

I think that these cells are the special phosphorescent elements. I have found the same cells in a good many other kinds of phosphorescent organs of fishes, but not in all of them.

c. Innervation.

According to Leydig¹ thick nerves extend through the superficial tissue of the fish below these organs, and give off stout branches, which enter the proximal, sac-shaped, glandular portion from the side.

According to my own observations the nerve enters at the incision between the sac-shaped and distal cup-shaped parts and extends principally *below the spicule-layer underlying the latter*; there the nerve fibres form a very conspicuous plexus (Pl. LXXII. fig. 44, g) which occupies the space between the continuous pigment-layer and the light-reflecting spicule-layer.

From this plexus nerves are given off which, together with bloodvessels, traverse the organ perpendicularly from the bottom to the roof, extending upwards in the central pillars of the cylinders of radiating cells described above. They are, as stated, probably in direct communication with the typical phosphorescent clavate cells.

According to Leydig² the nerves form a plexus *within* the phosphorescent tissue in the organs of *Scopelus humboldtii*.

d. Function.

Regarding the function of these organs, we are in a more fortunate position than in regard to most of the other structures described in this Appendix, inasmuch as direct observation has shown that these organs actually emit light, so that there can be no doubt about their phosphorescent nature.

Willemoes Suhm³ says that a *Scopelus* brought up by the trawl at night "shone like a star in the net." Guppy⁴ and Günther have made similar observations. Guppy particularly was able to observe that the light is emitted *from these organs*.

It seems not improbable that the glands in the sac-shaped proximal portion of these organs produce a secretion which is poured out into the cup-shaped distal part, and there a mutual chemical action between this slime, in which also cells and nuclei are found, and the typical phosphorescent clavate cells may take place at the will of the fish, and a certain amount of light may be produced, which is reflected by the parabolic spicule-layer, and thrown out as a strong flash.

The ventral organs can illuminate the dark water below the fish for any purpose,

¹ F. Leydig, Die augenähnlichen Organe der Fische.

² F. Leydig, *loc. cit.*, pl. x. fig. 60.

³ Willemoes Suhm, Challenger-Briefe, *Zeitschr. f. wiss. Zool.*, Bd. xxiv.

⁴ Guppy, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. ix.