

respect. The reviewer is far from denying that the phases of the moon may, through the tides in connection with other factors, exert an influence on the periodicity of the spawning, but as yet nothing definite has been proved in this respect. The author and the reviewer, however, quite agree in this that, as to a whole series of questions concerning the spawning of the oyster, more extensive experiments and investigations are needed.

R. SPÄRCK.

E. EMRYS WATKIN, B.Sc. Investigations on Cardigan Bay Herring. Parts I & II. Rept. Mar. and Fr. Water Invest. Dept. Zool. Univ. Coll. Wales, Aberystwyth. Vol. I, pp. 5—21. Dec. 1925.

This account of the Herrings of the Welsh Coast deals firstly with a statistical examination of two samples of fish from Borth Bay in 1921, and secondly with a more general biological study of 13 samples from Borth, Aberystwyth and Newquay in 1922.

The "racial" measurements in Part I were those recommended by the Ministry of Agriculture and Fisheries in 1913, and along with these, the maturity and age of the fish have been studied.

The two samples were taken on the 15th and 25th of October, 1921 and in each the fish with 2 winter rings predominated; the gonads were mainly in stages IV, V and VI.

From the consideration of the data, Mr. WATKIN concludes that there is a difference between these two lots of herring, the fish of the earlier sample being larger, age for age, than those of the later catch. When the various measurements are expressed as percentages of the length of the fish in each sample it is seen that the results are very similar, agreeing in some cases to the third decimal place. It is obvious therefore that there is no difference in the proportions of the fish, but only a difference in the actual size.

The author has made a series of measurements on the scales and so calculates the average length of the scale up to the formation of each winter ring, each year-class being treated separately. The result found is that the earlier sample of fish have a larger growth in their first growth period than those of the later lot. This is a common feature of the North Sea herrings and it probably represents a difference in the time when the two samples were spawned.

It is to be regretted that Mr. WATKIN has not made his growth calculations comparable with the actual length of the fish, for it is of great value in connecting together the "whitebait" or 0-group fish with the adults.

In the second part of this paper the age, growth, length and maturity of the herrings of Cardigan Bay from October—January 1922, have been observed. The catches were all made very near the coast and consist of different shoals of fish, as can be seen from the maturity tables. The 4 and 5-year old fish form the main part of this fishery but at times, possibly owing to the proximity to the coast, these year groups are out-numbered by fish with one and two winter rings on their scales.

These younger herrings are maturing for the first time and are obviously

on a spawning migration, but the main Aberystwyth fishery seems to be dependent on fish which have spawned some time previously.

It was found that the growth of these fish up to the formation of the first winter-ring could be classified as before into two types corresponding to two different spawning times, but the author states that much more work is needed before the origin and migrations of the Cardigan Bay herrings can be definitely outlined.

W. C. H.

J. O. BORLEY. Distribution of the Food Fishes in the North Sea during 1923 & 1924 with Notes on the Natural History of the Food Fishes of the North Sea by D. E. THURSBY-PELHAM, Ministry of Agriculture & Fisheries, Fishery Investigations. Series II, vol. IX, Nr. 4. London 1926.

Unter diesem Titel erscheint eine beachtenswerte Arbeit, in welcher auf 45 Karten graphische Darstellungen von der Intensität der britischen Trawlfischerei in den Jahren 1923 und 1924 gegeben werden, während der erläuternde Text von J. O. BORLEY auf  $1\frac{1}{2}$ , der von D. E. THURSBY-PELHAM auf etwa 9 Seiten sich zusammendrängt.

Es ist also nicht die gesamte britische Nordseefischerei, die hier nach der speziellen Örtlichkeit und Größe ihrer Erträge kartiert wird, sondern nur der Fang von Bodenfischen, und auch an diesen nur, soweit er vom Trawl — nicht aber von der Angelfischerei — erfaßt wird; dagegen sind die Ergebnisse der Treibnetzfisherei überhaupt nicht berücksichtigt, und für den wichtigsten aller Nordseefische, den Hering, erhält man demnach kein zulängliches Bild in der gedachten Richtung, da der britische Trawlheringsfang im Verhältnis zum Gesamtheringsfang von verschwindend geringer Bedeutung ist; etwas günstiger liegen die Verhältnisse für die Makrele, da die britischen Trawlmakrelenfänge in den letzten Jahren ganz erheblich zugenommen haben; dagegen mußten einige Fischarten wie Sprott, Sardelle, u. a. unwichtigere ganz fortfallen, da sie niemals im Trawl gefangen werden.

Immerhin erstrecken sich trotz dieser Auslassungen die gegebenen Daten auf einen sehr großen Prozentsatz der Gesamtanlandungen von Nutzfischen in den Nordseeländern, denn diese betragen im Jahre 1922 fast 475 Millionen Kg., und davon entfielen 68 % auf britische Schiffe.

Die Bewältigung dieser großen Arbeit war nur möglich, weil gewisse Vorbedingungen erfüllt waren. Unter diesen steht obenan die hervorragende Entwicklung der britischen Fischereistatistik, welche unter Aufwendung sehr bedeutender finanzieller Mittel die Fänge aller sogenannten erstklassigen britischen Trawler an den Märkten nach Gewicht der einzelnen Fischarten, Dauer des Fischens während jeder einzelnen Reise in Trawlstunden und genauer Feststellung des Fangortes erfaßt. Für die letztere wird nicht mehr wie früher die Angabe der international vereinbarten Areas oder Tiefenzonen als ausreichend angesehen, sondern die Benennung einzelner Rechtecke (rectangles) von einem Längengrad und  $\frac{1}{2}$  Breitengrad Seitenlänge verlangt, welche durch die Kombination von