

II. *Reasons for considering previous Classifications invalid.*

As the foregoing is the latest scheme of classification, and is, in fact, the embodiment of all that have gone before, I propose to examine briefly the fundamental characters upon which it is based.

Perrier's classification is based upon the character of the pedicellariæ. He considers that the pedicellariæ furnish characters of the highest taxonomic value; in other words, he regards them as class characters, upon the modifications of which divisions of ordinal rank may be made. He assigns to the pedicellariæ this importance on the ground that they are the degenerated rudiments of organs whose functions were more important in the ancestral forms than those which pedicellariæ now perform. Perrier states that the pedicellariæ appear earlier in the embryo of Echinids than the spines. He regards them as more ancient organs. He rejects the view that they are modified forms of spines, as suggested by A. Agassiz. He considers that they furnish positive ordinal characters in the Echinoidea. He asserts that these statements are even more clearly applicable to the Asteroidea than to the Echinoidea. He regards the more complex forms of pedicellariæ as older than the simpler forms, and believes that the forcipiform pedicellariæ are older and more typical than the more simple forcipiform pedicellariæ.

Confining my remarks to the Asteroidea, I venture to think that facts do not support any one of these statements, so far as that class is concerned.

(1.) Respecting the priority of appearance in the pedicellariæ and spines, I may say that in no starfish embryo which I have examined have I found anything to warrant the assumption that pedicellariæ appear before spines; in fact, my observations indicate unequivocally that the spines are formed before the pedicellariæ. In *Asterias*, a form which is crowded with pedicellariæ when adult, and is one grouped by Perrier amongst what he considers (erroneously in my opinion) the oldest forms of Asteroidea, this is certainly the case. Neither has any other observer who has written upon the development of starfishes recorded, so far as I am aware, the appearance of pedicellariæ before spines.

(2.) As to whether pedicellariæ are modified forms of spinelets, and as to whether the older forms of the organ are simpler or more complex than the more recent, I consider that those Asterids, which I believe to represent the most archaic forms, distinctly support the views, (i.) that the pedicellariæ are modified spinelets, and (ii.) that the older forms of the organ were simpler and less complex than the more recent. As to the mode in which the more complex forms may have been evolved it is unnecessary to speculate here. The further outcome of the argument that the most complex form of pedicellariæ indicates the most ancient organism would logically lead to the conclusion—although such an opinion is not definitely expressed by Perrier—that the Echinoidea are phylogenetically older than the Asteroidea, for I imagine that it will be generally admitted that the pedicellariæ of Echinoidea are more complex than those of Asteroidea. Such a conclusion, I venture to