characters? Explain. (10 marks)

Date - 09/04/2021 AMPHIBIA - (2nd) Dr. Pritam Kumar (Zoology Hons.)
B-Sc - II

ORIGIN AND EVOLUTION OF AMPHIBIA

Linnaeus first of all used the word 'Amphibia' for the animals which are more or less aquatic and amphibious vertebrate. However, by no means all the amphibious vertebrate - Snakes Some lizard and birds are Amphibia and not all the Amphibia are amphibious - i.e Tree frog. Hence the name Amphibia to this class of tetra - pods is probly based not upon the habitat but upon the fundamental morphological and physiologi - cal characters.

G. K. Noble (1931) - defined Amphibia as Cold blooded vertebrate having rough or smooth skin, rich in glands which keep it moist, if scales are found, remain hidden in the skin. As a matter of fact, Amphibia forms a true transi - tional group and track a short of Compromise between the aquatic life of fishes and Terres - trial life of tetrapods.

The origin of Amphibia involves the entire problems of the beginning of terrestrial life among the vertebrates and radical evolution - ary changes that have occurred as adaptations for an entirely new mode of life.

Palaeontological embryological and anatomical evidences obtained during combined researches reveal that 'Amphibia' evolved from some fish

like ancestor. Due to this long ago, Huxley put them together under one group called Ichthyopsida.

The similarities with fishes in general can be summarized as follows:-

(i) Cold blooded condition.
(ii) Presence of long Conus arteriosus with numerous valves in many cases.
(iii) Strictly symmetrical arrangement of arches.
(iv) Three chambered heart like that of Dipnoans.
(v) The glottis is supported by cartilages which themselves are derivatives of posterior visceral arches.
(vi) The development of vertebrate from 4 pairs of arcualia.
(vii) The presence of 4 or 5 branchial skeletal arches in the larval stage.
(viii) The hypoglossal still retains the characters of past cranial or cervical spinal nerve.
(ix) possession of 10 pairs of cranial nerves & lateral line sense organ.
(x) Eggs are usually laid in water, early development occurs in water, larvae have external gills, when eggs in some cases are laid on land these are devoid of calcareous shell like reptiles and birds. Embryos lack protective amnion and respiratory allantois.

The presence of above mentioned resemblance with fishes indicates clearly that amphibia originated from fish-like ancestors.

SEARCH OF GROUP OF FISHES WHICH GAVE RISE TO AMPHIBIA :—

Fish-like ancestor of Amphibia, it should be kept in mind that modern Amphibia cannot be compared with modern fishes as modern forms have become highly specialized in response to the demands of modern environment. The result of this specialization is that almost all the phylogenetic relationship have been covered up. Hence it is reasonable to compare the earlier forms.

Amphibians were present as three distinct groups, namely, Labyrinthodontia, Phyllospondyli and Lepospondyli during Carboniferous age. The first group was found in abundance and in variety of forms. In Devonian period. Another notable fact revealed by fossil records is their presence in fresh water. Hence, they have originated from fresh water forms. At that time freshwater fishes were Actinopterygii, Aberrent sharks, Dipnoi and Crossopterygii.

(1) ACTINOPTERYGIAN ORIGIN :— Due to lack of internal nares and fleshy lobed fins, Actinopterigians can not be considered to be the ancestors of amphibians.

(2) SHARK ORIGIN :— Aberrent sharks constitute a specialized branch, Hence, these can not be regarded as the ancestors of Amphibians.

(3) DIPNOAN ORIGIN :— Dipnoan exhibit following structural and functional resemblances with the amphi

The beginning line of the story goes as follows...

Deepti, all of 10 years old, was working as a full-time maid ...

(i) Both respire to a large extent by lungs.

(ii) Distribution of blood vessels to and from the organs have same pattern.

(iii) Histology of cartilage and autostylic suspensorium resemble in both.

(iv) cloaca is present in both.

(v) pectoral and pelvic girdles of dipnoans fores-hadowed some amphibian features.

The above mentioned distinct similarities guided some old zoologists to think that dipnoans are the direct ancestors of Amphibians. But modern studies reveled that the striking similarities particularly in respiratory and circulatory systems are due to the physiological convergece for living in similar condition of life. Further, Dipnoans possess several too specialized features. Hence, a specialized group can not be the possible ancester of another group of animals.

(4) CROSSOPTERYGIAN ORIGIN :— The crossopterygians like osteolepis and Eusthenopteron possessed some features which are either amphibian or lead towards Amphibia. The resemblances between two groups can be summarized as follows :—

(i) The plate of Amphibian resembles so that of crossopterygian in its basic plan.

(ii) The lower jaw of labyrinthodontia resembles with that of crossopterygian.