

the further development takes place, aided probably by nutriment obtained from the host by means of outgrowths penetrating the tissues. When the young mussel is fully formed, the cyst bursts, and the mussel falls to the bottom to assume a sedentary life. Whether this wonderful method afforded the means by which the mussels were enabled to colonise fresh water is doubtful. It is more probable that the process has been entirely evolved since they assumed a fresh-water habitat, and that its object has been to assure adequate distribution within the limits of that medium.

We have now to deal with the second method by which organisms primarily marine have come to inhabit fresh water, namely, by becoming terrestrial or swamp-loving in nature, and secondarily adapting themselves to a fresh-water life. In the first place, we are fully justified in supposing that the forms belonging to groups overwhelmingly terrestrial in character come into this category, and are modified land forms and not direct immigrants. This is in all probability the case with the majority of the higher plants; indeed, amongst the Angiosperms there are species living in swampy surroundings which can perfectly withstand changes from an almost wholly terrestrial to a partially submerged existence.

It is equally obvious that the Mammalia are an essentially terrestrial group, and that therefore fresh-water mammals (as, of course, marine mammals) have become secondarily adapted to a very different mode of life. The same is presumably true of the insects and arachnids which are now constituents of the fresh-water fauna. Finally, we may mention certain fresh-water Gasteropods, which belong to the great group of air-breathing forms (the Pulmonata) and so may be supposed to have secondarily arrived in our rivers, lakes, and swamps. Among the most common genera belonging to this group are *Limnæa*, *Planorbis*, and *Ancylus*.

The third method by which fresh-water organisms have been produced—by the isolation and freshening of portions of the sea—is a wholesale method, which must have acted upon a number of most diverse forms. It is, of course, clear that in a basin isolated by earth-movements from the sea there would probably be many organisms totally unable to accustom themselves to a fundamental change in salinity, however gradually that change might be accomplished.

There are certain indications afforded us as to which forms could survive, both by the experiments of Beudant and by the instances of partial direct colonisation by marine types which have already been discussed. We have also seen sufficient evidence that this process has actually been at work, but it is nevertheless practically impossible to point out the groups which have become inhabitants of fresh water in this manner. The temptation is to assume that all the organisms in