by transverse diaphragms or *vela,* which contain myocytes concentrically and sometimes radiately arranged. The excessive development of myocytes in such a velum gives rise to muscular sphincters such as those which close the chones of many corticate sponges, such as *Pachymatisma.* In this sponge, which occurs on the British shores, the function of the oscular sphincters can be readily demon­strated, since irritation of the margin of the oscule is invariably followed after a short interval by a slow closure of the sphincter.

Supposed sense-cells or *æsthacytes* (fig. 22) were first observed by Stewart and have since been described by Von Lendenfeld (*12*). According to the latter, they are spindle-shaped cells, 0·01 mm. long by 0·002 thick ; the distal end projects beyond the ectodermal epithelium in a fine hair or palpocil ; the body is granular and contains a large oval nucleus ; and the inner end is produced into fine threads, which extend into the collenchyme and are supposed—though this is not proved—to become con­tinuous with large multiradiate collencytes, which Von Lendenfeld regards as multipolar ganglion cells (fig. 22).

More recently he has described an arrangement of these cells curiously suggestive of a sense-organ. Numerous æsthacytes are collected over a small area, and at their inner ends pass into a granular mass of cells with well- marked nuclei, but with boundaries not so evident ; these he regards as ganglion cells. From the sides of the gan­glion other slender fusiform cells, which Von Lendenfeld regards as nerves, pass into the mesoderm, running tan­gentially beneath the skin. The inner end of the ganglion is in communication with a membrane formed of fusiform cells which Von Lendenfeld regards as muscular. If his observations and inferences are confirmed, it is obvious that we have here a complete apparatus for the conversion of external impressions into muscular movements.

In most sponges a direct connexion can be traced by means of their branching processes between the collen­cytes of the mesoderm and the cells of the ectodermal and endodermal epithelium and the choanocytes of the flagellated chambers. As the collencytes are also united amongst themselves, they place the various histological constituents of the sponge in true protoplasmic continuity. Hence we may with considerable probability regard the collencytes as furnishing a means for the transmission of impulses : in other words, we may attribute to them a rudimentary nervous function. In this case the modifica­tion of some of the collencytes in communication with the ectoderm might readily follow and special æsthacytes arise. Fusiform collencytes perpendicular to the ectoderm, and with one end touching it, are common in a variety of sponges ; but it is difficult to trace the inner end into connexion with the stellate collencytes, so that precisely in

those cases in which it would be most interesting to find such a connexion absolute proof of it is wanting.

The colour of sponges usually depends on the presence of cells containing granules of pigment ; though dispersed generally through the mesoderm, these cells are most richly developed in the ectosome. Pigment granules also occur in the choanocytes of some sponges,—*Oscarella lobularis* and *Aplysina aerophoba,* for instance. In the latter the pigment undergoes a remarkable change of colour when the sponge is exposed to the air, and finally fades away. In many cases sponges borrow their colours from parasitic algæ (*O scillatoria* and *Hostoc)* with which they are infested. The colours of sponge-pigments are very various. They have been examined by Krukenberg and Merejknovsky. Zoonerythin, a red pigment of the lipochrome series, is one of the most widely diffused ; it is regarded as having a respiratory function. Reserve cells or *thesocytes* (fig. 21 *f*) have been described in several sponges as well as amylin and oil-bearing cells.

Each spicule of a sponge originates in a single cell (fig. 21 *h-n),* within which it probably remains enclosed until it has completed its full growth ; the cell then prob­ably atrophies. During its growth the spicule slowly passes from the interior to the exterior of the sponge, and is finally (in at least some sponges, *Geodia, Stelletta)* cast out as an effete product. The sponge is thus constantly producing and disengaging spicules; and in this way we may account for the extraordinary profusion of these struc­tures in some modern marine deposits and in the ancient stratified rocks. Within the latter these deciduous spicules have furnished silica for the formation of flints, which have been produced by a silicious replacement of carbonate of lime (*26*)*.*

The horny fibres of the *Ceratosa* are produced as a secretion of cells known as *sponginblasts,* which surround as a continuous mantle the sides of each growing fibre, and cover in a thick cap each growing point (fig. 23). The

lateral sponginblasts are elongated radially to the fibre ; the terminal cells are polygonal and depressed. The latter give rise to the soft granular core and the former to the spongin-walls of the fibre. Cells similar to the lateral sponginblasts, and regarded as homologous with them, occur in a single layer just below the outer epithelium of some horny sponges *(Aplysilla* and *Dendrilla*) and under certain circumstances secrete a large quantity of slimy mucus (*11*).