

**THE SCIENTIFIC  
RESULTS OF THE  
EXHIBITION, PP. 3-38**

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**E. RAY LANKESTER**

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*International Fisheries Exhibition* (91)  
LONDON, 1883

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THE  
SCIENTIFIC RESULTS  
OF THE  
EXHIBITION

BY  
PROFESSOR <sup>Sir</sup> E. <sup>Swain</sup> RAY LANKESTER

LONDON  
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*International Fisheries Exhibition.*

LONDON, 1883.

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CONFERENCE ON FRIDAY, JULY 20, 1883.

HIS GRACE THE DUKE OF ARGYLL IN THE CHAIR.

THE SCIENTIFIC RESULTS OF THE  
EXHIBITION.

THE text which has been selected for the Paper which I have the honour to submit on the present occasion has caused me no little perplexity on account of its ambiguity.

It has been pointed out to me that it is unwise to prophesy unless you know, and that no one at present can know what may be the results, scientific or otherwise, of the great Exhibition, which has still some months of its career to run.

Again, it is apparent that the word "scientific" has a very wide scope, including statistical, mechanical, hydrographical, biological and sociological results, all of which are in some way or other to be observed and studied in the great International Fisheries Exhibition.

The comprehensive vagueness of the title of my discourse has consequently the advantage that it permits me to choose from a very wide range of subjects, and I have accordingly to submit to you the following as a more exact definition of the matter to which I desire to call your attention. I propose not to speak so much of scientific

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results which may flow from the Exhibition, as of scientific results which are illustrated in the Exhibition, and in particular of those results of the science of *Zoology* which are of importance to the Fish Industry, and are more or less completely set forth for our instruction and edification in the collections which have been brought together in the London International Fisheries Exhibition.

It would have been a congenial task to me to describe here some of the rare specimens of great interest to the zoologist, which have been sent by foreign countries to this exhibition, such specimens as Nordenskjold's *Phytina* and the magnificent skeletons of *Ziphioid* Whales shown in the Swedish court are of surpassing interest and importance from the zoological point of view. At the same time it must be admitted that they do not have any special importance in relation to Fisheries, and accordingly I must leave unnoticed such rarities and delights of the zoologist, in order to address myself more especially to the question of the relationship of the science of zoology to the fish industry.

The value of zoological science in relation to fisheries is not, I think, so fully appreciated in this country as is desirable in the interests of the public, and of those who make profit by enterprise in fisheries.

There is a very general tendency among men whose occupations are of a commercial character to undervalue the work of scientific inquiry, not only in regard to such matters as fisheries and fish-culture, but also in relation to manufacturing industries, agriculture, mining, and even in relation to medicine. To a large extent this arises from a misconception as to the real nature and character of what is called "science." Science is the knowledge of causes; its method and purpose when strictly pursued lead to the

accumulation and arrangement of thorough and accurate knowledge of any given subject to which it may be applied, with a certainty and an abundance which no other method and no other purpose can give. Undoubtedly the latest scientific knowledge of a subject is very usually not *immediately* useful to those who are engaged in applying commercial enterprise to the same subject. It is however to be noted, over and over again, that the scientific discovery of one generation becomes the necessary foundation of some valuable commercial enterprise in the next: what was at one time a curiosity and of little interest, save to men of science, becomes after fifty years the pivot of some great industrial manufacture.

Accordingly commercial men, and those who place the material well-being of this country beyond all things as an object to be continually striven for, should have patience in the presence of what seem to be the useless accumulations of knowledge; they should have faith in the ultimate utility of science, for already throughout the length and breadth of the land this cause-reaching knowledge, which we call "science," has proved its enormous power of aiding commerce, and has amply established its claim to not merely toleration but to eager and generous support from those who are reaping golden harvests through the science of a past generation.

When we remember that science is really no more nor less than such accurate and full knowledge of this or that class of natural things as enables us actually to understand "the causes of things," then it becomes obvious that the distinction which is sometimes drawn between the "scientific" man and the "practical" man is founded upon some kind of error. If there is the antithesis which fashion causes many persons to assert as existing, let us see what



becomes of it when we say, as we are justified in saying, that the scientific man is the man who knows thoroughly and accurately. The contrast insisted on between the scientific and practical man becomes, then, simply the contrast between the man who knows and the man who does not know, but acts in ignorance.

As a matter of fact there is no such antithesis. Your man of science is, or should be from the nature of his pursuits, more thoroughly practical than any one who affects to despise scientific knowledge, for he is accustomed to insure success in his experiments and investigations by taking every means in his power to that end ; above all, and chiefly, by guiding himself by reasonings based on the most accurate and extensive knowledge. So too, indeed, every so-called practical man who is not a mere adventurer—a happy-go-lucky tempter of Fortune—makes use of accurate knowledge to aid him in his commercial ventures and speculations ; so far as he can get it, he makes use of science, though he often calls it by some other name as soon as it becomes useful knowledge.

The fact is, that a large part of the indifference to science in this country, and the notion that science is dreamy, vague, untrustworthy and useless to practical men, has arisen from the fact that these worthy practical men have very often allowed themselves to be imposed upon by mere quacks and pretenders, who assume the language and authority of science without any credentials whatever, and lead the practical men astray. Such quackery in science has been by no means unusual in this country, owing to the almost complete destitution of the wealthy classes in respect of scientific education. Practical men have, as a rule, not even a smattering of scientific training, and cannot distinguish true from false science, cannot tell which is the

quack and which the man of real knowledge. Equally unfortunate in this respect, in former times, have been the members of the executive and deliberative branches of our successive governments, so that—in days which we may hope are past—ignorant pretenders to scientific knowledge have been, in good faith, placed in responsible positions, and have helped to justify the notion that modern science is a wind-bag of theories, and of little use to the practical man.

Such causes—namely a general mistrust of so-called science, and to a small extent a painful experience in especial connection with fisheries, of the results of placing confidence in quacks who have falsely pretended to scientific knowledge—seem to me to be accountable for the fact that in the British Islands, neither publicly nor privately, has there been any attempt to make use of the services of scientific men in relation to our fisheries. The recent appointment of the distinguished naturalist who is at present Inspector of Salmon Fisheries, is evidence of a new disposition to seek the aid of the highest authorities in science in connection with this subject; but it must be remembered that salmon fisheries form but a very small part of British fisheries in their entirety, and that a large staff of experienced naturalists would be required to deal satisfactorily, within a reasonable time, with the many important problems presented by the British Sea Fisheries.

The Governments of some foreign States, notably of France, but also on a smaller scale of Norway and Sweden, Holland, Prussia, Saxony, and in a special, and in many respects very noteworthy, manner, that of the United States of America, have concerned themselves to obtain the aid of zoologists in developing and managing the resources of the fish industries of their respective territories. The

results of the application of accurate knowledge concerning fishes, and such shell-fish as oysters, mussels, pearl-mussels, lobsters and cray-fishes, have been in some cases strikingly successful; in other cases time has yet to show what advantages may result from the attempts which have been made. In all these countries, however, one very distinct result of the appreciation of the possible value of scientific knowledge of fishes and shell-fish by the State authorities has been this, namely, that zoologists are occupying themselves independently, and with increasing earnestness, with the investigation of all that relates to the life and growth, the food and the enemies, of the marine and freshwater organisms which form the material basis of fisheries.

In the present Exhibition, accordingly, we see not a few of these scientific results exhibited in the courts assigned to foreign exhibitors; whilst, on the other hand, in the British department there is very little which comes under the head of zoological science at all, that is to say, which illustrates the results of exact inquiry into the natural history of the fishes and other animals which are such an immense source of wealth and industry to our seafaring population.

Before proceeding to enumerate and describe these scientific collections, I should wish briefly to explain in what ways it seems probable that the accurate knowledge with regard to fishes which is now being accumulated by zoologists may hereafter be useful in the regulation and management of fisheries.

In any given area of land or water, under natural conditions, where animals can obtain nourishment, there is found living (taking one year with another) fully as much animal life as can there nourish and reproduce itself. Practically the whole of the earth's surface and of the sea