The question, however, now arises, whether all these radiated animals form a type distinct from the Echinoderms, as Leuckart would have it; or constitute two classes of the type of Radiata, coequal with the Echinoderms, as Cuvier represented them; or three classes, as Owen and Ehrenberg admit; or any other number of classes.

In uniting the Acalephs and Polyps into one primary division distinct from the Echinoderms, Leuckart has overlooked the general homologies which unite the Echinoderms with the Acalephs and the Polyps, and has paid no attention to the Acalephian character of the embryo of a large number of Echinoderms. There is no feature more striking in all these animals, in the Polyps and Acalephs on the one side and the Echinoderms on the other, than the radiated arrangement of their parts. A comparison of Echinarachnius with Polyclonia and Æquorea, and of the latter with Actinia, can leave no doubt upon this question; and since all Polyps can easily be reduced to the type of Actinia, as well as all Acalephs to that of Æquorea and all Echinoderms to that of Echinarachnius or of Asterias, it must be admitted that the plan of structure is the same in all these animals. They are built upon the idea of radiation; that is to say, all their organs are arranged around a centre, at which the mouth is placed, and diverge towards the periphery, to converge again at an opposite pole. But this is not the whole: all the organs of this structure are homologous. The chambers between the radiating partitions of the Actinia correspond to the radiating tubes of Æquorea, and these, again, to the ambulacral system of the Echinoderms; and the marginal tentacles of the Actiniæ correspond to the marginal tentacles of the Acalephs, and appear as ambulacral tubes in the Echinoderms, under the various forms of seeming gills around the mouth of Echinoids, or of seeming gills in the rosette of Clypeaster, or of branching tentacles and ambulacral suckers in the Holothurians. The identity of all these parts I shall have an opportunity of showing hereafter.

The central cavity, in open communication with the radiating chambers in Polyps, is closed in Acalephs, and communicates only through narrow openings with the radiating tubes; while in Echinoderms there arises a distinct alimentary canal, which is, however, still in direct communication with the ambulacral system through a network of anastomoses, about which I shall also have more to say hereafter. The ocelli at the base of the tentacles, which in Polyps are mere pigment cells, appear like modified tentacles in the higher Medusæ, while they are still connected with real tentacles in the lower ones; in Echinoderms they appear again, in the same relation with the ambulacral system and the terminal odd ambulacral sucker, as they are with the tentacles in Acalephs. The sexual organs are upon the sides of the radiating cavities; that is, upon the edge of the partitions in the Polyps, upon the sides of the radiating tubes in the Acalephs, and alternating with the ambulacra in Echinoderms,—everywhere in a homologous position and relation.