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ON DIVERSITY OF GROWTH IN FISH.

BY

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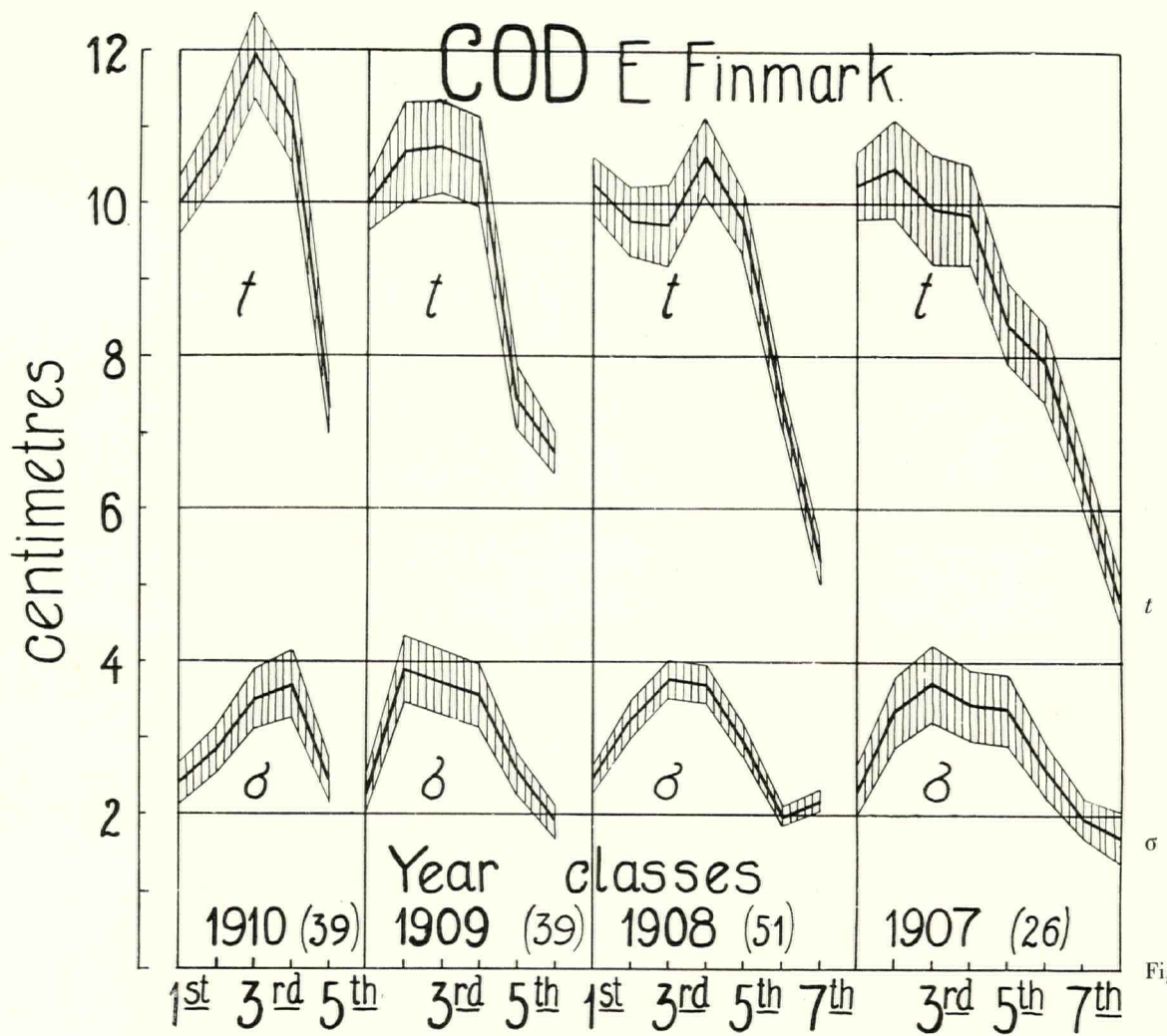


Fig. 1.

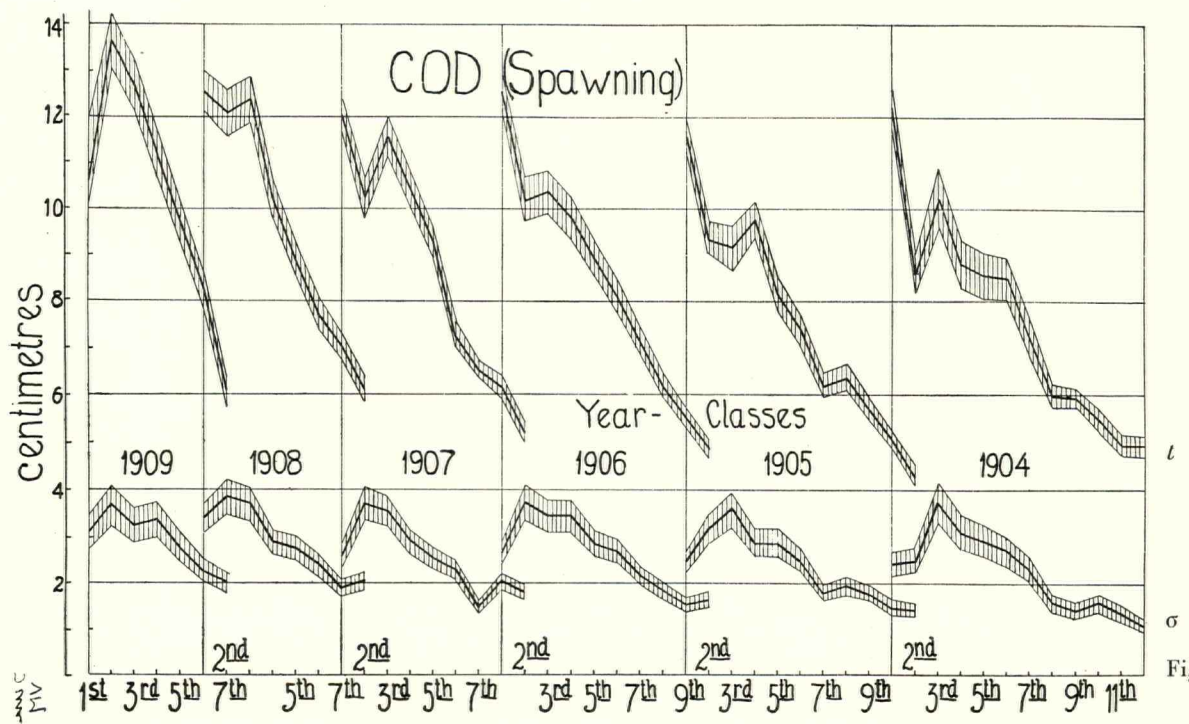


Fig. 2.

ON the assumption that the yearly increments in length can be ascertained by measuring the width of the scale-zones it is apparent that not only do these increments fluctuate in a manner indicating important changes in the well-being of the fish, and particularly in their means of subsistence, but that their standard deviation, or "spread", seems to offer a useful clue to one aspect of the history of the particular community represented by the sample.

A wide spread of increment values, therefore, would appear to indicate that the fish only congregated for shoaling shortly before they were caught, in as much as common conditions of life have not had time to exert any influence tending to make for uniformity of growth. On the other hand, uniformity of growth, or a more moderate "spread" of the increments, may generally be accepted as an indication of a comparatively long period of community of habitat.

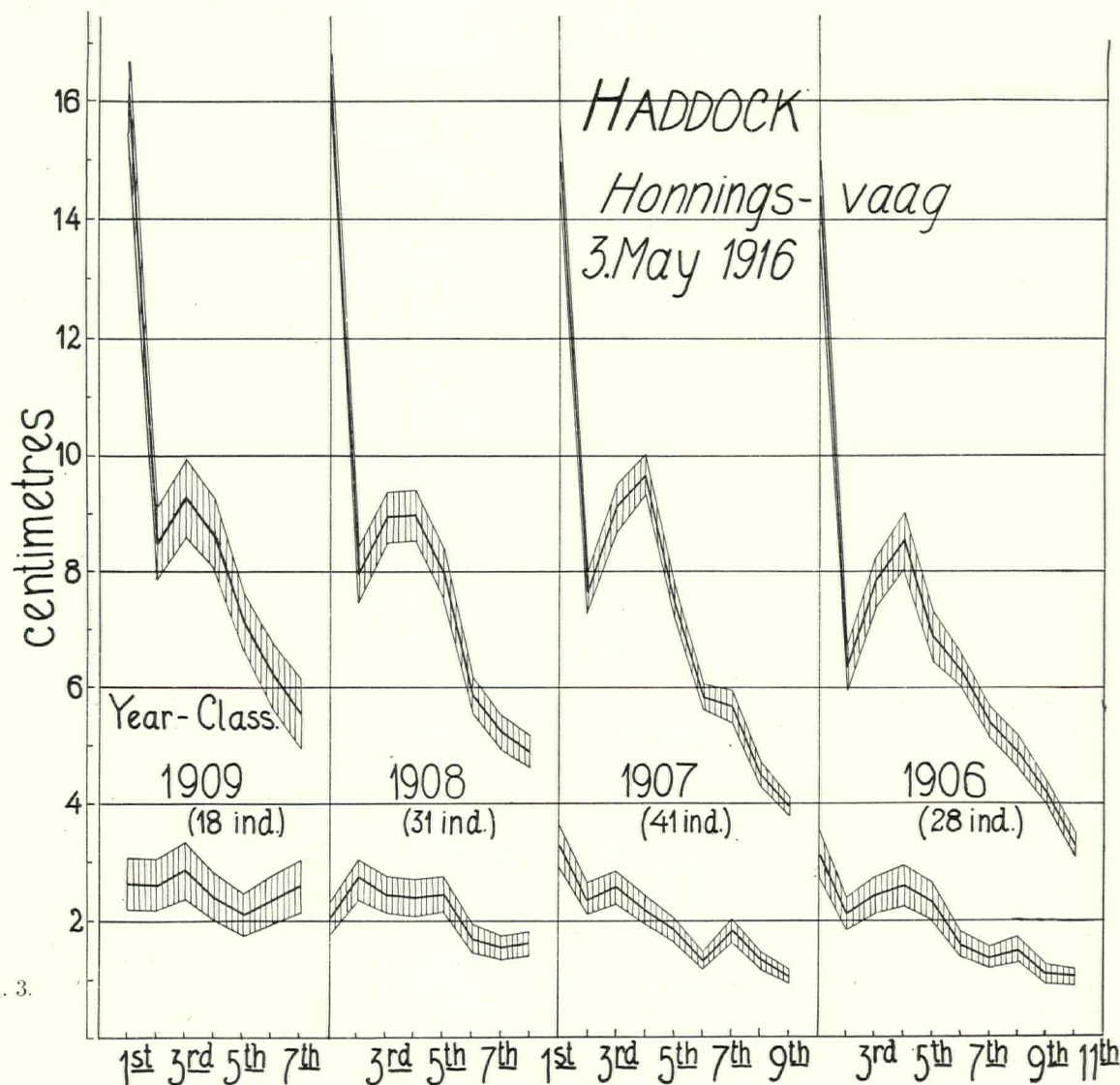


Fig. 3.

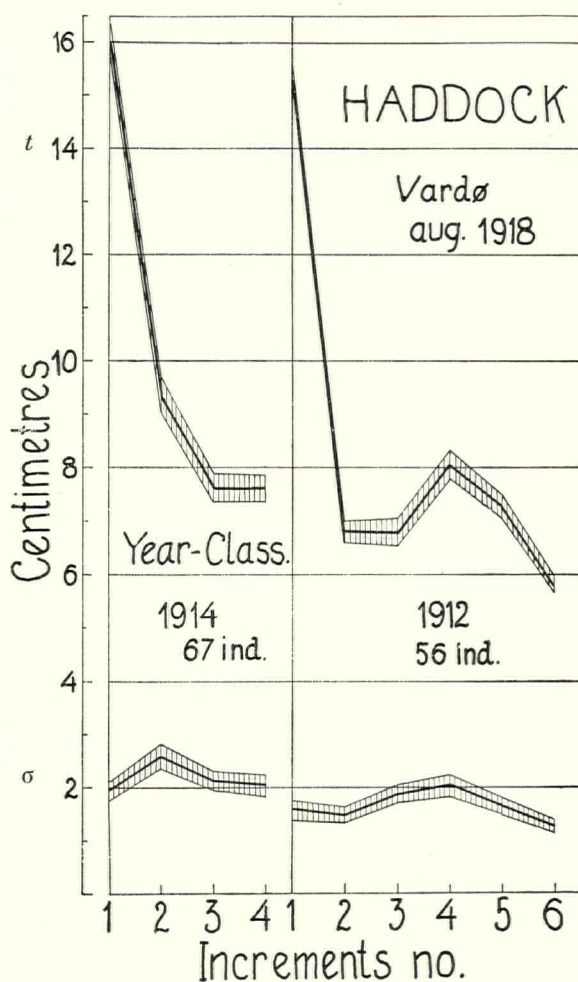


Fig. 4.

On the basis of this assumption we present in the form of graphs the calculated length increments and their standard deviation in samples of cod, haddock, and saithe.

In our opinion this method of presentation, in which also the standard errors of the two values are shown, enables a better idea to be obtained of the growth and its variability than from merely numerical tables.

From the "spread" it would appear that the three species differ from each other in the following manner:—

The **cod** show, on the whole, a gradually increasing resemblance to each other of the individuals comprising each year-class in the sample, indicative, in all probability, of a similarity of conditions in the areas in which the populations, from which the sample has been collected, have been formed by gradual accumulation or congregation.

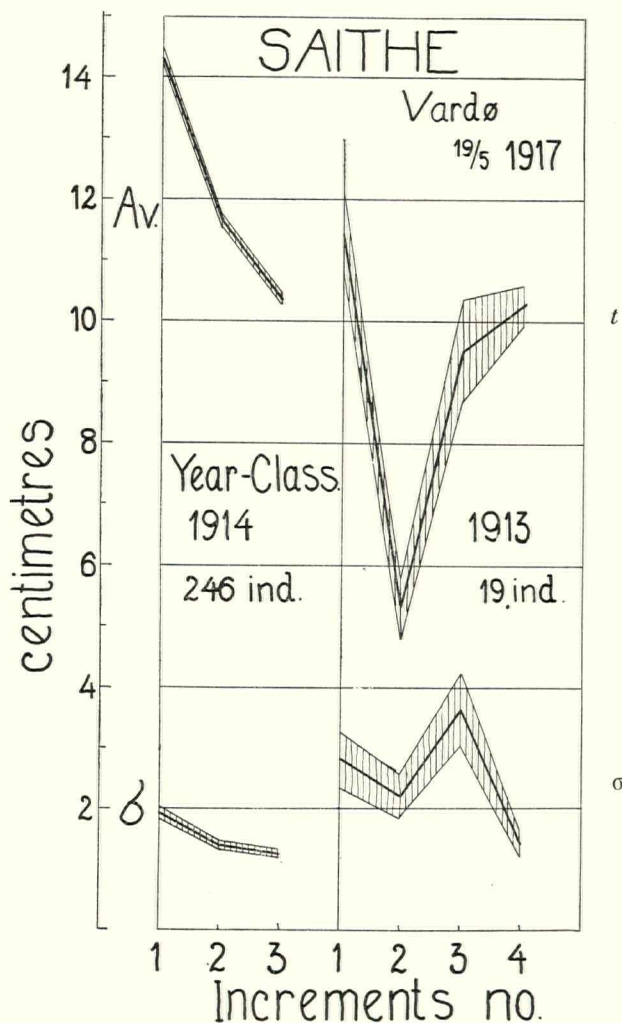


Fig. 5.

In the case of the **haddock**, a fish which has a long pelagic life, the stock appears to be composed of individuals spawned in a great diversity of areas and carried by the currents in widely differing directions from the North Sea to the Barents Sea. This would explain the great variety in the size of the fish after the first year. As a general rule the spread calculated for the subsequent years of the life of a year-class (individuals born in the same calendar year) becomes smaller with the increasing age of the fish. This indicates that once a shoal is formed its members tend to remain in company with each other or to keep to the same habitat.

Among **saithe** we find a low variability in growth right from the beginning. This is in keeping with the well-known propensity of these fish to shoal strictly among themselves and thus live under the most uniform conditions possible as regards means of subsistence and general well-being.