

The distinctively modern era in the history of fertilization dates from about 1875, when the brilliant researches of Auerbach, E. van Beneden, Bütschli, Fol, O. Hertwig, and others, showed that one of the essential phenomena in fertilization is the intimate and orderly association of the sperm-nucleus, of paternal origin, with the ovum-nucleus, of maternal origin, the result being the cleavage or segmentation-nucleus. The researches of Strasburger, De Bary, and others established the same result in regard to plants.

Subsequent research has been mainly concerned with deciphering the details of each step in the fertilization process, and with the attempt to ascribe a rôle or functional meaning to the different parts of the intricate cellular mechanism concerned in the act.

Although maturation precedes fertilization in time, its significance was longer in being appreciated. In 1824 C. G. Carus observed that little bodies (polar bodies, directive corpuscles, &c.) were given off by the ripe ovum of the water-snail *Limnæus*; Fr. Müller and Lovén made the same observation in 1848, and similar results gradually accumulated. In 1875 Bütschli showed that these little bodies were formed by the division of the ovum-nucleus, and Fol confirmed this a year afterwards. It was soon shown that in the majority of ripe ova it was a normal occurrence that the unfertilized nucleus should divide twice in rapid succession. In 1876 Giard interpreted the little bodies as abortive ova, a view which Mark also emphasized somewhat later (1881); and various other suggestions were made as to their meaning. In 1883, however, Van Beneden made the suggestive discovery that the sex-nuclei, which become intimately associated in the fertilization of the egg of the round-worm of the horse (*Ascaris megalocephala*), contain each one-half the number of nuclear elements or chromosomes characteristic of the *body-cells* of the species, and this has been confirmed in regard to numerous animals and plants. This led on to Weismann's theoretical interpretation, that the formation of polar bodies, and the analogous processes in the history of the spermatozoon, involved "reducing