

vol. i. p. 303.) In all Vertebrate animals without exception, man included, these important parts of the body during the embryological development out of the egg, originally begin in the same simple form, which is retained throughout life by the *Amphioxus*. It is only at a later period that the brain develops by the expansion of the fore end of the spinal marrow, and out of the spinal rod the skull which encloses the brain. As these two important organs do not develop at all in the *Amphioxus*, we may justly call the class represented by it, *Skull-less animals* (Acrania), in opposition to all the others, namely, to the *animals with skulls* (Craniota). The Skull-less animals are generally called *tubular-hearted* (Leptocardia), because a centralized heart does not as yet exist, and the blood is circulated in the body by the contractions of the tubular blood-vessels themselves. The Skulled animals, which possess a centralized, thick-walled, bulb-shaped heart, ought then by way of contrast to be called *bulbular-hearted* animals (Pachycardia).

Animals with skulls and central hearts evidently developed gradually in the later primordial period out of those without skulls and with tubular hearts. Of this the ontogeny of skulled animals leaves no doubt. But whence are these same skull-less animals derived? It is only very lately that an exceedingly surprising answer has been given to this important question. From Kowalewsky's investigations, published in 1867, on the individual development of the *Amphioxus* and the adhering Sea-squirts (*Ascidia*) belonging to the class of mantled animals (*Tunicata*), it has been proved that the ontogenies of these two entirely different looking animal-forms agree in the first stage of development in a most remarkable manner. The freely swimming larvæ of the