

brown, sometimes more orange, at other times more violet or even black. The inferior margin of the hemispherical or campanulate pigment-cap is usually separated by a sharp circular boundary-line from the colourless or yellowish middle portion of the air-sac (Pl. XXIV. fig. 5, *pp*).

*Sacculus pericystalis*.—The greater middle part of the pneumatosac is a simple layer of exodermal epithelium, and produces the pneumatocyst as a true cuticle; it ends, together with this latter, on the *pylorus infundibuli*, or the opening by which the air-flask communicates with the funnel-cavity; the terminal edge of the cuticle which surrounds this circular pylorus is usually a thickened chitinous ring (*annulus infundibuli*).

*Pneumatochone* (infundibulum pneumatophori, "Lufttrichter," Chun, 48, p. 512).—The distal or basal part of the original pneumatosac situated below the pylorus is the important pneumatochone or the "hypocystic funnel." The thickened glandular epithelium which lines its cavity is very different from that of the pericystic sac. It produces no cuticle, but is composed of several layers of polyhedral exoderm-cells, which have a rather dark granular protoplasm and a peculiar yellowish or more greenish appearance (Pl. XXIV. fig. 7). From this ovate, hemispherical, or nearly spheroidal "air-funnel" arises inside, the endocystic tapetum, and outside, the clustered groups of hypocystic villi (Pl. XXII. fig. 7).

*Tapetum endocystale* ("secondary exoderm," Chun, 48, pp. 514, 530).—The exodermal tapetum which lines inside the basal half of the pneumatocyst (in young Rhizophysidæ the basal third, in adult more than two-thirds) is the direct continuation of the hypocystic funnel, and its function is, like that of the latter, the secretion of gas; both together represent the "pneumadenia," or the gas-secreting gland. The stratified exoderm of the air-funnel grows upwards, passes through the chitinous ring of the funnel-pylorus into the cavity of the pneumatocyst and lines the greater part of its inside, with the exception of the apical part which is covered by the mitra ocellaris. The endocystic tapetum is composed of several strata of the same peculiar granular and yellowish or greenish exoderm-cells, as those which line the funnel-cavity and are polyhedral by mutual compression (Pl. XXII. fig. 7, *pd*; Pl. XXIV. fig. 7, *pd*).

*Villi hypocystales* (Pl. XXIV. figs. 4, 5, *pv*, 6).—The basal portion of the pericystic cavity, and often its greater part (with the exception of the apical portion), is filled with bunches of clustered villi, which arise from the outside of the hypocystic funnel. They were first described by Gegenbaur (in 1854) as "cæcal diverticula" of the pneumatocyst ("blinddarmähnliche Fortsätze," 7, p. 326, Taf. xviii. fig. 6, *e*). Huxley (in 1859) described them as "elongated and more or less branched processes, which project from the distal surface of the pneumatocyst freely into the cavity of the pneumatophore; each process consists of a cellular axis, invested by the ciliated entoderm. The cells of the axis are clear and very large, and have an opaque oval