

Ascidiozooids in some species (see fig. 3, p. 16, *v.ap.*; and Pl. V. fig. 13), are really diverticula of the mantle, and are composed of a layer of ectoderm and, inside that, of connective tissue containing two blood sinuses running side by side, and therefore correspond to the blood-vessels of the test in Simple and some Compound Ascidiæ. The vascular appendages may in some cases (*e.g.*, *Colella concreta*, and many of the Didemnidæ) contain muscle fibres continuous with the musculature of the mantle. Blood sinuses or lacunæ are present in all parts of the body, and form the greater part of the circulatory system.

A mass of a glandular nature, and having usually a yellowish-green colour, which coats the first part of the intestine, is in all probability of a renal nature, and corresponds to the renal vesicles found in many Simple Ascidiæ (*e.g.*, *Ascidia mammillata*, *Ascidia meridionalis*, &c.).

The Reproductive Organs.

The Ascidiozooids are probably in all cases hermaphrodite, but in many forms the ova and the spermatozoa are produced at different times, and are therefore not found mature together. The usual arrangement¹ is for the ova to form first, and then after they have been laid or have passed into the incubatory pouch the spermatoc vesicles commence to develop. This protogynous arrangement of course prevents self-fertilisation.

The genital glands may be placed on the sides of the branchial sac, as in the Botryllidæ, where there is usually an ovary and a group of spermatoc vesicles upon each side of the body (see Pl. II. figs. 10, 11). A more usual arrangement is for the genital glands to be placed in the intestinal loop, either alongside the intestine as in the Distomidæ, Didemnidæ, &c. (Pl. V. fig. 13), or projecting beyond the intestine posteriorly to form a shorter or longer post-abdomen (fig. 3, p. 16) as in the Polyclinidæ (Pl. XXI. fig. 5).

The ovary is simply a group of more or less completely developed ova and germinal cells (Pl. VII. fig. 7), and there is probably no true oviduct present.² The spermatozoa may be formed in a single large testis (as in *Didemnum savignii*, Pl. XXXIV. fig. 2) or in a large number of small testes or spermatoc vesicles (fig. 3, p. 16) which vary in shape and arrangement in the different groups (see descriptions of the genera and species in the Systematic Part of the Report). A distinct vas deferens is always present, and it is usually a very conspicuous tube which runs alongside the rectum in its entire length (Pl. XXV. fig. 6). In some cases (*Leptoclinum speciosum*) the vas deferens commences by coiling spirally around the large testis. In other forms the vas deferens is convoluted in its entire course. It opens into the peribranchial cavity close to the anus.

¹ Della Valle states that most are protandrous. That is not my experience, as will be seen in the description of the species further on in the Report, see also Summary at end.

² The evidence in regard to the oviduct is very conflicting. Some observers describe it as being present in many forms, others say that it is never found in any Compound Ascidian. I have been unable to find it in any I have examined.