

b. *Structure.*

The structure of these organs has been carefully studied by Ussow,<sup>1</sup> but I cannot here give a review of all his statements. The main results, however, of his examination of *Chauliodus*, *Astronesthes* and *Stomias*, are the following:—

The organ consists of two parts, divided from each other by a constriction of the wall. The outer portion is filled by a structureless liquid, the function of which is to protect the tender structures below from the pressure of water. A complicated lens which is composed of cells is situated in the constriction. It is convex in front and drawn out into a cylindrical process behind.

The lower or internal chamber, which is designated as an *eye*, is occupied by radial "Krystall Kegel." The spherical base is occupied by ganglion cells and the whole is enclosed by a pigment coat.

Leydig<sup>2</sup> describes these organs in *Ichthyococcus* very differently indeed. According to this author both the chambers of the composite organ are occupied by radial gland-tubes filled with the well-known spherical granular cells. In the centre, near the constriction, there is a space filled with a granular mass which is in connection with a stout nerve entering the organ from without.

My own observations made on those of the four species mentioned above, are in accordance with Leydig's (*loc. cit.*) results. I have not seen anything like the structures described by Ussow in any of the species examined by me.

Seen from the surface with the naked eye, the organs appear as dark spots with whitish centres. With a magnifying glass circular and oval patches of this kind can be distinguished. In section series we observe the following structure.

The whole organ evidently consists of two parts (Pl. LXIX. figs. 2, *a*, 3, 4; Pl. LXXI. fig. 32), an interior regularly spherical and an exterior cup-shaped part. The whole is exceedingly regular and appears as a rotation body round an axis, the leading lines of which form three-quarters of a circle for the interior part and a parabola for the external cup-shaped part.

The axis of this organ is mostly vertical to the surface as in *Astronesthes* (Pl. LXIX. fig. 3), or oblique and inclined to the surface at an angle of 30° as in *Opostomias micripnus*.

In the latter case the cup-shaped part, which is a rotation-paraboloid, appears cut off obliquely.

In the first case the organ appears, when seen from the surface, circular, in the second elliptical, otherwise there is no difference between the vertical and oblique composite phosphorescent organs.

These organs are of pretty uniform size. Usually those at the anterior ends of the

<sup>1</sup> M. Ussow, *loc. cit.*

<sup>2</sup> F. Leydig, *Die augenähnlichen Organe der Fische*, pp. 22-24.