

we are fairly safe in saying that such sensitive forms must be restricted in their range, and are little likely to colonise fresh water.

The evidence which has been cited seems to suggest that our lists of fresh-water and salt-water forms, while indicating correctly the general tendencies of the groups in question, are liable to be modified, as exploration brings to light types which are adapted to a different state of existence. We are justified in saying that in most instances it is not really impossible for representatives of this or that group to exist in either fresh or salt water as the case may be, for increase of knowledge has repeatedly brought to light cases which are exceptions to the ideas previously held. Our proposition that fresh-water forms have been derived from the ocean is clearly supported by the evidence we have at our disposal, and a good deal of this concerns a transference from sea-water, as we now know it, to water which is brackish or fresh.

We have, however, no reason to suppose that the water of the ocean has always been just as saline as it is at present; indeed, we have every reason to believe that its salinity has been slowly increasing through countless ages, by the addition of salts dissolved out of the land-masses. Quinton has collected testimony to prove that, on the one hand, the sea of former epochs was essentially the same in chemical composition as that of to-day,¹ but that, on the other hand, the concentration of the salts in the water was very considerably less.² If, then, we know of organisms which have been able to accomplish a greater change in recent times, it is not hard to believe that many forms gradually achieved a lesser change during past geological ages.

A further discussion of this is not necessary here; but granting that the earliest known forms of life were inhabitants of the ocean, and that the non-salinity of rivers and lakes was, in most cases, no insuperable bar to colonisation, we have to look for other reasons which may explain why only certain forms (and a very small assemblage, in the case of animals) have succeeded in establishing themselves. There are, indeed, other factors which have had as great or even greater influence in hindering the migration into fresh water as the difference in salinity, and these we may proceed to enumerate.

In the front rank we may place the prevalence in the sea of delicate, feebly-swimming organisms, or forms having weak free-swimming larvæ, for it is obvious that these could not contend against the seaward current of rivers and streams. The very exceptional occurrence of jelly-fish in fresh water is, for instance, probably due to

¹ *Op. cit.*, p. 235.

² *Ibid.*, p. 446. The figures given are 3·5 per cent. of dissolved salts, as an average for the existing ocean, and 0·85 per cent. for the primitive ocean in which we believe life to have originated.