and a double muscle plate, with outer radial and inner circular fibres. The plexus of pallial canals separates the pneumatocodon from the pneumatosaccus.

Pneumatosaccus.—That lamella of the exoderm which surrounds immediately the chitinous pneumatocyst, is the pneumatosaccus. It represents the invaginated part of the exumbrella, and has taken its origin from a simple bottle-shaped gland in its apex. This gas-secreting gland—or pneumadenia—originally small and occupying only the apical centre of the exumbrella, has afterwards become so extraordinarily expanded that it usually forms the most voluminous part of the entire umbrella. The exodermal epithelium of the pneumatosaccus is a simple stratum of glandular cells, which secrete the cuticular chitinous plate of the adjacent pneumatocyst. The basal part, or the inferior face of the former, is probably also the matrix of the centradenia or the so-called "liver." The exodermal cells, and cnidoblasts, which constitute the solid parenchyma of the latter, are probably derived from the basal part of the pneumatosaccus.

Pneumatocystis.—The chitinous polythalamous float filled with air, which we call pneumatocyst (formerly called "inner shell"), exhibits in all Disconectæ a rather complicated structure. Its general form is circular, and originally octoradial in the Discalidæ and Porpitidæ, elliptical or nearly quadrangular (parallelogram) in the Velellidæ; but also in the young larvæ of the latter its first rudiment is octoradial. It always commences with the formation of a simple central chamber, which is situated in the centre of the exumbrella, just above the gastral base of the large central siphon. It opens outside by a central stigma in its upper face. Around this primary central chamber (the chitinous lining of a central pneumadenia of the exumbrella) a peripheral corona of eight radial chambers is next formed, each provided with an outer stigma on its upper side, and with an articulate trachea on its lower side. These eight radial chambers are equal and regularly radial in the Discalidæ and Porpitidæ, while they are more or less amphithect and somewhat bilaterally disposed in the Velellidæ. Sometimes in the latter family they are more or less obliterated.

In the simplest case (*Discalia*, Pl. XLIX.) the formation of the pneumatocyst is complete with the eight radial chambers; in all the other Disconectæ a different number of peripheral concentric chambers is formed around their octoradial corona. All these tertiary chambers are simple rings without radial partitions; they open outside (in the exumbrella) by a different number of stigmata, inside (in the centradenia) by a number of open tracheæ. The rings are circular in the Discalidæ and Porpitidæ, elliptical or quadrangular (parallelogram) in the Velellidæ. In these latter there usually arises afterwards a solid vertical crest, placed diagonally on the upper side of the horizontal disc.

The general opinion regarding the physiological function of the polythalamous pneumatocyst of the Disconectæ may be summed up in the following propositions:—(1) The Disconectæ are exclusively pelagic animals, always floating on the top of the ocean, and never sinking below its surface; (2) the air contained in the pneumatocyst is atmo-