

phorescent organs of fishes was that of a gland, which produced luminous slime, and that to these glandular structures other more highly differentiated elements were added in the course of development. It may be assumed that the glands which produce luminous slime are, like other glands, supplied with nerves, and that their secretion is subject to nervous influences. These nervous elements do not seem to undergo any particular modification, even in the most highly developed phosphorescent organs, except that they increase in size. The phosphorescent gland was originally, as the lowest forms show, attached outside to the skin, and the dermis, or the scale which underlies it, may be further developed, so as to form a reflector. The lower portion of the gland, like the nerves which supply it, remains unchanged, but the superficial portion is sometimes highly modified, and here the typical phosphorescent cells are developed, and the nerves which supply them become modified, special ganglion cells being often developed in their course. Leydig comes to the conclusion that these organs have nothing to do with the slime-canal system. The various suborbital organs above described, and also the ocellar organs on the lateral line of *Halosaurus*, show clearly that in these cases at least, the organs in question have been developed in connection with the slime-canal system.¹ The histological facts ascertained are not in all cases sufficient to allow of a conclusion regarding the function of these organs, but it is quite certain that some of them are phosphorescent, and there are good reasons for assuming that the remainder are so likewise. It is quite certain that none of them are eyes. Most of the organs seem to be defensive, inasmuch as their position precludes their illuminating anything that lies within the field of vision of the fish, so that their only use can be to frighten away its enemies. This particularly applies to the metameric organs on the body. The organs on the barbels may have the function of luring other fish, whilst the large and formidable suborbital organs may be regarded as aggressive, inasmuch as they are used for the purpose of illuminating the field of vision and facilitating the capture of the prey. The large eyes of many deep-sea fishes show that there must be some light in the depths inhabited by them, the source of which can only be sought for in phosphorescent organs.

b. THE TYPICAL PHOSPHORESCENT CELLS.

The clavate cells with their highly refracting oval vesicle may be regarded as the most highly differentiated elements to be found in the phosphorescent organs of fishes. I am not aware that cells of this kind have been described before, although the luminous elements of *Phylliroë bucephala*, discovered by Panceri,² resemble them to

¹ Dr. Günther arrived at the same conclusion from a general consideration of the distribution of the luminous organs.

² Paolo Panceri, *Atti Accad. Sci. Fis. e Mat. Napoli*, vol. v. No. 14.