

den entsprechenden Theilen niederer Wirbelthiere bieten. Eine ausführliche Arbeit, welche das centrale Nervensystem der Vögel und anderer Thiere umfasst, wird in kurzer Zeit erscheinen, gleich wie die »Untersuchungen über die embryonale Entwicklung des Vogelhirns«.

3. On the body-cavity (coelom) and nephridia of Platyhelminia.

By E. Ray Lankester, Professor in University College, London.

In his valuable memoir »Recherches sur l'appareil excréteur des Trématodes et des Cestodes. Deuxième partie« published in the Archives de Biologie, Tome II. Fascicule 1. M. Julien Fraipont quotes and discusses the views which I have put forward as to the existence of a body-cavity in the Flat-worms, in my article on the »Cell-layers of the embryo« (Annals and Magaz. Natural History, 1873).

As a matter of fact (though I had not succeeded in observing the exceedingly important facts made known by M. Fraipont) I had been led by investigation of various species of *Cercaria* and of the transparent *Aspidogaster* and of *Caryophyllaeus* (Leuckart's *Archigetes*) to the theoretical conclusion which M. Fraipont has himself established, — namely that the canalicular system which communicates with the exterior in these animals consists of two parts, a part which represents the excretory organ or 'nephridium' and is nearer to the external pore and a part which consists of that portion of the canal system furthest removed from the pore, constituting a net-work which represents the coelom or body-cavity. This view I expressed as plainly as I was able in the article in question and also in »Notes on Embryology and Classification« 1877. p. 33 where are the words »The nephridia in Rotifers and Turbellarians and Trematods are the ciliated canals, though in the Flat-worms it is impossible to say where in the canal system 'nephridium' ends and 'coelom' begins«.

In thus interpreting a part of the fine canal system which I, in common with other observers, had studied in the more transparent forms of Platyhelminia as representing the coelom or body-cavity of Coelomata, I have found myself in opposition to Haeckel and in a criticism by him upon my views, the objection was very justly urged that we did not possess any knowledge of the development of the canal system in Platyhelminia which warranted the assumption that any part of it was the representative of the coelom of other animals.

It was therefore a matter of special satisfaction to me to find my supposition converted into an established fact by Bütschli's discovery of the terminal ciliated bodies of the nephridia of *Cercaria*. Bütschli's discovery of these bodies which had escaped all previous

observers, at once made it possible to say 'here nephridium ends and here coelom begins'.

Bütschli's observations have been extended and confirmed in an important way by M. Fraipont. At the same time I should wish to point out that he has (as it seems to me) mistaken and misrepresented my statements on the subject. He says with reference to my views »il considère l'appareil excréteur des Trématodes et des Cestodes comme homologue de la cavité du corps des autres vers«. M. Fraipont's error consists in his attributing to me the view that the entire canal system of the Flat-worms is to be regarded as coelom and only the pore as excretory organ or nephridium, whereas what I have maintained is that while »the first portion« of the canal system is to be regarded as nephridium or excretory organ a second portion (»main portion«) is to be regarded as coelom. The extremely fine networks formed by the canal system in *Aspidogaster*, terminating as it appeared to me in an intercellular net-work and also the extremely fine reticulum of canals in *Caryophyllaeus* which I had studied (with less success than has M. Fraipont), were what I had especially in view in comparing the main part of the canal-system of the Flat-worms to the canalicular body-cavity of such a Mollusc as *Phyllirhoë* which communicates through the pericardium by a ciliated canal, the nephridium, to the exterior.

I considered it probable, not that intracellular nephridial canals were the equivalents of the coelom of *Phyllirhoë*, as M. Fraipont would make me state, but that the ultimate ramifications of the canal-system were inter-cellular, and like the sinus system of a Mollusc equivalent to coelom.

This is exactly what Professor Bütschli and M. Fraipont have shewn to be the fact. At the same time I fully admit that the fine canals of the excretory (nephridial) system have been shewn by M. Fraipont to extend further and to a greater degree of subdivision and minuteness than I had supposed to exist, and that the ciliated funnels are placed in most of the instances described by him upon canals so fine and minute as to have escaped previous observation, and that, except perhaps in *Aspidogaster*, I had not clearly seen the true inter-cellular spaces of the coelom as now made known by him.

The exact limitation of nephridial canals and coelomic spaces is by Fraipont's results shifted to a further point on the canal system than I had, in the absence of precise observations, considered probable, but the substantial truth of the general conception of the Flat-worms which I put forward as coelomate animals with a reduced coelom communicating by canals with the exterior, is in consequence of M. Frai-

point's researches no longer matter for speculation and theory, but demonstrated.

I do not claim any importance for mere speculations, and in such a matter as this recognize most fully the solid value of carefully observed facts. Since however, M. Fraipont has been so kind as to notice my views at some length and has unfortunately mis-interpreted them, I am anxious to put them in their proper light.

April 14th 1881.

4. Embryonalfedern in der Mundhöhle der Vögel.

Von Dr. Paul Fraisse, Privatdocent in Leipzig.

Betrachten wir eine Zunge von *Anas boschas* im frischen Zustande, so fallen uns eine Menge von Papillen, Wülsten und haarähnlichen Gebilden auf, die für dieses Organ äußerst characteristisch sind.

Die Spitze der Zunge ist bekanntlich wie ein Löffel geformt und dient hauptsächlich dazu, die Nahrung aus dem Schlamme herauszuschaukeln.

Hierauf folgt an beiden Kanten der Zunge eine Anzahl größerer nach rückwärts gestellter Papillen, zwischen denen eine Reihe borstenähnlicher schmaler Hornblätter einen continuirlichen Saum bis zum hinteren Ende bildet. Man kann dieses Organ nach seiner äußeren Beschaffenheit füglich in drei Regionen eintheilen, welche in ihrer Architectur von einander scharf abweichen, jedoch zu complicirt sind, als dass man sie ohne Abbildung genau beschreiben könnte.

Am hinteren Ende des letzten Drittels nun stehen kammartige Zacken mit breiter Basis und oftmals gespaltener Spitze; diese setzen sich in unregelmäßiger Vertheilung bis zu der Rima fort, welche an ihren Rändern von kleineren, an der hinteren Seite aber ebenfalls von großen kegelförmigen Zacken umgeben ist.

Auch am Oberschnabel finden sich derartige Papillen, und zwar besonders zahlreich an der Öffnung der Choanen; hier wie dort das Eindringen von Fremdkörpern verhütend und zugleich dem heruntergleitenden Bissen durch ihre nach hinten geneigte Stellung eine Umkehr unmöglich machend.

Wenn man bedenkt, dass sich die Enten wie fast alle Wasservögel meistens von lebenden Thieren ernähren, so wird die wichtige physiologische Function dieser Papillen, welche ähnlich wie die beweglichen nach hinten gerichteten Zähne der Schlangen oder Fische wirken, sofort klar sein.

Es sind reine Hornbildungen, um welche es sich hier handelt, was schon nach dem äußeren Augenschein zu vermuthen war; sehr deut-

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