

unicellular plants a complicated process has been described by Chmielewski, where the nucleus, after conjugation, divides into two parts one of which breaks up and degenerates, being apparently digested by the cytoplasm, the other persists as the permanent nucleus. In this case the process seems to resemble the condition found in the Coccidiidae, if Siedlecki is correct in considering the dark bodies extruded from the nucleus during conjunction as true nuclear material. Perhaps no want is more necessary to-day in biology, than a wider and more comprehensive knowledge of the whole problem of reproduction, in all its various forms.

The discovery in the malarial parasite of some such relation between the asexual and the sexual modes of reproduction as Maupas has established for the Infusoria, might prove in the future of some practical value. He has established the fact that in the infusoria, in order for conjunction to take place, the conjugating animals have to be from different cultures, the sexes of the same culture not pairing together. He has also shown that the sexual mode of reproduction can be entirely suppressed, if the animals be grown on exceptionally rich culture media, going on reproducing themselves by fission until the culture finally dies out from senile degeneration. It is not only the lower animals and plants that exhibit merely a relative need of sexual reproduction, but many of the higher ones also. In bees, for instance, the egg invariably develops into an adult whether it is fertilised or not, the fertilised eggs producing female bees, the unfertilized drones. Perhaps one of the most singular examples of the relation of the sexual to the asexual mode of reproduction is exhibited by the alga *Ectocarpus* as described by Berthold (17). Here the macrogamete or female cell, on reaching maturity, comes to rest for a few minutes. If it does not happen to be fertilised by a male cell during these few minutes of rest, it draws in its flagella completely, becomes spherical, and prepares itself for parthenogenetic germination. The male elements have also the power of spontaneous development, but this development never gets beyond the embryonic stage.

While this need for fertilization may only seem relative, it probably occurs, however at some time in the life-history of every Protozoon though the exact period and the conditions under which it may occur seem to vary greatly even in closely related species. Hertwig in a recent paper (18) claims that in the Protozoa a true process of fertilization as we understand it in multicellular animals is not present; that what we have is a process of division in manifold shapes, accompanied by a need for the reorganisation of the unicellular body, accomplished from time to time by conjugation.