characters of the different schools, from which the samples were taken. This much may, in any case, be noted:—

1. There is a marked difference in the number of keel scales between the northern spring spawners and the southern fall spawners. The average for the first group being about 12·5, the number for the second group increasing to 13 to 14.

2. The total number of vertebræ is highest in the sample from the west coast of Newfoundland (56·83).

3. Amongst the three spring-spawning types the number of vertebræ of the dorsal and anal rays, and of the keel scales is higher in the sample from the west coast of Newfoundland than in the samples from the southern part of the gulf of St. Lawrence.

4. The number of dorsal and anal rays is higher in the individuals caught in the open sea than in those from the closed waters (the gulf and bay of Fundy).

If we compare these samples from the American Atlantic coast with the samples which have been studied in European waters, we note, first of all, the very low number of keel scales in the northern samples from the American side; while the oceanic herrings of Northern Europe have an average number of keel scales (behind the ventrals) 14, 14·5, and even 15, all the samples from the gulf of St. Lawrence show an average number below 13, and near 12·5. Such a low average has in European waters only been observed from the Baltic and the White Sea, that is from inclosed waters with a very low winter temperature and low salinities. It is in this connection interesting to note that the number of vertebræ, of fin rays and of keel scales decrease in the series: west coast Newfoundland, Magdalen islands, Northumberland strait, just as these corresponding figures decrease in Norwegian samples collected from the open coast to the head of long enclosed fjords (Beitstadfjord, see above).

The herrings from the west coast of Newfoundland, which in other respects, such as their rate of growth, very much resemble the herrings of the Norwegian coast, have no such high number of vertebræ (57 to 58) as the Norwegian herrings, but I must draw attention to the fact, that my material does not contain any samples from the eastern shores of Newfoundland and from Labrador. These should be obtained and studied before any final conclusions are drawn in this respect.

On the whole, if the material before us does not give any conclusive and final determination of the racial characters of the herring types off the Atlantic coasts of North America, it does at any rate indicate:firstly, a marked racial difference between northern and southern types; and secondly, a difference between the racial characters of American and European herrings

AGE AND GROWTH.

During the international investigations of the fisheries of northern Europe, methods have been developed for the study of the age and growth of the most important food fishes. The old discovery, that the bones and scales of these fishes show rings which very closely correspond to the growth of the fishes during the different seasons, has again attracted the interest of a great number of scientists, who have been able to prove[1] that the rings very closely correspond to the growth of the fishes, not only so, but the number of rings corresponds to the number of seasons (summers and winters) during which the fish have lived, and so complete are these features that the size of the rings, or zones, gives exact information with regard to the question as to the rate the fish has grown in the different periods of growth.

The investigations of Mr. Einar Lea have shown that the herrings of the Norwegian west coast mainly grow during the months from April to September; at the

[1] For the literature on this subject I may refer the reader to my paper quoted above.