

organisms to adapt themselves to conditions which often seem to us most unpropitious.

As living implies expenditure of energy, an income of food is obviously essential to continued activity; and yet we know that even food can be done without for prolonged periods. Succì fasted for thirty days, and the salmon seems to eat nothing for many months. Some slow-going animals, like Amphibia, are said to be able to fast for years, and there is no doubt of this in the case of organisms which pass readily into the state of latent life.

Water is another essential, but again the limits of necessity are wide. The desert plant, the spore in the air, the dry seed, the encysted Protozoon, the desiccated wheel-animalcule and water-bear, show that although water is necessary to keep the wheels of life going, it may be in great part removed without irretrievably spoiling the mechanism.

Since Priestley discovered oxygen and Mayow compared living to slow combustion, it has been recognized that an essential step in metabolism is the oxidation of carbon compounds. Yet here again the necessity for careful statement soon becomes obvious, and we learn once more the lesson, that life does not readily admit of being bound up in formulæ. Pasteur and others showed the existence of "anaërobic" micro-organisms, which are able to live and flourish in media containing no free oxygen, as the yeast-plant familiarly does in the brewer's vat, the solution of the riddle being simply that these "anaërobics" obtain the oxygen they require by splitting up the complex substances amid which they live. Similarly, Bunge has shown that parasitic thread-worms which live in the food-canals of many animals may be quite lively for 4-5 days in media entirely free from oxygen. As their store becomes exhausted, however, they sink into latent life.

For most of the higher plants and animals the limits of temperature consistent with life are comparatively narrow, but this is far from being the case with all. Over and over again, earth-worms, fishes, and frogs, not to speak of simpler creatures, have been thawed out