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- Mittheilungen aus dem naturwissenschaftlichen Vereine von Neu-Vorpommern und Rügen in Greifswald. Red. von Th. Marsson. 13. Jahrg. Mit 2 Taf. Berlin, R. Gaertner's Verlagsbuchh., 1882. 8^o. (XXXV, 109 p.) *M* 3, 50.
- Mittheilungen aus der Zoologischen Station zu Neapel etc. 3. Bd. 4. Hft. Mit 2 Taf., 17 Holzschn. und 3 Tabell. Leipzig, Engelmann, 1882. S⁰. *M* 10, -.
- Mittheilungen der Aargauischen Naturforschenden Gesellschaft. 3. Heft. Aarau, Sauerländer, 1882. 8°. (XLII, 196 p.) *M* 3, 20.
- Öfversigt af kongl. Vetenskaps Akademiens Förhandlingar. 39.Årg. No. 1/2. 3. 4. Stockholm, 1882. 8º.
- Periodico Zoologico. Organo de la Sociedad Zoológica Argentina. T. 3. Entr. 4. Cordoba, 1881. (Juli 1882). 8º.
- Précis analytique des Travaux de l'Académie des Sciences, belles-lettres et Arts de Rouen pendant l'année 1880-1881. Paris, Picard, 1882. 8°. (391 p.)
- Proceedings of the Boston Society of Natural History. Vol. 21. P. III. Oct. 1881 - Jan. 1882. Boston, June 1882. 8^o.
- Proceedings of the Scientific Meetings of the Zoological Society of London for the year 1882. P. I. II. London 1882. 8°.

(P. III. will appear Oct. 1., P. IV. Apr. 1882.)

- --- Index. 1871-1880. ibid. 1882. 8^o. (570 p.)
- List, a, of the Fellows etc. of the Zool. Soc. of London. Corrected to June, 1, 1882. London, 1882. 8^o.
- Proceedings of the United States National Museum. Vol. 4. 1881. Washington, 1882. 8^o. (534 p.) Vol. 5. 1882. Sheet 1-20. (Plates not yet received.)
- Report, Annual, of the Board of Regents of the Smithsonian Institution .. for the year 1880. Washington, 1881. 8^o. (rec. June, 1882.)
- Schriften der Naturforschenden Gesellschaft in Danzig, Neue Folge. 5. Bd. 1.—3. Hft. Danzig; Leipzig. Engelmann in Comm., 1882. 8⁰. (1. 2. XLVIII, 418 p., 3. XXXVIII, 308 p.) *M* 18. —.

II. Wissenschaftliche Mittheilungen.

1. On the Segmental Organs of Polynoë.

By William A. Haswell, M. A., B. Sc., Sidney.

The position and relations of these organs have been entirely misunderstood both by Williams and by Ehlers, and I find their statements repeated in the latest comprehensive work on general zoology¹ so that, though unable to obtain here all the literature of the subject, I am justified in concluding that these errors have not yet been corrected and explained.

Ehlers² in his remarks on the genus *Polynoë* states his opinion »that Williams has seen the segmental organs of that Annelide only

¹ Pagenstecher's, Allgemeine Zoologie, Band IV. p. 47. (1881.)

² Die Borstenwürmer, p. 95. (1864-1868.)

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imperfectly and the stages in the formation of the sexual products not at all.« A careful examination of the subject has led me to the conclusion that both of these observers were looking at the same thing from different points of view, but were entirely in error in regarding it as the segmental organ.

Williams's description of what he regarded as the segmental organs of *Aphrodita* is as follows³. "They appear under the character of pyriform tubuli, commencing or ending in a single external orifice. Internally they are lined by a ciliated epithelium, the cilia being large, dense, and acting with great force and vigour. The current raised by these cilia sets up on one side and down on the other. The ciliary epithelium ceases at the point where the primary branches divide. All the rest of the organ is unciliated and filled with the reproductive products. This part is elaborately branched; — the branches twining round the diverticula of the stomach. *** The individual tubes are bridled on one side and glandular on the other.«

»The author thinks it probable that if the roots or attached ends of these organs could only be followed through the integunents to their extreme outlets, they would be found to divide into two limbs, an ingoing and an outgoing; a fact which would account for the clearly divided ciliary currents as they are seen in the dilated portions of the organs. *** None of the branches communicate with the general cavity of the body«⁴.

I have not had the opportunity of dissecting any fresh or well-preserved specimens of *Aphrodita*; but the above account is stated by Williams to apply also to the segmental organs of *Polynoë*, and I find the arrangement in that genus so totally different from that described by Williams in the memoir above quoted that I have been led to an explanation of his descriptions and figures which at least reconciles them with what I find to exist in those *Polynoidae* in which I have worked out this point.

In the first place it is to be noted that Williams gives no clue to the position of the external orifice; he admits in fact that he had not been able to follow the canal through the integuments. In the seeond place in the figure which he gives of the alimentary canal and supposed segmental organs in *Aphrodita* (l. c. pl. VIII. fig. 26) he either has omitted altogether a portion of each intestinal caecum, or as I incline to believe, has represented it as the segmental organ. Thirdly, the figures which he gives of the segmental organs of *Polynoë* (fig. 27)

³ Phil. Trans. 1858, p. 134.

⁴ I. c., pp. 134 and 135.

resemble very closely the intestinal caeca in some species of the family when invested by the developing ova, and the position of the orifices relatively to one another and to the middle line answers very well to the position of the apertures of communication of the caeca with the intestine. Further it has to he observed that, were Williams's account to be accepted as correct, we should be obliged to admit that the segmental organs and sexual glands of Aphrodita and Polynoë are framed on a type totally unlike that observed in any other annelid: he represents the former as complexly branched tubes, not opening into the perivisceral cavity, and the latter as being developed in the interior of the former; whereas in other Annelides the segmental organs are unbranched, and nearly always open into the perivisceral cavity, and the sexual glands are developed in the walls of the latter. Moreover I have found in those species of Polynoë whose structure I have specially studied, segmental organs not markedly different from those of other annelides, and sexual glands having the normal relations. It is therefore not inadmissible to suppose that Williams's representation of these structures may have been founded in some way or other on erroneous observations or inferences. It seems to me most probable that what Williams took for the segmental organ was a part of the dorsal branched portion of the intestinal caeca, and that his ciliated efferent duct was the ciliated neck of communication between the caecum and the intestine. The intimate manner in which the ovaries are related to these caeca would help to account for this. When he states positively that the ova are most clearly seen in the interior of the branching tubuli it is evident that he had mistaken the yellow cells for young ova; what he figures as spermatozoa does not at all resemble the spermatozoa of Polynoë, which are rod-like, but are evidently ciliated epithelial cells. Be this as it may, it is perfectly conclusive as shewing that Williams's descriptions, whatever be their precise explanation, are erroneous, that the fully-developed sexual products both in Aphrodita and Polynoë are found floating freely in the perivisceral fluid, which could not be the case, were they formed in the interior of caecal tubes opening only on the exterior.

While there is some little difficulty in explaining Williams's statements on this subject, Ehlers's descriptions and figures, on the other hand, are so clear as to leave no doubt at all of the nature of the error into which he has fallen. In describing the anatomy of *Polynoë pellucida* he states: — »Segmentalorgane habe ich vom zweiten Segmente an in allen völlig ausgebildeten Segmenten gesehen. Ihre Lage haben sie im Hohlraume des Elytrenträgers oder Basalstückes des Rückeneirrus und ragen von da in den Segmentalraum unter

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die Haut der Rückenfläche hinein. Der wesentliche und größte Theil des Segmentalorgans (Taf. 1V. Fig. 3) ist ein fast die ganze Höhlung des Elytrenträgers oder Basalstückes des Rückencirrus einnehmender Sack, dessen Wand in sehr unregelmäßiger Weise zu halbkugelig gcformten Ausbuchtungen vorgewölbt ist. ** Dieser Sack setzt sich in den Raum des Segmentes hinein mit einer cylindrisch ausgezogenen Verdünnung, dem Halse des Segmentalorganes, fort, und auf dem Ende dieses Halses, der unter der Rückenwand des Körpers liegt, steht umgeben von einem etwas aufgewulsteten Rande die innere Öffnung des Segmentalorganes, an deren Eingange hier ein Kranz von kurzen Wimperhaaren in lebhaft rädernder Bewegung ist. ... Ich habe bereits erwähnt, dass auf der Oberfläche des Elytrenträgers Wimperrosetten in verschiedener Anordnung vertheilt seien, das Gleiche gilt vom Basalstücke des Rückencirrus. Diese Wimperrosetten stehen um kreisförmige Öffnungen, die äußeren Mündungen des Segmentalorganes; denn cylindrische Röhren gehen von der Oberfläche des Sackes ab zur Wand des sie bergenden Gliedes, durchbohren diese und münden dann an den mit den Wimperrosetten ausgezeichneten Öffnungen.« ...

»Die Wand des Segmentalorganes ist ziemlich dick, zumal im Halse; in den vorderen Körperringen war sie meist hell und farblos, in den hinteren bekommt sie dagegen im Sacke selbst eine gelbe Pigmentirung, indem hier auf ihrer Innenfläche so gefärbte Kugeln einer körnigen Masse von 0.0216 mm Durchmesser aufgelagert sind; die Wand des Halses wie der Ausführungsgänge war auch hier farblos und hell. Eine wichtige Erscheinung beobachtete ich an dem Sacke, das ist seine Contractilität, welche vielleicht durch Elemente musculöser Natur, die in der Wand eingebettet sind, veranlasst wird.«

Two species of *Polynoë* not uncommon in Port Jackson seem to be near allies of *P. pellucida*. In these the intestinal caeca consist of a ventral portion which is a rounded non-contractile sac, and of a dorsal portion which is contractile, usually with a regular rhythm, and is also undivided externally (though internally partitioned), but presents rounded elevations of its outer wall. The latter portion reaches into the cavities of the scale-tubercles, the bases of the dorsal cirri and the bases of the parapodia. They are found in all the segments from the second or third backwards, with the exception of one or two of the segments of the anterior region of the body. These caeca are connected with the intestine by a ciliated neck, which is very long in the anterior segments and very short behind, and the opening into the intestine is funnel-shaped and richly ciliated. They are connected with the walls of the parapodia by bands of muscular fibres, near the outer

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attached ends of which are external circlets of cilia. In the anterior segments they are almost colourless; behind their walls are of a bright golden yellow owing to their containing numerous yellow »hepatic« cells.

Ehlers's drawing [l. c. Taf. IV, Fig. 3] of the supposed segmental organ is in fact a very faithful representation of one of these caeca as seen in *Polynoë perclara*, mihi, save that the internal orifice is represented as opening into the body-cavity instead of into the intestine, and the bands of muscular fibres connecting the caecum with the walls of the parapodium in the neighbourhood of the rosettes of cilia are represented as cauals leading from the cavity of the caecum to the exterior.

The true position of the segmental organs of *Polynoë* is very different from this. On the ventral surface of the body close to the base of each parapodium is a smooth elevation the integument of which is very richly provided with vermiculate and flask-shaped subcuticular glands. At the posterior and external angle of this elevation is a minute projecting process — the ventral tubercle⁵. It is of varying shape; in some species short and vase-like with longitudinally folded walls; in the species in which I have studied it more specially (Lepidonotus oculatus Baird, Polynoë perclara and P. mytilicola, mihi) it is a longer or shorter, cylindrical, cirriform process. It is traversed by a central canal with dilatable, ciliated walls, which opens at its extremity either by a rosette of several mouths or by a single orifice the external opening of the segmental organ. The canal is continued from the base of the process inwards and slightly forwards and ends in the body cavity at some distance from the middle ventral line. The walls of the inner portion of the canal are glandular and contain reddish-yellow bodies, some of which may on the application of slight pressure be seen to pass out through the external aperture; like the outer portion of the canal it is lined with cilia. Of the form of the internal extremity of this canal I have not succeeded in satisfying myself, but there is no doubt that it opens into the perivisceral cavity. I found in several specimens spermatozoa in the act of being discharged through this canal. They were driven along by the action of the cilia into the external portion of the canal, which they distended somewhat in some instances by their accumulation, and were gradually emitted by the external aperture or apertures. In the female the tubercle is usually shorter than in the male and the aperture wider and never

⁵ The only attempt I can find to explain the nature of this ventral tubercle consists of a conjecture by Prof. Huxley (Anat. of Invertebrates p. 231) that it may possibly be connected with the reproductive function.

rosette-like. I have never succeeded in observing ova in the act of being discharged, but there can be no doubt that they pass out in the same manner as the spermatozoa — their passage through the rather narrow canal being favoured by their extreme viscosity. In specimens of Polynoë perclara with ripe sexual products the parapodia are beset at their bases with rows of long cilia so arranged as to drive anything discharged from the segmental organs upwards towards the cavity beneath the scales, where, as is well known, the eggs undergo the earlier stages of their development. This arrangement would have no meaning were it not intended for the transportation of the eggs from their points of discharge at the ventral surface to their brood-pouch beneath the elytra. In Lepidonotus oculatus this special arrangement of cilia is absent; and it is to be remarked that in this species, of which I have examined many specimens with ripe sexual products, the eggs do not seem to be hatched beneath the elytra, which are small, not covering the whole back.

Apertures have been described in the walls of the parapodia and through these it has been supposed that the ripe ova and spermatozoa are discharged. I have never found any such apertures in the species examined by me; rows and circlets of cilia frequently occur; these are set in rectilinear or circular slits in the cuticle, the cilia being prolongations of the subcuticular layer, and this arrangement may in the case of the circlets give rise to the appearance of circular apertures. It must be added, however, that those species in which I have made certain that no such apertures exist were examined only during the breedingseason. It may be that apertures, open at other seasons, are closed at that time to prevent the sexual elements from escaping through any but the proper channels. Be this as it may, it does not affect the main question with which this paper is concerned — viz. the position and relations of the true segmental organs.

2. Variation in the Yolk-cleavage of Renilla.

By Edmund B. Wilson, assisted by H. L. Osborn and J. Meredith Wilson. (Note from the Marine Laboratory of the Johns Hopkins University.)

During the months of May and June the ripe eggs of *Renilla reniformis* Cuv., were obtained in abundance at Beaufort, N. C., and I have been able to make a full study of the phenomena of segmentation. When studying a number of eggs it was found that the segmentation was not of a uniform character but presented a surprising and unprecedented amount of variation.

This observation appeared of such importance as to render desi-

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