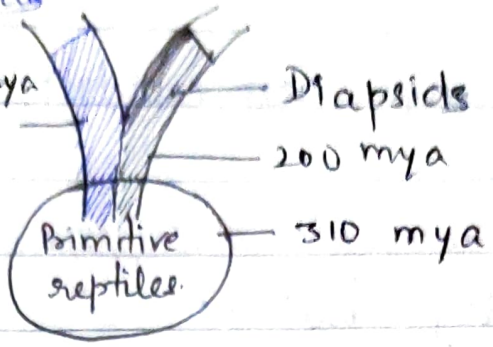
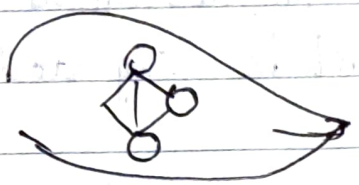
complete reptilian origin is polyphyletic.

06/09/2020
Tuesday

ORIGIN OF BIRDS



CC → Synapsida → Therapsids
DC → Diapsida → Bird origin
→ Modern reptiles.



Scientists are divided in 2 major groups depending opinion of origin of birds.

(1) Psed Pseudosuchian Thecodont theory:

Birds are evolved from animals who had some pseudosuchians. These small pseudosuchians gave to ~~free~~ three groups.

Pseudosuchian → Pterosaurs
→ Dranosaurs.
→ Crocodiles

▶ evidences in support:

* Pseudosuchian had several primitive bird characters like skull, elements of fore and hind limbs elemen

pelvic and pectoral girdles, ribs, tail vertebrae and teeth.

Appraisal:-
+ Archaeopteryx were present b/w 150-155-160 mya. so there is a large time gap b/w archaeopteryx and pseudosuchian. Pseudosuchians were pr in b/w 200-300 mya. Archaeopteryx has max. bird characters.

Conclusion - This theory couldn't be accepted due to larger time gap.

(2) ~~Pseudo~~ Coelurosaurian thecodont ancestory:

- Small bodied, lightly bodied.
- Bipedal dianosaurs with elongated limb adapted for running. They had several bird characters. If feathers are removed then archaeopteryx resembles with
- Originated 150-160 mya.

As the time is same for coelurosaurian and archaeopteryx, ~~th~~ former can't be regarded as parent of latter.

So this theory is also eliminiated.

(3) Merged theory of above two-

+ A/t Huxley & Birds are glorified reptiles. He added that, during early triassic period small pseudosuchians showed essential characteristic feature of birds. Detailed evidence suggests that cold-blooded terrestrial ancestral reptiles were transformed in warm blooded flying birds.

Birds are originated from ancient archaeosaurs during Jurassic pd. of Mesozoic era.

Flying reptiles like pterosaurs may not be ancestor for birds because they ~~didn't~~

Last important avian characteristic presence of clavicle which is imp. for attachment of several flight muscles. Without clavicles, these primitive ancestral bird reptile unable to flight. Wing of these reptiles (ptero saurs) were membranous folds of skin rather than having feathered wing.

* Archaeopteryx (An ancient bird) *

- In 1861, fossil was found in Bavaria of Germany. This fossil was pigeon sized animal living during Jurrasic pd. It had long reptilian tail, clawed finger but unfortunately, head was not preserved. Imprints of feather on head and wing found which are main character for an ancient bird.

- 18 years later in 1877, four different fossils were discovered that had almost complete body imprints and reinforced that the archaeopteryx are the ancestral bird.

Based on several fossil record, they told that archaeopteryx is only ancestral bird (1877)
Age of archaeopteryx = 150 - 165 mya.

- 1986, two scientists claimed that they have found fossils of two birds from Texas and they named them as protoaves.
- These protoaves are older than archaeopteryx. These protoaves had small wing than latter and had dianosaurs like characters. Hence some of zoologists think that protoaves are closer to ancestral avian stalk.

Modern bird
↑
Archaeopteryx
↑
Protoavis
↑
Ancestral reptile

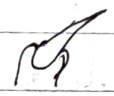
CONCLUSION :

Protoavis and archaeopteryx are only evidences that support origin of birds from ancestral reptile.

Origin of birds from ancient reptile to archaeopteryx or protoavis can be accepted based on their fossils record. Hence they are c/a missing link b/w reptiles and birds.

Reptilian character of archaeopteryx –

1. Presence of homodont teeth and teeth was lodged in a socket i.e. thecodont.



2. Tail was long, lizard like having >20 free caudal vertebrae.
3. Bones were not pneumatic.
4. Cervical vertebrae are fewer than birds with no fusion of sacreal vertebrae.
5. Sternum poorly developed without keel.
6. Each hand has 3 claws and carpals & metacarpals are free.
7. Pelvic girdle show elongated ~~ilium~~ ischium and backwardly directed pubis.
8. Brain was simple with ~~single~~ cylindrical cerebral hemisphere.

Avian character –

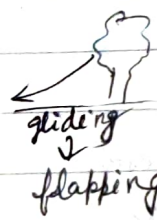
1. Presence of feathers for flight.

2. Forelimbs are modified in wings.
3. Tail bears 2 rows of feather.
4. Brain is cased in skull. Skull bones are fused
5. similar to birds.
5. Two jaws are elongated in beak.
6. Two clavicle fused to produce V-shaped furcula
7. Tibia and fibula are separate.

Conclusion : Birds are originated from ancestral reptile as evidenced by comparative anatomy such as skeleton, alimentary canal, resp., circulatory, nervous, sensory, organ, urinogenital system. Embryological evidences such as telolecithal egg, int. fertilization, meroblastic cleavage extra-embryonic memb. and palaeontological evidences such as archaeopteryx and protoavis.

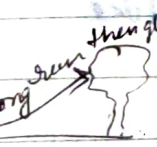
Q. How bird become good flier? or evolution of flight.
There are 2 hypothesis given to explain evol^{n} of modern bird.

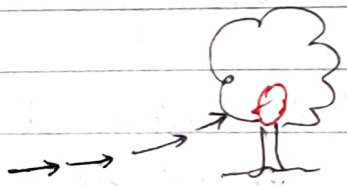
(A) Arboreal hypothesis – These protoavis and arch. have ability of flight by gliding and flapping which was evolved secondarily.



This was rejected b'coz. arch. have strong scaly legs which can't fit in this hypothesis.

(B) Cursorial hypothesis – A/t to this hypo., arch. might have gained ability to flight by leaping





Legs are strong built which support this theory.