

elements concerned have both been recognised to be cells, both have been found to undergo, before what is termed the stage of maturity, similar preparatory changes. The changes represent, as it were, the last stages of their independent existence as living cells. After these changes have taken place they can only enter into a new cycle of existence, exhibiting new powers of growth and division by a process of fusion where each supplies what in the other is wanting to start on a new cycle of life—*i.e.*, of differentiation and development.

Thus the vague theories of former times, which reach far into the nineteenth century, the speculations of the Spermatists and the Ovists, have during the last thirty years, beginning with Pringsheim's observation in 1869 of the pairing of the swarm-spores of certain algæ,

tation of the purely enumerative, or all-case method. The number of instances in which the process of fertilisation, with its various preparatory stages and its consequences, can be actually observed is infinitesimally small compared to the number of different species and varieties in which it is endlessly repeated on lines which no biologist doubts to be essentially the same. M. Yves Delage says: "C'est une chose remarquable combien certains êtres, par des particularités en apparence sans intérêt ont facilité la solution de certains problèmes presque insolubles en dehors d'eux. *L'Ascaris megaloccephala* [the round-worm of the horse, first observed by van Beneden in 1883], par le petit nombre de ses chromosomes, les Echinodermes [sea urchins, &c.] par la facilité avec laquelle ils acceptent la fécondation artificielle, ont fait faire, en dix ans, plus de progrès

aux questions relatives à la fécondation que n'ont fait avant ou depuis tous les autres animaux réunis. Dans l'*Ascaride*, le testicule forme un long tube et les diverses phases de la spermatogénèse s'accomplissent dans les régions différentes de l'organe: il y a une zone à spermatogonies, une zone à spermatocytes en voie d'accroissement, une zone où se font les divisions reductrices et une enfin où les spermatides se transforment en spermatozoïdes" (*L'Hérédité*, p. 133). See on the variety of objects which have lent themselves to the gradual unravelling of the processes of cell division, nuclear division, fusion of nuclei, cleavage and embryonic development, notably the volume of Prof. Val. Haecker, '*Praxis und Theorie der Zellen- und Befruchtungslehre*' (Jena, 1899). A very lucid summary is contained in J. A. Thomson's '*The Science of Life*' (1899).