

a certain extent. These elements are evidently modified gland-cells, and the shining vesicle represents the secretion. Although such cells are produced, the ordinary undifferentiated gland-cell is not dispensed with. These typical clavate cells are always found in connection with undifferentiated glands.

The slender cells which support these clavate cells may have been derived from the fibrous layer surrounding the gland-tubes.

The light reflecting spicule layer is apparently a modified inverted scale.¹

The glands themselves are not to any extent different from other slime-glands found in fishes.

The only doubtful structures which remain are the yellow bodies in *Halosaurus*, and these may with great probability be regarded as a secretion. We may, therefore, sum up as follows:—

1. *The phosphorescent organs of fishes are more or less modified glands, which have partly been developed from simple slime-glands in the skin, and partly in connection with the slime-canal system.*
2. *The typical clavate cells are modified gland-cells.*
3. *The accessory reflectors and sphincters are developed from the skin around and below the gland.*
4. *The large suborbital organs are innervated by a modified branch of the Trigemini, and the other organs by the ordinary superficial nerves.*

c. THE PHOSPHORESCENT ORGANS OF FISHES COMPARED WITH THOSE OF SOME OTHER ANIMALS.

Among Cœlenterates, particularly the higher species, there are a great number of forms which are known to produce light. Among Sponges no such observations have been recorded, but in the other groups such instances are numerous. Special organs are not, however, developed for phosphorescent purposes, but the *ordinary slime* produced by the gland-cells in the epithelia is luminous, the light being apparently emitted independently of the will of the animal. This is the lowest form of phosphorescence hitherto observed among Enterozoa.

A higher form is represented by *Phyllirhoë bucephala*,² where a great number of spherical cells scattered throughout the body emit light. These cells, which contain an oval, flattened nucleus and a large spherical vesicle filled with a highly refracting substance, have been compared above to the clavate cells in fishes. They are scattered and isolated and are attached by granular threads to ganglion cells. The organs are under

¹ According to C. Emery, *Mittheil. aus d. zool. Station zu Neapel*, vol. v.

² Paolo Panceri, *Atti Accad. Sci. Fis. e Mat. Napoli*, vol. v. No. 14. E. Müller, *Bau der Phyllirhoë*, *Zeitschr. f. wiss. Zool.*, 1854.