acters whose differences indicate changes in structural detail resulting from modification and development, and show a relationship of subordination which warrant their being ranked as ordinal factors :—

1. The adaptation of the organism to subserve the functions of respiration and excretion.
2. The character of the ambulacral skeleton.
3. The character of the ambital skeleton.

I will remark briefly on each of these topics, confining, however, my observations on the present occasion to the sub-class Euasteroidea, as the other constituents of the Asteroidea are fossil forms whose classification it is not my intention to discuss in this place.

1. The organs which Stimpson[1] first named "papulæ" (abactinal or dorsal water-tubes, A. Agassiz; Hautkiemen, Ludwig; respiratory processes, Carpenter; Kiemenbläschen, Hamann; tubules, Vogt and Yung; branchies lymphatiques, Cuénot; dèrmal branchiæ, Durham), which puncture the body-wall in the form of delicate transparent membranous cœca, permit an exchange by osmosis of fresh oxygenated fluid from without, and of the effete or carbonised fluid from within the body-cavity. According to Mr. Durham,[2] they would also seem to permit of the passage of "scavenging amœboid cells" and more or less solid particles. The papulæ may be distributed over the whole body, or may be confined to a limited area. By means of their mode of occurrence, the Euasteroidea may be divided into two groups: in one the papulæ are confined to the abactinal surface, and never pass beyond the boundary of the supero-marginal plates, and consequently do not occur in the lateral walls or on the actinal surface; in the other group the papulæ extend beyond the boundary of the supero-marginal plates, and occur in the lateral walls and on the actinal surface. The former of these groups may be called the Stenopneusia, the latter the Adetopneusia. I regard the first group (the Stenopneusia) as the older, and as indicating a simpler or less complex stage of organisation for the performance of the functions in question. Embryology supports this view, for at an early stage in the life history of an Adetopneusate Asterid no papulæ are present; those first formed are confined to the abactinal surface, and the earliest to appear are situated near the base of the ray. It is only at a later stage of growth that the papulæ invade the lateral walls and the actinal surface. In other words, the members of the more highly developed group (the Adetopneusia) pass in the course of their development through a stage which represents the characters of the adult condition of the more primitive group (the Stenopneusia).

2. The ambulacral skeleton—by which I understand not only the ambulacral plates and their associated adambulacral plates, but also the correlated series of tube-feet—exhibits,

[1] *Proc. Boston Soc. Nat. Hist.*, vol. viii. (1862), p. 261.
[2] *Proc. Roy. Soc.* 1888, vol. xliii. p. 329.