assimilating fancy than our own who perceives it in these objects. Amid this diversity of forms, we may neverthe­less remark, that a line drawn so as to connect the species of the rays together would give a circular outline to the body, which is very rarely protuberant, and never globular. It consists of two parts, the disc and the rays ; the latter either continuous and homologous, or dissimilar and articu­lated to the other by the medium of peculiar scales. There is always a distinct dorsal and ventral surface ; the former in general vividly coloured, and covered with spongeous tubercles or scales, whose office is defensive ; the latter colourless, and furnished with the organs of locomotion and of touch. The colour resides in the mucous coat that oc­cupies the place of the epidermis of higher animals, but the scales and tubercles are essentially parts of the thick creto- coriaceous skin which gives figure and consistency to the whole. In this skin there is deposited a considerable pro­portion of carbonate of lime, with some phosphate of the same earth, sometimes in the form of scales, either imbri­cated or scattered ; more usually in grains or short pieces, so joined as to make a sort of knotted thread, that, by its divarications and anastomoses, is woven into a netted frame-work, the interstices of which are filled up by the mucous tissue. On the calcareous frame-work the spines and tu­bercles are placed, and these vary in size and structure according to their position. When dorsal, they are mostly short and obtuse, unordered and immoveable, excepting in so far as their degree of erection and relative position may be effected by the more or less turgid condition of the body ; but on the sides of the rays, while their size is greater, they are also dressed in regular lines, and appear to be capable of being moved backwards or forwards by pe­culiar muscles. In the Asterias, the under surface of the rays is deeply furrowed from their origin to their extre­mity ; and the furrow, analogous to the ambulacra of the Echinides, is occupied with two or four series of tentacular feet, which are also guarded by moveable spines, different in their structure, however, either from those of the back or sides, and forming a protective hedge on each side. There is nothing similar in the Ophiuridæ or Crinoidea, whose rays are not grooved, nor possess tentacular feet, but consist of a succession of similar pieces soldered to each other, so that they resemble the vertebral column of some slender anima), or, more exactly, from the squamous nature of the pieces, the tail of a lizard ; and, like that tail, they are tapered and flexible to a certain extent, and equally brittle. It is interesting to remark, that this ray, appa­rently very dissimilar from that of the Asterias, really finds in that genus its type and original ; for the roof, if we may so speak, of the ambulacral groove, is made up of a series of pieces catenated exactly like those of the Ophiuræ, with compressed processes arching up from each side after the manner of ribs, between whose intervals the tentacular feet are extended.

The mouth is situated in the centre of the ventral sur­face. It is a circular orifice, with a membranous lip, capa­ble of great dilatation, but bounded by spinigerous and tuberculated angular projections, formed by the conver­gence of the bases of the rays, that may be useful in cap­turing and bruising the prey. A short œsophagus leads to the stomach, a large membranous sac occupying the centre or nave of the body ; and though connected to the parietes by several ligaments, yet sufficiently loose and dilatable to permit of its frequent eversion and extrusion in the shape of bladdery lobes. It has no intestine, excepting in the Crinoid family, where there is a distinct vent opening on the inferior surface, near the mouth.@@1 But the nutritive parts of the food pass from the stomach either into saccu­lated reservoirs, as in Ophiura, or through narrow vascular passages into large complicated cæcal appendages, which lie along the floor of the rays, two in each ray, consisting of a regular series of pectinations or overlying lobules, and having no unapt resemblance to some beautiful compound leaf or fern. Such organs we find in the Asterias ; and as it circulates through them, the chyle is largely subjected to the influence of the oxygenating medium, and prepared for its assimilation. Such at least is the opinion of Tiede­mann ; but it may be necessary to mention, that Cuvier, Blainville, and Meckel regard these cæca as secreting or­gans, analogous to the biliary organs of many invertebrate animals, with which, says Dr Sharpey, it must be allowed they agree in several respects. In the living animal they are bathed, or rather float, in sea-water, which is presum­ed to be introduced within the body by means of numerous small tubular filaments that rise up on the back between the tubercles, penetrating the soft parts of the skin ; and it is ascertained that the water, after a time, may be expelled through the same conduits,@@® for there is no doubt of the animal’s ability both to fill and empty its body. The ani­mal, observes Dr Sharpey, slowly distends itself with the water, “ and again, but at no stated interval, gives out a portion of it : this is obvious from the fact, that the same animal may be seen distended at one time and flaccid at another. Naturalists are generally of opinion that the wa­ter enters and issues by the respiratory tubes (or dorsal filaments), and indeed no other orifices have been disco­vered ; we must however freely own that we have never been able actually to observe its passage through these tubes.” In the Ophiuridæ, in whom these tubes are not to be found, there must certainly be other entrances for the fluid ; and these are probably certain orifices situated on the ventral surface, near the base of the rays. The water, however introduced, is there for the purpose of respiration, the prin­cipal seat of which seems to be the peritoneal membrane. “ Spread over the viscera and the parietes of their containing cavity, and lining the respiratory tubes, it presents a great extent of surface, continually in contact with the surround­ing medium ; and we have found that a beautiful provision exists for maintaining currents of water along the mem­brane, and thus effecting that constant renovation of the fluid in contact with its surface which is required in the respiratory process. These currents are produced by means of cilia.”...“ Ciliary currents take place also on the external surface of the body, which probably partakes in the process of respiration ; we have moreover observed them within the tubular feet, and on the internal surface of the stomach and cæca: in this last situation they are probably subservient to digestion.’’@@3

The mode of progression of the Stellendes is probably limit­ed to a sort of creeping;@@\* but their walk is not so slow as the language of most authors would induce us to believe ; nor have we been able to ascertain, from many observations, that any one or two rays have a preference for the van, as has been insinuated, but whatever ray happens to point toward the object or place in view, is made the leader for the time being. The organs of locomotion are very dif-

@@@1 Gray in *Annals of Philosophy,* n. s. xii. p. 392.

@@@2 Reaumur in Linck. *de Sidi. Mar.,* App. p. 93. Ehrenberg has discovered that these filaments are inwardly clothed with vibratile cilia,

and he believes there is within them a circulation, not of water, but of a fluid analogous to blood ; for he says we see in it globules altogether like the blood-globules of other animals. *Ann. des Sc. Nat.* n. s. iv. p. 304.

@@@3 Sharpey in *Cyclop, of Anal, and Phys.* ii. p. 40.

@@@4 Baster (*Opusc. Subs.* i. p. 119) and Bosc say that the Asterias can also swim. “ In this act they suspend themselves obliquely in the water, and with their rays produce slight undulations, which suffice to direct their course. When they wish to descend, they cease these mo­tions, and immediatcly sink to the bottom.” *Hist. Nat, des Vers,* ii. p. 125. Blainville has seen certain species of Asterias swim swiftly. *Man. d'Actinologie,* p. 241.