



On the circulatory apparatus of *Mygale cæmentaria*, Walck

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2. "On some Palæozoic Ostracoda from the Girvan district in Ayrshire." By Prof. T. Rupert Jones, F.R.S., F.G.S.

This paper aims at the completion of the palæontological account of the Girvan district, so far as the Ostracoda are concerned; and follows up the researches indicated in the 'Monograph of the Silurian Fossils of the Girvan District in Ayrshire,' by Nicholson and Etheridge, vol. i., 1880.

In about a dozen pieces of the fossiliferous shales, submitted for examination some few years ago, the writer finds nearly thirty specimens of *Primitia*, *Beyrichia*, *Ulrichia*, *Sulcuna*, and *Cypridina*, which show interesting gradations of form, not always easy to be defined as specific or even varietal, but valuable as illustrating modifications during the life-history of individuals, thus often leading to permanent characteristics of species and genera. Like those formerly described in Nicholson and Etheridge's 'Monograph,' the specimens have all been collected by Mrs. Elizabeth Gray, of Edinburgh.

3. "On some Bryozoa from the Inferior Oolite of Shipton Gorge, Dorset.—Part II." By Edwin A. Walford, Esq., F.G.S.

As we pass backward in time, the characters of the two sub-orders Cheilostomata and Cyclostomata merge. The accessory organs of the genus and species described in this paper illustrate this statement. The genus is named *Pergensia*, and the following new species are described:—*P. nidulata*, and vars. *major* and *minima*, *P. porifera*, *P. amphoralis*, *P. jugosa*, *P. bi-gibbosa*, and *P. galeata*. The genus is, however, placed in the sub-order Cheilostomata, thus recognized for the first time in the Jurassic Series.

MISCELLANEOUS.

On the Circulatory Apparatus of Mygale cæmentaria, Walck.

By M. MARCEL CAUSARD,

THE circulatory apparatus of the Araneida Tetrapneumones has hitherto been very little studied. So far as I am aware, the only authors who have dealt with this subject are Dugès, who, in the illustrated edition of Cuvier's 'Règne Animal,' has figured the heart of the mason *Mygale* (*Nemesia cæmentaria*), and M. Blanchard, who, after having briefly described the results obtained from the investigation of *Mygale* (*Theraphosa*) *Blondii*, in the 'Comptes Rendus de l'Académie,' t. xxxiv. 1852, gave a representation of the circulatory apparatus of this spider in his 'Organisation du Règne Animal' (Arachnides, pls. xv. & xvi.).

Since I had not at my disposal any of the large American species of *Mygale*, I had to content myself with our humble mason *Mygale* of Provence. In the present communication I shall concern myself

only with that portion of the circulatory apparatus which is contained in the abdomen, that is to say with the heart and the vessels which open into or issue from it.

The heart of the mason *Mygale* greatly resembles that of the rest of the spiders. Enveloped by a pericardium it is situated in the dorsal portion of the abdomen, immediately beneath the integument. Its anterior region is attenuated to form the aorta, which penetrates into the peduncle and passes on to ramify within the cephalothorax. Its posterior portion exhibits a corresponding diminution in size, and then terminates with a bifurcation. In transverse section it is not circular, but shows an angle in its lower part, since the heart is as it were carinate on its inferior face. Four pairs of lateral eminences are to be observed upon this organ. The *anterior* pair, which correspond to the curvature of the heart, are but slightly marked; the following pair, which I shall call the *intermediate* ones, are much more prominent, as are also the third (*median*); finally the *posterior* pair, situated near the extremity of the heart, are much less pronounced. Each of these eight eminences is perforated by an aperture, forming a communication between the pericardiac cavity and the interior of the heart. There are accordingly four pairs of these apertures, while the Araneida Dipneumones only possess three pairs, and less in a few very rare cases. The number four has, moreover, been stated by M. Blanchard for *Mygale Blondii*. The anterior apertures are placed at the sides of the heart; the intermediate ones are a little further advanced towards the dorsal face; and, lastly, the median and posterior pairs are almost entirely dorsal, and in these cases the two apertures of the same pair are separated one from another, in the median line, only by a somewhat narrow strip of tissue. Like the corresponding eminences, the intermediate and median apertures are much more developed than the anterior, and above all than the posterior pair. The two edges of each aperture are constituted by powerful bundles of muscular fibres, which sharply define them.

According to M. Blanchard, the heart of *Mygale Blondii* is divided into five chambers. In the mason *Mygale* this division into chambers does not exist, any more, in fact, than in the Araneida Dipneumones. On examining the interior of the heart, we observe that the two lips of each aperture are turned back in such a way as to make a noticeable projection on the inside of the heart when they are applied together. The internal angles of the two apertures of the same pair are only united together, on the interior of the organ, by a slightly projecting raphe, which is produced by the muscles which encircle these orifices; on the floor of the heart a similar seam is even much less distinct. The arrangement here described is that of the intermediate and median apertures; it is even much less pronounced in the case of the anterior and posterior ones. Neither do we find the *valvular folds*, which, according to Dugès, should conceal the origins of the vessels. The heart therefore forms only a single chamber, exhibiting four enlargements.

As regards the vessels, Dugès confines himself to stating that

“the heart gives off branches in front and at the sides.” M. Blanchard figures four pairs of *pneumo-cardiac* vessels, which bring the blood from the lungs to the heart, and three pairs of arteries issuing from the heart. There exists only two pairs of pneumo-cardiac vessels, or pulmonary veins; these are constituted by prolongations of the pericardium. Those of the anterior pair collect the blood from the anterior lungs and open into the pericardium opposite the anterior apertures of the heart; those of the posterior pair receive the blood from the posterior lungs and discharge at the level of the intermediate apertures. Further back many prolongations of the pericardium are seen, but these only form ligaments uniting the heart to the dorsal integument.

As for the vessels which carry the blood away from the heart, we may distinguish the following. At the level of the median cardiac apertures there arises, on the inferior face of the heart, a pair of large lateral arteries which ramify abundantly and irrigate the anterior portion of the abdomen. At their origin they are separated one from the other by two hypocardiac ligaments. Below the posterior apertures there arise, like the foregoing, two other lateral arteries of rather narrow diameter, and, between the bases of these, there detaches itself from the heart a capacious trunk which takes a vertical direction. It soon gives rise behind to a branch which I consider as corresponding to the caudal artery of the other Araneida; then, having reached the upper surface of the intestine, near the posterior portion of the rectal sac, this large artery divides into two branches, which pass one to the right and the other to the left of the alimentary canal, and ramify in order to bathe the posterior region of the abdomen.—*Comptes Rendus*, t. cxvi. no. 16 (April 17, 1893), pp. 828–830.

On further Evidences of Deuterosaurus and Rhopalodon from the Permian Rocks of Russia. By H. G. SEELEY, F.R.S.

The author endeavours to separate the Labyrinthodont remains, distinguished by having teeth anchylosed to the jaw, from such as belong to animals having a Theriodont type of dentition. The genera founded upon cranial fragments which show the Theriodont type are *Deuterosaurus*, *Rhopalodon*, and *Dinosaurus*. The skull in *Deuterosaurus* is described from new materials, which make known the structure of the palate and other cranial structures. The palate is of Plesiosaurian type. The back of the skull is a vertical plate, and the brain-cavity rises in a long vertical tubular mass to the parietal foramen. The quadrate bones descend below the foramen magnum in a way that is best compared with Plesiosaurs.

The articular end of the lower jaw is identified among bones figured by von Meyer.

The skull of *Rhopalodon* is nearly complete, and has a general resemblance to the skull of the South-African Dicynodont *Psychognathus*. The orbit is defended with a sclerotic circle of bones. Whereas in *Deuterosaurus* there is only one molar tooth, in *Rhopalodon* there are apparently eight molar teeth, which have the posterior edge finely serrated.