IX CONCLUSION.

In this study an attempt has been made to trace the development of the chondrocranium of O. punctatus and to study its morphology. Relations of the blood vessels, nerves and eye muscles to the various cartilages of the chondrocranium have also been studied.

Cartilage appears very early at 3.5 m.m. stage and the chondrocranium is completely formed at 7.5 m.m. stage. The development of the chondrocranium in O. punctatus is similar in many respects to that of other teleosts. The following features of interest have been noted:

1. Trabeculae arise in continuity with the parachordals. The fenestra between the two trabeculae is single at first and it is later that it gets divided into an anterior hypophysial fenestra and a posterior basicranial fenestra.

2. Parachordals when they first chondrify are widely separated from the notochord. It is later that they extend medially and meet the notochord to form a continuous basal plate. This is a condition found only in O. punctatus among Teleostei. The same condition is found in Amia and Lepidosteus.

3. The anterior basicapsular commissures appear earlier than the auditory capsules which arise in continuity with the former. Among Teleosts Clupea, Anguilla and Casteros-teus approach this condition. The same condition is found in Amia, Lepidosteus, Acipenser and a few Selachii.
4. Internasal septum arises as a ridge from the ethmoid plate (like that of *Anguilla*) which is broad, truncated and without any cornua or process.

5. Lamina orbitonasalis is reduced secondarily from posterior to anterior wards (reduced more than that of *Amia* and *Lepidosteus*) and therefore the olfactory nerve from the cranial cavity passes through two foramina before reaching the nasal capsule, as it has to traverse through the orbit.

6. Myodome is entirely absent and the oblique eye muscles arise from the base of the posterior end of the internasal septum. A myodome is absent in such divergent forms as *Polypterus*, *Lepidosteus*, *Gadus* and *Anguilla*. Absence of a myodome is correlated with the smallness of the eyes.

7. The relation of the arteries to the chondrocranium are strikingly similar to those of *Amia*. A pseudobranch is present in both fishes and *Amia* the relations of the efferent pseudobranchial arteries are the same. The pseudobranch receives its blood supply from the internal carotid through a secondary afferent pseudobranchial artery. In *O.punctatus* the afferent pseudobranchial artery arises from the orbital artery (which arises in turn from the internal carotid) while in *Amia* directly from the internal carotid. But in *Amia* too the afferent pseudobranchial artery is connected to the orbital artery by a cross connection. *Salmo* (where a pseudobranch is present) does not possess a secondary afferent pseudobranchial artery arising from the internal
-(94)-
carotid. The efferent pseudobranchial artery in
*O. punctatus* does not join the internal carotid but is
continued forwards as the ophthalmica magna artery, but
this is a secondary feature. The

8. Palatine nerve is not enclosed in a foramen, which
is the case in *Amia* and *Salmo*. This condition is not
primitive as the nerve lies dorsal to the subocular shelf.
The palatine nerve becomes free secondarily by the absorp-
tion of the trabeculae in this region.

The chondrocranium of *O. punctatus* possesses the
following specialised and secondary features:

(i) The side wall is reduced.
(ii) The roof is reduced.
(iii) The Lamina orbitonasalis is reduced.
(iv) The trabeculae are absorbed in their posterior regions.
(v) The internal carotid artery is continued forwards
as the ophthalmica magna artery.
(vi) The olfactory nerve traverses the orbit.
(vii) The palatine nerve is free and lies dorsal to the
subocular shelf.

The following are the primitive features in the
chondrocranium of *O. punctatus*:

(i) The parachordals appear away from the notochord.
(ii) The auditory capsules develop in continuity with
the anterior basi-capsular commissures.
(iii) The myodome is absent.
(iv) A pseudobranch with its efferent and afferent blood vessels is present.