

ORIGIN

AND

EVOLUTION

OF

BIRDS

B.Sc. Part - II

Paper - III

INTRODUCTION:- In searching the origin of the birds, a naturalist's journey to this voyage is halted with the arrival of the reptilian age. The study of those days reptiles reveals that they were the dominant form of animals existing in the vast arena of this living universe, but today these are doomed to their racial inferiority in comparison to the highly evolved birds. Hence their inglorious present is quite a contrast to their glorious past. T. H. Huxley while studying the birds on the basis of too much similarities with the reptiles called the birds are the glorified reptiles, and placed both of these under a single sub-class Sauropsida. Woodrich was also of opinion that the birds are originated from the reptilian base - Sauropsida.

Origin & evolution of birds:-

In tracing the origin and evolution of birds as well as in the favour of Huxley's statement, two points can be highly discussed i.e. -

- [A] The evidence that the birds are originated from the reptiles.
- [B] Group of the reptiles ancestral to the birds.

- [A] The evidence that the birds are originated from the reptiles:-

To fulfill the demand of this point, the evidence from the comparative anatomy, embryology and palaeontology can be discussed. (a)

- (a) Evidence from the comparative anatomy:-

① The feathers of the birds are the modified

reptilian scales. The taxometatarsus of birds is also provided the scales.

(iii) The scleroplate of the eye of birds can be comparable to those of the Crocodyles and Sphenodon.

(iv) Pecten is present in eye of both.

(v) The ribs are provided the uncinate process in birds & Sphenodon.

(vi) The limbs are clawed and the 1st claw is rotated towards the forametarsus in birds and Archaeopteryx.

(vii) The air sac of birds can be comparable to those of chameleon.

(viii) The heart is four chambered in birds & in Crocodyles.

(ix) Scott reported that the serological examination of the blood in both shows close approximities.

(x) Single facet for occipital condyle.

(xi) 12 pairs of Cranial nerve in both.

(xii) The cloaca is divided into the proctodaeum, urodaeum and coprodacum in both.

(xiii) Beam like structure is also reported in certain reptiles.

(xiv) The number of vertebrae is variable in both.

(xv) The trachea is composed of the tracheal rings.

(xvi) The kidney is metanephric in both.

(xvii) Both are oviparous (except Sea snake and vipers).

(xviii) Lower Jaw is composed of 4-6 bones in both.

(xix) Urinary bladder is absent in birds and snakes.

(6) Evidences from the embryology:-

The embryology of birds maintains the Haeckel's law of biogenesis i.e. "the ontogeny repeats phylogeny". The developmental history of birds and the reptiles shows close affinities.

- (i) As it is earlier mentioned that the birds and the reptiles (except sea snakes & vipers) are oviparous.
- (ii) The eggs are telolecithal and the cleavage is meroblastic.
- (iii) The blastoderm is present containing an area pellucida towards the centre and an area opaca towards periphery.
- (iv) On the surface of the area pellucida is found an embryonic shield.
- (v) Behind the embryonic shield is situated a primitive streak.
- (vi) Amnion, chorion and allantois are present.

(C) EVIDENCES FROM THE PLACANTOLONY:-

The evidences from the comparative anatomy and embryology are the supplement to the more valuable palaeontological evidences. The fossil records of the birds is incomplete and fragmentary, only two fossils of the birds are recorded from the Jurassic period of Bavaria. These are the Archaeopteryx lithographica, found by Andreas Wagner (1861) and is kept in the British Museum (London) where as the second is the Archaeopteryx which found in 1877 and is kept in the Berlin's museum.

Recently in 1986 a third fossil is discovered by Mr. Shunxue Chatterjee (a palaeontologist in the Texas University Chicago). This fossil is named as the Protoavis and is supposed to be occurred in the living form in the Triassic period 225 million years ago about 75 million years ago than (Archaeopteryx (The time of India) Dated Oct 1986).

All these fossils possess the reptilian as well as the avian character both