

On the basis of these researches Viguièr proposed an amended classification of the Asteroidea. He divided the class into two sub-classes, named "Astéries ambulacraires" and "Astéries adambulacraires." The first characterised by the predominance of the ambulacral plates in the mouth-ring, the presence of pedunculate forciform or forcipiform pedicellariæ, and the usually quadriserial arrangement of the ambulacral tube-feet; the second sub-class characterised by the predominance of the adambulacral plates in the mouth-ring, by the presence of sessile, pincer-like, or valvulate pedicellariæ, and by the almost constant biserial arrangement of the ambulacral tube-feet. The first sub-class was divided into three families, the "Asteriadae," Heliasteridae, and Brisingidae. The second sub-class was divided into seven families, the Echinasteridae, "Linckiaidae," Goniasteridae, Asterinidae, Pterasteridae, Astropectinidae, and Archasteridae.

The three families, Heliasteridae, Brisingidae, and Archasteridae are additions to those given in Perrier's list. Perrier, however, included the family Brisingidae in his remarks, but did not include it in his synoptical table. The genera recognised by Perrier are accepted by Viguièr, *Metrodora*, *Nepanthia*, and *Brisinga* being the only additions on his list. Viguièr, however, defined the genera chiefly on the basis of his own investigations on the skeleton, the characters of the odontophore and the mouth-plates being used by him as important factors in the classification. On these grounds several of the genera are placed by Viguièr in different families and associations from those to which they were referred by Perrier.

In 1879 Zittel¹ published a classification having special reference to fossil forms. He divided the class Asteroidea into two orders—(1) the Ophiuridae, which was again divided into two sub-orders, the Euryaleæ and the Ophiureæ; and (2) the Stelleridae, which was subdivided into two sub-orders, the Encrinasteriæ and the Asteriæ veræ. The latter group—which comprises all the recent forms—was simply divided into two unnamed sections, characterised by the quadriserial and the biserial arrangement of the ambulacral tube-feet.

In 1884 Perrier² again discussed the question of classification, and pointed out that the structure of the mouth determined by Viguièr, and the character of the ambulacral furrow, are morphologically correlated, the one dependent on the other, and that the modifications in the form of the pedicellariæ stand in no definite connection with the structure of the ambulacral furrow and the mouth. From this he was led to discuss the relative taxonomic values of the structure of the ambulacral furrow and mouth on the one hand, and of the form of the pedicellariæ on the other. He decided in favour of the pedicellariæ, on the ground that they are in his opinion aborted rudiments of ancestral organs

¹ Handbuch der Palæontologie, München, 1879, Band i. p. 437.

² Mémoire sur les Étoiles de mer recueillies dans la mer des Antilles et le Golfe de Mexique durant les expéditions de dragage faites sous la direction de M. Alexandre Agassiz (*Nouv. Archives Mus. Hist. Nat.*, 2e Série, t. vi. (1884) p. 134).