SUMMARY

An account of a series of the various developmental stages of *Ambassis ranga* (*Chanda ranga*) up to the adult stage has been given, dealing with the development of the lateral line canals, their associated neuromast sense organs and bones in the head region.

The first indication of the formation of the different neuromast sense organs of different canals of the head is found at 4.5 mm stage. In the supraorbital the third and fourth as well in the preoperculo-mandibular line the second, third and sixth organs of the adult are represented by small patches of modified epidermal cells.

The full compliment of six neuromasts of the supraorbital line is formed when the fish reaches a length of 6.00 mm. The infraorbital canal also makes its appearance at this stage by the first three neuromast sense organs.
The full compliment of nine neuromasts of infra-orbital canal and, ten of preoperculo-mandibular canal is formed at 8.00 mm stage. The first indication of the formation of the temporal line in the form of four neuromast sense organs is also found, at this stage.

The total number of five neuromasts of the temporal line and two of the supra-temporal diverticulum are formed at 10.00 mm stage. Thus this is the stage where all the neuromasts found in the adult are formed, which later on become associated with the different canals and are arranged in four lines corresponding to the future canals. Each half of the system is represented by a total number of 33 organs.

The supraorbital line is represented by six, the infraorbital by nine, the preoperculo-mandibular by ten (four in its mandibular portion and six in the preopercular portion) and the temporal by five neuromast sense organs. The supra-temporal diverticulum is represented by two neuromast sense organs.

All the neuromast sense organs in the latero-sensory canals of A. ranoga (C. ranoga) invariably contain the cupulae above them.
The different organs reach the surface first and then start to invaginate. First invagination takes place at the stage when the fish reaches 6.00 mm in length.

The different canals develop in a definite order i.e. the anterior part of the preopercular canal of the preoperculo-mandibular canal is formed first at 10.00 mm stage of the fish, followed by the middle portion of the supraorbital canal at 12.00 mm stage, and then by the mandibular portion of the preoperculo mandibular canal at 14.00 mm stage. The infraorbital canal develops at 14.00 mm stage and the temporal at 22.00 mm stage.

All the canals are formed in a common teleostean pattern. To begin with each neuromast lies at a level with the epithelium, then starts to invaginate, thus a gutter is eventually formed. Subsequently the two edges of the gutter arch over and finally fuse together to form a canal.

Except the infraorbital canal, all the different canals are completely formed when the fish reaches 34.00 mm in length. The middle portion of the infraorbital canal containing the fourth, fifth and sixth neuromasts is still incomplete, the canal is open which becomes closed in the adult fish only.
In an adult, the system is an open one. All the different canals start with terminal pores and communicate to the exterior by different number of pores which are placed in an alternate position with the neuromast sense organ.

All the different canals are complete and continuous.

The supra- and infraorbital canals meet with each other and the temporal canal behind the eye. This junction point is marked by an opening.

The two mandibular canals of the two sides do not unite but start with separate terminal pores.

The mandibular canal is in continuation with the preopercular canal.

The preopercular canal joins the temporal canal in the middle of the temporal canal, in the pterotic bone.

The frontal commissure is present and transversely connects the supraorbital canals of the two sides. It does not lodge any neuromast sense organ.

The temporal canal of each side gives out a supra-temporal diverticulum in extra-scapular bone, which runs transversely in the transverse limb of the bone, but does
not unite mid-dorsally to form a cross-commisural canal, and remains in the form of a diverticulum.

The different canals communicate to the exterior by a number of pores, some of which are placed at the tips of small tubular processes (canaliculi), but there is no secondary ramification in canals, tubular processes and the pores.

Each half of the system communicates to the exterior by a total number of 33 pores. Each of the supraorbital, infraorbital and the preoperculo-mandibular canals starts with a terminal pore. Including this terminal pore the supraorbital canal communicates with the exterior by six, infraorbital by nine, preoperculo-mandibular by eleven, and the temporal by five pores. The supra-temporal diverticulum opens out by two and each half of the frontal commissure by a single large caudal pore tube.

There are two types of canal bones. One of these is comprised of tubular canal bones or ossicles, which lack a membranous component and the other includes the two component type of bones which are composed of a membranous and a latero-sensory component.

The supraorbital canal passes through the nasal and frontal bones. The first blastema of nasal is formed at
10.00 mm stage. Each nasal is a tubular canal bone, lacking the membranous component. It lodges the first two organs of the line.

The frontals appear at 5.00 mm stage as lamellar components. Under the third neuromast of the supraorbital line which attains its full length at 12.00 mm stage and the laterosensory component develops from the underlying lamellar component at 14.00 mm stage. It lodges last four neuromasts of the line.

The infraorbital canal passes through the lachrymal and a series of four infraorbital ossicles. The lachrymal is a two component type of bone. The first primordium of the lamellar component which is formed at 6.00 mm stage and the latero-sensory component start to develop at 14.00 mm stage. It lodges first three neuromasts of the line.

The first blastema of the third and fourth infraorbital ossicles are formed at 18.00 mm stage but the first and second ossicles are formed at 22.00 mm stage. The first and second ossicles lodge two each and the third and fourth lodge one organ each respectively.

The preoperculo-mandibular canal runs through the dentary, angular and the preopercular bones. All the three are first seen at 5.00 mm stage. However, at 4.5 mm stage the
preosseous lamellae of these bones are present. The 
latero-sensory component of preopercular develops at 
12.00 mm, of dentary at 14.00 mm, and of angular at 
18.00 mm stage. The dentary lodges three, angular one, 
and the pre-opercular six neuromasts.

The supra-preopercular bone is absent.

The temporal canal passes through the sphenotic, 
pterotic, extra-scapular ossicle and the post-temporal bone. 
The sphenotic develops first at 14.00 mm stage. Its lamellar 
component never forms the complete bone tube, thus the 
canal runs through the gutter shaped bone. The bone lodges 
a single neuromast sense organ.

In pterotic also the complete bone tube is not formed. 
For the first time it is seen at 16.00 mm stage. It lodges 
a single neuromast.

The extra-scapular ossicle is developed behind the 
pterotic bone at 16.00 mm stage by the fusion of three 
ossification centres located in the posterior portion of the 
temporal canal. It lodges four neuromasts, two in its 
lateral and two in its median limb.

The post-temporal bone is developed at 16.00 mm stage 
and it lodges a single neuromast sense organ.
The protective function of the canal bones is a secondary one as in the case of two component type of canal bones first the lamellar component of the bone is formed, next the canal develops, and then only it is encircled by the bone tube.

In *A. ranca* (*C. ranca*) the neuromasts of the lateral line serve not to cause the bones to arise, but to determine the localization of their rudiments and that they seem to stimulate ossification in their neighbourhood by exerting some trophic influence associated with their presence.

In *A. ranca* (*C. ranca*) the lamellar component of the two component type of bones develop in the vicinity of the neuromasts at the time when they are freely exposed at the surface of the epithelium, thus it is concluded that invagination of neuromasts has nothing to do with the formation of the membranous component of the bone.

The membranous component and the latero-sensory components are united with each other from the very beginning. The membranous component (ex. frontal) develops first and then after the formation of the canal the latero-sensory component is formed from the underlying membranous component and encircles the canal.

The canal and neuromasts have not sunken far deep in to the dermis and the epidermis is not thick, so the two components are united with each other from the very beginning.