

have become retractor muscles for the purpose of pulling the Ascidiozooids downwards into the test (as in the case of *Leptoclinum thomsoni*).

In some of the Compound Ascidians certain parts of the test may become very greatly enlarged so as to produce large massive colonies (such as *Atopogaster aurantiaca*, Pl. XXIII. fig. 7; and fig. 5, p. 27), or long peduncles upon which the rest of the colony and the Ascidiozooids are borne (e.g., *Colella pedunculata*, Pl. V. fig. 1, and *Distaplia vallii*, Pl. XVIII. fig. 1, &c.; see also fig. 6, p. 27). Usually in such cases the enlarged part of the test becomes modified. Peduncles, for example, are almost invariably harder and tougher than the rest of the test. The superficial layer of test also frequently becomes slightly modified to form a firmer layer which may be stripped off as a membrane from the surface of the colony. In some cases the outer layer of the test may be prolonged into delicate processes for purposes of attachment (see Pl. XXXV. fig. 3), and such processes may become covered with adhering sand-grains so as to form a protecting sandy investment.

### *The Ascidiozoid.*

The Ascidiozooids or members of the colony are usually placed vertically (at right angles to the upper surface) in the test. In the genus *Botryllus*, however, they are placed nearly horizontally, and in *Diplosoma* and some other forms they are inclined at all angles. The anterior end, indicated by the branchial aperture,<sup>1</sup> is always nearest to the outer surface of the colony, and the antero-posterior axis generally runs along the length of the body (see fig. 3, p. 16).

The Ascidiozooids vary greatly in shape in different groups of the Compound Ascidians. Savigny in 1816 pointed out and figured<sup>2</sup> most of these shapes, and in 1842 Milne-Edwards<sup>3</sup> arranged them in three groups, one characteristic of each of his great sections, Polycliniens, Didemniens, and Botrylliens. These divisions of the Compound Ascidians are no longer recognised, but still it is useful to employ Milne-Edwards' arrangement so far as it relates to the shape of the Ascidiozooids. In his group Polycliniens the body consists of three regions placed one behind the other—first, the branchial or "thorax" (see fig. 3); second, the intestinal or abdomen; and third, the reproductive or post-abdomen. The "thorax," to make use of Milne-Edwards' terms, contains the branchial siphon and branchial sac with all its accessory organs (endostyle, &c.), the nerve ganglion, and the terminal part of the rectum. The abdomen contains the alimentary canal from the œsophagus to the rectum, with any accessory digestive glands or cæca which may be present. The post-abdomen is composed of the reproductive organs—with the exception of the greater part of their ducts, which pass upwards into the abdomen and the thorax—and of the heart. From the posterior end of the post-abdomen occasionally one or

<sup>1</sup> See Part I. of this Report, p. 27.

<sup>2</sup> Mémoires, &c.

<sup>3</sup> Observations, &c.