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The Nephridial Duct of Owenia.

[Read at the meeting of the British Association at Oxford, Aug. 13, 1894.]

By Prof. G. GILSON of Louvain.

With 5 Figures.

The latest writer on the anatomy of Owenia, Dr. VON DRASCHE¹⁾, frankly confesses his ignorance as to the presence or absence of the nephridia, as well as to the way through which the genital products are led out of the cœlome.

Although my own researches are far from terminated, I am able to give some information on the subject.

In fact the nephridial system is not altogether absent, but is in a state of extreme reduction; and seems to have lost all secretory

1) VON DRASCHE, Beiträge zur feineren Anatomie der Polychäten. 2. Heft. Wien, Gerold's Sohn, 1885.

function. It consists usually of one pair, sometimes two pairs of very small funnels, lying in the posterior part of the sixth segment, against the muscular layer, in an extremely dorsal position (Fig. 2).

Each of these funnels ends in a very thin tube which passes through the muscular coat.

But, instead of opening directly and freely on the epidermic surface, these tubes fall into a longitudinal duct which runs forward and opens, through a tiny pore, at the other end of the sixth segment (Fig. 1 and 2).

This duct is a merely epithelial structure; it lies outside of the thick basal membrane, within the epiderm itself. Being thus super-

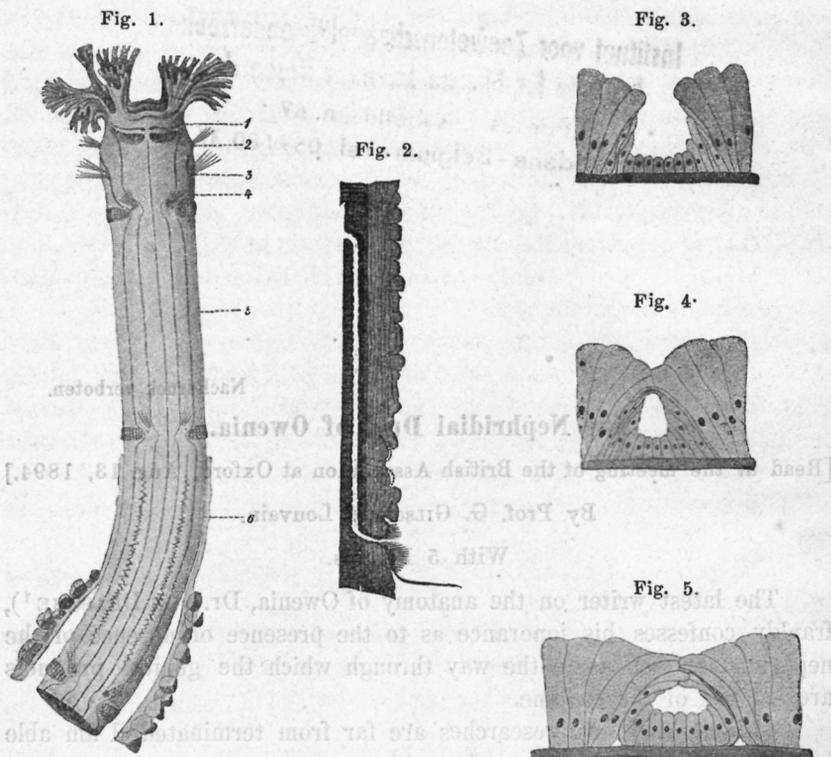


Fig. 1. Fore part of *Owenia* projecting out of the sandy tube; dorsal view. The two epidermic ducts appear as a dark sinuous line on the sixth segment.

Fig. 2. Schematic longitudinal section through the body wall, showing the relations between the funnels and the epidermic duct.

Fig. 3, 4 and 5. Transverse sections of the epidermic duct showing its superficial situation and the peculiar disposition of the cells. In Fig. 3 the duct is transformed into an open groove.

ficially situated, it is exteriorly visible and appears as a very sinuous line, extending the whole length of the sixth segment (Fig. 1).

Dr. VON DRASCHE, in his valuable monograph, very accurately represented this line, though he did not make out its significance. I have seen this epithelial duct opening at certain places, thus taking the shape of a groove instead of that of a tube (Fig. 3). These occasional imperfections of its structure, together with the peculiar disposition of its constituent cells (Fig. 3, 4, 5), clearly show that this canel originates a sa longitudinal folding of the epithelium. They lead us also to consider it as an organ still in full course of phylogenetic development.

Its utility, as well as the original cause of its formation, is obvious. I have shown elsewhere ¹⁾ that the sandy tube in which the *Owenia* lives is rather tight round the fore end of the body. The genital products could scarcely reach the exterior, were they directly ejected into the space between the worm and its protective sheath (Fig. 1). The animal is obliged to protrude its body out of its dwelling; but, thanks to the epidermic canal, it is spared the trouble, and danger, of laying bare more than its five anterior segments, though the funnels lie in the posterior part of the sixth, which is a very long one.

A question now presents itself: What is the morphological significance of this epidermic duct?

It is not my intention in the present state of my researches to enter into a full discussion of the subject. I shall content myself with calling attention to the bearing which the discovery of the epidermic canal of *Owenia* may have on the discussion of the homologies of the excretory system in general.

We know other instances of a longitudinal duct in connection with the nephridia.

The most classical one is that of *Lanice conchilega*, described by CUNNINGHAM ²⁾ and by E. MEYER ³⁾.

The longitudinal duct of this species is generally regarded as an unsegmented part of the longitudinal row of cells which gives origin to the excretory system, — an opinion which I have no reason to oppose.

But certain morphologists go further than that, and compare the

1) GUSTAVE GILSON, Les glandes filières de l'*Owenia fusiformis*. La Cellule, T. X, Fasc. 2, 1893.

2) CUNNINGHAM, Quart. Journ. Micr. Sc., 1888, p. 239.

3) E. MEYER, Mitt. Zool. Station Neapel, VII, 1887.

longitudinal duct of *Lanice*, *Polymnia*, *Polygordius* and others, to the segmental canal, or primitive ureter of Vertebrates.

Professor WILSON in his remarkable paper on the germ-bands of *Lumbricus* goes even so far as to consider this homology as evident.

On this point I venture to recall attention to Professor HADDON's hypothesis as to the phylogenetic origin, and epiblastic nature of the segmental duct of Vertebrates¹).

The existence of such an evidently adaptive structure as the epidermic duct of *Owenia* seems to give a remarkable confirmation to his suggestion as to how a continuous groove into which the nephridia opened, may have been converted into a canal.

It is not evident at all that the segmental duct really is an unsegmented part of a cell-row homologous to that of *Clepsine*²) or *Lumbricus*³). It may have appeared at a much later period of the phylogenetic evolution, and have been at a given moment a new structure corresponding to new wants, just as the epidermic duct of *Owenia* corresponds to a peculiar disposition of the protective tube of the worm. The coexistence of a segmental duct analogous to the epithelial duct of *Owenia*, and of a structure homologous to the longitudinal canal of *Lanice* is even possible.

I do not affirm that the epidermic duct of *Owenia* really represents the segmental duct at an early stage of its phylogenetic development. I rather think that we have here a case of homoplasy, not of homogeny. I believe however that the homology of the primitive ureter is not settled as the American professor would have it, but remains a question open to further investigation.

1) HADDON, Suggestion respecting the epiblastic origin of the segmental duct. Proc. Royal Soc. Dublin, Vol. V, 1886—87.

2) WHITMAN, A contribution to the history of the germ-layers in *Clepsine*. Journal of Morphology, 1887, Vol. I.

3) WILSON, The germ-bands of *Lumbricus*. Ibid.