ORIGIN OF BIRDS

Modern birds possess certain features which are purely reptilian. It is probable that the birds have evolved from reptiles. The origin of birds is suggested by a few fossils, which are not very ancestral but are somewhat evolved in the line of the evolution of birds. The Archosaurian diapsid reptiles from which birds arose, were many in the later Mesozoic.

Formerly it was considered that birds were direct descendants of Dinosaurs or that at least both were derived from the same parent forms. But this view is completely rejected.

Another view that birds and flying reptiles - the Pterodactyles had a common ancestry. The ancestary of birds first of all known by the imprint of a single feather found in Solenhofen quarries in year 1861. These fossils were very different from birds and possessed traces of reptilian ancestary.

The "Archaeopteryx" is a connecting link between the reptiles and birds. These fossils are reptilian in character and from the starting point in the history of the feathered vertebrates or birds. So

Reptilian characters :- Externally, reptiles and birds are quite different but closer study advocates that both these classes are basically similar. T.H Huxley (1868) has called the "birds are glorified reptiles" and included both the classes under the superclass Sauropsida. The evidences in favour of reptilian ancestary can be seen in the following ways:

A. Anatomical evidence
B. Embryological evidence
C. Palaeontological evidence.

A. Anatomical evidences :-

1. Monocondylic Skull developed from basioccipital.
2. Mandible of lower jaw is composed of several piece of bones and articulate by quadrate to the upper jaw in both the classes.
3. The uncinate processes (avian characters) are found in the ribs of crocodiles and Sphenodon.
4. Both reptiles and birds have well formed exoskeleton structure - scales in reptiles and feathers in birds. The feathers are considered as modified scales.
5. Claws of reptiles and birds are similar in nature.
6. Grizzard present in birds and crocodiles.
7. The air sacs present in birds, and chameleon and chelonians.
8. 4 chambered heart is found in crocodile (reptile) and birds. In crocodile ~~left~~ right aortic arch predominate like birds.
9. Metanephric kidney.
10. Urinary bladder is absent in birds and snakes.
11. Both are oviparous, fertilization internal.
12. The cerebellum of birds and crocodiles shows close similarities

B. Embryological evidences :-

The development history of both the classes show a phylogenetic interrelationship between them. The evidences are -

1) Similarity in Shape, size and structure of sperms.
2) Large, albuminous, telolecithal eggs are covered by hard calcareous egg shell.
3) Meroblastic Segmentation.
4. Extraembryonic membranes, amnions and chorion are present in both reptiles and birds.
5. Development of scales and feathers are closely similar.

6. clawed digits characteristics of reptiles present in ratites (Bird)
7. The organ of Jacobson a reptilian feature is present in the embryonic stage of birds.
8. The interclavicle is present in the embryonic pectoral girdle of birds.

On these evidences, Parker mentioned that birds is transformed or glorified reptiles.

II Palaeontological evidences :-

Considering the palaeontological evidences 'Archaeopteryx' is worthy of reference. This bird of lithographic stone of Bavaria, Germany shows some reptilian affinities which can be summarised as follows :- Reptilian characters :-

1. Teeth were present in both jaws.
2. Lizard like tail having 20 caudal vertebrae possess a ~~long~~ pair of long lateral rectrices.
3. claws present on digits of hands and legs. (reptilian ch.)
4. No pygostyle Only modern bird posses pygostyle.
5. The centra of the vertebrae is amphicoelous (reptilian ch)
6. Non-pneumatic bones, modern birds have pneumatic bone.
7. 10 cervical vertebrae is reptilian feature.
8. 6 Sacral vertebrae fused to form synsacrum.
9. cervical and thoracic ribs are without uncinate processes except crocodile and sphenodon.
10. Flat and Keelless sternum.

Avian characters :-

1. Size is like crow.
2. Forelimb with 3 clawed digits. Feather present on the back of ulna and hand.
3. The feathers were on the back of ulna and hand.

4. Two fused clavicles formed 'V' shaped furcula.
5. Large skull with a rounded brain case and completely fused parietals.
6. The orbits were large. Sclerotic ossicles present in the eyes. (present in some modern bird & living reptiles.
7. The scapula were slender and curved like birds.
8. Pelvis and hind limb show both avian and reptilian features. Pubis was elongated and backwardly directed (bird like).

Besides, the fossil of Archaeopteryx other fossil birds of cretaceous period like Hesperornis, Baptornis, Ichthyornis, etc. showed many reptilian characters. These fossil birds were all diving and swimming forms. Discovery of all these fossil birds proclaimed the reptilian ancestary of birds.

The similarities between the fossil reptiles and modern birds are due to their adaptive convergence for similar mode of living. The cumulative evidences from all sides added more weight to the idea that the reptiles and birds are phylogenetically related with one another.