

communities of northern waters to distinguish between the various types of areas of distribution. In accordance with all previous descriptions of the animal life of northern waters, we may recognise three typical faunas, viz. (1) the arctic, (2) the boreal, and (3) the temperate Atlantic.

The arctic communities include those forms which are propagated and attain their maximum abundance in waters belonging to the ice-covered area at temperatures below 2° C.

The temperate Atlantic communities comprise those forms which occur mainly in the warm layers of the Atlantic, and only at certain seasons or in small quantities occur in the north. Most of these forms are entirely oceanic.

The boreal communities include those forms having their maximum frequency in waters at temperatures between 4° and 8° C. It is the boreal region which specially interests us, but the nature of boreal communities can only be fully grasped when we know the "strange elements"—the Atlantic and arctic "visitors."

The boreal region includes several areas, each limited by natural borders, one of which lies between the west coast of Britain and South Iceland, extending to the Faroe-Shetland channel, the upper layers being occupied by the North European branch of the Gulf Stream. Another area is the Norwegian Sea, separated from the first-mentioned by the submarine ridges between Shetland and Faroe and Iceland; a third area is found round Greenland, Davis Straits, and the Newfoundland banks.

We will discuss the Norwegian Sea first, because this area has been most thoroughly investigated.

*The Norwegian Sea.*—The borders of the ice may be considered as indicating roughly the limits of distribution of pelagic arctic communities. It is therefore interesting to examine the ice-limits as shown by the charts published by the Danish Meteorological Institute. Fig. 481 represents some of these ice-limits for different months of the years 1902, 1903, and 1906, showing considerable variations from season to season and from year to year. Vast areas of the Barents Sea and White Sea are closed in winter and open in summer, as also the sea off Spitsbergen, and the Greenland Sea between Jan Mayen and Greenland. The Polar Sea north of Spitsbergen is in certain years ice-covered all the year round, but sometimes a

Arctic animal communities.