

it by which water enters to the body of the Appendicularian and passes from it (see arrows Fig. 12).

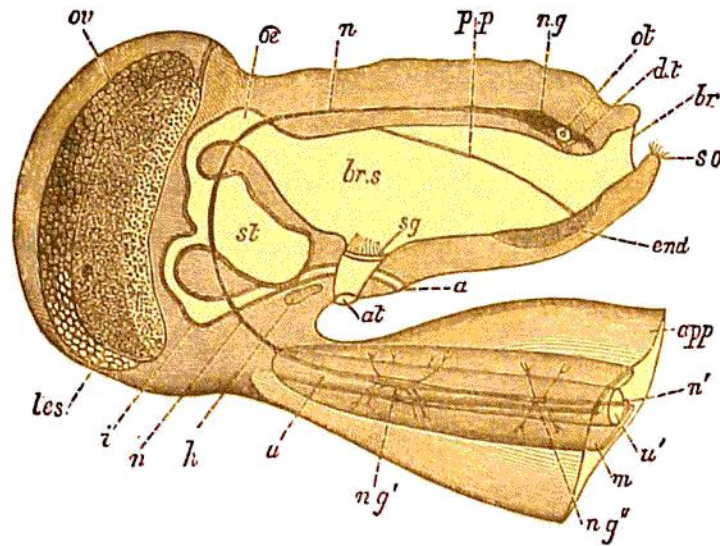


FIG. 13.—Diagram of *Appendicularia* from the right side. (From the *Encyclopædia Britannica*, 9th ed.)

*a.* anus; *app.* tail; *at.* one of the atrial apertures; *br.* branchial aperture; *br.s.* branchial sac; *d.t.* dorsal tubercle; *end.* endostyle; *h.* heart; *i.* intestine; *m.* muscle band of tail; *n.* nerve cord in body; *n'.* nerve cord in tail; *n.g.* large anterior (cerebral) ganglion; *n.g'.* caudal ganglion; *n.g''.* enlargement of nerve cord in tail; *o.* oesophagus; *ot.* otoplast; *ov.* ovary; *p.p.* peripharyngeal band; *sg.* one of the stigmata; *s.o.* oral sense-organs; *st.* stomach; *tes.* testis; *u.* urochord; *u'.* its cut end.

The branchial aperture or mouth is at the anterior end of the body, and leads into a branchial sac or pharynx which presents for notice only an endostyle, peripharyngeal bands, and two ciliated openings into tubes leading to the exterior. There are no tentacles, no dorsal lamina or languets, and no systems of vessels. The endostyle is very short, only reaching one-third or halfway along the ventral edge of the sac. The peripharyngeal bands run from the anterior ventral part of the sac obliquely backwards and dorsally, so as to reach the dorsal middle line near the posterior end of the sac (see Fig. 13, *p.p.*).

The two ciliated openings (often called stigmata) are placed far back in the branchial sac, one at each side of the mid-ventral line. These openings correspond not to the stigmata of ordinary *Ascidia*, such as the species of *Ascidia*, but to the primary stigmata which first appear in the larva, and, according to Van Beneden and Julin, to the internal openings of the gill-clefts in *Amphioxus* and the Vertebrata. The tubes from the ciliated openings run ventrally, and open independently to the exterior in front of the tail and behind the anus (see Fig. 13, *at*). These tubes correspond to the right and left atrial involutions of the epiblast, which in ordinary *Ascidia* fuse dorsally to form the peribranchial cavity. The Larvacea therefore in this respect also possess a character which is only a temporary stage in the development in other groups of the Tunicata.

At its posterior end the branchial sac narrows to become continuous with the oesophagus, which curves posteriorly and ventrally to enter the large and sometimes bilobed stomach. The intestine (except in the case of Fol's remarkable *Kowalevskia*