were done, but these will not be given in detail as the results were exactly the same as has already been described.

Experiment 12. *Nerve Muscle Preparation of Frog. Pithed Frog.*—The preparation was made in the usual way. An induced current was used to stimulate the nerve. The solution of poison was applied to the muscle with a brush. Each time the poison was applied the muscle shortened slightly. The muscle was kept moist with the solution of poison until it failed to contract, when the nerve was stimulated. The electrodes were now applied to the muscle itself, but it failed to respond with the strongest current.

On the Origin of the Sertoli or Foot-cells of the Testis.

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[Plates 5 and 6.]

The function of the Sertoli or foot-cells of the mammalian testis has frequently been described, and will not be dealt with in the present brief communication. Neither do we intend to deal with the later stages of the life-history of these cells, except in so far as to draw a parallel between them and the cells performing a similar function in the amphibia.

In the embryo testis of a mammal before the tubules are formed it is seen that a number of so-called male ova lie, singly or in groups of about four, among masses of cells, which we will for the moment designate as being of a more or less undifferentiated character. These undifferentiated cells are much smaller and of quite a different character to the male ova (see fig. 1).

At a little later stage we find that the wall of the tubule begins to appear. This wall is apparently actually in process of formation in parts of fig. 1, while in fig. 2 a tubule with a complete wall has been formed. We are convinced from a careful study of the stages of development that cells which form the wall of the tubule and those that are enclosed with the male ova inside the wall thus formed are identical or derived from the same immediate ancestors. As development goes on these cells become more and more differentiated until we reach the state of the tubule in the adult testis (fig. 3).

The processes that are gone through in the testis of *Triton* seem to offer a further confirmation of the conclusions suggested above. Here the normal course of events in the male ova seems to be: (1) amitosis; (2) somatic mitoses; (3) the maiotic phase; and (4) the conversion of the cells resulting from the second maiotic (homotype) division into spermatozoa. These periods are sharply defined and are easy to follow. While amitosis is taking place, the individual male ova seem to be scattered amongst a number of "undifferentiated" cells, just as happens in the embryo testis of mammals. At this time the future pockets are but ill-defined or not defined at all. Apparently each individual male ovum eventually gives rise to a pocket (fig. 4). A little later on we see that the cells surrounding the male ova wander in between them as they multiply amitotically, until a stage is arrived at when it is impossible to say whether a particular one of them is going to become a cell forming the wall of a pocket or one of the cells which is enclosed within that wall together with the male ova (figs. 5, 6). To the latter the spermatozoa eventually become attached.

It will thus be seen that what happens in the development of the embryo testis of the mammal is parallel with what happens every year in the testis of *Triton*. Certain undifferentiated cells which surround the male ova are more or less differentiated along different lines, some apparently becoming cells to which the spermatozoa are attached during a certain period of time, others forming the walls of the tubules or pockets as the case may be.

It will be found that there are, among the undifferentiated cells in the early embryo testis of mammals, forms of division where the chromosomes are apparently reduced in number and different in shape to what is seen in ordinary somatic division (figs. 7, 8, and 9). These closely resemble

Fig. 7.

Fig. 8.

Fig. 9.

Mitotic figures in undifferentiated cells surrounding the male ova.

what has been described as a second maiotic (homotype) division figure. It has been shown by one of us* that this form of division is very

* C. E. Walker, "Observations on the Life-History of Leucocytes" (next paper, p. 53).

common in leucocytes, in bone marrow, and lymphatic glands. While we have occasionally seen somatic division figures among these undifferentiated cells of the embryo testis, this form of reduced division is by far more common. In the male ova themselves at this stage the only mitotic figures we have seen have been typically somatic, and it is hardly possible to confuse the one kind of cell with the other.

The fact that we have what are apparently second maiotic divisions in cells which are obviously not destined to become sexual cells is in itself very suggestive, but when we come to compare the cells in which this happens with cells that are undoubtedly leucocytic in character, the suggestion is very much strengthened (figs. 10 and 11). We use the term leucocyte in the widest sense, and under it include all the wandering cells of the body.

Our conclusion is, therefore, that the foot-cells of the testis and the cells forming the walls of the tubules or pockets have immediately common ancestors, and that if these cells are not identical with certain stages in the series of leucocytic generations, they are derived from cells that were identical not more than two or three generations before.

DESCRIPTION OF PLATES.

Plate 5.

Fig. 1.—Early stage in the development of the testis. Signs of the wall of the tubule are visible in places. A division figure among the undifferentiated cells is shown. (Embryo guinea-pig.)

Fig. 2.—Later stage of the same. The wall of the tubule is formed.

Fig. 3.—Part of a tubule of adult testis, showing foot-cells. (Guinea-pig.)

Plate 6.

Fig. 4.—Early stage in the testis of *Triton*. The walls of the pockets are not everywhere defined.

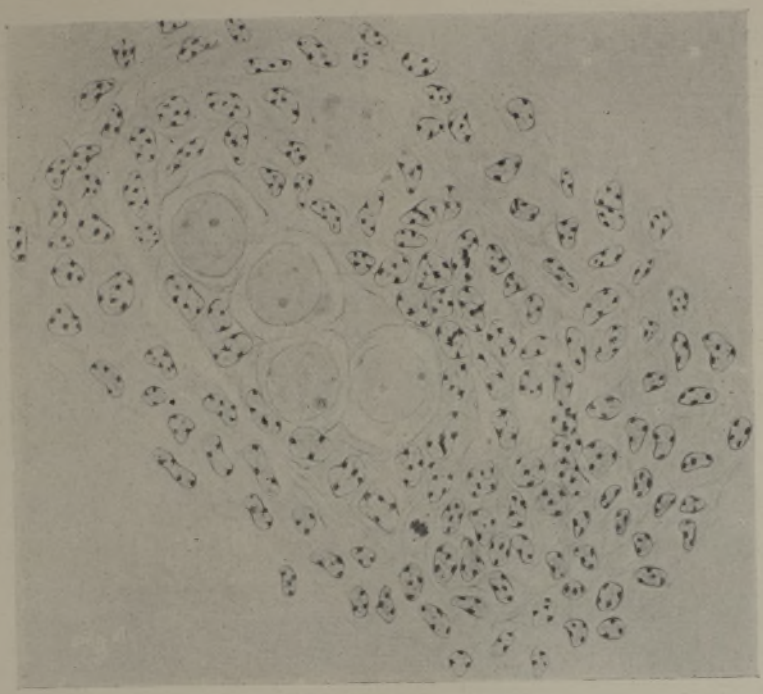
Fig. 5.— The same, showing the undifferentiated cells wandering in among the male ova.

Fig. 6.—The same, showing pockets in process of differentiation and one completely formed.

Fig. 10.—Leucocytes in the lymphatic gland of guinea-pig.

Fig. 11.—Leucocytes in the spleen of *Triton*.

FIG. 1.



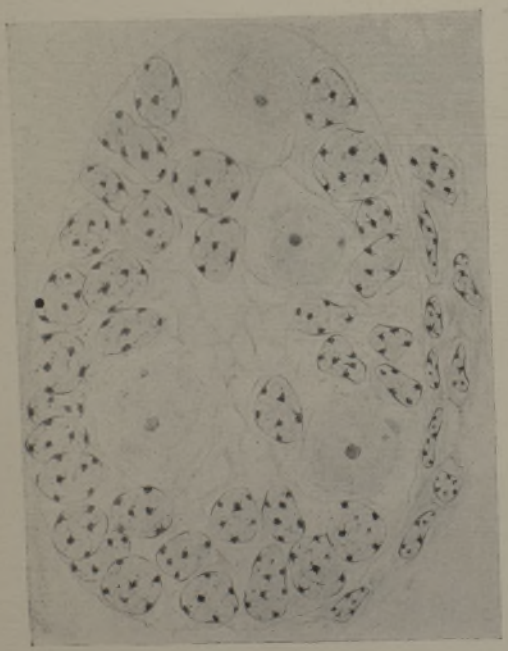


FIG. 2.

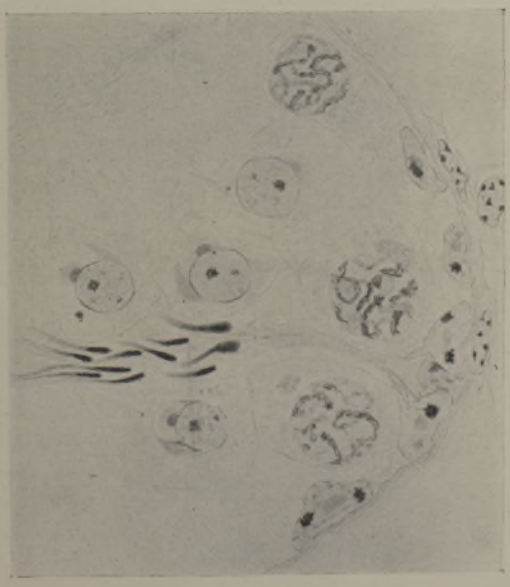


FIG. 3.

FIG. 4.

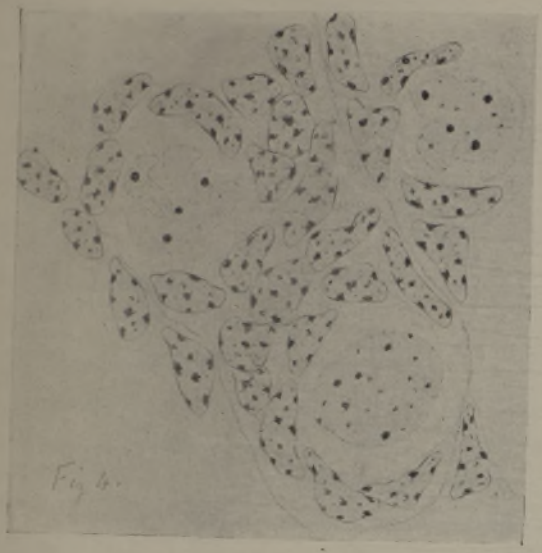


FIG. 6.

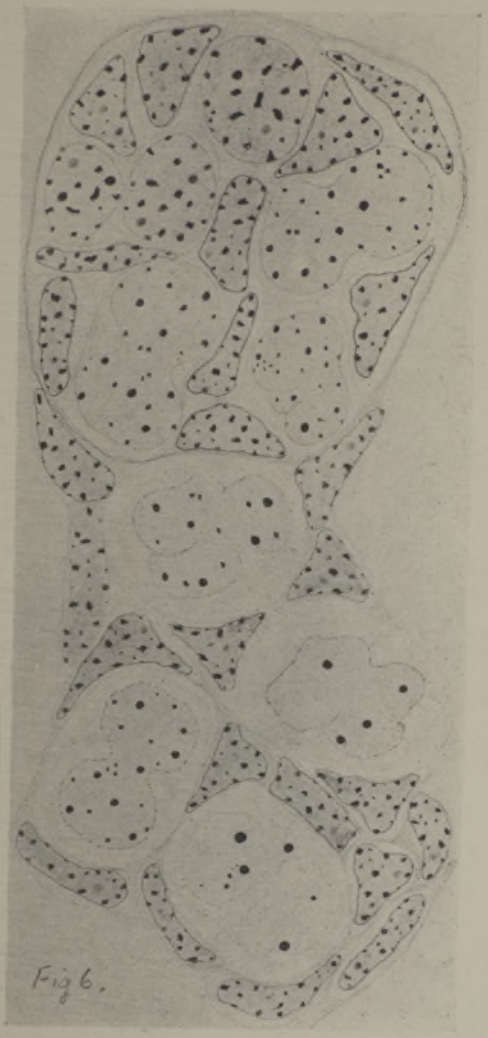


FIG. 5.

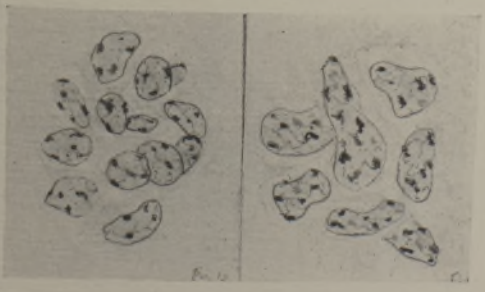


FIG. 10. FIG. 11.