Pneumatosaccus.—The invaginated portion of the apex of the trunk, which forms the air-sac, hangs in all Cystonectæ freely in the pericystic cavity, or the wide interval between the inner and outer wall of the pneumatophore. These two walls are not connected by radial septa, as in most Physonectæ, and are united only on the margin of the apical stigma. The uppermost portion of the air-sac, which surrounds this stigma, is usually intensely coloured (mostly red or brown), or covered by a hemispherical pigment-cap (mitra ocellaris). A ring-like constriction (the pylorus infundibuli, "Trichterpforte") separates incompletely the larger apical and the smaller basal portion of the air-sac. The former is the pericystic sac, which secretes the chitinous pneumatocyst (or the cuticular air-flask); the latter is the hypocystic infundibulum or the pneumatochone (air-funnel, "Lufttrichter"), which together with the tapetum endocystale forms the air-secreting gland, or the pneumadenia. The basal or inferior opening of the pneumatocyst (opposite to the superior or apical stigma) is often surrounded by an annular thickening of the cuticle, the annulus pylori (Pl. XXII. figs. 7, 8).

Pneumadenia.—The exodermal epithelium of the pneumatosac (or strictly speaking of its basal portion), which secretes the gas filling the float, in all Cystonectæ is a gas-gland or pneumadenia of considerable size. It exhibits the simplest shape in the monogastric Cystalidæ (Pl. XXII. fig. 5); it is here a spheroidal vesicle of thickened glandular exoderm, which communicates by a proximal opening (the pylorus) with the cavity of the pneumatocyst; this simple "air-funnel" is very similar to that of the Apolemidæ among the Physonectæ (**50**, Taf. xix. fig. 93). The pneumadenia of the Physalidæ, the largest of all, is originally of the same simple shape as in the Cystalidæ, but expands afterwards unilaterally, on the ventral side of the pneumatophore, and forms there a large circular or oblongish air-secreting plate ("Luftplatte," Chun, **83**, p. 569); in *Caravella maxima* it reaches the extraordinary size of 100 to 150 mm. This peculiar growth along the ventral side of the float is effected by the extraordinary expansion, which the air-sac reaches in the Physalidæ, growing downwards into the cavity of the trunk, along its dorsal side; and by the consequent asymmetrical development.

The three other families (Rhizophysidæ, Pls. XXIII., XXIV.; Salacidæ, Pl. XXV.; and Epibulidæ, Pl. XXII. figs. 6–8) agree in a peculiar structure of the pneumatophore and differ essentially from the two preceding (Cystalidæ and Physalidæ). The beginning of the structure is the same as in the latter; but afterwards the pneumadenia exhibits a further very remarkable development, firstly in the endocystic tapetum, and secondly in the hypocystic villi. The glandular exodermal epithelium of the primary spheroidal pneumadenia (or the air-funnel) grows in apical direction, passes through the pylorus into the cavity of the pneumatocyst, and expands into its basal portion, lining its inside (in younger floats only one-third, in older more than two-thirds). The extraordinary development of the gas-gland in these Cystonectæ corresponds to its important physio-