

the fact that they float at the mercy of every current; while among the groups which are poorly or never represented in fresh water we find a large proportion of forms which pass through a free-swimming larval stage. That this factor has been of great importance is confirmed when we examine those organisms which have effected a conquest of fresh water, for we find that in the majority of cases a free-swimming stage during development has been suppressed.

Of almost equal significance are the temperature differences between the waters of the ocean and of inland areas. It is quite evident that comparatively small masses of water, such as even the largest rivers and lakes, are more liable to variations of temperature than the vast waters of the ocean. In the tropics, a comparison between the ocean and a really large lake may show differences of little importance; but on the other hand, where the mass of water is small, as in ponds and streams, the contrast becomes very marked, and there is the additional danger that the water may entirely dry up. In temperate and colder climates there are often greater extremes, and in many cases equal danger to life, on account of the freezing of the water. The inhabitants of the more uniformly warm ocean, which is never subject to drying up or to freezing, will certainly find a difficulty in colonising where there are these undesirable features, and in fact it is only the forms which can fully adapt themselves to such altered circumstances that can make the change.

While these conditions have probably checked migration in a number of instances, there are types belonging to several groups which have become able to withstand high or low temperatures, as the case may be, or have devised means of surviving desiccation and freezing.

A few examples will serve to show the extremes which can be reached by forms which have been successful colonists. Certain Algæ and Bacteria have been found living in the water of geysers at temperatures up to 80° C., and a fish (*Haplochromis desfontainesi*) lives in Tunis in hot springs with a temperature of 75° C.

On the other hand, it is well known that most of our familiar plants are not killed by frost, though their vital activities are suspended, and a temperature of a little over 0° C. is sufficient for vigorous growth in the case of our earliest spring flowers and the plants of alpine and polar regions. There are animals, too, which can survive a temperature below freezing-point, but the cold in many cases induces a complete cessation of the ordinary functions of life. Frogs and toads, many fishes, and certain Mollusca can undoubtedly withstand such cold and resume their normal existence on the necessary increase in warmth. Further, it is a fact that the seas in the Arctic and Antarctic regions are often well stocked with life (largely Algæ and the