

The anterior subœsophageal mass gives off the nerves to the arms, and hence has been called "brachial."

The middle subœsophageal mass, from which arise the nerves of the siphon, has been universally regarded as constituted by the pedal ganglia.

Lastly, the posterior subœsophageal mass innervates the mantle and the viscera; hence it corresponds with the combined visceral ganglia of other Mollusca.<sup>1</sup>

The supracœsophageal mass (cerebral ganglia) is united to the infracœsophageal masses by two connectives on either side; the anterior is rather thin and passes to the brachial ganglion; the posterior is very large and thick, and joins the cerebral ganglion to the two posterior infracœsophageal masses, that is the pedal and visceral ganglia.

It has already been stated that all observers are agreed as to the interpretation of the supracœsophageal and the two posterior subœsophageal masses. The disagreement relates only to the brachial ganglia, which are regarded by one party as pedal and by the other as cerebral. We shall now proceed to discuss this point.

Those zoologists who maintain that the brachial ganglia are part of the cerebral ganglia explain their position below the œsophagus by saying that on either side a part of the cerebral ganglia has been displaced from the upper to the lower surface of the œsophagus, still remaining united to the cerebral ganglion, and that these two nervous masses have fused below the œsophagus and formed the brachial ganglia. In this manner the brachial ganglia are cerebral in origin, and the arms which they innervate are similarly cephalic.

Against this interpretation the following arguments may be adduced:—

I. It is eminently unlikely that in order to innervate the crown of arms which surrounds the buccal aperture on *all* sides (*lateral* and *dorsal* as well as *ventral*) a portion of the cerebral ganglia should have descended on either side to the lower aspect of the œsophagus, and that it should be just this particular part of the cerebral ganglia situated entirely below the œsophagus that innervates the arms situated dorsally to and at either side of the latter.

If the arms were really cephalic in origin, the nervous mass which innervates them would not have descended *entirely* to the lower surface of the digestive tract, and those arms, which are situated above the œsophagus, would surely be supplied directly from the supracœsophageal cerebral mass, even if all were not so innervated as in the case of the six cones of *Clione*.

If the muscular mass of the arms had all been displaced from the upper aspect of the head in order to locate itself entirely below the mouth, then it would be reasonable to suppose that a portion of the cerebral ganglia had followed this movement, and descended on either side of the digestive tract. But nothing of the kind is the case. On the

<sup>1</sup> See Paul Pelseneer, *Recherches sur le système nerveux des Ptéropodes*, *Arch. de Biol.*, t. vii. p. 121.