

herring stock, one single annual class may thus be enormously prolific, the individuals exceeding in number those of all other annual classes taken together.

These facts naturally lead to the following conclusions touching questions of interest to general biology as well as to practical fisheries. The age-composition of a fish-stock varies exceedingly; there are good and bad years, producing annual classes rich or poor in individuals. Favourable and unfavourable conditions must thus vary in nature, and seem to affect specially the earlier phases in the life of the fish, inasmuch as we perceive that in advanced years the numerical preponderance of an annual class is equally perceptible for a number of years.

The variations caused by the influence of one year will therefore not always perceptibly influence the number of individuals of the total stock, and in practical fishery its influence will as a rule only be felt some years later, when the annual class in question plays an important part in the catches of fishermen. If favourable years have occurred just before or after the birth of the class in question its influence may perhaps not be felt at all. All this of course applies only to species with many annual classes of spawners, for where few annual classes spawn (or perhaps only one) conditions will be different.

The influence of one year may, however, appear in the quality of the whole stock, for instance in the fat-contents (see Fig. 556 representing the growth of the sprat).

Wherever there is a good opportunity of obtaining representative samples showing the age-composition of a fish-stock, it should be possible to predict the composition of that stock for the following years. We may thus, for instance, count upon the possibility of annual classes containing a marked abundance of young individuals reappearing, after the lapse of a definite time, as equally abundant shoals of older and more valuable fish.

The results here mentioned have been obtained through laborious investigations occupying many years, involving the study of the fishes at all seasons, in order to prove that the various growth-rings of the scales really correspond to seasonal changes.

As far as I know, no systematic investigations as to growth have ever been made in the open ocean, but I may point out that in tropical waters and at all depths in the ocean the same biological problems, which we have just described from boreal waters, present themselves for study and solution. In this connection I consider it interesting to cite some instances from