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XLI.—On the animal of Kellia rubra

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very efficient aid by exciting discussion. On these natural phenomena we cannot at once apply mathematical demonstration, but must be content to obtain facts, and arrive at truth by inductions, in the first instance, from hypothesis.

I am, Gentlemen, your most obedient servant,

WILLIAM CLARK.

P.S.—Since the above observations were written I have examined a great number of the *Lagena striata*, and have no doubt that, like the *Lagena levis*, they form in their natural habitat, a fixed stem of cells piled on each other.

XLI.—On the *Animal of Kellia rubra*.

By JOSHUA ALDER, Esq.

To Richard Taylor, Esq.

DEAR SIR,

Newcastle-on-Tyne, April 18, 1849.

CAN you spare me room in the next Number of the 'Annals' for a few remarks on Mr. Clark's interesting letter on *Kellia rubra*?

I am glad to find that Mr. Clark is enabled to confirm my statement that the anterior tube of this species is an open fold of the mantle: the only difference now between us is as to its uses, involving the question of the mode of supplying a current of water for respiratory and alimentary purposes.

In cases where a matter of fact is in dispute, it is always best, before arguing the point, to test the truth of former observations. On reading Mr. Clark's letter, therefore, I resolved, as he had done, to submit this little bivalve to a re-examination; and accordingly applied to my friend Mr. Cocks of Falmouth to send me a few specimens by post, as it is rather difficult to procure on our part of the coast. Mr. Cocks very obligingly and promptly complied with my request by sending me above a hundred specimens, which, after a land journey of nearly 500 miles, arrived quite fresh, and immediately showed signs of life on being put into sea-water. I placed two or three of these in a watch-glass under the microscope, and examined them by transmitted light, the mode I had before employed with success to observe the currents in this species as well as in *K. suborbicularis*. By this means I distinctly saw, as on former occasions, a continuous current of water flowing into the anterior tube; indicated by the minute floating particles it contained, which were gradually drawn towards the tube, and one after another passed into it in quick succession. In this manner I examined many individuals, and always with the same results. When the water is perfectly clear

its motions cannot be observed, and it is therefore necessary to have some minute floating matter contained in it; but this is always the case in water obtained fresh from the sea, though it may appear pure to the naked eye. The next thing to ascertain was, whether a current of water passed in by any other channel. For this purpose I examined carefully the circumference of the mantle, but found no indication of an ingress-current at any other part. The floating particles in the water remained perfectly stationary, with the exception that an egress-current was occasionally seen to proceed from the posterior orifice: but this was more difficult to detect than the ingress-current, probably because the floating matter appeared to be all detained and appropriated, and partly because the flow was not continuous, occasioned by the alternate opening and closing of the aperture as is usual in the excretory siphon. In two or three cases I saw a current issuing from this orifice very distinctly, but never one entering it. In another instance where a delicate filament of extraneous matter was attached to the edge of the aperture, its vibratory motion showed the presence of a current which I could not otherwise detect; but this filament was always deflected outwards, and was never drawn towards the fissure, as would have been the case had an alternate current set in in that direction.

We shall now turn to Mr. Clark's observations. As Mr. Clark does not say that he has *seen* the currents of water in any instance, I infer that his conclusions are drawn from the appearance and motions of the parts only, which in all cases he states very correctly. Mr. Clark considers that the only use of the anterior tube-like fold is to assist the foot in progression. I do not exactly understand how this is to be accomplished, nor is its mode of operation distinctly explained. The tube is indeed partially withdrawn at the same time that the foot is contracted,—that is, while the body is drawn forward,—but this appears to be more easily and satisfactorily explained by supposing that the withdrawal of the tube at each step is for the purpose of regulating the admission of water while the body is advanced. These parts are known to be extremely sensitive, and contract on the slightest external motion. But Mr. Clark thinks he has discovered that the supply of water for the branchiæ is received and expelled by the same aperture—the posterior one—in the manner of systole and diastole. To this I would reply, that such a supposition is contrary to the known œconomy of the bivalves, in which the inhalant is always kept distinct from the exhalant current, and admitted by a separate aperture from that by which the latter is expelled. This seems to be necessary, as the currents, being caused by the motion of the branchial cilia, and not by the expansion and contraction of the walls of a cavity, are continuous

in one direction, and the passing in of one portion of water is consequent on the displacement and passing onwards of another portion, so that both processes are going forward at the same time. The two apertures are always present in those genera where the mantle is more or less closed, though one of them is sometimes confluent with the pedal opening. They are usually siphonal, and have been called the branchial and anal siphons; a mode of appellation not altogether correct, as both are alike subservient to branchial and alimentary purposes; the one (inhalant) being branchial and buccal; the other (exhalant) branchial and anal. In the former the current is pretty regularly sustained; in the latter the water is usually expelled by an intermittent motion and occasionally by jerks. I should not have thought it necessary to be thus minute in detail did not Mr. Clark's arguments lead to the supposition that he takes the words branchial and anal, as applied to these apertures, in a literal and restricted sense, which they are not intended to bear. But to return to *Kellia rubra*: the contraction and expansion of the posterior orifice is no more than is seen in the excretory siphon of all bivalves, and has no power to produce the internal circulation, but merely to regulate the discharge, and in this case, where the orifice is a mere slit, the ejecting force is very limited. The situation of the anus, as pointed out by Mr. Clark, is no doubt correct, and in the usual place opening behind and within the egress-aperture. Mr. Clark, however, saw the points of the branchiæ within the fissure, which he seems to consider a proof of its being a branchial (ingress?) aperture. The branchiæ of this species are of a triangular form and very unequal in size, the lower angle extending down posteriorly very near to the orifice, but it does not enter it, and I think no conclusion can be drawn from this circumstance; at least, none that can be set against the evidence derived from the actual sight of the currents, which any one may obtain, especially the inhalant one, in the way that I have pointed out.

The superior size of *Kellia suborbicularis* renders it less liable to be misunderstood. Having frequently had this species alive for several days together, both before and after ascertaining the peculiarities of *Kellia rubra*, I am sufficiently familiar with it to speak confidently concerning its anterior siphon, which, as I have more than once stated elsewhere, is a perfect tube, closed below, through which the branchial current may be seen to enter. This is perhaps the only described species in which the tube is really perfect, for M. Deshayes was most likely deceived with respect to the Mediterranean *Kellia rubra* (*Bornia siminulum*) in the same manner that Mr. Clark and I had been on a first examination.

To reconcile the conflicting statements of authors, Professor E. Forbes has suggested that the open or close form of the tube

in this genus may be only a sexual distinction ; but this is disproved by an examination of the British species, where the peculiar form of each is constant in all the individuals that have been examined.

Before quitting the subject of *Kellia rubra* I wish to take the opportunity of mentioning that Dr. Turton was the first to point out the viviparous character of this species, which he announced in his 'British Bivalves,' p. 258, twenty-seven years ago.

I am, dear Sir, yours very truly,

JOSHUA ALDER.

XLII.—*Description of a bag-shaped, glandular apparatus on a Brazilian Bat, the Emballonura canina of Pr. Maximilian.* By J. T. REINHARDT.

DURING a recent sojourn in the Brazils I collected, in the interior of Minas Geraës, numerous specimens of a small species of bat (the *Emballonura canina*, Pr. Maxim.) which is there very common, and which attracted my particular attention from the fact of its having its wings provided with a small bag-like appendage similar to that noticed by Mr. J. E. Gray* and by Professor Krauss† in the species of *Saccopteryx*.

On my return to Europe, I saw, from the annual report of the natural history of the Mammalia for the year 1846 by Professor A. Wagner‡, that this organ had already been discovered on the very same species of bat by the late Dr. Natterer, and that the learned Professor had published drawings of it in his 'Beiträge zur Kenntniss der Säugethiere von America,' published in the 'Abhandlungen der Königl. Bayerischen Academie der Wissenschaften, Vter Band, 1ste Abth. 1847.'

Two figures (*loc. cit.* tab. 4. figs. 6 & 7) being all that is to be found in the above-named work, there being no description in the text, I have thought it right to publish my observations concerning this organ, which are founded on the examination of a large number of specimens, both alive and immediately after death.

On examining in the *Emballonura canina*, that part of the alar membrane which extends to the thumb, along the fore-edge of the upper and lower arm, we find on the back a fissure leading to a small cavity in the interior of the membrane, in which is secreted a reddish, greasy matter, of a strong, somewhat ammoniacal smell. The aperture is at a distance of about 3 lines from the insertion of the alar membrane on the back : the

* Ann. and Mag. of Natural History, vol. xvi. p. 279.

† Erichson's Archiv für Naturgeschichte, Band 1. p. 178. t. 6.

‡ Erichson's Archiv, 1847, B. 2. p. 13.