

The question which I would examine here in particular, is not whether the circumscription of these great groups was accurately defined by Cuvier, whether the minor groups referred to them truly belong there or elsewhere, nor how far these divisions may be improved within their respective limits, but whether there are four great fundamental groups in the animal kingdom, based upon four different plans of structure, and neither more nor less than four. This question is very reasonable, since modern zoölogists, and especially Siebold, Leuckart, and Vogt have proposed combinations of the classes of the animal kingdom into higher groups, differing essentially from those of Cuvier. It is but justice to Leuckart to say that he has exhibited, in the discussion of this subject, an acquaintance with the whole range of Invertebrata,¹ which demands a careful consideration of the changes he proposes, as they are based upon a critical discrimination of differences of great value, though I think he overrates their importance. The modifications introduced by Vogt, on the contrary, appear to me to be based upon entirely unphysiological principles, though seemingly borrowed from that all important guide, Embryology.

The divisions adopted by Leuckart are: Protozoa, (though he does not enter upon an elaborate consideration of that group,) Coelenterata, Echinodermata, Vermes, Arthropoda, Mollusca, and Vertebrata. The classification adopted, many years before, by Siebold, in his text-book of comparative anatomy, is nearly the same, except that Mollusks follow the Worms, that Coelenterata and Echinoderms are united into one group, and that the Bryozoa are left among the Polyps.

Here we have a real improvement upon the classification of Cuvier, inasmuch as the Worms are removed from among the Radiates, and brought nearer the Arthropods, an improvement however, which, so far as it is correct, has already been anticipated by many naturalists, since Blainville and other zoölogists long ago felt the impropriety of allowing them to remain among Radiates, and have been induced to associate them more or less closely with Articulates. But I believe the union of Bryozoa and Rotifera with the Worms, proposed by Leuckart, to be a great mistake; as to the separation of Coelenterata from Echinoderms, I consider it as an exaggeration of the difference which exists between Polyps and Acalephs on the one hand, and Echinoderms on the other.

The fundamental groups adopted by Vogt,² are: Protozoa, Radiata, Vermes, Mollusca, Cephalopoda, Articulata, and Vertebrata, an arrangement which is based solely upon the relations of the embryo to the yolk, or the absence of eggs. But, as

¹ LEUCKART, (R.) Ueber die Morphologie und die Verwandtschaftsverhältnisse der wirbellosen Thiere, Braunschweig, 1848, 1 vol., 8vo.

² VOGT, (CARL,) Zoologische Briefe. Naturgeschichte der lebenden und untergegangenen Thiere. Frankfurt a. M., 1851; vol. 1, p. 70.