

already said that in *Limacina helicina* and *Limacina antarctica* the operculum is caducous in fully-grown specimens, a fact which explains how it is that these species have often been regarded as lacking this organ.

The Mantle is open dorsally, and united to the body behind the foot (on the ventral surface of a spread out *Limacina*). Its margin is simple; it presents, on the right side, a little ventrally, a rather narrow lobe, terminating in a point, and called the "balancer," the considerable development of which perhaps enables it to play the part of a counterpoise during swimming, the coiled Pteropods not being symmetrical like the straight forms. Possibly this lobe is also sensory, as its whole surface is ciliated.

The dorsal portion of the mantle which covers the pallial cavity presents a rather thick glandular area, corresponding to the "shield" of the Cavoliniidæ. The structure of this organ is already known and is practically the same in *Limacina* as in the Cavoliniidæ; but in the present case it is asymmetrical (Pl. I. fig. 5, *a*) and uniform in structure throughout its extent.

The Digestive Tract.—The mouth opens in the natatory plane formed by the two fins enveloping the cephalic region; it is situated towards the dorsal border of this plane and bounded by two lips, united dorsally and separating towards the other side.

The mouth is succeeded by a buccal mass, the cavity of which encloses two lateral jaws, such as have already been described by Sars.¹ The number of folds presented by these jaws varies in different species. The disposition of the radula agrees with that of all the odontophorous Mollusca, but the ribbon is very short, the number of transverse rows being but small. The number of longitudinal series is three, as in all the Thecosomata.

On either side of the radula opens a salivary gland. These organs have escaped the attention of the different naturalists who have studied *Limacina* (van Beneden,² Souleyet³). According to Gegenbaur⁴ they are wanting in all Thecosomata, nevertheless all these are provided with them. In *Limacina* these glands are small, short, oval, and without a differentiated duct.

The œsophagus, rather long and longitudinally plicated within, leads into an enlargement of the digestive tube called the stomach, which here, as in all Thecosomata, is in reality a masticatory gizzard. Its walls have about the centre a large muscular transverse band, which actuates a number of horny plates situated within it.

These masticatory plates are four in number and are placed symmetrically (two ventral and two dorsal); a fifth has not been observed by the anatomists, although the embryologists have recorded its existence (Krohn,⁵ Fol⁶). The four symmetrical plates

¹ Mollusca regionis arcticæ Norvegiæ, pl. xvi. fig. 17.

² Mémoire sur la *Limacina arctica*, loc. cit.

³ Voyage de la Bonite, Zoologie, t. ii. p. 210.

⁴ Untersuchungen über Pteropoden und Heteropoden, p. 10.

⁵ Beiträge zur Entwicklungsgeschichte der Pteropoden und Heteropoden, p. 42.

⁶ Sur le développement des Pteropodes, Arch. de Zool. Expér., sér. 1, t. iv. p. 162.