ORDER I.—FISTULIDES,@@, **Lamarck.**

The radiant character of the class is faintly impressed upon this family, being marked with decision only in those parts which encircle the mouth. The form of the body is in general that of an elongated cylinder or pentagon, rather unseemly, and invested with a thick coriaceous tunic, which is sometimes scaly, like the skin of a fish, more frequently of a uniform earthy colour, or white painted with bright red or orange spots. If placed in a vessel of sea-water, we soon observe, issuing from perforations in the skin, a num­ber of papillary tubes, which the animal has the power of extending at will. These are scattered over the body, or more usually arranged in rows, limited sometimes in ex­tent, at other times running uninterruptedly from one extre­mity to the other. The creature gives perhaps little other evidence of life than what we infer from the protrusion of these organs, and from continual changes in the figure of its body. A species of Holothuria, which we watched for some time, was as changeable in this particular as its native ocean. From a long vermiform cylinder, it would become gradually shortened, and swollen in the centre ; then it would relax itself, and again become cylindrical ; next one part would be blown out, and another drawn in, with a deep stricture, as if a thread had been tied round ; or the contraction would begin near the head, which is then made very narrow, and would spread backwards, the anterior por­tion recovering its original diameter as the wave of constric­tion passed away ; and sometimes the contraction will spread in the opposite direction. This mutability in form is de­pendent on the action of the muscles which enter into the composition of the skin, and which are of two kinds : one set forms a series of transverse parallel fibres, lining its inner surface completely with an even muscular coat, while the other set is collected into five or ten strong cord-like ten­dinous bands, which stretch from the oral to the anal aper­ture, usually in pairs, but where five only, they are at equal distances.

In this state, it is not always easy to say which is the anterior and which the posterior extremity, for the tentacula and foreskin containing the oral apparatus are retrac­tile, and then wholly concealed. When displayed, the ten- tacula form a circle, in which all the beauty of the creature centres. They are all alike in some species ; in others two of them are smaller and less divided than the rest, which for the most part are sufficiently branched to be called plumose or arborescent. Whether their functions are the same, has not been questioned ; but we may observe, that the less are often alternately pushed out and in when the larger are kept steadily extended. They fringe, and are the continuation of a ligamentous neck ; and in their middle we find the mouth, a round aperture, often limited by an interior ring of bony pieces, bound together by a strong muscular ligament, and giving insertion to one half of the longitudinal muscles. The pieces of the ring are ten in number, a large one placed in regιdar alternation with a smaller, all of them of a fibro-cretaceous consistence, so that, acted upon by the muscles attached to them, they must prove bruising instruments of considerable power.@@2 Exterior to, and between them, there is a circle of five or more vesicular glands of a linear oblong shape and fleshy nature, the use of which is undetermined ; for while Bo- hadsch and Cuvier regard them in the light of salivary glands, Blainville is tempted to refer them rather to the aquiferous system. The intestine is very long. The superior portion, or that immediately under the osseous ring, from

being thicker in texture and a little wider, may be consi­dered the proper stomach, for the remainder is of a cylin­drical form and nearly equal calibre throughout. It is tied to the side by a vascular mesentery ; and after making a large bend upon itself within the belly, terminates in a cloacum or passage common to it and the respiratory ap­paratus, and which leads outwards by an aperture opposite the mouth. The only chylopoetic organ attached to the intestine, the salivary glands excepted, is what is presumed to be a liver, under the guise of some penicillate structures, which occupy the space formed by the sinous bend just mentioned. From this structure, and from the great length of the alimentary canal, we may infer with probability that the food of the Fistulides is of sparingly nutritious quality, while their organization otherwise fits them to be little better than the recipients of that chance fare which cur­rents or accident may bring almost within contact. Bo- hadsch found the intestine of a large Holothuria, of which he has written an excellent description, filled with sea-sand and the fragments of corallines and fuci;@@3 and from mat­ter like this, and the water gulped with it, the necessary nourishment is extracted during its long and lingering course.

The ovaries consist of a bundle of filaments attached to a determinate spot on the side near the middle of the vis­ceral cavity, and notwithstanding their numbers, they have only a single exterior orifice placed in the median line near the head, which it is often difficult to discover from its mi­nuteness. Each ovary contains many ova, of a roundish figure, and apparently immotive, being unclothed with the cilia which move about the eggs of polypes. At the period of their maturation, there occurs a simultaneous develop­ment of certain very extensible filaments, which originate from near the anus, and are supposed by some anatomists to be the male organs. How and under what form the ova escape, is not known. They are occasionally retained in the abdomen and developed there, which has given rise to a belief in their viviparous generation. Thus Bose af­firms, on the evidence of personal observation, that the common species of Holothuria are viviparous ;@@4 and the same assertion had been made long before by Otho Fabri- cius in regard to his H. pentactes.@@5 But the most singular notion has been broached, that these animals do, at their full time, evacuate the entire mass of pregnant ovaries, with the other viscera, through the month or anus ; do, in fact, vo­luntarily, and from a law of their nature, eviscerate them­selves.@@6 The fact on which this seemingly absurd conjec­ture is based is most singular, perhaps unexampled in any other animals. When a Holothuria is placed in a basin of sea-water, it has been seen to emit jets of water from the posterior aperture at regular intervals, the jets succeeding each other at not more than about a minute’s interval. This water is undoubtedly what has been rendered inju­rious by its stay and use in respiration, mixed probably with a considerable proportion from the intestine. But when the water in the basin has become impure, these jets be­come also less regular ; and after evidence of uneasiness, and some unusual motions, the worm will at length vomit up its tentacula, its oral apparatus, its intestine entire and with its appendages, and a large cluster, if not the whole, of the ovaries. And after this complete embowelling, the animal lives for at least six or seven hours ; for the empty skin shews, by its motions, that nearly all its irritability re­mains, and even its power of locomotion is not lost. “ Denique, quod magis mirum est, omnia *Hydroe* individua, postquam intestina sua dejecere, septem et ultra horas su-

@@@1 Synonymes: Fistulida; Fistulidans ; Holothurida ; Holothuridea ; Holothurina; Holothuries.

@@@m "Quæque *lanternæ* in Echinis quasi analoga est, nisi quod amplior sit, et *dentes deficiant,* quibus ea in Echinis armnta reperitur.” Pallas, *Misc. Zool.* p. 156.

@@@*3 De Anim. Marin,* p. 86.

@@@*4 Hist. Nat. des Vers,* ii. p. 150.

@@@*5 Faun. Groenlandica,* p. 353.

@@@6 Bohadsch *de Anim. Mar.* p. 88.