all the Cephalopods, also merit the name of auricles; they empty on each side into the ventricle (Fig. P; Pl. VI. fig. 8).

Between the portion of the mantle enclosed in the last chamber of the shell and the part of the visceral sac contained therein, there is, in *Spirula reticulata*, a sharply limited sinus (Fig. Q, iv) with rather thick walls, communicating with the cavity of the membranous siphuncle; no other communication has been *seen* with this sinus, but it is certainly to be presumed that it presents in some place a contractile orifice analogous to "Keber's valvule" in the Lamellibranchs.

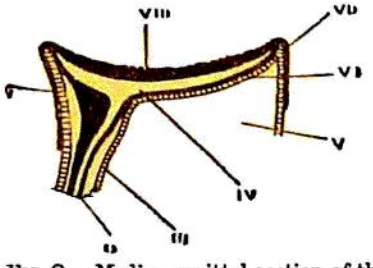

FIG. Q.—Median sagittal section of the terminal part of the siphuncle, left view; magnified. i, reflected mantle on the shell (ventral side)=P^8, Pl. III.; ii, membranous siphuncle; iii, shell siphuncle; iv, pallio-siphonal sinus; v, penultimate chamber of the shell; vi, last septum; vii, mantle reflected on the shell (dorsal side)=P^8, Pl. III.; viii, part of the visceral mass (liver) included in the last chamber.

The physiological action of this sinus appears very important and apparently regulates the hydrostatic conditions of *Spirula*, and consequently the production of new chambers of the shell. In fact the cavity of the membranous siphuncle is a blood sinus continuous with the preceding (in the terminal enlargement of the siphuncle this cavity occupies the dorsal side, see Fig. Q). This membranous siphuncle may then be distended by the blood coming from the pallial sinus, and the constriction of its proximal portion by the hermetic muff of the shell siphuncle (Fig. B, i) permits it by its enlargement to compress the gas contained in the shell siphuncle, without this gas being able to flow back into the last chamber under the mass of the liver. We thus explain how it can produce a change of equilibrium, in contracting or distending this gas, according as the *Spirula* wishes to descend or ascend, the pressure remaining always constant in the air chambers, quite separated from the siphuncle.

On the other hand, when by continued growth the weight of the animal threatens to become too great for the hydrostatic apparatus constituted by the air chambers of the shell, the distension of the pallio-siphonal sinus pushes forward insensibly the visceral mass resting upon the last septum, and thus permits the continuity of the secretion of the shell by the margins of the true mantle (Pl. III., margins of P^7); the last chamber is thus completely formed. Then the contraction of the sinus clearing this last, a new septum is secreted in turn by the whole surface of the true mantle (Pl. III., P^7) at the same time that a new segment of the shell siphuncle is produced by the membranous siphuncle.[1]

[1] It is evident that a mechanical interpretation of the means of progression in the shell, and the ascent and descent in the water, is alone admissible, and that no naturalist will accept that proposed by Barrande in 1877: "They must there and then have been inspired and imposed by the Creator at the moment when the Cephalopods had been introduced among the inhabitants of the Silurian Seas" (Barrande, Céphalopodes, Etudes générales, Prague, 1877, p. 210).