

XVII.—*On the Zoological Characters of the Living Clio caudata, as compared with those of Clio borealis given in Systematic Works.* By JOHN DENIS MACDONALD, R.N., F.R.S., Surgeon of H.M.S. "Icarus." Communicated by Professor MACLAGAN. (Plate IX. fig. 3.)

(Read 5th January 1863.)

Great credit is due to those observers who have been enabled to give to science both clear and comprehensive views of the anatomy of creatures which have only been presented to them in a spirit-preserved, opaque, brittle, and contracted state; for it is certain that their penetration in this respect could not be successfully brought into exercise without the aid of much knowledge, both bibliographical and practical. Yet there are many whole animals, and, in particular, parts of animals, which must be seen in the living state, to be at all comprehended by even the most brilliant mind; and this fact has induced me to make drawings and notes of many interesting matters connected with the *pelagic mollusca*, when the living animals fell casually under my own observation. In the present communication, however, I shall confine myself to the genus *Clio*.

Good figures are in general more valuable than even lengthy descriptions; for though it would not be very easy to make a good figure from an imperfect description, a very excellent description may be formed from an indifferent figure. On consulting all the figures of *Clio* available to me, I found most of them far short of nature, and all quite incapable of affording a just conception of the living and fully expanded animal; nor, indeed, can I say that any descriptions, of the members of the genus extant answer much more than the purpose of mere recognition, in a popular sense.

In the widest sense of the word, the physiognomy of *Clio caudata*, in the expanded state, is as remarkable as that of any animal in creation. The head, or that enlargement in front which is separated from the body by a slight cervical constriction, is fronted on either side by two small tentacula, one of which has been supposed to be an eye pedicle, though there is no proof that *Clio* enjoys one whit more visual faculty than any other Pteropod. CUVIER remarks, that "some have asserted the existence of eyes;" and subsequent writers say that those in *Clio*, though minute, have a very complete organization. For my own part, however, I cannot say that I have ever been able to detect them, though I should be sorry, on this ground alone, to affirm that they are not present. But the little tentacula just noticed are quite insignificant, in comparison

with the *four* long, conical, and perfectly retractile arms, which spring immediately in front of them. These arms are dotted over with minute rudimentary suckers, arranged quincuncially, and from between them arises a curious shovel-shaped and retractile proboscis. This latter organ is broad and depressed, terminating in a point anteriorly, and having, on the upper surface, a large oral opening with a thin circular lip. The dental armature of this proboscis is, with the exception of that of *Pneumodermone*, the most formidable amongst mollusca. In the middle of the floor of the mouth, and quite exposed from above, is a globular tongue, mainly composed of two broadly oval cartilages, overlaid with a lingual pavement of teeth, leading into a short saccule posteriorly. The median series of plates are crescentic, with the concavity directed backwards, and armed with a principal conical fang in the middle, and a rudimentary one on either side. The lateral plates are numerous, and bear a simple conical tooth on the inner side, with a small shoulder externally.

In front of the tongue, the anterior or inferior lip is furnished with a transverse row of minute hooks, one in the centre, and an outlying one on either side, being larger than the rest. Behind the position of the tongue, and on each side of the oral cavity, is a shallow evertile pouch, lined with large gently curved conical teeth, which appear to enjoy a twisting or cork-screw action while they are being everted, so as to pierce and secure living prey when both cheek-pouches are brought forcibly in apposition. The upper or posterior lip is wholly unarmed, so as to admit of its expansion in receiving prey thus seized, probably torn up and forced backwards into the gullet by this most efficient and wonderful armature. Speaking of the lateral oval plates of *Pleurobranchæa*, SIEBOLD observes,—“To the same category belong the spines which ESCHRICHT found upon the pharynx of a *Clio*, and described as jaws placed laterally, as in the *Articulata*, and furnished with long sharp comb-like projections or teeth,” giving a very false idea of the organs just noticed in *Clio caudata*, if they are indeed the same or similar in the northern *Clio*.

The description of the head, tentacula, arms, proboscis, and dentition of *Clio caudata* just given, for the simple reason that it has been taken from life under favourable circumstances, will be found to agree but little even with the recognised characters of the *genus*, at least as they occur in systematic works. I have observed, moreover, that without any other apparent distinguishing feature some of the southern *Clios* had simple tapering tails (*Clio à longue queue* of the French), while others have three prominent ridges (the dorsal one frilled) meeting in a point posteriorly, so as to give a depressed trigonal section.

On comparing a *Clio* with a thecasomatous pteropod, *Hyalæa* for example, the mouth and dental system in the former case will be seen to occupy the most advanced position, while in the latter they have receded so far within the limits of the foot as to give the animal an acephalous appearance, and this view

alone warrants the whole of the *Pteropoda* to be included under the term *Cephalophora*.

The ease with which naturalists interchange names without any conciliatory explanation, is certainly a great stumbling-block to the beginner. Thus, if he were to fall in with *Clio caudata*, as I have done, and immediately consult all the authorities within his reach, in some modern work he may find a figure of the creature he is in quest of, though denominated *Clio australis*, but on still further inquiry as to the authorship of that figure, he discovers that it is a lineal descendant of a figure of *Clio à longue queue*, given in the "Voyage de la Bonite." Now, on comparing this with DE BLAINVILLE's figure of *Clio australis*, he may probably perceive even generic differences between them; but, continuing his search, he looks over one or two other modern books, and one can scarcely say whether his mind is settled, or his confusion is made still greater, to encounter stereotype repetitions of the figure of the said *Clio australis* of DE BLAINVILLE boldly named *Clio borealis*.

If there is indeed such an animal as *Clio australis*, and M. DE BLAINVILLE's figure is a correct representation of it, it is obvious enough that the species *borealis* and *australis* are members of the same genus; but as both differ so remarkably from the so-called *C. caudata*, and the broad trigonal-tailed species, of which I have given a short notice and figure, it strikes me that there are ample grounds for the establishment of a new genus, to receive, at least, the two last-mentioned species, while at the same time it will become apparent how little the nature of the respiratory system can be depended upon for generic characters, though it may be of great specific value.

Not desiring to add unnecessary names to a list already large, I merely submit the views above expressed to the consideration of zoologists, who may form their own judgment on the matter. The more important characters are simply as follows:—

*Tentacula*, two, minute, on either side of the head anteriorly; *Cephalic arms*, four, perfectly retractile, long, and conical, with sucker points still more rudimentary than those in *Clio*; *Proboscis* exsertile, broad, depressed, and pointed in front; *Oral aperture*, superior, oval, with minute lower lip uncini; *Cheek pouches* shallow, but evertile, and furnished with curved conical teeth; *Lingual pavement* broad, with a median series.

Setting the above characters aside, however, the original object of the paper has been to show the great importance of the study of all soft, collapsible, and contractile animals in the living and expanded state; for I am much of opinion, that the Northern *Clio*, examined in this way, will be found to present very similar characters, or such as could not be arrived at by the most patient dissection of spirit-preserved specimens.

*Explanation of Plate IX. fig. 3.*

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| <p>1. <i>Clio caudata</i>, &amp;c.</p> <p>2. The second species alluded to in the text.<br/>Both are about the natural size; and the appearance presented by a transverse section, near the caudal extremity, is given immediately below each figure.</p> <p>3. Enlarged figure of the head, proboscis, and cephalic arms of <i>Clio caudata</i> in the expanded state.</p> <p>a. Proboscis, &amp;c.</p> <p>b. Its pointed extremity.</p> <p>c. Oral cavity.</p> <p>d. Anterior or lower lip, armed with teeth.</p> <p>d'. Do., magnified.</p> | <p>e. Tongue with lingual pavement.</p> <p>e'. Portion of the lingual dentition magnified.</p> <p>f. Lateral or cheek pouches, with their curved conical teeth.</p> <p>f'. Do., magnified.</p> <p>gg. The four cephalic arms, with their minute suckers.</p> <p>g'. One of the suckers magnified: 1. lateral view; 2. in face.</p> <p>h. The four minute tentacula, of which the posterior pair is regarded as eye pedicles.</p> <p>i. Head.</p> <p>k. Swimming fins.</p> <p>l. Auditory sac, with otoconia.</p> |
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