

be seen in glacial deposits, though they no longer live in the neighbourhood. Considerable numbers of the arctic species have succeeded in adapting themselves to the altered conditions, and constitute at the present day a regular portion of the boreal fauna, being at the same time distributed throughout the arctic region; these are the arctic-boreal forms.

The present-day fauna of the Norwegian Sea thus consists of two elements of different origin: (1) an *endemic* arctic element, and (2) a *southern* element derived from the littoral, sub-littoral, and the deeper parts of the Atlantic and Mediterranean. Thus we may divide the present-day fauna into groups, as follows:—

(1) One group consists of two categories of endemic arctic forms, viz. the purely arctic species, and the arctic-boreal species widely distributed throughout both arctic and boreal waters. Both categories existed everywhere in the Norwegian Sea throughout the Glacial Age, but only species of the last-named category have since been able to adapt themselves to the boreal areas. These species, therefore, in contradistinction to the remaining boreal forms, are of genuine arctic descent; that is to say, when a species occurs normally in both arctic and boreal areas, it is as a rule arctic in its origin.

The purely arctic species are not generally limited to the arctic region of the Norwegian Sea, but are usually widely distributed over the other arctic seas as well. Very frequently they inhabit all the areas round the pole (European, Asiatic, and American), and are in that case designated *circumpolar* species. The arctic-boreal species have precisely the same arctic distribution, but within the boreal region their southern boundaries have strict limitations; the bulk of them on the European side never leave the Norwegian Sea, being absent from the coast banks south of the British Islands and deeper parts of the Atlantic,¹ owing to the physical differences of the sea-water. A great many of the arctic-boreal forms, in boreal areas at any rate, inhabit the littoral or sub-littoral zone along the coasts and in the North Sea, and it is precisely in these zones to the south of the English Channel that the hydrographical conditions (and especially the temperature) differ

¹ There are, however, a few exceptions to this rule in the case of archibenthal and abyssal forms, some arctic-boreal deep-water species being distributed throughout the northern Atlantic as far as the Azores, including among others the echinoderms *Cribrella sanguinolenta*, *Pontaster tenuispinus* var., and *Ophiacantha bidentata*. An explanation may perhaps be found in the fact that the temperatures in the deeper boreal areas of the Norwegian Sea and Atlantic are fairly alike and uniform.