those features which he has most plainly outlined. At the Faroes, a *Modiola* epifauna is by far the most important item so far as the fisheries are concerned, the fauna of the level sea floor being either too poor, or the communities of too slight extent, to be of any considerable value as food for fishes. The *Modiola* epifauna covers large areas along the open coasts and in the sounds between the islands. It includes a number of organisms furnishing excellent food for cod, notably *Galatea neza*, *Ophiopholis aculeata*, *Hyas* and annelids; so much so that in the northern part of the Faroe waters, a little distance from land (within an area lying from 2 to 10 miles out), there should be good conditions of growth for cod, whereas off the southern parts of the islands conditions must be regarded as far less favourable.

In Faxe Bay, Iceland, the situation is markedly different. In contrast with that of the Faroes, the clay and sand communities are here very important in their relationship to the fisheries. There is every reason to believe that the sand community in the south of Faxe Bay, dominated by *Mactra elliptica*, forms the main basis for the plaice fishery there. A shallower clay community in which *Macoma calcarea* predominates is also of considerable economic importance.

Dr. Spärck observes that all the communities in the Faroe and Iceland waters are poorer in species than the corresponding communities of north-western Europe. Such molluscs as *Cardium edule*, *Mya arenaria* and *Macoma baltica*, which are characteristic of the fauna in shallow and calm waters like the Zuyder Zee, the coastal waters of the German North Sea coast, and most Danish waters even into the Baltic, are entirely lacking in the communities of Iceland and the Faroes. Although a few arctic species may be said to be common, none save *Sternaspis fossor* are of dominant importance, so that there is no indication, even on the North Coast of Iceland, of truly arctic communities similar in character to those described from the Barents Sea and White Sea. One feature held in common with more northerly waters, however, is the scarcity of echinoderms, in contrast with what is found in the Kattegat and the North Sea.

This report, which is quite short and accompanied by full sample data on numbers and weight per 1 sq. m. of each species, should prove very useful as a preliminary to further investigations.  

E. F.


Besides Dr. Thompson, only two naturalists, Dr. B. Sæmundsson and Prof. Joens. Schmidt, have hitherto written on the subject of the Icelandic Haddock. Dr. Thompson, however, is the first to use the scales of this fish in estimating its past lengths at various stages.

On the basis of hydrographical conditions he divides the whole Icelandic plateau into 3 natural sub-areas: (a) the south and west, (b) the north and (c) the east coasts. This subdivision also corresponds very well with the different growth rates of the haddock in these waters. The growth is
most rapid on the south coast and slowest on the east, while the north coast is intermediate in this respect. According to growth rate there are two main types of Icelandic haddock, the south coast and the north coast types.

The scale measurements have received most careful and critical attention, and, as the material is very extensive, the results obtained by Dr. Thompson are particularly valuable, especially in regard to the migrations of the haddock.

It was found possible to obtain the mean size of an age group, say the III-group, both by measurement of the fish themselves and by scale measurement. The mean size found by the latter method is somewhat shorter than that found by direct measurement of the fish, a fact that can be explained in this way:— 1) In sampling the shoals of young haddock, the largest specimens are most liable to capture, while the small ones have a greater chance to escape and grow up. 2) The growth of the fish and its scales are proportional in the early years of life, until the fish reaches a certain size, which, for the Icelandic haddock, is 39—44 cms. After this the scales grow proportionally faster than the fish does. 3) Finally the selection of scales is of great importance, as the scales grow with different rapidity according to the part of the body they cover. Every scale grows proportionally with the fish, but the actual growth rate of the scale depends upon its position on the body.

Dr. Thompson has succeeded in identifying the regions in which the various year classes from recent broods are distributed, by calculating, for example, the growth rate of the haddock in different parts of the Icelandic waters by means of scale examinations. Thus valuable conclusions could be drawn as to the biology of the fish, especially in regard to its migrations.

It is a well known fact that the haddock spawns on the south and west coasts, the spawning culminating in April. The I-group is found chiefly on the south and west coasts, more rarely on the north coast and only exceptionally on the east.

The haddock stock of the south and west coasts varies with season. Mature fish gather in abundance on the spawning grounds here, but young fish may also be found in their immediate neighbourhood. East Icelandic waters do not possess any distinct stock: a few old mature recovering spents are found here, and in exceptional years the I-group can be taken in great quantities. This group sometimes appears on the north coast and remains there until maturity is reached, in company with fish which have migrated hither from the south and west coasts in the first three years of life. Although the brood comes to the east coast in exceptional years, it only remains there for a short while, and in the second year it leaves the east coast for the north, where it grows up. On the south coast growth takes place practically the whole year round, but on the north and east coasts it occurs chiefly in the late summer months. This is perhaps connected with the food supply, as the sand eel generally seems especially to favour growth. Secondly growth is both directly and indirectly dependent on temperature. Lee’s suggestion that the central body of the scale is compressed when new sclerites are added cannot be maintained. The morphology of the scale prevents such compression.

When 5—6 years old the haddock gather on the spawning grounds in
order to spawn, and the spawning shoals are then of mixed growth types, of course.

When dealing with haddock more than six years of age, scale examinations are required in order to find out where the specimen in question spent its immature years. The Icelandic haddock material now available is too scanty to allow conclusions to be drawn in regard to the actual extent of the annual recruitment, but it can yield comparative information on this point. The years 1899, 1904, 1922 can be indicated as very good brood years, 1901, 1902, 1908 and 1909 as poor. The results of trawling for a standard time (10 hours) with a sixty foot otter trawl can be used as a measure of the relative abundance of a brood. When two thousand specimens of a particular brood are taken in the I- to III-group stages by trawling for the standard time on the south or west coast, the brood is denominated as normal. If, on the other hand, the catch is much less or greater than this, the brood is considered as abnormal. This is also the case if the I- to III-groups are distributed mainly on the north and east coasts.

The Icelandic haddock stock is independent of that of other countries but does not represent any distinct race. The growth rate of the Icelandic haddock and the morphology of its scales differ very much from those of North Sea haddock, but are more closely connected with those of the Faroe haddock.

It is to be hoped that the methods employed by Dr. Thompson in this paper will be more widely applied to the biology of other Icelandic food fishes, e.g., the cod. Undoubtedly it would then be possible to answer many biological questions which still remain to be settled. It is of great importance to be able to establish the hydrographical conditions responsible for the transport of a brood to a certain part of the coast and the circumstances which give rise to a specially favourable distribution. The locality in which the fish spends the first years of its life has a great influence upon its size and weight, which have an interest from a commercial point of view. On the other hand, as the author shows, the growth rate and the locality in which adolescence is spent influences the time of reaching maturity. Consequently the longer it takes the fish to grow up, the less is the productivity.

When these problems are elucidated, and a method is found for enumerating the stock of haddock or of any other fish, it will be possible to predict the fishery for the coming years, which is one of the aims of the investigations. A good beginning is made with Dr. Thompson's valuable work.

A. F.


Diese Arbeit ist ein kurzer Auszug einer ausführlicheren Darstellung die dem Nordsee-Ausschusse der Internationalen Meeresforschung während ihrer Sitzung in Kopenhagen in 1928 vorgelegt wurde; sie enthält