

point the animals changed their habits and became fixed. And just as the tailed larval Ascidian at the present day after a short free-swimming existence becomes attached, loses its locomotory organ, and undergoes other changes, so the ancestral Ascidian when it settled down on some object to lead a stationary existence, probably went through a similar but more gradual process of degeneration. The tail with its contained notochord and muscles being no longer necessary, would become rudimentary and disappear. The well-developed sense organs, which were most important to a locomotory organism, became almost useless through the change of life, and they also were suppressed, and, as a result, the nervous system which had been in most intimate connection with the sense organs underwent considerable degeneration. On the other hand, the alimentary canal, and especially its respiratory portion, or branchial sac, became greatly enlarged and somewhat more complicated. A well-marked permanent test was also produced, and the atrial aperture—formed by the union of the two primitive laterally-placed peribranchial openings—came to lie on the dorsal surface of the body not far from the anterior end. In this way an ancestral form (E. in table, p. 120) was produced somewhat resembling many of the Simple Ascidians, and probably more like a solitary *Clavelina* than any other existing form¹ (Fig. 18).

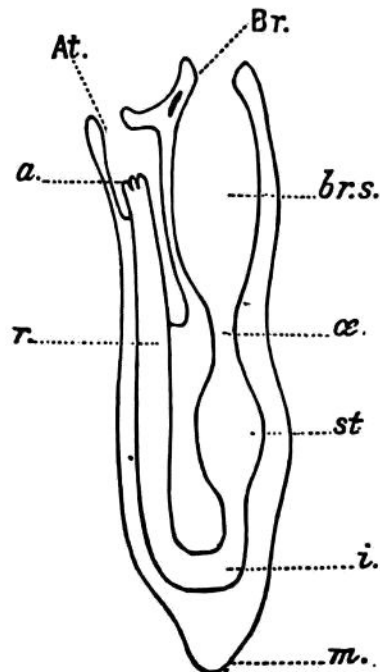


FIG. 18.—Diagram of one of the hypothetical Protoascidiacea, showing what is probably the primitive condition of the Ascidian Alimentary Canal.

a. anus; *At.* atrial aperture; *Br.* branchial aperture; *br.s.* branchial sac; *i.* intestine; *m.* posterior end of the body by which it is attached and from which outgrowths forming buds are produced; *æ.* oesophagus; *r.* rectum; *st.* stomach.

Probably this form, or one of its immediate ancestors, acquired the power of reproducing by gemmation, so as to form small, and possibly at first only temporary,

¹ In 1882 (this Report, Part I. p. 285) I placed *Clavelina* close to the ancestral form of the Ascidiæ Simplicis. Recently Van Beneden and Julin have come to the same conclusion as the result of their embryological investigations, and they regard *Clavelina* as the most archaic of Ascidiæ (*Arch. de Biol.*, tom. vi. p. 327).