a remnant of the cavity of an excurrent sinus which has been left behind amidst a surrounding growth of mesoderm. The accompanying diagrams (Fig. V.) will serve to make this clear.

The aphodal character appears at a very early stage in the embryological history of those spouges in which it occurs; it is already perfectly displayed, for instance, in a young sponge of the species, *Stelletta phrissens*, not measuring more than 0·65 mm. in diameter (Pl. XVI. fig. 18); at the same time some of the chambers in this example retain a eurypylous character.

The change in the character of the mesoderm already alluded to as accompanying the transition from the eurypylous to the aphodal chamber-system, consists in its conversion from collenchyma to sarcenchyma (see p. xxxviii). In young sponges up to at least 3 mm. in diameter the whole of the choanosomal mesoderm consists of sarcenchyma; but in the adult sponge the mesoderm forming the walls of the larger excurrent canals is collenchymatous.

In some of the lower forms of sponges with aphodal chambers (*Chrotella simplex*, p. 17), where the aphodus is very short, the collenchyma merely becomes abundantly granular in the neighbourhood of the flagellated chambers, but in the higher forms with a fully expressed aphodal chamber-system, and these are the rule in the Tetractinellida, it is entirely replaced by a true sarcenchyma.

One other important modification remains to be mentioned; this is the relatively smaller size of the flagellated chambers that usually marks the aphodal as compared with the eurypylous chamber-system. A similar reduction accompanies the passage from the simpler to the more complicated types of eurypylous chamber-system. From these generalisations we reach one still more general, namely, that the flagellated chambers diminish in size correspondingly with increased development of the mesoderm.

In the absence of any exact knowledge of the physiology of sponges it would appear hopeless to attempt to explain this result, but the following considerations present themselves:—In the eurypylous type of chamber-system, the choanocytes work at a mechanical disadvantage, no inconsiderable part of their energy being expended in producing eddies, which in no way promote but rather interfere with the production of currents definitely directed; in the aphodal type this useless expenditure of energy is to a great extent prevented by the elongation of each chamber into a tube, which isolates the separate currents and prevents them from interfering with each other. Increased efficiency being thus acquired, the same amount of current can be produced by fewer choanocytes; and thus smaller chambers, and relatively to the bulk of the sponge fewer choanocytes, characterise the aphodal as compared with the eurypylous chamber-system. Until the volume, velocity, and duration of the currents in different types of sponges has been investigated, this explanation must be regarded as hypothetical; and still more so the following attempt to connect the change in the character of the chambers with the