B. Sc. Part – III (Hons) Zoology

27/08/20

Paper III 'A'

Topic: Origin of Birds

By
Dr. Sunita Kumari Sharma
A.P. & Head
Dept. of Zoology
Maharaja College
Ara

Birds Constitute a very specialized group of vertebrates which have evolved from reptile during mecosoic era. The actual documentary record of the stages showing how ~~such~~ reptiles were transformed into birds are rare because of the non-availability of abundant avian fossils. Luckily, a ~~such~~ transitional stage between reptiles and Aves is represented by Archaeopteryx and Archaeornithes, the two fossils from Germany. These combine in themselves many of the reptilian features with undoubted avian features; so that the reptilian origin of birds is quite clear. The gap between this stage and the actual reptilian ancestor is yet to be filled. The two fossil species of Archaeopteryx discovered from the Upper Jurassic beds aided the Evidence to this Contention. The exact nature of hypothetical ancestor of Aves, which from

the link between Archaeopteryx and the reptile has been a matter of speculation. Some of the theories are mentioned here as they are of interest.

According to Osborne, the ancestral bird was an arboreal, five legged parachuting animal which glided from tree to tree, like a flying squirrel. The parachute became an active wing for which the development of feathers and strengthening of wing muscles. In other flying animals, like Bats and Pterodactyles with patagium, the hind limbs are incapacitated for walking, whereas in birds they are prominent.

Nopsca, put forward the theory that "Proaves" was a quadrupedal, long tailed, bipedal creature which ran about and lived along the ground with their strong hind limbs, flapping their fore-limbs. In the air as an aid to increase the speed. The fore-limbs which were the wings became broadened by the development of scales in the hinder part of the arms and the scales became spread out to form quill feathers. Steiner suggest that 'Proaves' should have been arboreal form with five legs, five legs being modified for springing and fore legs for climbing.

and steadying the body after a leap. The quill feathers developed along the hinder aspect of the fore limbs and the tail which helped the animal to buoy up the body in the air. The transformation of the fore-limbs into wings was accompanied by the development of bipedalism.

Beebe suggests that 'Proavis' should have been an arboreal tetrapod with backwardly directed feathers on all the legs, both sets serving as parachutes in gliding. This view is supported by indications of tufts of feathers on the hinder aspect of the limbs of Archaeopteryx.

Gregory is of the view that birds have a dual origin, some have evolved from cursorial and others from arboreal ancestors, which will be seen to be a compromise of several theories.

Presently, the origin of birds is considered mainly on two lines —

A Diphyletic Origin and B Monophyletic Origin.

A Diphyletic Origin :- The Earliest known both flying as well as flightless types. The recently extinct moas and Elephant birds were also flightless. The most

primitive living birds of Ratitae (Ostrich, Rhea, Cassowary, Emu and Kiwi) and Penguins are also flightless. This led some authors notably R. R. Lowe to believe in the diphyletic origin of birds. They maintain that the flightless and flying birds of today have descended from flightless ancestors. According to Lowe, the present day flightless birds were never capable of flight and their wings are not degenerate now. But better developed than anytime in their past history.

B Monophyletic Origin of Birds:-

In Ratitae, the legs are well developed and powerful, the wings vestigial and the feathers are fluffy. But recently fossil of Eleutheornis, a probable ancestor from the present day Ostrich from Eocene of Switzerland, shows closer affinities to flying forms than does the present day Ostrich and poses a severe blow to the concept of Diphyletic Origin of Birds.

Presently, most palaeontologists believe that the 'Carinatae' are more primitive, precursor, the ratitae evolved from flying ancestors, but

adapted to a terrestrial mode of life in areas with abundant food and few competitors or enemies. The more usually accepted view today maintains that birds have a monophyletic origin i.e. all birds have evolved from a single ancestor perhaps close to Archaeopteryx. Accordingly, the flightless birds have evolved by loss of flight from flying ancestors. The weight of the known evidence also favours this view.

So, in the conclusion, it can be stated that some intermediate reptiles are responsible for origin of birds, of which may be like Boiga'. These first evolved flying birds, and then due to some reasons, they lost the wings and became flightless birds. This view is also supported by palaeontological evidences.