

The cellular membrane below this supposed lens is 0.008 mm. thick, and composed of one layer of polygonal cells. This membrane extends, like the two preceding ones, beyond the orifice of the cup on every side for some distance down its sides; nuclei can be discerned in it after staining.

The light-reflecting membrane which divides the internal portion from the pigment coat is continued over the outer surface in the shape of a very fine, circular, watch-glass-shaped membrane, apparently dividing the thick cellular membrane from the interior of the phosphorescent organ.

It appears from this that—at least in *Astronesthes*—there are four membranes outside the phosphorescent organs, as follows:—

Outermost, continuation of cuticle.

Second, convex structureless membrane.

Third, cellular membrane divided by a large space from the former, which is supposed to be occupied by a corpus vitreum in the living state.

Fourth, continuation of the special membrane of the organ.

The supposed lens would be concavo-convex, the convex surface having a shorter focus than the concave one. The action of it on light would therefore be equal to the action of a plano-convex or biconvex lens with a focal length equal to the difference of the focal lengths of the two surfaces of this structure.

The internal part, invested on all sides by the thin special membrane, is of a very complicated structure. I have referred above to the results of the studies of Ussow and Leydig on this subject, but as my own results differ from these very much in some respects, it will be necessary to describe these structures, as seen by me, in detail.

The internal spherical portion is occupied by radial, pyramidal, closely-packed and flattened gland-tubes, and in the centre of this part there is a space, as in the similar simple organs, into which the gland-tubes open.

The gland-tubes correspond to Ussow's "Kristallstäbchen," and the empty space in the interior to the lower extension of his "lens"¹ of *Chauliodus sloanei*.

Leydig's representation of the organ of *Ichthyococcus ovatus*² corresponds well with my own results, and in the four species possessing such organs examined by me this structure is identical.

The gland-tubes are formed of very fine membranes into which blood-vessels extend, and are 0.02 mm. wide at the base. The central space—the lumen of the gland—is about 0.1 mm. wide, and extended in a plane parallel to the surface.

The gland-tubes are filled with spherical granular cells similar to those described above from the gland-tubes of the simple phosphorescent organs.

The gland-tubes are closed at their distal ends by convex membranes projecting

¹ M. Ussow, *loc. cit.*, pl. ii. fig. 6.

² F. Leydig, *Die augenähnlichen Organe der Fische*, pl. vi. fig. 33.