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THE ROLE OF SALTS IN THE PRESERVATION OF LIFE[1]

I

LESS is known of the rôle of the salts in the animal body than of the rôle of the three other main food-stuffs, namely, carbohydrates, fats and proteins. As far as the latter are concerned, we know at least that through oxidation they are capable of furnishing heat and other forms of energy. The neutral salts, however, are not oxidizable. Yet it seems to be a fact that no animal can live on an ash-free diet for any length of time, although no one can say why this should be so. We have a point of attack for the investigation of the rôle of the salts in the fact that the cells of our body live longest in a liquid which contains the three salts, NaCl, KCl and $CaCl_2$ in a definite proportion, namely, 100 molecules NaCl, 2.2 molecules KCl and 1.5 molecules of $CaCl_2$. This proportion is identical with the proportion in which these salts are contained in sea-water; but the concentration of the three salts is not the same in both cases. It is about three times as high in the sea-water as in our blood serum.

Biologists have long been aware of the fact that the ocean has an incomparably richer fauna than fresh-water lakes or streams and it is often assumed that life on our planet originated in the ocean. The fact that the salts of Na, Ca and K exist in the same proportion in our blood serum as in the ocean has led some authors to the conclusion that our ancestors were marine

[1] Carpenter lecture delivered at the Academy of Medicine of New York, October 19, 1911.