

IX. *On a New Genus of Trematoda, and some new or little-known Parasitic Hirudinei.*
 By JOHN DENIS MACDONALD, M.D., F.R.S., Deputy Inspector-General R.N.,
 Professor of Naval Hygiene Army Medical School. (Communicated by G. E.
 DOBSON, M.A., M.B., F.L.S.)

(Plate XXXIV.)

Read April 6, 1876.

MANY striking points of resemblance are traceable between the *Trematoda* and the *Hirudinei*; but this is merely indicative of a representative relationship, or one of analogy. The numerous errors into which our forefathers fell in grouping together really incongruous things may be referred to the deceptiveness of *primâ facie* resemblance, and the failing to recognize the intrinsic difference between the kind of relationship here alluded to and that of a genuine affinity. This, I am quite sure, is one of the greatest difficulties with which modern evolutionary biology will have to contend. An analogous property of gemmation in certain animals, in common with plants, being the innocent cause, so to speak, of the dendritic or tree-like form, so deceived the earlier observers that even their very word *Zoophyte* is accepted by us as a merely descriptive term, in a sense which is precisely the converse of that which its etymological construction would indicate. The balance was so far in favour of the plants, that the doubt gave rise to the additional complication of confounding this group with the *Corallines*. Now, we know that there are also other representative relationships between the two great organic kingdoms, such as conjugation, fission, contractility, and motion, in connexion with which errors of judgment are continually creeping into the dicta of science. I might further say that the light available to Linnæus and his immediate followers with regard to these matters was scarcely less than that which we have at present to guide us in the more difficult study of the primary modes of evolution observable in the ovum, with the view of establishing the affinity or antipathy of the resultants, however different or identical in type these latter may seem to be. Indeed, even up to the present, facts are not wanting to show that very similar beings originate in a very dissimilar way, and *vice versâ*. Nevertheless we look forward with pleasure to the results that appear to be promised to the labourers in this line of research.

If we look upon the *Trematoda* as representing the *Hirudinei*, coupling also the *Oligochæta* with the *Polychæta*, and the *Rotifera* with the *Articulata*, Prof. Huxley's interesting classification, embodying a large proportion of the results just alluded to, would seem to sanction the idea. Thus the corresponding part of his table may be arranged, without material change, in the following manner:—

1. ARCHÆOSTOMATA.

Trematoda.
Oligochæta.
Rotifera.

2. DEUTEROSTOMATA.

Annelida.
Polychæta.
Arthropoda.

There is surely something more than coincidence in this. There may be misgivings as to the position of the *Oligochæta*; but perhaps something will soon turn up to reconcile it.

One or two additional points of analogy between the *Trematoda* and the *Hirudinei* will be seen in the description of the forms which I have now to present to your notice.

The little Trematode represented in the first figure of the plate was found by me creeping about in the respiratory siphon of a large *Melo*, or melon-shell, in Shark Bay, Western Australia. It was between an eighth and a tenth of an inch in length, tallowy white (to use an American expression), and so much resembled a leech as to deceive me at first sight; for I had already seen white leeches, both parasitic and free, and I did not expect to find a Trematode walking abroad. The fore part of the body was slender, tapering, and depressed; the oral sucker was subterminal, and of the usual cup-like form; and after a slight constriction, a bulbous pharynx was distinctly seen, from which the œsophagus passed backwards for some length, to what would appear to be its bifurcation; and the appearance of the cæca could be traced to within a short distance of the posterior extremity. But the ventral disk constituted the most striking feature in this little animal, on account of its great size and complex structure. It occupied more than the two posterior thirds of the inferior surface of the body, which was laterally compressed instead of depressed in this locality. The disk, or virtually the foot, might therefore be said to be narrow and elongated in form, and not unlike that of *Aspidogaster*, though very different in structure. Thus, it presented four rows of alveoli, or deep sucking-pits (fig. 3), the marginal series being the largest, with their long diameter running transversely, while that of the intermediate ones was longitudinal. All the contiguous borders of these little pits were so connected by straight bands of muscular fibres as to divide the whole of the intervening area into triangular spaces, the centre of each of which was occupied by a curious tentaculiform cirrus, capable of complete retraction from the apex, as in the common instance of the finger of a glove (fig. 4). Six rows of these cirri, with thirty in each row, would make up 180, and four rows of alveoli, thirty in each row, 120; so that the disk altogether presented a very remarkable appearance.

The water-vascular system, as in the *Trematoda* generally, opened posteriorly. The aperture, however, was subterminal and dorsal, or just above and within the hinder border of the disk. The tortuous vessels of this system were seen running forwards on either side of the body as far as the space between the pharyngeal bulb and the oral disk, whence they turned backwards upon themselves, as shown in fig. 5. The genital opening, as in most other cases, was situated in front of the ventral disk (fig. 1, *b*).

About the same time I found a large black leech on a species of *Myliobatis*, presenting at least two characters which were quite new to me—namely, a row of branchial leaflets on each side of the body (figs. 8 & 10), and a caudal sucker alveolated (figs. 11 & 12) very much after the manner of the Trematode already described.

The head of this creature was depressed, spatulate, and pointed in front (fig. 8). The anterior third of the body was without appendages, constituting a kind of neck, but the rest was furnished on either side with a row of heart-shaped leaflets on short pedicles. Over the base of these, on every fourth segment, was situate a pulsating projection,

connected, no doubt, with the water-vascular system, as in *Pontobdella*. The rich black body, moreover, was ornamented with six rows of white spots (fig. 10).

The alveoli of the caudal disk were disposed in rays rather than in circles, with radiating muscular bundles between them; they were circular and cuplike, with a central retractile portion, reminding one of the mechanism of the suckers of the Cephalopoda.

Attached to the body in a very irregular manner, but chiefly at its fore part, were several of the double tubular spermatophora shown in fig. 9. These curious bodies I have also found on other marine *Hirudinei*, but always with some characteristic difference. Fig. 6, for example, represents a small black leech with white tubercles, referable, apparently, to the genus *Pontobdella*, found on *Rhinobatis* in the same seas; and fig. 7 is its double-barrelled spermatophore, which is quite different from fig. 9, though obviously of the same nature. Very little is positively known of the generative processes of the marine leeches; but the facts here mentioned may one day meet with a satisfactory explanation.

Fig. 13 is a small white leech, with two eyes, a retractile proboscis, and, in short, the general anatomy of *Glossiphonia*, but characterized by possessing seven pairs of ramose lateral branchiæ, taking up about the middle third of the body. It was found on the conjunctiva of a green turtle at Huon's Island, on the reef to the northward of New Caledonia. Fig. 14 is another specimen of the same species, but much larger, taken in Shark Bay; both figures are about double the natural size. Fig. 15 shows one of the branchiæ as seen with a power of a quarter of an inch.

In systems of classification both the *Oligochaeta* and the *Hirudinei* come under the head of *Abranchiata*. But this is evidently a mistake; for, in the first place, it is difficult to deny the branchial function of the ciliated finger-like organs surrounding the vent in Oken's genus *Prato*, of which I have found good examples in the Taro beds of the Fiji Islands; and, from what has been above advanced, there can be no doubt of the existence of external branchiæ in the *Hirudinei*.

I have now only to say, by way of apology, that I have written this paper without having the opportunity of consulting any recent researches on the subject; so that, if I have mentioned things already known to science, they may at least be taken as corroborative matter.

DESCRIPTION OF PLATE XXXIV.

- Fig. 1. A little Trematode, with large and complex ventral disk, found in the respiratory siphon of a species of *Melo*, Shark Bay: *a*, oral sucker; *b*, genital opening; *c*, ventral disk; *d*, external opening of water-vascular system. $\times 20$ diameters.
2. Posterior extremity of the disk, with cirri exerted. $\times 150$.
3. Central portion of the disk, $\times 300$: *a*, alveoli of the border; *b*, intermediate alveoli; *c*, openings of the cirri.
4. Small portion of the disk, $\times 350$, to show the cirri in different conditions: *a*, completely retracted; *b*, partially exerted, with the apex still inverted; *c*, completely protruded.

- Fig. 5. Tortuous course, loop, and return of water-vascular canal.
6. Small black *Pontobdella*, parasitic on *Rhinobatis*.
 7. Spermatophore of the same.
 8. Black leech, with branchial leaflets and alveolated caudal disk, found on *Myliobatis*.
 9. Spermatophora of the same.
 10. Portion of the body of the same, slightly magnified.
 11. Inferior surface of the caudal disk, magnified to the same extent.
 12. Marginal portion of the disk, more highly magnified.
 13. White leech, with lateral branchiæ, on conjunctiva of Green Turtle, New Caledonia.
 14. Larger specimen of the same species, Shark Bay, W. Australia.
 15. One of the branchiæ. $\times 300$ diameters.

