, the herring, and the cod, while in Belgium the total value of soles annually landed is more than twice that of plaice, which stands fourth in the list, after haddock and herring.

The reasons why the plaice is of such importance that it has been made the principal object of investigation on the parts of England, Germany, Denmark, Holland, and Belgium are as follows:—

(1) This fish constitutes a proportionately large as well as much appreciated element in the ordinary dietary of the poorer classes in the five countries named.

(2) The livelihood of large numbers of fishermen in these countries depend on their ability to maintain an adequate supply of this fish in the markets.

(3) It is especially in regard to the plaice that the cry of "depletion" of the fishing grounds, and of the undue destruction of undersized and immature fish, has been, and is still being, raised.

(4) The plaice lends itself perhaps more readily than any other fish to protective legislation, on account of its comparatively restricted range, its regular distribution from the coast seawards according to size, and its slow rate of growth.

In view then of the urgent need which was expressed in discussions on the plaice at Royal Commissions and fishery conferences of a satisfactory knowledge of the natural history of the fish on one hand, and for trustworthy statistics showing the actual condition of the fishery in time and space on the other, it is not surprising that the International Council took the matter in hand at the outset of its career and arranged for a thorough investigation of the plaice fisheries both from the biological and from the economic point of view, an investigation in which each of the five countries most interested was appointed a share. The result of the large amount of research which has been expended on the plaice during the past few years is that we now possess a considerable amount of information respecting the movements of the fish at all stages of its career, the age of the fishes, and their growth-rate in different parts of the sea, their age and size at maturity, and so forth, while the sea fishery statistics of the various countries bordering on the North Sea have been so completely reorganised that they now show us, for a quinquennial period at least, something like the actual

¹ Contribution à l'Étude biologique et économique de la Plie. Par G. Gilson. Délégué de la Belgique au Conseil international pour l'exploration de la mer. Travaux de la Station de Recherches relatives à la Pêche maritime. Ostende. Fascicule IV. (Bruxelles: Imprimerie Polleunis et Ceuterick, 1900.)

yield of different fishing grounds from year to year and from month to month.

Although we have no continuous or sufficiently exact statistics of the plaice fishery extending into last century, there can be no reasonable doubt that the condition of the fishery and the composition of the plaice population on the fishing grounds are very different to-day from what they have been in the memory of the older fishermen, and fragmentary statistics of the number of baskets formerly taken are not altogether wanting to show this. If the destruction of an "accumulated stock" of old fishes (such as is to be found in the Barents Sea at the present day, and not so many years ago at Iceland) was inevitable, and quite rational and economic, the same can scarcely be said if the supply of fish at the present day is being maintained at the sacrifice of an increasing proportion of the smaller and much less valuable sizes. If this actually is the trend of the fishery at the present day, then, apart from the possibility of an ultimate shortage of supply which is at any rate threatened, it is obvious that the fishery is not being exploited in a rational way. As Prof. Gilson, in his important memoir, says:—"On sait qu'il faut considérer la capture en grande masse de jeunes plies, inaptes à la reproduction pour la plupart et capable de gagner en une année le double et même le triple de leur valeur, comme une opération anti-économique appelant une réforme."

It is greatly to the credit of Prof. Gustav Gilson, of Louvain, the Belgian delegate to the International Council, that he has been able to carry out a plan of researches in accordance with the international programme, in spite of the great disadvantages attending the lack of a special research steamer able to work on the fishing grounds at all seasons, and of a coastal laboratory where material could be examined fresh and continuously.

The institution in Belgium which has assumed the task of participating in the international investigations is the Royal Museum of Natural History, which maintains a station for sea fishery research at Ostend. Solely with the aid of the resources of this institution and entirely outside the official machinery, Prof. Gilson has reorganised the sea-fishery statistics at Ostend. Previous to 1904 these gave only the total quantities and value of fish landed at the port without distinction of species, size, number of baskets or fishes, place of capture, &c. From 1904 onwards, thanks to Prof. Gilson's efforts, all these and other essential particulars are given in the statistical returns, so that now the Belgian statistics are equally precise and detailed as those of other countries bordering the North Sea.

In the memoir under review the data collected with regard to the plaice landed at Ostend are analysed and coordinated from two points of view:—(1) So as to show the principal features in the evolution of the Belgian plaice fishery during the quinquennial period (1904-8), and (2) to furnish indications of the influence which a raising of the minimal size legally established (18 centimetres) would probably exercise on one hand on the reserves of plaice in the sea, and, on the other, on the product of the fishing industry in weight and value.

It is impossible to indicate all the features in the evolution of the Belgian plaice fishery during the period 1904 to 1908 which are revealed by Prof. Gilson's analysis of the Ostend statistics. It will suffice to point out the most important feature from the point of view of the present discussion. This is to be found in the progressive increase from year to year of the proportion of small fish in the catches of the *sailing* trawlers, which boats are re-

sponsible for the great bulk of the plaice landed at Ostend at the present day. Now it is clearly shown that this increase in the proportion of small fish is not due to a change in the field of action of the boats concerned, for the displacement which has actually occurred has been of such a nature that it ought to have produced a *contrary* effect. It is in consequence of a modification of the composition of the reserves of plaice inhabiting the Southern Bight of the North Sea. The curves for the various divisions of the Southern North Sea show this very clearly. The proportion of small fish in the annual catches in *each* of these divisions shows a gradual rise from 1904 to 1908. That the change in the composition of the plaice population on these fishing grounds consists in a diminution in the number of large individuals and *not* in an increase in the number of small is also fairly clear.

This is the important point: the supply of plaice in the Belgian market is apparently being maintained at the sacrifice of an increasing proportion of the smaller and much less valuable sizes. Researches on similar lines which have been made by the other four nations most interested have apparently much the same tale to tell; but, as these have not been co-ordinated and compared, it would be premature to make any general statement about the condition of the plaice fishery in the North Sea as a whole.

As a remedy for the state of things revealed in the Belgian statistics, Prof. Gilson suggests the *tentative* imposition of a minimum size of 23 centimetres, below which it should be illegal on the part of the sailing trawlers to land or sell fish, and a similar standard of 25 centimetres for steam trawlers. The reasons for the selection of these particular size limits and for a distinction between the two classes of vessels in this respect are fully discussed in the report and hardly need be recapitulated. Very similar size limits for plaice have been suggested by certain of Prof. Gilson's colleagues on the International Council, who will probably be found unanimous in agreeing with him that all such measures designed for the protection of undersized plaice should be of an experimental and elastic nature. In view of the still very incomplete state of our knowledge of the plaice problem, which is far more complex than was at first supposed, certainly no State would be justified in making such legislation final or irrevocable. It would be impossible to predict the effect of the imposition of a given size limit, or the amount of inconvenience attending its enforcement. It is inevitably a case of "try and see." Moreover, a size limit is not the *only* possible means of bettering the plaice fishery. Transplantation to the Dogger Bank, and other grounds richer in food, has been tried on an experimental scale with striking results, in view of which it is worth considering as a possible commercial enterprise.

Finally, one cannot but agree with Prof. Gilson that if we are ever to have experimental legislation for plaice, then it is clear that the scientific control of its effects is indispensable. In other words, there ought to be a permanent International Commission to continue researches on points not yet elucidated, to study the statistics from year to year, and to carry out biological investigations designed to show the changes in the composition of the plaice population on the fishing grounds and in the rate of growth of the fishes which might be expected to result from the legislation. As Prof. Gilson truly says:—"C'est à ce prix seulement que l'on peut espérer de réparer le mal accompli et de porter remède à la rupture encore récente de l'équilibre qui

s'était établi, au cours des siècles, entre la puissance alimentaire des mers, le pouvoir reproducteur des espèces et les causes de destruction aux quelles celles-ci étaient soumises avant l'intervention de l'homme."

WILLIAM WALLACE.

NOTES.

MR. A. E. SHIPLEY, F.R.S., has been elected a foreign corresponding member of the Helminthological Society of Washington.

WE regret to announce the death, on April 15, at seventy-nine years of age, of Prof. J. Bosscha, correspondent of the physics section of the Paris Academy of Sciences, and formerly permanent secretary of the Dutch Society of Sciences at Haarlem.

THE National Geographical Society of America is sending out in the summer an expedition for the further study of the glaciers of Alaska. It will be led by Prof. Ralph S. Tarr, of Cornell University, and Prof. Martin, of the University of Wisconsin.

AN expedition, under the charge of Prof. Homer R. Dill, taxidermist of the University of Iowa, has left San Francisco for Layson Island. This island, which is situated in the Pacific about midway between California and Japan, is only about three and a half square miles in area, but is estimated to support a bird population of about eight millions.

THE tenth International Congress of Geography will be held at Rome on October 15 and the six following days. Excursions in northern and central Italy, as well as southern Italy and Sicily, will be arranged, of which the details will be published later. The subscription for membership of the congress is 1L, and all persons desirous of joining are requested to remit this sum at an early date to the treasurer of the committee, 102 Via del Plebescito, Rome.

THE Victoria League has in operation a scheme for sending newspapers and magazines, when done with, to addresses in distant parts of the Empire. Although more than 81,000 newspapers and magazines are being sent away annually there are still many applicants unprovided for, and in South Africa and Victoria, Australia, particularly, we are informed copies of NATURE would be gratefully received. Any reader willing to help the movement should apply to the hon. sec. of the Newspaper Scheme, 2 Millbank House, Wood Street, Westminster, S.W.

PROF. HANS MEYER will undertake in May his fourth journey in East Africa. Starting from Bukoba, on the west shore of Lake Victoria, he proposes to march to Lake Kiva and the Kirunga group of volcanoes, in order to study the relations of the volcanic phenomena to the tectonic structure of the western rift system at this point. From Kiva the expedition will travel by Lake Tanganyika and, if time permits, also to Lake Nyassa. Besides geological studies, the botany, zoology, and ethnology of the region traversed will also be investigated.

DR. Pöck, in the April number of *Petermann's Mitteilungen*, discusses the distribution of plague during recent years, and illustrates it by two maps. The first shows the location of areas where it is endemic, and also those over which it has recently spread, as well as the places where isolated cases have occurred in different years. The second map shows the probable area of origin of the recent outbreak in Manchuria, and the region which was affected.