anterior or oral sucker, being perforated by the oesophagus. The posterior or ventral sucker is situated, as its name implies, on the inferior surface of the body, just behind the head-papilla. The suckers measure on an average about 1 mm. in diameter, the ven­tral being slightly the larger. The internal organs communicate with the outer world by four apertures :—(1) the mouth (o), situated at the anterior pole of the body and perforating the oral sucker ; (2) the excretory pore (*x*), placed at the opposite extremity, and giving exit to the effete products; (3) the porus genitalis (fig. 1, B, *p),* leading into a sinus into which the ducts of both sets of genital organs open,—it is to be found on the under surface of the head­papilla at or near its centre ; (4) the opening of the Laurer-Stieda canal, situated on the dorsal surface of the animal, near the junction of the two portions of the median area,—it is excessively minute and difficult of detection, and leads by a narrow canal into the duct of the yolk-gland.

Internal Structure.—All Trematoda have been commonly re­garded, like other flat-worms, as devoid of a body-cavity (coelom), and as consisting of parenchymatous tissue, in which the various organs were embedded. Recent researches of Fraipont (15) appear to show, however, that the intercellular spaces in this tissue are to be regarded as the homologue of a coelom. The body is enclosed by a complex sheath (cortex), which may be resolved into several layers, which will be discussed in order, proceeding from without inwards. (1) The cuticle, which encloses the whole body, is a thin, pellucid, structureless membrane ; at the margin of the mouth it is reflected so as to form a lining for the oesophagus, and similarly at the opening of the genital sinus it passes inwards to form a lining to the vagina. The same phenomenon is observed at the excret­ory aperture. By the application of ammonia the cuticle may be separated from the subjacent tissues and its peculiarities demon­strated ; although apparently smooth to the naked eye, it presents under the microscope numerous sharp backwardly directed pro­cesses, each of which encloses a hard stylet-shaped body. These prominences are closely set over the whole body except immediately

around the suckers, extending even into the interior of the sinus genitalis. The cuticle is furthermore perforated by innumerable fine pores, directed outwards and somewhat backwards. With regard to the homology of the cuticle of Trematodes the same un­certainty prevails as in the case of Cestodes (see Taγe-Worms) ; the general opinion is that it is not comparable with the chitin­ous cuticle of *Arthropoda,* but is either a specially developed base­ment-membrane (Herbert, 11) or a layer of modified cells (Ziegler, 12, and Schwarze, 13). (2) The outer cellular layer is the matrix

of the cuticle. (3) The muscular coat consists of three different layers:—(i.) a thin layer of circular fibres; (ii.) the longitudinal muscles, which form a series of separate bundles; (iii.) the oblique muscles, confined to the anterior half or third of the body, and crossing so as to form a rhomboidal lattice-work,—they are espe­cially strong on the anterior ventral aspect of the animal. (4) The inner cellular layer consists of elements which closely resemble those of the outer, but are somewhat larger; they have been mistaken by various observers for cuticular glands. The suckers may be con­sidered as parts of the cortical layer ; speaking generally, each has the form of the segment of a sphere, although the anterior one is shallower at the lower than at the upper margin, and is penetrated by the oesophagus. Each consists of three sets of muscles,—a thin outer equatorial layer, a second meridional, and a mass of radially disposed fibres forming the greater part of the substance. It would appear that the function of the first two of these groups is to flatten out the sucker, whilst the radial ones restore its cavity and thus produce a suctorial action. To the ventral sucker are attached a number of muscular fibres belonging to the dorso-ventral system, and in particular a strong bundle, which passes from behind down­wards and forwards.

The digestive system (fig. 1, A), the presence of which furnishes one of the most characteristic differences between Trematodes and Cestodes, extends throughout the body on a plane between the peripheral nervous and reproductive systems. It has only one aperture, as above mentioned, in the centre of the anterior sucker. The anterior portion or pharynx, although very short, measuring not much more than 1 mm. in length, is again divisible into two sections. The hinder of these is the larger, and is sometimes spher­oidal but more commonly fusiform in shape ; it has strong muscular walls, which, in conjunction with protractor and retractor muscles, bring about a kind of pumping action whereby nutritive fluids are taken into the stomach, which name may be applied to the larger posterior section of the alimentary tract, since in it the digestive processes are carried on. The canal, which leads from the posterior end of the pharynx, divides almost immediately into two branches, which diverge at first rapidly and then run almost parallel, as far as the hinder end of the body. Each of these gives off from its outer aspect some 16 or 17 lateral branches (c), which divide and sub­divide till their ramifications fill nearly the whole area of the body. The digestive tract is lined by a layer of simple cells, resembling a cylinder epithelium. These behave towards the blood corpuscles and other contents of the intestine exactly as would a number of *Amœbæ,* putting out processes or pseudopodia, which ingest them,— so that, in common with many of the lower Invertebrates, the liver- fluke lives by “intracellular digestion” (see Metschnikoff, 14).

The canals of the excretory system (*m*) may be divided into three groups. (1) The collecting network consists of very fine tubules which anastomose freely with each other: they are situated on the boundary between the cortical and middle layers, and arc therefore visible from either side of the body. (2) Conducting vessels (*v*, *d)* receive the contents of this network. Each of these is formed by the union of a larger or smaller number of the delicate canals just described, and after a longer or shorter course opens into the median excretory canal (*m*). On the way, however, it communicates with the neighbouring vessels, so that a second network is formed, which is distinguished from that of the collecting tubules by the greater size of its meshes and by the fact that it is specially visible from the dorsal surface of the animal. In the head four of these con­ducting vessels arise, which are disposed in two pairs, one situated dorsally and one ventrally. As they pass backwards they receive many branches, the dorsal unites with the ventral of its own side, and the two tubes thus formed unite to constitute the last division of the excretory system. (3) The median vessel (*m*) passes along the body for the posterior two-thirds of its length, immediately beneath the dorsal cortical layer. It is widest near the commence­ment, where it measures about 0∙5 mm. in diameter, and finally opens at the posterior extremity of the body. The wall of the excretory apparatus is constituted everywhere by an exceedingly delicate elastic membrane, which exhibits neither a cellular lining nor cilia ; furthermore, neither valves nor muscles have been de­monstrated in connexion with it. It contains a thin colourless fluid, in which very small highly refractive drops are suspended.

The details of the termination of the excretory system seem to have been first clearly made out by Fraipont (15), who worked upon species in which they are more distinct than in the form now under consideration. The spaces between the round connective­tissue cells of the body are star-shaped in form, and into these the