herstammt. Bei *Bombyx* findet sich diese Spermatogonie im Larvenstadium, bei *Laphria* bleibt sie aber im Stadium von Imago thätig und existiert zu gleicher Zeit mit zahlreichen vollkommen entwickelten Samenbündeln, die den mittleren und hinteren Abschnitt der Hodenröhre strotzend erfüllen. Von dieser Zelle gehen strahlenartig Plasmaauswüchse aus (wie bei *Bombyx mori*), in welche zahlreiche Kerne eingebettet sind. In der centralen Plasmamasse der Spermatogonie habe ich niemals einen einzigen großen Kern gefunden (Verson), sondern immer mehrere große Kerne von unregelmäßiger und sehr verschiedener Gestalt, die sich mit Carmin entweder blaß oder sehr intensiv färbten. Außerdem habe ich in der centralen Plasmamasse der Spermatogonie immer zahlreiche kleine Chromatinkörperchen gefunden, die zuweilen etwas gekrümmt erschienen und öfters zu kleinen Häufchen vereinigt waren. Nach diesen Bildern zu urtheilen, wird die Kerntheilung in der Spermatogonie von *Laphria* nicht amitotisch sich vollziehen (wie es Verson für *Bombyx mori* beschreibt), sondern eine typische mitotische Theilung sein.

Was die übrigen Gattungen der Dipteren anlangt, so sind meine Erfahrungen über den feineren Bau des Geschlechtsapparates vorläufig noch lückenhaft. Ich erlaube mir also hier nur einige Worte über die Hoden der Gattung *Calliphora* zu sagen. Bei diesen Fliegen sind die beiden Hoden, jeder für sich, von einer orangegelben Kapsel bedeckt und außerdem noch von einem besonderen Fettkörpersäckchen umgeben. Innerhalb dieses Säckchens, d. h. zwischen seiner Wandung und der Hodenkapsel liegen eigenthümliche sehr große Zellen, deren Plasma zahlreiche große Kügelchen enthält, die anscheinend hart sind und mit Fuchsin sich sehr intensiv färben. Welches die Bedeutung dieser merkwürdigen Zellen ist, erscheint vor der Hand ganz räthselhaft.

St. Petersburg, den 14./26. Februar 1892.

3. Some Points in the Histology of Leucosolenia (Ascetta) clathrus O. S.

By E. A. Minchin, Assistant in the Morphological Department, Oxford.

eingeg. 1. März 1892.

Having been employed for some time in studying the histology of *Leucosolenia clathrus*, it seemed to me advisable to publish at once some of my more important results, since it may be some time before I shall be able to bring forward the whole of my work.

The principal method employed, and which has been fruitful of good results, was careful examination of surface views of pieces of the wall of the sponge, prepared and mounted in various ways, and always preserved quite fresh from the sea on board the fishing boat. The results so obtained were then verified and corrected by sections and by isolating the cell elements.

1) The Ectoderm. This layer, the contractile layer of the sponge, consists in the expanded state of flattened, nonciliated cells, each with a large spherical or sligthly ovoid nucleus containing an evenly distributed chromatin network. In surface views the nuclei appear at varying distances from one another, each surrounded by a number of granules, and without cell outlines in ordinary preparations. In sections prepared by many methods the jelly is seen to have a sharply defined limit, appearing as a thick line, immediately under the ectoderm. The nuclei of the ectoderm are close to this limiting membrane and are covered externally by a thin layer of granular protoplasm. When the cells contract, the nucleus remains in proximity to the limiting membrane, but the protoplasm external to the nucleus thickens, and the protoplasm on each side of the nucleus raises itself up from the membrane. As this process continues the whole cell assumes a mushroom form, with a stalk containing the nucleus and an expanded portion continuous with the similar portion of the next cell. The accompanying diagram (Fig. 1) illustrates this pro-

Fig. 1.

cess, showing the passage from an expanded cell on the left to a very contracted one on the right. All stages of contraction can easily be found in sections of a sponge preserved fresh, and if sections of an open and a closed osculum[1] be compared, the external ectoderm will be found in the first case to consist of flat cells, in the latter of mushroom cells. There are two places, however, where the contracted ectoderm does not assume this appearance, but the cells become simply more rounded. The first of these places is in the muscular sphincter of the osculum, the second is the ectoderm on the inside of the oscular margin. The first case may be explained by the two layers of the ectoderm composing the sphincter being in immediate contact, and not separated by any jelly; the second is perhaps due to the cells being passive and not active in the contraction.

The mushroom like cells were first seen and figured by Metschnikoff (1) in a »*Clistolynthus*« form of *Ascetta blanca*. Bidder (2) sta-

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[1] I have described these oscula and their sphincters in a paper shortly to appear in the Quarterly Journal of Microscopic Science.

tes that their function is excretory and that they are provided with a fine duct opening on the surface. I have never seen any structure in them resembling a duct. Von Lendenfeld (3) describes the nucleus of the ectoderm cells (p. 398) as »brotlaibförmig« and in the contracted ectoderm-cells of *Sycandra raphanus* figures two nuclei (Taf. XIII Fig. 102), a spherical one at the base and another »brotlaibförmig« in the upper expanded portion; and in this manner he makes two cells, a supposed mesodermal one with the spherical nucleus and a flattened ectoderm cell with the other nucleus. As a matter of fact his descriptions and figures of the ectoderm cells are throughout erroneous and the contracted ectoderm-cells have not two nuclei but one only the spherical one at the base, which is the true ectoderm nucleus. Where the sponge is in contact with the foreign body, whatever it may be, on which it is growing, the ectoderm cells are very columnar, granular, and of irregular outline, and are no doubt glandular, forming some secretion by which the sponge adheres to the base on which it grows.

2) The Pores. At the ends of growing branches every stage in the formation of pores can readily be found, though they also occur almost everywhere in the sponge.

The first stage is an ectoderm cell which is somewhat more granular than the ordinary cells, with protoplasm of a characteristic yellowish brown tinge, and having distinct cell limits. Such a cell then grows inwards towards the endoderm, and reaching it, pushes its way between the collar cells, while still retaining a connection with the remaining ectoderm. The nucleus, which does not alter in any way, may remain at the level of the ectoderm, or may grow in with the cell and be found at any level. Pores in this stage are very common in sections, and have led to much error, since the cell is very large and often grows inwards in a slanting direction, and its connection with the outer surface is always very delicate. Hence the cell may appear in sections as if lying entirely between the endoderm cells, or entirely in the mesoderm, or partly in one, partly in the other position. It is these cells which I (4) formerly wringly described as amoeboid mesoderm cells (p. 265, Pl. XI, Fig. 22) while von Lendenfeld (3), finding them in the endoderm, has without further investigation described them as »Kragenmutterzellen«, and a similar position has apparently caused Bidder (2) to attribute an endodermal origin to the pores. After the cell has reached this stage, it spreads out and becomes perforated. The fully formed pore is a single cell with a nucleus exactly similar to the remaining ectoderm nuclei and an intracellular duct, which has a wide inner opening and a very delicate outer opening. When the sponge contracts the pores close and then in sections look like amoeboid mesoderm cells. In fact the »größere, körnige Zellen« described by von Lendenfeld (3) in his forms B and C of this sponge (p. 212, 213 and 216) are in all probability only closed pores.

3) Mesoderm. The spicules always have on each arm one, sometimes two cells. Each of the cells is closely applied to the spicule sheath and has a rounded, or more usually oval nucleus slightly smaller than the ectoderm nuclei, with a chromatin network thickened in several points. The protoplasm is very clear and free from granules and it is often extremely hard to see its limits. Sometimes the cell contains two nuclei close together; often there are two cells on one arm of a spicule. In many cases the cell has a simple fusiform shape, lying along a spicule; in others it is placed so as to connect the arms of two spicules; or finally it is often connected with other spicule cells by processes. The impression one gains by a careful study of these cells is that the spicules lie in a continuous cell network. Besides these cells the mesoderm contains potato-shaped wandering cells, of a greenish yellow colour and so full of refractive granules that the nucleus is only visible by careful focussing as a clear (or stained) space, and ova with colourles protoplasm containing granules varying in size and appearance and a distinct large spherical nucleus and nucleolus. Both these kinds of cells can easily be distinguished from closed or not yet open pores by the colour and granules of the protoplasm and the structure of the nucleus. The stellate mesoderm cells so often described, e. g. by von Lendenfeld (3) (p. 211 »zahlreiche, sternförmige Bindegewebszellen«) are exceedingly rare, if not entirely absent. What have been mistaken for such are the spicule cells, owing to the spicule itself being nearly always more or less displaced in sections.

4) Endoderm. The collar cells vary in shape, according as the sponge is expanded or contracted. In the first case (Fig. 2) they are short and broad, and have very long collars, but when the sponge contracts they become laterally compressed and are then columnar and narrow, with a very low collar. The base of each cell is rounded and the cells are in close contact without any intervening substance, appearing in surface views as polygonal from mutual pressure. In the normal condition they are without any projections, but when observed living they can often be seen to throw out numerous fine processes, which is always, however, a sign of cessation of activity and death. The figures of these cells given by von Lendenfeld (3) (Pl. IX, Figs. 33, 34, 35) appear to me, therefore, to represent purely

abnormal and pathological phenomena, and I have never seen anything like them in material preserved fresh. The nucleus is always at the base, and is spherical with a diameter scarcely more than half of that of the ectoderm nuclei, containing a chromatin network irregularly thickened at certain points, no two nuclei being exactly alike in details. Above the nucleus, under the base of the collar, a clear bright space is always present in the protoplasm, circular in outline, of about the same size as the nucleus, and often containing 1—3 black

Fig. 2.

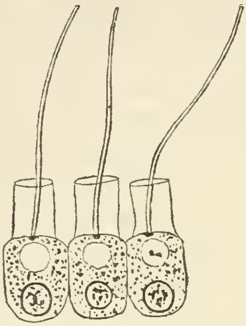
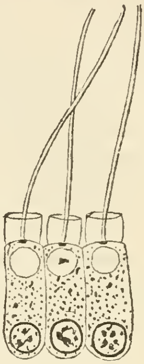


Fig. 3.



granules. I am not certain as yet whether this space represents a »Centralkörper«, or a kind of food vacuole, or whether it is in some way connected with the movements of the flagellum and collar. Immediately above this space, in the centre of the collar, is a dark spot, from which the flagellum arises. The collar is thickened towards the base and exceedingly thin towards the extremity. The flagellum is of equal thickness throughout.

Naples, 27th Febr. 1892.

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