

Science and Fisheries.

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I SHALL, without apology, introduce a controversial topic, and endeavour to maintain a view which I myself hold with conviction. That view, expressed in the simplest terms, is that scientific investigations of fisheries are primarily a matter for the State, and can, as a whole, be most successfully conducted by a Government Department charged with responsibility for fishery matters. I believe—and I may say that, in a general sense, it is the view of the Department of State I have the honour to represent—that a Department of Fisheries which does not conduct such investigations is, *ipso facto*, unfitted for the work it has to do and might as well cease to exist, and that in many respects the State is better placed for the purpose than a semi-private institution.

A Live Department of Fisheries Must do Scientific Work.

The function of a Fisheries Department is to promote progress in the industry. All development in the fisheries and in the trades allied to fisheries is dependent, in the long run, upon scientific investigations. A Department of Fisheries which is not adequately equipped for scientific research is, in my view, incapable of developmental work, and ought not to be kept in being at the public expense, because it certainly can do little good, and it may do a great deal of harm. If it is suggested that the Department can act on the reports of others, I say that that is not so. The Department must have a scientific intelligence of its own. In the ordinary course of events scarcely a day passes on which administrative officers have not occasion to seek information or advice of the scientific staff. Supposing that they could rely upon mere reference to scientific reports, the Department must have scientific officers to advise it on the bearings of those reports upon its work, and you can imagine what kind of a scientific staff it would be that existed merely for the perusal of reports and was cut off from every prospect of active scientific work and individual research.

There are many things which a properly equipped Department may do for the maintenance and development of the British fisheries, but there is practically nothing it can do effectively—and it is almost certain that it will do a great deal of mischief—if it has not a thoroughly competent, well-equipped, and earnest scientific staff actively engaged in scientific research. I say, therefore, that the Department of Fisheries must conduct scientific investigations.

Fishery Investigations can most Successfully be Conducted by the State.

(1) To begin with, for all practical investigations of the sea there must be a broad basis of statistics, and no person or institution can have the same facilities for the collection of statistics as a Government Department the authority of which is recognised in every fishing port. I have no doubt that if the Marine Biological Association sought statistics of the fish landed in the port of Plymouth, and, indeed, any neighbouring ports, it would get statistics of a sort gladly given in a friendly spirit. It would be difficult for it, however, to guarantee their accuracy, and if it asked for similar statistics at such distant ports as Grimsby, Hull, Fleetwood, etc., it would

probably be refused, and the statistics would almost certainly not be accurate if given.

(2) The Department of Fisheries must be in close and constant touch with the fishing industry—that is to say, with the owners of fishing vessels, skippers, mates, and crews. It is, therefore, in a position to get assistance from them in various forms. One very valuable form of such assistance is the suggestions which fishermen themselves may offer, and which, even if wide of the mark, may, at any rate, be pregnant of ideas, as to what needs to be investigated, what lines investigations might usefully follow, or what is actually the cause of a hitherto unexplained phenomenon. Practical assistance can be given in the hospitality of their ships when engaged in commercial fishing. At the present time the Fisheries Department has fourteen fish measurers in its service, the majority of whom are working, by the courtesy of owners and skippers, on commercial fishing vessels. They take and measure all the fish in a definite number of hauls per day, with a view to the correlation of age, length, weight, and maturity, and with regard to the variations which occur corresponding to the differences in the nature of the bottom, position and season, and, to some extent, time. That work is particularly important now, because as regards at least three of the principal food-fishes we have the results of investigations which took place over a period of three years in the case of each fish before the war, and by the work which is being carried on we shall place ourselves in a position to compare the present condition of the stock of these fish in the sea with that of pre-war days, and thus be able to judge of the effect of the greatest measure of closure which has hitherto taken place. As one of the questions which we shall be bound to answer before long is whether in the interests of the conservation of that stock certain areas of the sea should be closed by international agreement to all fishing vessels, or to certain types of fishing vessel, permanently, or at certain times and seasons, it behoves us to make use of the great experiment which the war provided.

(3) Marine investigations on the scale which the preservation of our great fishing interests demands involve the use of deep-sea fishing vessels, which need to be kept in commission continuously throughout the year and from year to year, and they involve also the co-operation and assistance of other Government Departments concerned with shipping and with the sea, especially the Board of Trade and the Admiralty. The last-named Department in particular must of necessity carry out for its own purposes investigations which have a direct bearing upon our work, and, with certain necessary limitations, we can count upon its co-operation with us.

(4) The aim of our investigations, the only justification for them in the eyes of the State, which is calling upon the taxpayer to foot the bill, is the necessity of taking all practical steps to promote the development of the fishing industry, which, though the fact is not generally appreciated, undoubtedly saved this country from disaster in the late war. Moreover, the fishing industry brought into this country invaluable supplies of food; and even now we must, if we reflect, recognise the fact that fish is relatively cheap compared with other food, and, regarded as an import which does not involve any corresponding export, it is nationally by far the cheapest food the nation receives.

¹ Opening of a discussion on "The Need for the Scientific Investigation of Fisheries" in Section D (Zoology) of the British Association at Cardiff on August 26.

It behoves the State, therefore, to look well into the conservation of the stock upon which the prosperity of the industry depends; but it must be remembered that the bulk of the fish landed by our fishing vessels is taken in extra-territorial waters which are accessible to all nationalities alike. If, therefore, scientific investigations point to the necessity or desirability of regulations for the closure of certain areas of the sea or of such measures for the increase of the stock of fish or of the general bulk of the fisheries as transplantation or artificial propagation, it is essential that those measures should be adopted internationally in order that the good which one nation is endeavouring to do may not be undone by another nation which refuses to co-operate. If we are to have international regulations based upon the findings of science, those findings must be internationally accepted, and the simplest road to such general acceptance is co-operation in the work. Moreover, the area to be covered is so vast, the medium in which we are compelled to work is so obscure, the facts in the propagation and lives of fish which we are called upon to correlate are so many, and the study of most of them at the present time is so little advanced, that no one country working alone can hope to cover the whole field except at a prohibitive cost or at a rate which will leave the solution of the main problems to future generations. Therefore, combined international investigations are essential, and to none are they more important than to the greatest sea-fishing nation in the world. If we are to have such international co-operation, I maintain it must be co-operation between Governments.

The Scientific Aims of the Fisheries Department.

Whatever opinion may be held as to the capacity of a Department of the Government to conduct scientific research, at any rate it is something that a Government Department should be so firmly convinced of the importance of such research that it insists on carrying it out. The Ministry of Agriculture and Fisheries had before the war advocated and partly embarked upon a wide programme of investigation framed in consultation with an Advisory Committee of persons eminent in science. That programme was interrupted by the war. It included wholehearted co-operation with the International Council for the Exploration of the Sea in its general programme, and in the particular parts of it in which this country was more especially interested, and so much importance did the Ministry attach to these investigations and to the co-operation of our foreign colleagues that, alone of all the belligerent nations, Great Britain continued throughout the war to subscribe to the funds of the Council in order that the organisation which it represented might be kept in being to facilitate the revival of its work when conditions permitted. There is little doubt that, but for the financial and moral assistance of Great Britain, the International Council would have come to an end. I am convinced that the International Council will justify its existence; and it is interesting to observe that two new Powers, Spain and Portugal, have recently announced their intention of joining the organisation.

I have urged as a general thesis that the Department must carry out scientific investigations or run the risk of stultifying itself. I do not propose to discuss individual researches, but only to state the broad questions to which the Department seeks an answer. They are these:

(1) How can the stock of fish be maintained at its present level so that the prosperity of the fishermen may be preserved and the supply of food for the people not be diminished?

(2) Can the stock be increased by human endeavour

while the fisheries continue to yield their present toll—or even an increased toll—to human necessity?

(3) Can we learn to foretell good and bad seasons for this or that fishery?

Having answered all or any of these questions, we must be prepared to answer as regards each one of them the further question:

(4) In what measure is the application of the findings of science practicable in existing circumstances?

I think those questions present with fair accuracy the positive aims of our investigations. I do not refer here to that other aspect of our work which concerns the utilisation of the fish when caught or to investigations affecting only inland and fresh-water fisheries; for the moment I am thinking only of what may properly be described as marine investigations. But these investigations, or rather the motive behind them, have also a negative aspect. The Department must always be prepared to resist what I may describe as panic proposals for legislation or proposals advanced by interested persons who use alleged facts of natural history as a stalking-horse. I need not particularise too closely. Most of you are aware of the outcry raised against the trawl on the ground that it damaged the eggs of fishes on so-called spawning-grounds, and how this allegation was disposed of by the discovery of science that the eggs of all the principal food-fishes of the sea, except the herring, were pelagic, and could not, therefore, be damaged by the trawl. That instance alone is sufficient to prove the importance to the Department, which may be called upon to introduce or to criticise legislative proposals for the regulation of fisheries, of having an adequate scientific intelligence.

The Relation of the Department to the Independent Scientific Worker.

These being the aims, broadly stated, of the Department, does it claim for itself the whole field of fisheries research, and does it seek to suppress independent effort? By no means. To me such a policy is inconceivable. Provided that the Department is itself supplied with funds for an adequate equipment in both apparatus and personnel, it must welcome the assistance of the independent worker, for the work to be done is so great and the field of research to be covered so vast that there cannot be too many workers in it.

Moreover, there is, I think, a perfectly clear and obvious distinction to be drawn between investigations proper to the State and those which are more properly confided to independent institutions. The State's business is to conduct investigations which are more or less expressly directed to the solution of clearly defined problems affecting the fishing industry, the demand for the solution of which either has arisen or can be foreseen. The function of the independent worker is to add to the sum of our knowledge without regard to the solution of any particular problem. The line must not be drawn too fine. On one hand, the Departmental staff must seek in the course of its inquiries all the knowledge it can get; and I, for one, hold that the Departmental scientific worker should, so far as is practicable, be given opportunities from time to time to take up and follow up a line of research of his own choosing in order that his vigour and freshness of mind may remain unimpaired. On the other hand, the independent institution or individual worker may properly be invited to take up a line of investigation which the Department foresees may be of importance, but has not the means or the time to prosecute itself. In short, the Department may see that such and such an institution or individual is admirably qualified for a particular piece of work,

and may invite it or him to take it up at the Department's cost.

And so, while the Department maintains—and, in my view, must maintain—that fishery investigations are primarily its concern, and that it must have, so to speak, a first call upon State funds available for such research, its policy is to encourage every competent worker in the field; to procure adequate financial support for every institution which is giving its attention seriously to such researches and is so placed as to be in a position to prosecute them successfully; and to work in the closest and most cordial co-operation with them without seeking in any degree to limit their independence.

We are proud to represent the greatest fishing industry that the world has ever seen, and we are determined, if possible—and the possibility depends largely upon the measure of support we can secure from a nation amazingly ignorant of, and indifferent to, this all-important industry—to make Great Britain

lead the world, not only in the practice of fishing, but also in the scientific studies upon which the future prosperity of the industry must depend. We have established close co-operation with our colleagues in Scotland and Ireland, and, I hope and believe, friendly relations with the scientific workers of those institutions which have established a reputation in this field of research and the continued prosperity and efficiency of which it is our hope to secure. And while we seek to lead the world, we seek also to secure the co-operation of the Governments of those other nations which exploit the harvest of the sea; for we have no monopoly of the fishing-grounds, though our position is most favourable for their exploitation, and whatever measures may be devised by science for the maintenance or increase of the harvest can be effective only if they are carried out by international consent, and wisely directed to the attainment of the object which forms the motto of the International Council: "The rational exploitation of the sea."

Scholarships and Free Places in Secondary Schools.¹

AN interesting and important Departmental Report upon the above subject was published on October 25 by the Board of Education. The inquiry was begun a year ago at the instance of Mr. H. A. L. Fisher, President of the Board, and the Committee appointed was comprised of representatives of the Board, of the local education authorities, of persons engaged in elementary and secondary schools, and of others interested in the question. Some sixty-six individual witnesses were examined, including officers of the Board of Education and of local authorities, as well as teachers and others, representing in all thirty organisations wholly or partly concerned with education. The Committee was directed to inquire into the existing arrangements for the award by local authorities of scholarships tenable at secondary schools or institutions of higher education other than universities or institutions for the training of teachers, and into the provision of free places under the regulations of the Board of Education, and to make recommendations thereon with respect to the improvement of such arrangements so as to bring the facilities of higher education within the reach of all classes of the population and with special regard to the migration of pupils from one school area to another.

The report deals concisely with the history of scholarship provision at the instance of local authorities, and shows that the scholarships awarded by them tenable at secondary schools had risen from 2500 in 1895 to more than 12,000 in 1906, and if there be included those awarded to intending teachers, to more than 23,500. The next important step with the object of facilitating the transfer of suitable pupils from elementary to secondary schools was taken by the Board of Education in 1907, whereby, as a condition of qualifying for the higher rate of grant, secondary schools were required to admit a certain percentage of pupils (ordinarily 25 per cent. of the previous year's admissions) from public elementary schools, subject to an entrance test of proficiency. These were styled "free-place scholars."

The immediate effect of these regulations was to increase the number of pupils receiving free tuition in secondary schools, including those arranged for by local authorities, from 24 to 27 per cent. In 1911-12 the total number of pupils receiving free tuition in such schools had risen to 32 per cent., the actual

figures being 52,583, of whom 49,130 had been in public elementary schools, and of this number 38,009 owed their exemption from fees to the scholarship and free-place arrangements of the local authorities. At the present time in 961 grant-aided secondary schools in England with some 246,000 pupils enrolled, the number of "free places" held amounts to 72,386, or about 30 per cent., made up of 53,460 awarded by local authorities, 16,548 by school governors, and 2378 by other endowments.

It is now the duty of the local authorities, made statutory by the Education Act of 1918, to make provision for the means of higher education for all children capable of profiting thereby. It is estimated on the basis of 20 per 1000 of the total population of England and Wales that there should be at least 720,000 duly qualified children in the secondary schools, or more than double the present number. The grave defect of the present system is, the report states, that exemption from fees alone does not, by reason of the poverty of many parents, enable their children to take advantage of the benefits of higher education, or if they do they are quite unable to keep them at school beyond fourteen years of age for the full period of secondary education. It is therefore recommended that maintenance allowances, including all incidental school charges, should be made available for all free-place pupils who are in need of them. Whilst favourable to the abolition of all fees in grant-aided secondary schools, the Committee scarcely considers the time ripe for so drastic a change, and therefore suggests as a tentative measure the raising of the percentage of free places from 25 to 40 per cent. of the admissions. The age of admission of free-place pupils should be between eleven and twelve, determined upon by an examination in English and arithmetic, followed by an oral examination. Free places should be awarded for the full school course, secured by agreement with the parents, and where a pupil migrates to another area he should be entitled to continue his education upon the same terms. It is recommended that children who have not been previously educated in public elementary schools shall be eligible as free-place pupils provided that the parents show inability to pay fees for higher education.

The report is signed by all the members of the Committee, subject to certain reservations on the part of a few members. It concludes with a valuable summary of statistics bearing upon various aspects of higher and specialised education.

¹ Report of the Departmental Committee on Scholarships and Free Places. Pp. vi+82. (London: H.M. Stationery Office.) Price 9d. net.