

spätere Verwendung zu anderen Zwecken als das Material der reinen gebliebenen Seitenwände. Solche Bodenreste fand ich auch in der Höhlung des Farbholzklotzes und es wurden einige Stückchen derselben aufbewahrt. Da endlich auch diese Bodenreste weggeräumt wurden, schwebte nunmehr der Rest des Brutthurmes in der Luft und ist somit gegenwärtig an den zu diesem Zwecke vermehrten Seitenstützen aufgehängt. Die Zahl der Bienen hat sich bis jetzt (30. Nov.) bedeutend vermehrt. Ihre Zahl wird an Tausend geschätzt, da sie in allen Räumen des Stockes zahlreich angetroffen werden. Bemerkenswerth erscheint es, dass die Bienen den Stock nicht verlassen, ungeachtet das Flugloch stets offen steht, höchstens wird eine oder die andere todte Biene aus dem Stocke herausgeworfen. Jedenfalls muss es als ein Übelstand bezeichnet werden, dass die Brut in Folge der Zerstörung des Baues im Sommer erst jetzt während des Winters auskriecht. Obwohl nicht unwahrscheinlich ist, dass die jungen Bienen sich bis zur nächsten Flugzeit lebend erhalten dürften, so ist doch zu befürchten, dass sie in der neu beginnenden Arbeitsperiode nicht mehr mit voller Jugendkraft eingreifen werden, wenn überhaupt nunmehr eine Ruheperiode folgen würde. Jedenfalls ist die Erhaltung dieser wunderbaren Ansiedelung bis zur wärmeren Jahreszeit um so wünschenswerther, als eben in dieser Zeit sich die beste Gelegenheit zur Beobachtung derselben ergeben würde. Insbesondere sind Beobachtungen über die Vermehrung und Neubildung von Stöcken erwünscht, da bisher, wie ich glaube, das Schwärmen bei diesen Bienenarten nicht wahrgenommen wurde. Sollte das gewiss schwierige Problem der Erhaltung durch den Winter glücklich gelöst werden, so werde ich nicht ermangeln, weitere Berichte einzusenden. Auch über die durch die Güte des Directors des k. k. zoolog. Museums in Wien vorgenommene Bestimmung unserer Biene, so wie über die specielle Litteratur derselben werden Mittheilungen erfolgen.

3. The general features of the development of the Spermatozoa in the Vermes, Mollusca and Vertebrata.

By James E. Blomfield, B. A., Stud. in Medic. of University College, London.

At the suggestion and under the direction of Professor Ray Lankester I have recently carried out in the zootomical laboratory of University College, London, a series of observations on the development of the spermatozoa from the primitive testis-cells in the following animals, *Lumbricus*, *Hirudo*, *Helix*, *Paludina*, *Rana*, *Salamandra*, *Mus*. The details of my observations on *Lumbricus* are published with two plates in the first part of the Quarterly Journal of Microscopical Science for 1880. I have been led to results which have some interest on

account of their general character. The primitive testis-cells corresponding to ovarian ova may be called spermatospores — whilst the ovarian ova are termed oospores. — A fertilized ovum is an oospermospore whilst an asexual spore is an autospore. In *Lumbricus* and *Hirudo* (and in very many other forms belonging to other groups of Invertebrata) the spermatospore by division of its nucleus and incomplete fission of the protoplasm gives rise to a sperm-polyplast or spermatosphere. Each constituent cell-element of a sperm-polyplast is a spermatoblast or sperm-bud. By fission the spermatoblasts multiply whilst remaining side by side, and ultimately assume an elongated form — that of the ripe spermatozoon — the elongated nucleus with a thin coating of protoplasm forming the head whilst the vibratile tail is formed of the protoplasm only, which is extended peripherally in the form of a filament. The most important fact with regard to the type represented by *Lumbricus* is however this, viz. — that the spermatoblasts do not take up all the protoplasm of the original spermatospore — but are arranged peripherally on a central mass of protoplasm which ultimately has the form of a large spherical corpuscle many times larger in bulk than any one spermatoblast. This central corpuscle I term the sperm-blastophor — or blastophoral corpuscle, since it carries the spermatoblasts.

The blastophor of *Lumbricus* (and of *Hirudo* and others) is devoid of nucleus: it is also central in position.

In *Helix* and *Rana* I find the same elements present. The primitive spermatospore gives rise by division of its nucleus to a number of spermatoblasts which remain attached to a blastophor or corpuscle of protoplasm corresponding to the sperm-blastophor of *Lumbricus*. In *Helix* and *Rana* however — the blastophor possesses a large nucleus and instead of being central — it is lateral in position, being in fact adherent to the wall of the testicular follicle in which the development of the spermatozoa takes place.

The difference in the two types of development together with the fundamental identity of the blastophor or carrier of the spermatoblasts is to be explained, as suggested to me by Professor Lankester, by the fact that in *Lumbricus* the development of the spermatoblasts does not occur in the testis itself — whilst it does do so in *Helix* and *Rana*. In *Lumbricus* the spermatospores of the testis are continually multiplying by fission in the base of the small testis and are thrown off at its free surface whence they pass into the seminal reservoirs to develop further. On the other hand the spermatospore of *Helix* and *Rana* does not become detached from its seat of origin in the wall of the testicular follicle. The development proceeds in situ.

Accordingly the production of spermatoblasts cannot take place equally on all sides but only at the free side, viz. that turned towards the lumen of the follicle. This explains the difference of the two types so far as the central and eccentric position of the blastophor in the respective cases, is concerned. But further than this, it appears that the nucleus of the eccentric sperm-blastophor of *Helix* and *Rana* corresponds to the nucleus of a distinct testis-cell of *Lumbricus*. The free spermatospores of *Lumbricus* are formed by division of parent cells in the growing base of the small lamelliform testis. The sister-cell of a free spermatospore is in this case left behind in the testis; in *Helix* and *Rana* there is no such division and liberation of the spermatospores. In these latter it is not until the spermatoblasts are fully formed that they break away together with a basal mass of protoplasm from the wall of the crypts and float in its lumen leaving the nucleated portion of the sperm-blastophor adherent to the wall, and carrying a considerable non-nucleated mass of the cell-body away with them. It is then this non-nucleated moiety which strictly corresponds with the central non-nucleated blastophor of *Lumbricus*: whilst the nucleated moiety which still adheres to the wall of the testicular crypt and carries on the development of spermatozoa again — in a succeeding season — is the representative of the sister-cell remaining in the testis of *Lumbricus* from which at a quite early period the free-floating spermatospore of that animal (and of many others which conform to the same type) is separated by fission.

The existence of the non-nucleated mass of protoplasm, centrally or eccentrically placed and carrying the sperm-buds or spermatoblasts and to which I have given the name of the sperm-blastophor appears to be general in its occurrence in a wide range of animal forms. The spermatoblasts growing as nucleated cells on the surface of this blastophor are the essential and only important portion of the result brought about by the developmental changes of the spermatospore or primary sperm-cell; the blastophor itself shrivels and is destroyed when the spermatozoa drop from its surface in a ripe condition.

London, December 1879.

4. Medusen werden durch Frost getödtet.

Von Dr. Karl Möbius, Prof. in Kiel.

Am 21. Dec. 1879 bemerkte ich beim Schlittschuhlaufen auf der Kieler Bucht eingefrorene Medusen (*Aurelia aurita* L.). Ihre Scheiben lagen wohl erhalten im klaren Eise. Die Genitaltaschen waren deut-

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Zoologischer Anzeiger](#)

Jahr/Year: 1880

Band/Volume: [3](#)

Autor(en)/Author(s): Blomfield James E.

Artikel/Article: [3. The general features of the development of the Spermatozoa in the Vermes, Mollusca and Vertebrata 65-67](#)