

on the west, but in regard to individuals they are very much exceeded by the attached forms.

A great difference between the arctic region in high latitudes, where the Gulf Stream has lost its warming influence, and the boreal region, is to be found in the littoral, or more correctly in the strand, zones. The luxurious growth of fucus and laminaria which covers the rocks along the coasts in the boreal region, both above and below low-water mark, is wanting in depths less than about 6 metres. This is due to the ice blocking up the shore for a great part of the year and preventing the development of animal and plant life. The strand zones in high arctic latitudes accordingly exhibit nothing but naked rock, in contradistinction to the rocks of the boreal region, where we find numbers of attached animal-forms right up to high-water mark. As soon, however, as we descend below the limit of the baneful effects of the ice, we meet with a profusion of both plants and animals, sometimes even in greater abundance than in the boreal region.

Arctic littoral forms.

Though we are thus unable to speak of an actual strand-fauna in high arctic latitudes, we can distinguish, to a certain extent, between the littoral, or rather sub-littoral, and the deeper non-littoral forms. The former, however, appear to be comparatively few in number, taking 40 metres as the lower limit as we did in the boreal region, while on the other hand most of the non-littoral forms reach nearly up to or actually pass the littoral limit. Generally speaking, the limits between a littoral and non-littoral zone seem to be less clearly defined in the arctic than in the boreal region.¹ The reason for this is obvious enough, if we remember that temperature largely controls distribution. In high arctic latitudes the difference in temperature between deep and shallow waters is inconsiderable compared with that at corresponding depths in boreal areas. As a result the forms find favourable conditions of existence, so far as temperature is concerned, at very different depths, and the vertical distribution of most of the arctic forms is far more extensive than that of boreal forms. A few instances may be cited: *Hymenaster pellucidus* in the Norwegian Sea deep basin is found even below 2000 metres, while on the east side of Spitsbergen it occurs at 27 metres; *Antedon eschrichti* may be met with in the cold area of the Norwegian Sea at very considerable depths, whereas at Spitsbergen it flourishes in

¹ Cf. Stuxberg, "Evertebratfaunan i Sibiriens ishaf," *Vega-exped. vetenskap. iakttagelser*, Bd. i. pp. 730, etc.