

malaria parasite they arise in connection with both the female and the male gametocyte, the polar bodies proper of the higher animals arising only in connection with the female element. Our ideas to-day regarding the development of the polar bodies and the maturation of the germ-cells date from Van Beneden's epoch-making discovery, that the germ-cell contains only one-half the number of chromosomes of the ordinary tissue body cells. Thus, on conjunction of the germ-nuclei in the egg, the number of chromosomes are kept constant instead of being doubled on each act of fertilization, as they would be if the germ-cells contained the same number as the body cells contain. In man, for instance, the number of chromosomes in the body cells is said to be sixteen, their number in each germ-cell is eight, the union of the two germ nuclei in fertilisation gives the egg the full sixteen chromosomes of the body cell, eight of which are derived from the male, eight of which are

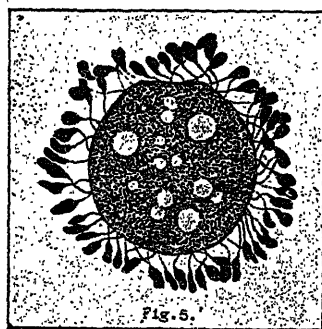


FIG. 5. The formation of spermatozoa in the coccidium of the occipus, the spermatozoa are seen adherent to the residual mass or blastophore, similar in manner to the way they adhere to the blastophore in the case of the earthworm. (Siedlecki.)

derived from the female side. Beyond this primary halving or reduction of the chromosomes in the germ nuclei, we know little or nothing of the real significance of the phenomena connected with their maturation. When we attempt to advance beyond this we meet with the most contradictory observations, and diverse opinions, this being one of the most difficult and obscure fields of biological research. All agree that the final reduction of the chromosomes in the germ-cells is effected in both sexes, by the last two divisions by which the definitive germ-cells arise from the primordial mother germ cell. In each case, four cells arise from these two divisions. In the case of the female, only one of these four cells reaches maturity as the ovum, the other three aborting; *they are the polar bodies*. Thus in the higher animals it will be seen that the polar bodies are peculiar to the maturation of the female germ-cell. No similar bodies have been found in connection with, so far, the