

or have formed the raw material of evolution remain obscure. The literature of the pathology of *tissues* and *cells* grows annually like an unending encyclopædia.

(5) The final step in pathological analysis leads, as in physiology, to the study of the metabolism of protoplasm. For it is here that deranged function and normal function have their foundation. As yet, however, the step has been, as it were, into the darkness, with faint glimmerings of light which suggest the possibility of a new pathology and a new therapeutics.

As a fine example of comparative pathological work which is at the same time distinctively biological, we may refer to Metschnikoff's epoch-making researches on phagocytosis.

There is as yet only a rudimentary physiology of reproduction either as regards plants or animals. What is called the physiology of reproduction is usually a descriptive account of the processes by which eggs and male elements are formed, liberated, and brought together, and to this there is usually appended some theory of the nature of fertilization and the determination of sex. But the descriptive account is only a needful preliminary, it does not deal with the relation of reproduction to the general metabolism of the body; and we are as far from understanding the physiological meaning of fertilization, or the conditions which lead one fertilized ovum to become a male, and its neighbour to become a female organism. Of theories there has been a profusion, and some of them may have a suggestive value, but the majority of the earlier ones are mystical and absurd, and the majority of the later ones hopelessly partial. *The Evolution of Sex* (1889) contains a preliminary attempt to unify the various sets of phenomena by restating them in terms of protoplasmic metabolism.

Reproduction in Animals.

Perhaps no scientific problem has been viewed with more interest by outsiders than that of the determination of sex, that is, the analysis of the conditions which determine whether an ovum shall develop into a male or a female offspring. The interest is, of course, due