

well (Butley Creek) and in those from the beds (Main Channel) where fattening is less satisfactory.

4. There is an apparent relation between the consumption of diatoms and "fattening", the principal species of diatom taken being *Nitzschia longissima* f. *parva*.
5. Metazoa formed part of the food when the vital activities of the oyster were at their highest. Peridinea were practically absent from the plankton in the waters above the beds, and in consequence very few were found in the food.
6. When actively feeding the oyster appears to ingest anything suitable that it can capture, and no evidence was found to show that selection takes place.
7. It is suggested that growth is due mainly to inanimate food, and "fattening" to diatoms.

In addition to the record of the experiments the paper contains a précis of previously published work on the subject in which thirtyfour papers are summarised.

The careful quantitative and qualitative observations made by the author may well serve as a standard for future work on oyster nutrition and it seems likely that the extension of these methods to other localities and conditions will throw light on many questions which have long been a puzzle to oyster cultivators.

- A. C. JOHANSEN. On the Influence of the Currents upon the Frequency of the Mackerel in the Kattegat and adjacent parts of the Skagerak. Meddelelser fra Kommissionen for Havundersøgelser. Serie: Fiskeri, Bind VII, Nr. 8, 1925.

This is an interesting study in the correlation of the movements of the mackerel with hydrographical conditions, and opens up the possibility of predicting a month or two in advance whether the fishery in the Kattegat will be good or bad.

As is well known, there is in the Belts and the Kattegat an outflowing surface current from the Baltic of low salinity, beneath which is found an inflowing current of saltier water from the North Sea. In the course of a cruise in the "Dana" in April and May 1923 Dr. JOHANSEN observed that this undercurrent was of a higher salinity than usual, and carried with it a plankton population of a more than usually oceanic type, indicating that water of Atlantic origin was entering, along with the North Sea water. The yield of mackerel in the Kattegat was much higher than usual in 1923, which led Dr. JOHANSEN to investigate whether there was a connection between the two phenomena.

He shows in this paper that there is a positive correlation between the percentage catch-anomalies of mackerel in the Skagerak and Kattegat and the salinity-anomalies in the bottom water (at 26 metres) at Schultz' Grund light vessel in May, the coefficient of correlation rising as high as

0.73 in one period. There is therefore a definite relation between a good catch of mackerel in these waters during the fishing season (June to September) and high salinity at the bottom in the Kattegat (southern part) in May, and to a less extent in April. There does not appear to be a direct causal connection between the two phenomena, as it is improbable that the mackerel immigrate in the bottom current. A high salinity in the bottom layer at Schultz' Grund light vessel in May is normally followed by a increase in the surface salinity and a decrease in the surface temperature in June and July, and the probability is that the mackerel enter these waters in the upper layer in search of water of a suitably high salinity and low temperature in which to spawn. Between the surface temperature in June in the Skagerak and the catch of mackerel there is a pronounced negative correlation, i. e. lower temperatures than normal are followed by good catches, higher temperatures by poorer catches.

Dr. JOHANSEN concludes that "there is a connection between the following phenomena in the Kattegat: — (1) A strong ingoing current in the lower water layer in April—May, indicated by a high salinity in this layer, (2) A low temperature of the surface waters in June, (3) A great amount of mackerel in the Kattegat, as shown by a large yearly catch" (p. 25).

It is also shown that a high salinity in the bottom layer in May is normally preceded by a low salinity in the surface layer in March—April. It is therefore possible as soon as the surface salinity is known in March and April to prophesy whether the mackerel season is likely to be good or bad, and when the salinity of the bottom layer in April and May has been ascertained the prediction can be made with greater confidence.

Dr. JOHANSEN proposes to publish such predictions in the „Dansk Fiskeritidende“, and it will be very interesting to see what success attends them. Reliable predictions of this kind would be of great practical value, and would help to bring home to the industry the utility of fishery research.

E. S. R.

C. F. HICKLING. A new Type of Luminescence in Fishes. Journal of the Marine Biological Association of the U. K., N. S., XIII, pp. 914—37, 1925.

In the course of his investigations on the hake fishery carried out on commercial trawlers in the Atlantic Slope area south of Ireland Mr. HICKLING discovered that the Macrurid *Malacocephalus laevis* (Lowe) possesses a luminous organ in the vicinity of the anal papilla. He gives in this paper a careful and well illustrated account of the anatomy and histology of the organ. "It consists essentially of an epithelium for the secretion of luminous substance, which has been thrown into long folds and wholly invaginated to form a gland. This gland is bound in connective tissue and has a compact appearance, and is furnished with supporting tissue internally. The duct is a flat and wide passage, continuous with the gland, which opens to the exterior about the anus in such a way as to surround the lower part of the rectum. The gland lies in the thickness of the body-