

In the first section he discusses the various physical and chemical factors, which are supposed to have an influence upon the vertical distribution of plankton organisms and his conclusion is, that the most important external factors in this respect are light and temperature. The paper is primarily concerned with the behaviour of the zooplankton, but a short account of the vertical distribution of the phytoplankton is also inserted. Of considerable interest is a scheme given to illustrate the suggested classification of depth distribution of the different plankton communities according to various authors. As it has been shown by several investigators that the vertical distribution for any one species is not to be laid down within fixed limits but is liable to variation, the author has divided these variations under the following headings: 1) regional changes in vertical distribution, 2) seasonal changes, 3) daily changes, 4) ontogenetic changes, 5) changes due to spawning habits and 6) special variations due to hydrographical conditions. It is a very useful method to consider the different changes in vertical distribution in this way, stating briefly under the separate headings the various observations and explanations which have been put forward by the different authors. Concerning experimental observations on plankton animals the literature is fairly rich but the results of the various investigators are very often rather different, and the author emphasizes the point that it is necessary to know precisely the normal conditions under which the animals live in nature before studying the reactions in the laboratory. It seems most probable that light can be regarded as the most important controlling factor, but undoubtedly the question of vertical distribution in general is very complicated and we are very far from possessing a general theory explaining the whole problem. The author seems rightly to emphasize the point that far more observations in the field and in the laboratory are required, indicating how limited our knowledge really is about the behaviour and the distribution of plankton organisms in the sea. The importance of the present paper is very great, displaying as it does in a clear and useful manner our present knowledge from various points of view, and it will certainly serve as an incitement and point the way to lines of future research.

P. JESPERSEN.

J. TRAVIS JENKINS. *The Herring and the Herring Fisheries*. London, P. S. King & Son, Ltd. 1927.

The latest product of this fertile author deals with a subject that nowadays receives much attention. The bulk of the book is occupied by historical matter, only two chapters being devoted to the biology and the races of the herring. The present writer proposes to discuss these latter first.

The principal impression we get from reading these chapters on natural history is that they are somewhat fragmentary, as if the author has drawn his knowledge from occasional books, incidentally at his disposal. Hence it comes about that some subjects are treated in a cursory manner and others are unduly circumstantial. Why for instance dwell largely on the Arctic migration theory, now long since abandoned, and on the transportation of herring eggs to Southern countries? Why devote so much

space to the controversy as to whether the rings on the scales are true indications of age or whether they are merely an expression of the law of variability, to which latter view the author is inclined to give preference? To the general reader such discussions in a handbook must necessarily seem to confuse the whole matter. As to investigations of scales of sprat LUND (SUND?) is cited, but BJERKAN is altogether passed over in silence. Speaking of food of herring LISSNER is mentioned, but HARDY has apparently been forgotten. — By the way: the photograph of herring eggs opposite p. 18 is obviously enlarged, but this is not specially mentioned. The treatment of the herring races is in some points not very clear: it is of no value to give a tabular comparison between coastal and sea herring (p. 42) without stating that such measurements as are mentioned are antiquated, and that JOHANSEN'S method of counting is by far the better. Bank herring of the North Sea are called "Scottish herring", a term somewhat misleading, and the Skagerrak herring ("almost [to] be regarded as the eastern variety of the Northern North Sea herring, as the Scottish herring may be regarded as the western variety") is stated to spawn on the Little Fisher Bank, whereas we now know that this happens only in occasional years, not regularly. Why LJUNGMANN (of 1874) is cited in regard to the herring fishery on the west coast of Sweden, and why PETTERSSON and EKMAN are not, is a mystery. The author contends: "this herring is now taken in large quantities by the German herring trawlers", though it is well known that the Germans of late have abandoned this winter fishery. The table on p. 29 in which the lengths of herring at the age of one, two years etc. are given is useless, in so far as it is not stated to which races the various samples, examined by a number of authors, apparently belonged.

The historical part of the book is really interesting, and the present writer has only to remark that the statement: "for the most part the Dutch boats fish for the so-called summer herring in the neighbourhood of Lowestoft" is on the same page (p. 76) contradicted by the words: "At the Scottish summer herring fishery a considerable number of Dutch herring boats are engaged." The fisheries of the middle ages, the Scania fishery, the rise and development of the present day industry — all this affords interesting reading and the author shows himself well versed in the literature. But passing on we get the vague impression that we have read already somewhere most of this history. Indeed many pages are wholly copied from the author's former book "The Sea Fisheries", which appeared in 1920. Here and there some passages are somewhat amplified or abbreviated. As an example of the first we may cite Chapter VI (The Fisheries Companies of the Stuarts) and Chapter IX (Trawling for herring). Such transcription also occurs in Chapter II (The Natural History of the herring), so that an obvious mistake in describing herring scales ("the other and posterior part is striated and has a number of concentric transparent semicircular zones, each bounded by a dark (!) ring") has passed over from "Sea Fisheries" into the present book (p. 25).

At the end of the last chapter the author mentions the International Council and the way it has worked during a quarter of a century. His adverse criticism is rather severe, we regret to say, so much so that it is stated: "Briefly, the International Council has, so far as the sea fisheries

are concerned, outlived its usefulness and should be replaced by some other organisation, or if left as at present, then it should be dissociated from bureaucratic control" (p. 152—153). The author's chief grievance seems to be that the scientific men charged with the research work are, by the fact alone that they are controlled and paid by State funds, under the necessity "of adjusting their views so that they will conform with official opinion" (p. 154). This is indeed a serious but really quite unjustified charge. Was there an "official" attitude in Great Britain towards herring trawling before the war? And what was the conclusion that English and Scottish investigators came to in their reports on the matter? Has any scientist employed by the State in any country after careful investigation, shrunk from expressing his honest view, if his opinion did not fall into line with preconceived ideas, provided that any such existed? Truly this whole accusation is unfounded and grievous to all those who have given whole-heartedly their time and their labour to the international fishery work.

J. J. T.

H. LISSNER. Die grosse Heringsfischerei in Deutschland. Berichte der Deutschen Wissenschaftlichen Kommission für Meeresforschung, N. F. Bd. III. H. 4. 1927.

As a result of the enquiry made by Dr. EHRENBaum and his fellow workers into the question of the German trawl fishing for herrings, it became evident that a careful study of the condition of German drift-net fishing for herrings was desirable. In particular it seemed necessary to examine whether the complaints made by the drift-net fishermen that their occupation was being injured by trawl fishing, and by excessive fishing for herrings in the North Sea were justified, or to what extent the decrease in the yearly catch of herrings was due to faulty methods or to the general economic conditions prevalent in the post-war period. It was thought that an examination of these conditions might lead to the discovery of means to help and improve the position of the German herring industry and to maintain in a healthy condition an important branch of German deep sea fisheries.

For the purpose of his enquiry, Dr. LISSNER collected material partly through personal observation at sea on board the Fishery Protection Vessel "Zieten", and partly through a large number of records of voyages which were distributed through the fishing companies and filled up by the skippers of the fishing vessels. Of these latter he obtained about 250 records which covered about 300 separate voyages forming about 50 per cent. of the possible voyages in the period during which the records were taken.

The author has examined in detail the statistics of the fisheries in the western North Sea from the year 1894 to the year 1926 and he gives a comparative table covering the results of drift-net fishing and trawl fishing for Scotland, England, Holland, Germany and France, so far as these are available. It is noteworthy that the French statistics for recent years are very incomplete. He also examines the existing statistics of the herring fishing fleets in Scotland, England, Holland and Germany, and with regard