

2. The Nervous System of Sponges.

By Professor F. Jeffrey Bell, in London.

eingeg. 28. März 1887.

I have every reason to believe that the text-book referred to on p. 142 of No. 246 of the »Zoologischer Anzeiger« as »Bell's Textbook of Zoology London 1886« is one which bears the title of »Comparative Anatomy and Physiology« and which was published in 1885. Had it been published in the later year I should be justly blamed for referring only to the observations of Prof. Stewart. May I, therefore, correct Dr. von Lendenfeld's wrong date, and point out that his »Vorläufige Mittheilung« on »Das Nervensystem der Spongien« only appeared some time after my work had begun to be printed off.

I acknowledge that Dr. von Lendenfeld brings no charge of omission against me, but others, incorrectly acquainted with the date of my work might do so.

3. Herr Max Weber and the General Organs of Myxine.

By J. T. Cunningham, Edinburgh.

eingeg. 30. März 1887.

A few days ago Herr Max Weber sent me a copy of a short paper communicated by him on Feb. 26 of the current year to the Nederlandsche Dierkundige Vereeniging, on the subject of the sexual organs of *Myxine glutinosa*. For his courtesy in sending me the paper I thank him sincerely. For the treatment he has bestowed on me in the paper itself I cannot thank him unreservedly. He makes known to me the existence of a publication on the subject which had entirely escaped my notice, and for that I am grateful. But he says that the results of my inquiries published by me in the Quarterly Journal of Microscopical Science, 1886, were already contained, in nuce in the paper I had overlooked, and when I refer to this paper I find that this is very far from an accurate statement.

The paper to which Max Weber refers as having anticipated my discoveries is one by W. Müller on »Das Urogenitalsystem des *Amphioxus* und der Cyclostomen«, contained in Bd. IX of the Jenaische Zeitschrift, 1875. Müller there gives a description of the urogenital system of *Myxine*, including an account of the ovary and ova, and of the testis. His description of the ovary adds nothing to what had been previously known.

The young ova .6 mm in diameter he describes as surrounded by a single layer of polygonal cells outside which is a layer of fibrillar

connective tissue. Round older eggs he says the mesoarium grows out into a diverticulum, so that they come to lie in a stalked pocket-shaped appendage of the mesoarium. No one from reading this could understand the exact relations of the ovum to the mesoarium, which are clearly described in my paper. Müller next describes ovarian eggs of 18 mm length. These are surrounded by two connective tissue envelopes; the outer is thin and only closely connected with the inner: the former is a continuation of the mesoarium. The second or inner is firmly adherent to the testa which lies beneath it. The inner surface of the inner membrane forms a *Membrana propria*, in contact with which is a layer of cells towards the middle of the ovum single, towards the poles many cells deep. Towards the middle of the ovum the cells of this layer are square or cubical, towards the poles more cylindrical and forming 3 or 4 layers. In the middle of the white pole of the egg this cellular layer shows a conical hollow .1 mm deep with a funnel shaped opening directed towards the nucleus and surrounding protoplasm, this opening being the micropyle. The only other stage of the ovum which Müller describes is that of the fertilized ova obtained from the Göteborg Museum. These possessed the polar threads, and were fastened together by them. The testa of these eggs showed no trace of the inner or outer connective tissue envelope, which must have disappeared completely like the enamel-organ of teeth when the enamel is completely formed. Müller then describes the blastoderm of these ova.

It is perfectly obvious from the above that Müller considered the follicular epithelium to be the testa, the membrane which surrounds the deposited ovum: the micropyle he describes in the large ovarian ovum is a cavity in the epithelial layer: in the ovarian ovum he did not see the true vitelline membrane or zona radiata at all, and in the deposited ovum he thought the vitelline membrane was the follicular epithelium or cellular layer of the earlier stage, as is evident from his comparison of the egg membrane with the enamel of teeth. Moreover, although Müller states that the outer of his two connective tissue layers was continuous with the mesoarium he evidently considers them as belonging to the ovum, and concludes that they disappear by degeneration. Müller gave no account whatever of the development of the polar threads.

In my paper I have shown that there is only one layer of connective tissue round the egg, and that this belongs to the ovary where it remains after the ovum is shed, forming a corpus luteum. I have also described completely the structure and development of the vitelline membrane which Müller in the ovarian ovum did not see and in the

deposited ovum did not understand, and have shown how the polar threads grow as processes of this membrane, Müller having considered them as of cellular nature, parts of the follicular epithelium. The aperture which Müller described as micropyle I have not seen, instead of a hollow at the point he describes there is a process growing out towards the ovum, and producing the micropylar aperture in the vitelline membrane.

As regards the structure of the testis I was anticipated by Müller, his description and mine being practically identical. But the discovery of hermaphroditism in *Myxine*, of the abundance of hermaphrodite individuals and the probability of nearly all females being hermaphrodite when young, was made by me; and the spermatozoa, with stages in their development were also described by me for the first time. Max Weber then must have neglected to read either my paper or W. Müller's or both when he made the unfounded assertion that my results were already contained in W. Müller's account.

I have next to consider Herr Weber's own remarks on the subject. He says the eggs develop in follicles in a manner similar to that which holds for other Vertebrata. This fact was first established by me. He states that it follows from the researches of W. Müller and myself that the shell (egg-membrane) and polar threads are products of the secretion of the follicular epithelium. The micropyle is also due to these cells.

These results follow from my researches and not in any degree from those of W. Müller. Herr Weber then refers to the Göteborg fertilized ova which were known to W. Müller but not to me; he adds nothing at all to the knowledge gained by Müller from these ova. He next discusses the period of oviposition, saying that even less than myself has he attained to definite conclusions on the matter: my investigations led to what appeared to me the certain conclusion that oviposition was limited, in the neighbourhood of St. Abb's Head, to the time of year between the beginning of November and the beginning of April. Herr Weber obtained eggs which had no threads from Alvärströmmen in August and from Gäsö (Bohuslän) in May and concludes, with very little reason, that oviposition takes place at these localities some months later than the times mentioned, that is to say about October and November at Bergen, about August and September on the coast of Bohuslän. The latter supposition is confirmed by the fact that the Göteborg fertilized eggs were taken in August 1884. Now this last fact is of course conclusive, but Herr Weber's own observations give no information as to the period of oviposition, for there is nothing to show how long the ova whose stage of development he so inade-

quately describes would take to become perfectly mature. Eggs of the kind he mentions can be found in abundance any day of the whole year. From the fact that various stages of the ova are present at all seasons Herr Weber thinks it possible that the period of oviposition is not limited to a special time of year. There is a possibility of this, but he makes no mention of the important fact announced by me, that after examining large numbers of specimens every month in a year I found newly spent specimens only from November till March. The Dutch zoologist has evidently paid no attention to the description I gave of ovaries from which the ova had recently been discharged. He repeats the suggestion of Steenstrup that the ripe females take on another mode of life, but does not consider my suggestion that they cease to feed, like many other fish.

Finally Herr Weber says that my researches do not completely elucidate the relations of the males, and that his results do not completely decide either for or against mine. My results, as Herr Weber will find if he refers to my paper, were absolutely certain as far as they went, and he adds nothing to them. He concludes his remarks by calling attention to the importance of the fact that in *Cyclostomata* not only the female but the male genital products are expelled without the intervention of genital ducts, a condition found otherwise only in worms: as in the Muraenidae and Salmonidae the testis has a duct. I was under the impression, like most other zoologists, that in the Muraenidae vasa deferentia were absent, as in the *Cyclostomata*. On the whole then I think it is proved that my results were not anticipated by W. Müller, and that Max Weber has not made a single observation which modifies my conclusions in the least degree, excepting his statement of the date at which the Göteborg eggs were obtained, and of the accuracy of this date he gives no evidence.

Edinburgh, March 27, 1887.

III. Mittheilungen aus Museen, Instituten etc.

1. Notiz.

Vielleicht ist manchen Fachgenossen ein Dienst damit erwiesen, wenn ich auf die neuen Wachsmodele der verschiedenen pelagischen Larvenformen aufmerksam mache, welche Herr Dr. Ziegler hier in recht passender Auswahl und in vortrefflicher Ausführung angefertigt hat. Die Serie von acht Typen ist wohl geeignet, eine lebendige Anschauung dieser Entwicklungsformen zu geben, und eignet sich gut, sowohl zur Demonstration in der Vorlesung, als besonders auch zur Aufstellung in einer Instituts-Sammlung.

Freiburg i. Br., 1. April 1887.

Weismann.

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Zoologischer Anzeiger](#)

Jahr/Year: 1887

Band/Volume: [10](#)

Autor(en)/Author(s): Cunningham J. T.

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