

results of your dredgings across the great ocean-basins of both hemispheres, and now that you and your able assistants have completed your great task so satisfactorily and are safely returned, we beg you to accept our most hearty congratulations and the expression of our united sentiments of admiration; for you have, indeed, revealed a New World to Biological Science and opened a new and most important field for physical research.

PH. PARLATORE,  
AD. TARGIONI-TOZZETTI, Prof. of  
Zool. and Comp. Anat.,  
A. GLEGNI,  
ENRICO HILLYER GIGLIOLI, Prof.  
of Zool. and Comp. Anat. Verte-  
brates,  
Dr. GUELFO CAVANNA,  
MGR. GIUSEPPE GRATTAROLA  
(Mineralogy),  
Prof. PIETRO MARCHI,  
GIOVANNI ARCANGELI (Crypto-  
gamie Botany).

The following is Sir C. Wyville Thomson's reply to the above:—

*To the Professors of the Natural Science Section of the Royal  
Institute of Florence.*

20, Palmerston Place, Edinburgh, Aug. 12, 1876

GENTLEMEN,—Allow me in my own name and in that of my colleagues on the Civilian Scientific Staff on board the *Challenger* to thank you most cordially for your kind letter of congratulation on our return to England, and on the success of our labours.

Owing chiefly to the manner in which throughout the whole of this undertaking the Admiralty have uniformly accorded the first place to the purely scientific work, and to the heartiness with which the objects of the scientific specialists have been seconded by the naval officers on board, we have certainly been enabled to carry out our investigations almost more fully and completely than we had a right to hope. We are well aware, however, that we have only now entered upon the most difficult if not the most important part of our task, and I can only say that we will do all in our power to justify the liberal encouragement which we have received from Government by working out fully the mass of data and materials which we have accumulated, and publishing our results as soon as possible in an appropriate form.

I need scarcely add how great a gratification it has been to us to receive assurances of sympathy and approval from so many of our most distinguished fellow-workers, but it seems to me that such assurances are more specially welcome from Italy, the wonderful country whose language and modes of thought have been before us as a model from our childhood, and which perhaps above all others commands our interest and regard.

I have the honour to be, Gentlemen,  
Yours gratefully and respectfully,  
C. WYVILLE THOMSON

#### A CONTRIBUTION TO THE NATURAL HISTORY OF THE HERRING

THE Meteorological Society of Scotland has made an important contribution to the natural history of the herring (*Clupea harengus*), the capricious movements of which have recently attracted attention and been discussed in the columns of NATURE. It is often asserted by the more observant persons who assist in the capture of the herring, that the *Clupea* family are lovers of very cold water, and it is, doubtless, from a knowledge of this fact, that the story of the herring being a native of the Arctic regions took its rise. Pennant's tale of these fish coming annually in a vast *heer* from the high latitude of the northern seas has been discussed and settled again and again. There need now be no hesitation in saying that Pennant erred; indeed, he only gave literary life to the fables of the fishermen, and, so far as we know, he made no personal effort to determine whether or not the herring was a migratory fish. It has been ascertained beyond doubt that the herring is a local animal, the different varieties of which can readily be identified. Dealers or fishermen are able to distinguish between a

Loch Fyne herring and one captured in the Frith of Forth or in the Bay of Wick, or any other sea or frith. As a matter of fact, the herring is found on British shores all the year round, and there is no authority for supposing that the varieties taken in different localities are members of any great general body of these fish, or that there is one great shoal in existence every year, which, at a certain season divides and then subdivides itself, *à la* Pennant.

To come back, however, to the new discovery. We are indebted to the Meteorological Society of Scotland for some interesting experiments which have been made as to the temperature of the waters in which the herring can live with the greatest amount of comfort to itself, and, when known, with the greatest benefit to its captors. It has been determined by the experiments of the Society that the take of herrings is most abundant where the temperature of the sea is lowest. It was found in 1874 and 1875 that "the temperature of the sea, off the east coast of Scotland, from the middle of August to the close of the fishing season, was continuously and considerably higher in 1875 than in 1874, and that the catch of herrings was continuously and considerably lower during 1875 than during the same period of 1874." As regards the difference between surface and bottom temperature and their relation to the fishery, it has been noted that when the temperature of the surface of the sea is high, the fish are found in the deeper parts of the water. "The fish prefer, apparently, so far as the inquiry has gone, the lower to the higher temperature." When a thunder-storm has prevailed on any of the days devoted to the fishing a good take of herrings may be expected by the fishermen, "but, on the following day, few, if any fish are caught over that part of the coast, *unless at the extreme verge of a deep part of the sea* as if the fish were retreating thither." The Meteorological Society of Scotland are desirous of extending their inquiries and observations, and they wish the fishermen to aid the inquiry by taking the trouble of "observing the temperature of the sea at the surface and also at the depth at which the fish strike the nets." In other countries than ours observations of a relative kind to those prosecuted by the Scottish Meteorological Society of Scotland have been successfully accomplished. The Dutch have ascertained many interesting facts regarding the effects of temperature on fisheries. The Norwegians have also been prosecuting similar inquiries. Herr von Freeden, of Hamburg, Director of the German Seewarte, has also made observations, both as regards temperature and direction of wind. As regards the latter, he has come to the conclusion that north-west winds are the best for large catches, and northerly winds better than southerly, westerly better than easterly; also, that moderately strong winds, sufficient to ruffle the surface of the sea, are better than calm weather, and light winds almost as unfavourable as stiff breezes; a ruffling of the sea being in his opinion of considerable importance to success of fishing.

These are important discoveries, so far as they go, and must ultimately exercise considerable influence on the practice and results of the herring fishery. Hitherto the men have fished as in the dark, so far as regards the kind of knowledge which has just been found for them. That the month of August is a good time to seek the herring is about all that fishermen do know; the most likely part of the water in which to find them, or the depth at which they may be lying, they cannot tell. When the fishermen *shoot* their nets they may not fall in the path of the fish; the herrings they seek may be either above or below the snare which the men have let into the water for their destruction. By a fruitful continuance of the observations we have referred to, we shall be able to conduct the herring fishery with greater exactitude and likewise with more economy of time.