SUMMARY.

1. The development and morphology of the chondrocranium of O. punctatus is studied.

2. The eggs of O. punctatus were brought from the Saugor lake to the laboratory where development took place.

3. Staining methods of van Nijhe and P. Gray are utilised. For reconstruction, modified Born's method is used.

4. The study of the development of the chondrocranium in O. punctatus is based on seven embryos from 3.3 m.m. to 7.5 m.m. stages:

i. 3.3 m.m. Stage:
Mesenchyme condensations appear in the region of trabeculae and parachordals.

ii. 3.5 m.m. Stage:
Cartilage appears in trabeculae and parachordals which are continuous from the first. The parachordals are widely separated from the notochord. The rudiments of the anterior basicapsular commissures have appeared independently.

iii. 3.8 m.m. Stage:
The parachordals and notochord form the basal plate. Auditory capsules have appeared. Basicapsular fenestra is open behind. The trabeculae meet in the middle to form trabecula communis. In the visceral arch skeleton Meckel's cartilages, hyo-
symplectic, quadrate, ceratohyal, first three ceratobranchials and the median copula have developed.

iv. 4.6 mm Stage:
Lateral commissure is formed enclosing the facial foramen; the occipital arches are developing; the hyomandibular foramen is enclosed; quadrate has developed a pterygoid process; hypohyal, interhyal and fourth ceratobranchials have also been chondrified.

v. 5.2 mm Stage:
The posterior basi-capsular commissure is developed enclosing the basicapsular fenestra. The occipital arches are fused with the hind end of the auditory capsules forming the jugular foramen. Ethmoid plate, orbital cartilages and preotic bridge have been formed. The visceral arches are complete except that the fourth and fifth branchial arches are represented only by ceratobranchials.

vi. 6.3 mm Stage:
The roof of the chondrocranium starts forming. Each orbital cartilage (which is continuous with the post-orbital process of the auditory capsules) anteriorly becomes bifurcated into sphenos-eptal and sphenethmoid processes. The fourth branchial
arch has developed the four elements.

vii. 7.5 mm. Stage:
The chondrocranium is completely formed. The orbital cartilages meet the ethmoid plate and enclose olfactory foramina. The tectum posterius and tectum synoticum are completely developed.

5. Morphology of the Chondrocranium:
The floor is formed of the ethmoid plate, trabecula communis, trabeculae enclosing the hypophysial fenestra, pro-otic bridge and the basal plate. The roof is formed of the tectum transversum and the tectum synoticum. The side wall in the posterior half is formed by the auditory capsules but in the anterior half there is a wide opening, the sphenoid fissure bounded dorsally by orbital cartilages. The appertures or foramina in the floor are: paired facial foramina for the entrance of head vein and orbital artery and the exit of hyomandibular branch of the facial nerve; paired basi-capsular foramina for the exit of glossopharyngeal nerves; paired jugular foramina for the exit of vagus nerves; a median hypophysial fenestra through which the carotid arteries enter; a median basicranial fenestra into which the tip of the notochord lies. The following are the points of special interest:

1. The nasal capsules are without complete roofing.
ii. Side wall has a wide sphenoidal fissure through which all the nerves from second to fifth pass out and the pituitary vein enters.

iii. Trigemino-facialis chamber is divided into pars gangliomaris lodging the ganglia of the fifth and seventh nerves and par jugularis enclosing the head vein and orbital artery.

iv. Myodomes are entirely absent. The oblique eye muscles are attached to the internasal septum while the recti muscles are attached to the parasphenoid bone beneath the hypophysial fenestra.

v. Pseudobranch is present and its blood supply comes through the orbital artery. Efferent pseudobranchial artery does not join the internal carotid but is continued forwards as the ophthalmic magna artery.

vi. The olfactory nerve traverses a part of the orbit.

vii. The palatine branch of the facial nerve does not pass through a foramen and lies dorsal to the sub-ocular shelf.

6. In the general structure the chondrocranium of *O. punctatus* resembles that of *Salmo*. The differences seen from that of *Salmo* are as follows:

i. Myodome is absent.

ii. Palatine nerve is not enclosed.

iii. Parachordals are separated from notochord.
iv. Anterior basicapsular commissure arises in continuity with the auditory capsules.

v. Secondary afferent pseudobranchial artery is present.

Casterosteus resembles O.punctatus in the origin of the auditory capsules and in the structure of the mandibular and hyoid arches.

Resemblances with Amia are seen in the manner of origin of parachordals and auditory capsules, presence of a secondary afferent pseudobranchial artery and the absence of any perforation for the palatine nerve.

Thus it is seen that the development and morphology of the chondrocranium of O.punctatus exhibits many features of specialization or secondary modification though a few primitive features are also retained.