

between the germ and the mosquito might exist. But the idea took no definite form until Manson formulated his hypothesis that the malaria parasite was common to man and the mosquito, which it should enter, depending on circumstances, and that it could be transferred from the one to the other. There were many observers, however, who disagreed with the evolution theory regarding the flagellate body. The Italian school for the most part held that the phenomenon of flagellation was not a life process of the plasmodium, but was one of involution or degeneration. It was due to a change brought about in the dying protoplasm. The future knowledge of the intra-corporeal life history of the malaria germ depended on proving that the nature of the process of exflagellation was developmental. With this end in view, Major Ross made Manson's hypothesis the basis of further investigation.

In his preliminary experiments he showed that the transformation of crescents into flagellate bodies, could be checked or produced at will according as certain conditions were present or not. The transformation could not, therefore, be a degenerative change. By feeding mosquitoes on crescent containing blood, he then made the important observation that the great majority of crescents were rapidly transformed into flagellate bodies very soon after entering the stomach of the insect. The flagellæ subsequently broke off and became free. Pursuing his observations in India, Ross succeeded in cultivating the human parasite in the dapple-winged mosquito of the genus *Anopheles*. The next year, 1898, by following the development of the parasite of birds in mosquitoes, and by infecting healthy birds by means of mosquitoes which had bitten infected birds, he completely traced the cycle of the life history of the parasite. This work was confirmed by Koch and by Italian observers in 1898, and by Daniel's in 1899. McCallum had in 1897, demonstrated that certain forms of the parasite were sexual in nature and every link in the chain was complete. A little later it was shown in Italy, by actual experiment that the human being could contract the disease by the bite of an infected insect of the genus *anopheles*. The life history of the parasite as given by Ross is as follows:—"The youngest forms exist in the red corpuscles of the vertebrate host and on reaching maturity, become either sporocytes or gametocytes. The former are to continue the species in the blood, and proceed to sporulation. The latter are sexual forms and remain unchanged in the blood. On being sucked into the stomach of the mosquito the female gametocyte emits a body which is fertilized by another body emitted by the male form. The resulting body is termed a zygote. This now pierces the stomach wall of the mosquito and