

of the organs which occupy the floors of the orbital (?) cavities (fig. 1, *a*) lie so deep as to be almost or quite invisible from the surface. It is only in the regions where the phosphorescent organs lie very near the skull-roof, that their component hexagonal bodies can be seen with a microscope in the uninjured condition of the fish.

The phosphorescent organ is of identical structure throughout its extent, and no difference in its composition could be detected in its various regions. When it is viewed from above it is seen to be marked over its entire upper surface with a series of hexagonal areas of about 0.04 mm. in diameter. When its surface is viewed by reflected light, the appearance is of a number of glistening, white, isolated, short columns, hexagonal in outline, standing up in relief from its basal membrane (Pl. LXVIII. fig. 3). The organ forms a continuous membranous expanse about 0.04 mm. in thickness, excluding the connective tissue and vascular layer. It is composed of the hexagonal columnar masses arranged with considerable regularity in rows, and resting inferiorly on a pigmented connective tissue layer. Each hexagonal column is composed of a number (about thirty or forty) of transparent rods disposed side by side at right angles to the outer surface of the organ, and with their bases applied against the concave surface of a large hexagonal pigment-cell, one of which forms the base of each hexagonal column. The basal pigment-cells (figs. 10, 14) are hexagonal in outline and are cup-like, concavo-convex in form and of the same breadth as the hexagonal columns. The under surface of the phosphorescent organ is thus covered with a series of hexagonal areas each presenting a rounded convex prominence (fig. 5, *c*). The outer extremity of each rod is surmounted by a hexagonal nucleated cell (Pl. LXVIII. figs. 5, 6, 7).

In stained sections (fig. 5) each phosphorescent organ is seen to be composed of three strata; the superficial layer of cells (*e*) deeply stained, the layer of rods very little stained and the layer of pigmented-cells (*c*) conspicuous by its dark brown colour.

The superficial layer is composed of cells all alike, of hexagonal outline, each with a large nucleus filled with fine granules. The protoplasm of the cells also contains granules. These cells are present in exactly the same number as the rods, and each when *in situ* forms the summit of the rod beneath it. The cells of this layer are closely connected together and the layer composed of them is frequently found in microscopic sections separated as a continuous sheet from large areas of the organ, leaving the ends of the rods exposed.

The rods (figs. 6, 7) are more or less regularly hexagonal in section apparently perfectly clear, hyaline and transparent in structure. They appear to taper slightly towards their lower extremities where they rest on the concave surfaces of the hexagonal pigment-cells. In some few preparations I have seen a highly stained small oval nucleus present in the lower extremities of certain rods, but have failed to detect such in the large majority of instances (fig. 8).

The basal hexagonal pigment-cells have each a well-marked nucleus. Their substance