

PLATE LXIX.

Astronesthes niger.

Fig. 1. Lateral view, showing the disposition of the luminous organs; natural size, from a spirit specimen.

a, a, Compound organs; *b*, simple organs; *c*, luminous patch on the side; *d*, on the forehead; *e, e'*, on the upper jaw.

Fig. 2. Transverse section through the ventral side. $\times 10$.

a, Compound luminous organ; *b*, simple luminous organ; *I*, intestine; *a*, cartilage; *V*, blood-vessel.

Fig. 3. Compound luminous organ, from ventral side. Longitudinal section. $\times 100$.

b, cornea-shaped transparent part of skin over the organ; *c*, transparent membrane outside the lens-shaped body; *d*, lens-shaped body; *e*, gland-tubes of the spherical part; *f*, pigment-layers; *g, g'*, pigment coating of the outer and inner parts of the luminous body; *h*, gland-tubes in the outer part of the luminous organ; *k*, granular mass of secretion and cells, inner portion belonging to the glands of the inner part of the organ; *l*, granular mass of secretion and cells, outer part; *m*, shining membrane within the pigment-mantle of the organ; *n*, ganglion cells in the granular central disc.

Fig. 4. Diagrammatic section through the axis of the compound luminous organ. $\times 100$.

a₁, a₂, a₃, a₄, b₁, b₂, b₃, b₄, Rays of light emitted from the central part of the organ (*k*) and reflected in the lower spherical portion of the organ; *c₁, c₂, c₃, d₁, d₂, d₃, e₁, e₂, e₃, f₁, f₂, f₃*, rays of light emitted from the central part of the organ (*k*), in a centrifugal direction, reflected from the sides of the outer parabolic portion of the organ and refracted by passing through the outer surface of the cornea-like layer (*g*); *Ax*, axis of the optical system; *g*, cornea; *h*, phosphorescent tissue of the outer parabolic part; *i*, glands of the inner spherical part.

Fig. 5. Longitudinal section of a simple luminous organ. $\times 150$.

a, Mass of granular secretion and cells; *b*, radial gland-tubes; *c*, pigment-mantle; *d*, cornea; *e*, reflecting membrane.

Fig. 6. Section of a lateral luminous patch (*c*, fig. 1). $\times 40$.

a, Pigmented skin of the fish; *b*, vertical gland-tubes.

Fig. 7. Section of a lateral luminous organ. $\times 4$.

a, Phosphorescent gland.

Fig. 8. Vertical section of a lateral luminous organ. $\times 150$.

a, Granular secretion with cells; *b*, gland-tubes vertical to the skin; *c*, pigment-layer; *d*, lamellæ of pigment, extending upwards between the gland-tubes.

Fig. 9. Section through outer portion of simple luminous organ. $\times 300$.

Fig. 10. Simple luminous organ, seen from without. $\times 30$.

Fig. 11. Head in profile. $\times 4$.

a, Frontal phosphorescent gland; *b*, anterior, *c*, posterior infraorbital phosphorescent glands; *d*, ocellar phosphorescent organs.

Fig. 12. Transverse section of narrow posterior end of anterior infraorbital phosphorescent gland. $\times 150$.

a, Transparent outer skin.

Fig. 13. Longitudinal section of anterior infraorbital gland. $\times 100$.

a, Transparent outer skin.

Fig. 14. Portion of the section figured in fig. 13, showing a gland-tube. $\times 500$.

a, Membrane of the gland-tube; *b*, gland-cells; *c*, lumen of the gland-tube, filled with secretion; *d*, a thread of cartilage.