

The really phosphorescent apparatus is to be sought in the cells which occupy the cavity of the cup, and which are evidently connected with the ganglion-cells by means of the radial fibres issuing from the disc.

The structure is intermediate between the simple form in the simple ocellar phosphorescent organs and the more complicated structure of the composite organs with special reflector, to be described below.

The fish can at its option incite the organ, which under ordinary circumstances is non-luminous, to phosphorescence. The voluntary impulse is transmitted by the thick nerve of Leydig to the disc of ganglion cells, which excite the phosphorescent cells in the cup to action by means of the radial nerve-fibres.

The phosphorescence of the latter requires, however, the secretion of the gland in the sphere as fuel, in a manner similar to that which has been described in the simple organs.

The secretion passes through the disc and the radial fibres to its destination, where it is consumed to produce light.

e. Development.

Although no transitional forms have been observed by me, I do not doubt that these composite phosphorescent organs have been developed from the simple ones by continued differentiation of the parts. During this progress of development the shape, which is very variable in the simple organs, has been determined. Their number has been reduced and likewise determined, together with their position. From a great number of undifferentiated organs scattered irregularly over the surface of the body, a small number of more highly differentiated organs, with a definite position, has been evolved.

4. Composite ocellar organs, with special reflector.

a. Distribution.

These most highly differentiated phosphorescent organs have been found by me in *Argyropelecus hemigymnus*, *Sternoptyx diaphana*, and *Scopelus benoiti*, whilst Ussow¹ has seen them in *Argyropelecus hemigymnus* and designates them as "drüsenähnliche Organe." Leydig,² who designates them as "glasperlenartige Organe," has found them in *Gonostoma denudatum*, *Argyropelecus hemigymnus*, *Scopelus rissoi*, *Scopelus humboldtii*, *Scopelus benoiti*, *Scopelus bonapartii*, *Scopelus rafinesquii*, and *Scopelus metopoclampus*.

The number of these organs and their distribution on the body are very regular, and

¹ M. Ussow, *loc. cit.*, p. 108.

² M. Ussow, *loc. cit.*