

in the Botryllidæ (fig. 4, C., and Pl. III. fig. 17), where the branchial sac is relatively much larger than in other forms, and the œsophagus runs ventrally to open into the large stomach, which is inclined ventrally and a little anteriorly. The intestine after leaving the stomach runs anteriorly and then dorsally and then turns anteriorly again to become the short rectum. The second series of modifications consists in the twisting of the intestinal loop so that the stomach comes to lie upon the dorsal in place of the ventral edge of the intestine (see fig. 4, B.). This condition is seen in various degrees of perfection in some of the Distomidæ and Didemnidæ.

The œsophagus is usually narrow, but may be of considerable length (Pl. IV. fig. 7). The stomach is thick-walled and large. Sometimes its surface is smooth, but in many cases it has conspicuous longitudinal folds which project as ridges into the interior (Pl. XXX. figs. 6, 7); occasionally these folds are represented by short detached cæca (Pl. XXV. fig. 6). The intestine may be a simple tube, or may be divided into several regions distinguished from one another by their calibre and the thickness of their walls (Pl. XLI. fig. 2). The rectum is always thin-walled, and is sometimes very wide. It may vary in calibre at different points, and sometimes it is folded. The anus may have a large margin, either plain or lobed. In some cases it opens near the posterior and in others near the anterior end of the peribranchial chamber.

Many of the Ascidiæ Compositæ have a system of tubules branching over the wall of the intestine, which clearly corresponds to the digestive gland of a similar nature found in many Simple Ascidians.¹ The duct from this system runs across from the intestine and opens into the stomach. A short cæcum may be present near the posterior end of the stomach at the point where the duct opens (see Pl. III. fig. 21). The exact function of this system is still unknown.

Heart, Blood, &c.

The heart varies in position in the different families. In the Botryllidæ it is placed close to the stomach alongside the branchial sac. In the Distomidæ, &c., it is placed alongside the intestinal loop on the right side, and runs antero-posteriorly. In the Polyclinidæ the heart is placed at the posterior end of the post-abdomen behind the reproductive organs (see fig. 3, p. 16, *h.*), and is bent so as to form a loop concave anteriorly. The structure of the heart and of the blood is the same as in the case of the Simple Ascidians. A large number of the blood-corpuscles may in some cases be pigmented. These are usually opaque white or red or purple.

The so-called vascular appendages, which form prolongations from the bodies of the

¹ See Part I. of this Report, Introduction, p. 49. Roule (*Recherches sur les Ascidies Simples des Côtes de Provence*) states that this is a system of blood sinuses! I am convinced that in some of the species in which I have investigated it the main duct opens into the alimentary canal.