

tissue layer, as shown in fig. 6. In some instances these blood-vessels are seen to give off branches to join the capillaries within the substance of the phosphorescent organ. I have also traced nerve-fibres from the connective-tissue layer to the region of the pigmented hexagonal cells, but have not been able to observe any satisfactory connection between them and the elements of the organ.

The phosphorescent organs receive a specially rich blood supply, in the form of a pair of large vertically directed branches of the main blood-stems traversing the base of the skull, apparently the carotids.

I have not found any distinguishable traces of rudimentary eyes or of optic nerves in the *Ipnops* examined. The Gasserian ganglia are specially large and well developed, composed of numerous large multipolar ganglion cells, and although no distinct nerve connection has been traced, there appears to be little doubt that the nerves passing to the phosphorescent organ from the connective tissue layer originate from the fifth nerve. No trace has been found of any other source of nerve supply for the organ. It is just possible that the network of pigmented strings may have some connection with the nerve-system.

The phosphorescent organs can hardly be sense-organs since they appear to be supplied with no special nerves but only by ordinary nerves. They are certainly not modified eyes.

The richness of their blood supply is in favour of their being phosphorescent organs, as is also the extreme transparency of the portion of the roof of the skull covering them.

They can scarcely be electric, since there is an entire absence of the definite connective-tissue walls of insulation between the hexagonal bodies so characteristic of electric organs. No olfactory nerve was found in the sections of *Ipnops*, and apparently the nasal organs are in a condition of abeyance of function. No olfactory membrane was detected in them.

The auditory nerve is well developed.

The interstices between the muscular fibres of the specimen examined are everywhere crowded with parasitic psorosperms (spores of Myxosporidia) of pseudonavicellar shape, showing that fish are not free from the attacks of Sporozoa at great depths.

#### COMPARISON OF THE PHOSPHORESCENT ORGANS OF IPNOPS WITH ALLIED ORGANS OF OTHER SCOPELIDS.

The phosphorescent organs of *Ipnops* show in certain points of structure a close affinity with the so-called "eye-like bodies" of other Scopelids, as described by Ussow, Leydig<sup>1</sup> and other authors, whilst in others they differ from them most remarkably. Moreover, in some points of structure they resemble the organs of one genus of Scopelids, in others those of other genera, thus combining the peculiarities of several.

Thus the rod layer in *Ipnops* is closely similar in general appearance to the unbroken

<sup>1</sup> Die augenähnlichen Organe der Fische, Bonn, 1881.