

THE SPECTRUM OF  $\eta$  CARINÆ ( $\eta$  ARGUS).—The study of the spectrum of the well-known variable  $\eta$  Carinæ, or as perhaps known better under the name of  $\eta$  Argus, has been undertaken by numerous workers, but the latest research on this star forms No. 252 of the Lick Observatory Bulletin, and is contributed by Messrs. J. H. Moore and R. F. Sanford. The spectrograms here described and studied were secured with the one-prism spectrograph of the D. O. Mills Expedition, at Santiago, Chili. The iron arc was used as a comparison spectrum, and the spectrograph was provided with a constant temperature case. The authors reproduce a plate showing the spectrum secured on March 28, 1913, and give tables of wave-length determinations, with comparisons with the chromosphere, laboratory spectra, and Nova Aurigæ. A brief summary of their results is as follows:—The spectrum is essentially a bright-line spectrum, a number of these lines being identified with the enhanced lines of iron, titanium, and chromium. The titanium and chromium lines show a greater displacement towards the violet than do the iron lines, the latter indicating a velocity of approach of 28 km. a second. The iron lines are in general the stronger lines, those of titanium and chromium being classed among the weaker lines. The origins of several strong lines are still unknown, and notable absentees are the lines of helium, the nebular lines, and 4481A magnesium. Some evidence suggests the doubling of the hydrogen lines. The authors conclude that the spectrum of  $\eta$  Carinæ is closely associated with that of novæ at an early stage, and that possibly  $\eta$  Carinæ is a nova. Its position in a great nebula further supports this conclusion.

#### SCOTTISH FISHERY INVESTIGATIONS.<sup>1</sup>

THE Fifth Report (Northern Area) on Fishery and Hydrographical Investigations in the North Sea and Adjacent Waters" is the last of a series of reports, issued by H.M. Stationery Office during recent years, which have contained the detailed accounts of work done in this country in connection with the international fishery investigations. The whole series appearing under the above general title comprises five Blue-books dealing with the northern area (Cd. 2612, 3358, 4350, 4893, and 6950), where the work has been carried out by the Fishery Board for Scotland, and five dealing with the southern area (Cd. 2670, 3837, 4641, 5546, and 6125), where the work was done by the Marine Biological Association of the United Kingdom. Other reports dealing with the English statistical side of the international work have been published by the Board of Agriculture and Fisheries (Cd. 4227, 4738, 5362, and 5686).

In the introductory statement to the volume under review the Scottish Fishery Board announces that the results of future investigations will find publication among the Board's ordinary scientific reports. As the southern work is now entirely conducted by the Board of Agriculture and Fisheries, it is to be presumed that the reports dealing with it will be issued in a similar way by that Board. It may therefore be hoped that this change in the mode of publication marks the establishment of the investigations upon a permanent footing instead of their being regarded as merely temporary as heretofore. From the commencement it has been obvious that such work could only accomplish its full purpose when continued over a long series of years, and the Scottish Fishery Board, and especially Prof. D'Arcy Thompson, its scientific member, under whose superintendence the northern investigations have been carried out, are to be congratulated not only

upon the completion of the five volumes of the present series of reports, but still more upon the future prospects of the undertaking.

The first four volumes issued under the direction of the Scottish Board dealt chiefly with hydrographical and statistical researches. In this fifth report, in addition to these subjects, we have accounts of some of the results of the more biological investigations carried out by the research steamer *Goldseeker*. Prof. D'Arcy Thompson is responsible for the first memoir, in which he deals chiefly with the sizes and the distribution of plaice on the basis of the hauls of the research steamer and on the Aberdeen market statistics. A further report on the plaice and other flat fishes, by Dr. T. W. Fulton, based on special statistics of individual catches of Aberdeen trawlers extending over a period of ten years (1901–10) treats of the distribution and seasonal abundance of these fishes in the different areas of the North Sea fished by the trawlers. Dr. Fulton also divides the statistics into two periods of five years, 1901–5 and 1906–10, and contrasts the quantities of fish yielded in a hundred hours' fishing in the first and second periods. It is shown that in the case of plaice the weight landed per unit of fishing is less in the second period than in the first, but that whilst this decrease is marked in the case of large and medium-sized fish, there is an actual increase in the weight of small plaice landed during the second period as compared with the first.

The same feature is also brought out by the Aberdeen market statistics for the years 1905–11, which show a progressive decrease in the average catch per voyage of large and medium plaice, but a progressive increase in the catch of small. In dealing with the question of the increased landing of very small plaice, Prof. D'Arcy Thompson expresses the opinion that their destruction is detrimental to the fishery, and that it yields no commensurate benefit to the trade, a view which supports the recommendation of Prof. Heincke, which will come under the consideration of the International Council, that an international size limit of 10 in. should be enforced for plaice.

A second memoir by Dr. Fulton deals with the plaice-marking experiments. Unfortunately the number of fish marked in Scottish waters has not been large; indeed, it has not been sufficiently large to give results of a very definite kind. There can be no doubt that such experiments, when carried out upon a sufficiently extensive scale, are capable of yielding information of quite exceptional value, and we are glad to learn from the Board's introductory statement that since the period covered by the experiments here dealt with, others have been conducted upon a much larger scale.

The volume concludes with a memoir by Dr. A. J. Robertson on the hydrographical investigations for 1909–10. No new features of a striking character were found during the two years dealt with, but the work has now been carried on over a sufficient period to show what is the ordinary, normal distribution of salinities and temperatures in the area dealt with, and a useful summary of these conditions is given.

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#### THIRTEEN YEARS' MEASUREMENTS OF SOLAR RADIATION.

IN a paper entitled "Valeurs Pyrhéliométriques et les sommes d'insolation à Varsovie," Dr. Ladislas Gorczyński discusses the measurements which he has made at Warsaw with actinometers and pyrheliometers during the thirteen years 1901–1913. The results are to some extent of a provisional character, and they have been published chiefly with a view of assisting the Commission on Solar Radiation in its

<sup>1</sup> Fishery Board for Scotland. Fifth Report (Northern Area) on Fishery and Hydrographical Investigations in the North Sea and Adjacent Waters, 1908–11. Cd. 6950.