the Disconectæ, on the other hand, have a complicated apparatus, composed of concentric annular chambers, which occupy the greater portion of the umbrella. In all cases the pneumatophore arises very early in the primary medusoid larva, and that by a gland-like invagination of the exoderm of the exumbrella. In the bilateral Siphonula of the Siphonanths this invagination has an excentric position (being often shifted down near to the umbrellar margin), but in the octoradial Disconula of the Disconanths it is central, in the very apical pole. The marked and apparently considerable differences of the developing pneumatophore, in relations both of time and space, between different (often nearly related) Physonectæ, I simply explain as secondary cenogenetic modifications. That portion of the medusoid larval body on which the first trace of it appears always belongs originally to the exumbrella.

In the Siphonanthæ the invaginated portion of the exumbrella, comparable to a simple, pouch-like, glandular sac, is known as the air-sac (*pneumatosaccus*); it secretes in its superior or apical half a chitinous membrane, the air-flask (*pneumatocystis*), while its inferior or distal portion (the "air-funnel") discharges the function of a gas-gland (*pneumadenia*). The glandular (usually yellowish or greenish) epithelium of this last portion secretes the air, which passes by the basal opening of the air-flask ("funnel aperture," "Trichterpforte," or *pneumatopyle*) into the latter. The Cystonectæ or Pneumatophoridæ possess at the apical pole of the pneumatocyst an external air-hole or stigma (the primary opening of invagination), by which the air may be discharged at will. In many Siphonanths the air-secreting glandular epithelium of the air-funnel (or infundibulum) grows through the aperture into the basal half of the pneumatocyst and clothes the latter as endocystal tapetum, or "secondary ectoderm" (Chun).

In most Siphonanthæ the air-sac becomes subsequently united with the peripheral (uninvaginated) portion of the primary umbrella—the *pneumatocodon*—by a number of vertical radial septa, usually eight, more rarely four or sixteen, and occasionally a variable number. The radial pockets between these septa open inferiorly into the central canal of the stem and represent the radial canals of a simple medusoid umbrella. On this is based the opinion that the entire air-chamber is to be regarded as an "invaginated swimming-bell" (Metschnikoff 1874). In contrast to this the air-chamber is at present regarded by most zoologists as an independent *medusoid person* (or "medusiform zooid"), and is supposed to originate as a "bud" from the primary larva (Leuckart 1875, Claus 1878, Chun 1887). The antithesis between these two opinions culminates in the interpretation of the air-sac, which according to the first theory is the *exumbrella* of a medusoid disc, according to the second the *subumbrella*. The latter opinion is according to my conviction entirely erroneous, the former is in a certain sense admissible. The comparative ontogeny of the Siphonophoræ appears to me to show conclusively that the air-sac is an apical gas-gland of the exoderm, which in the Disconula of the Disconanthæ sinks centrally into the gelatinous disc from the apex of the same inwards, and in the Siphonula