

II. "On the General Characters of the Genus *Cymbulia*." By  
JOHN D. MACDONALD, M.D., F.R.S., Inspector-General R.N.  
Received March 21, 1885.

The purely pelagic habit of the interesting order of Pteropods places them so far beyond the reach of zoologists in general, that the opportunities of examining them in a living or recent state are few and far between. I have myself been fortunate enough to obtain, from time to time, nearly all the leading genera of the order in question, but, singularly, have never fallen in with *Cymbulia*.

Judging from the figures and descriptions of this genus given by naturalists, it always appeared to me as if both animal and shell were taken end for end so as to render all the descriptive relationships ambiguous; but it was only a short time ago that I was enabled to investigate the point practically through the kindness of a naval friend who brought me some specimens of *Cymbulia Peroni* from the Indian Ocean.

The result of examination proved the impression above expressed to be a correct one, while other particulars of interest also revealed themselves. I found that the attachment of the animal to the shell was so slight, and the visceral mass so short and rounded, that by incautious handling the animal very readily came away, and here I believe is the whole secret of the matter, for, on attempting to place it *in situ* again, one would be very likely to turn it upside down, and the error would, of course, be propagated in otherwise, possibly, excellent figures and descriptions. It might be mentioned here that the great malacologist De Blainville gave the generic name of *Gastroplox* to an *Umbrella* which he found with the broad surface of the foot accidentally adherent to the shell, so that we need not wonder at what anybody else might do under similar circumstances.

Mr. S. P. Woodward, in his Manual of Mollusca, thus characterises *Cymbulia* :—

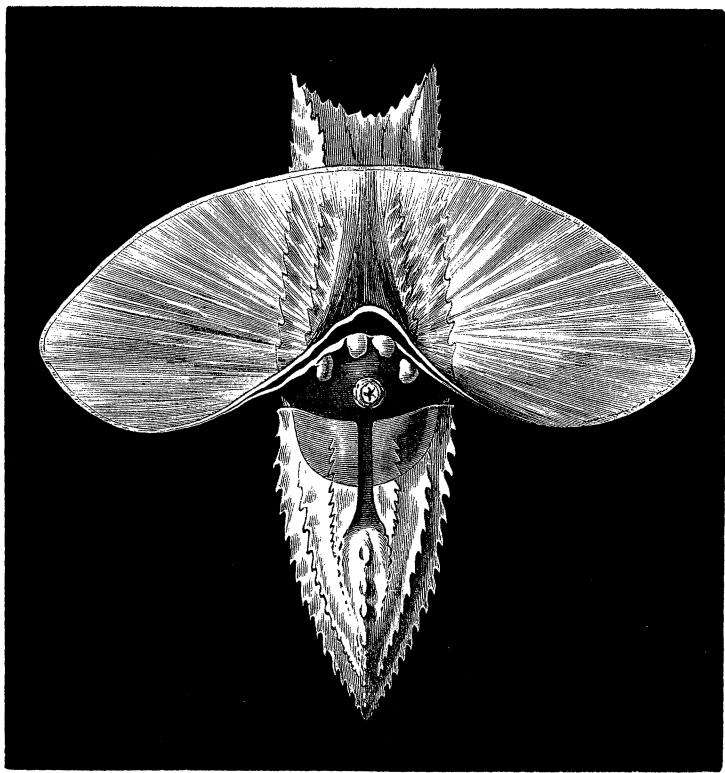
*Shell* cartilaginous, slipper-shaped, pointed *in front*, truncated *posteriorly*, aperture elongated ventral.

*Animal* with large rounded fins connected ventrally by an elongated lobe; mouth furnished with minute tentacles, lingual teeth, 1,1,1; stomach muscular, armed with two sharp plates.

In keeping with the above description, the figure given of *Cymbulia proboscidea* (after Adams) shows the toe of the slipper in front like a rostrum, probably suggesting the specific name *proboscidea*, for the animal itself presents no appearance of a proboscis. In De Blainville's figure, however, a protrusion from the generative orifice might be so interpreted; but unfortunately, though the shell is given in its natural position, the animal is turned upside down. The eyes men-

tioned by the same authority I have not been able to discover, but in the figure they are represented as set in the two central processes, which would appear to be a modification of the metopodium of other Pteropods.

The fins are said to be rounded and connected ventrally (?) by an elongated lobe, but this statement is not quite correct. The two fins



together form a broad continuous reniform plate, with an unbroken curved outline in front, and a hilum-like notch behind, where the mouth of the animal is situated. Nevertheless, the epipodial expansion exhibits a tendency to fall into folds that might suggest the idea of a ventral lobe if the animal were reversed in its shell.

The posterior margin of the fins on each side presents a dilamination which gradually widens towards the middle line so as to include the mouth, and form two distinct, but quite linear, labia or lips.

The beautifully transparent shell of this species (probably *C. Peroni*)

is about an inch in length, and a quarter of an inch across the instep, from which it tapers elliptically to a pointed toe, while the heel at the anterior extremity is abruptly truncated and broadly notched.

The slipper is ornamented with eight principal spiny ridges, taking a longitudinal direction, diverging from the toe and terminating separately at the heel. But the central vertical ridge corresponding with the front of the slipper is cut off where a square notch or fissure in the instep receives the muscular attachment of the animal. The whole scheme of arrangement will be better understood on inspecting the accompanying figure, which is about three times the natural size.

III. "On the Agency of Water in Volcanic Eruptions; with some Observations on the Thickness of the Earth's Crust from a Geological Point of View; and on the Primary Cause of Volcanic Action." By JOSEPH PRESTWICH, F.R.S., Professor of Geology in the University of Oxford. Received March 26, 1885.

(Abstract.)

That water plays an important part in volcanic eruptions is a well-established fact, but there is a difference of opinion as to whether it should be regarded as a primary or a secondary agent, and as to the time, place, and mode of its intervention. The author gives the opinions of Daubeny, Poulett-Scrope, and Mallet, and dismissing the first and last as not meeting the views of geologists, proceeds to examine the grounds of Scrope's hypothesis—the one generally accepted in this country—which holds that the rise of lava in a volcanic vent is occasioned by the expansion of volumes of high pressure steam generated in the interior of a mass of liquefied and heated mineral matter within or beneath the eruptive orifice, or that volcanic eruptions are to be attributed to the escape of high pressure steam existing in the interior of the earth. The way in which the water is introduced and where, is not explained, but as the expulsion of the lava is considered to be due to the force of the imprisoned vapour, it is, of course, necessary that it should extend to the very base of the volcanic foci, just as it is necessary that the powder must be in the breech of the gun to effect the expulsion of the ball.

The author then proceeds to state his objections to this hypothesis. In the first place, he questions whether it is possible for water to penetrate to a heated or molten magma underlying the solid crust. The stratigraphical difficulties are not insurmountable, although it is well known that the quantity of water within the depths actually

