

regarding them. As regards the reproductive elements of the malaria parasite, however, there is nothing about them which is for a moment a matter of conjecture, every stage has been repeatedly confirmed over and over again by the most competent observers. As a matter of fact, these elements were first described in the Coccidiidae (closely related forms to the malaria parasites or *Hæmamoebidae*), in the summer of 1897 by Simond (5). He showed that in the case of *Coccidium oviforme*, a familiar and well known parasite of the epithelial cells of the rabbit's intestine and liver, while the majority of the parasites become sporocytes, infecting fresh cells, under certain circumstances a few grow large and become macrogametes or ova, while others give rise to an outgrowth of spermatozoa or microgametes, resting on a central residual mass or "blastophore," as we get in the case of the earthworm, Fig. 4. In fact, Simond, judging from the conditions which he found in the Coccidiida, was the first to suggest that in the malarial organism, we might expect to find a similar process. We now know of many species of Coccidiidae which produce microgametes and macrogametes, similar to the above. Podwysoski (13), Clark (14), Simond (5), having described them in *C. oviforme*, Schuberg (6), in the coccidium of the mouse, Labbé (8), Simond (5), and Siedlecki (11), in a coccidium of the triton, Simond (5), in *C. salamdrae*, Léger (7) and Hagenmüller (12), in the genera *Diplospora* and *Barroussia*, while Léger (7), and Wasielewski (9), have found recently a peculiar form of microgamete in a coccidium of *Myriapodes*, which has the form of an elongated club, bearing two cilia in its anterior surface. The real significance of the microgamete was first surmised in 1895 by Schuberg (6), whom Siedlecki (11) quotes, regarding the microgametes of the coccidium of the mouse as follows, ". . . namentlich könnte man daran denken dass die Formen eventuell eine Copulation vermitteln möchten." In this, however, he was probably forestalled by Labbé as far back as 1891.

In the case of the malarial parasite, a point of some considerable interest arises in connection with two small bodies found in relation with the maturation of the male and female gametocytes. (Fig. 1 and 2 polar bodies.) They resemble in shape and mode of origin the polar bodies arising in connection with the maturation of the ova of multicellular animals. Ross has suggested that in the malarial parasite they are of this nature. The suggestion is a very tempting one; we must have, however, a more detailed account of their origin, the nuclear changes that take place with regard to them, before we can finally accept this conclusion, their presence so far being seemingly somewhat inconstant. It will be observed that in the case of the