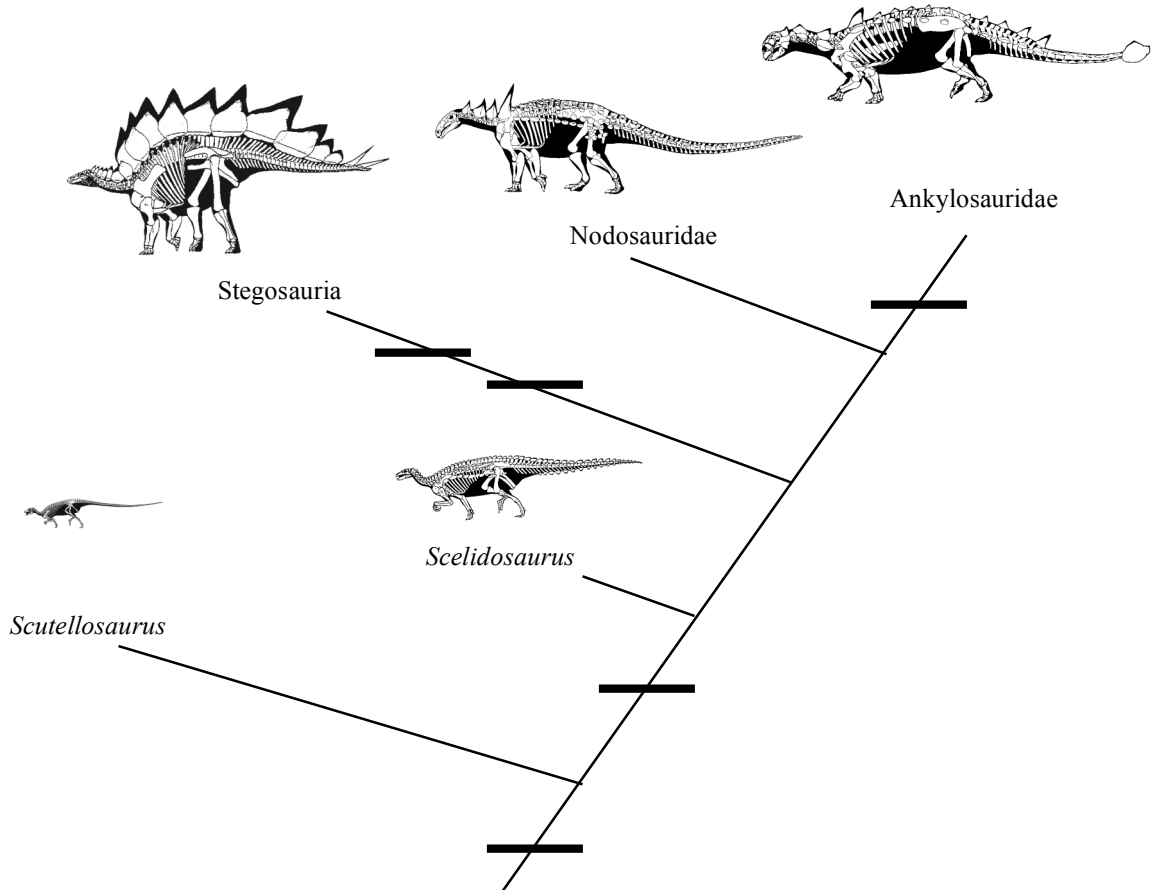


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GEOL 104 Dinosaurs: A Natural History
 Homework 3: Dinosaur Relationships

DUE: Wed. Nov. 1

Questions 1-8 refer to the thyreophoran cladogram below. The skeletal restorations are approximately to scale.



Put the numbers of shared derived characters listed below at the mark showing where they originate on the **cladogram** above:

- 1. Osteoderms
- 2. Obligate quadrupedality
- 3. Paired plates and spikes
- 4. Tail club
- 5. Thagomizer

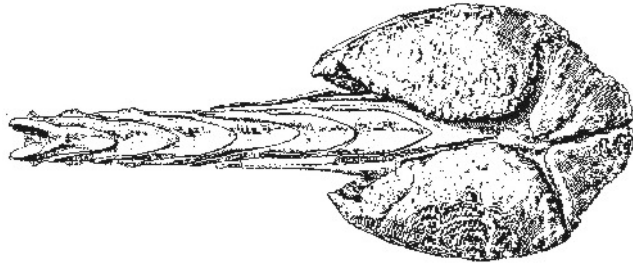
Indicate where the following names belong on the cladogram above:

- 6. Thyreophora
- 7. Ankylosauria

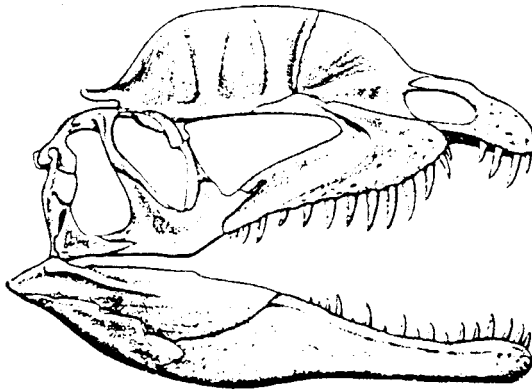
8. What is the hypothesized diet of the dinosaurs in the cladogram above?

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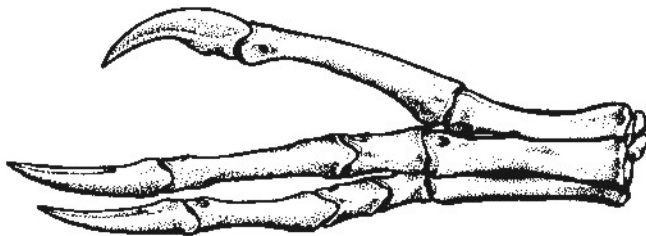
For questions 9-19, answer the questions referring to the illustrations immediately above them. Where given a choice in brackets, circle the correct answer.



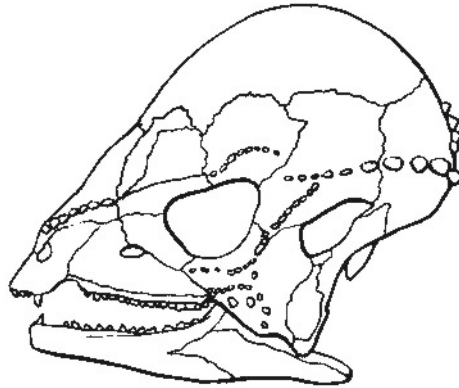
9. The above tail (in dorsal view) is from a [stegosaur | ankylosaurid | hadrosaurid].
10. The primary function for this tail was [to obtain food | as active defense | to help it run faster].



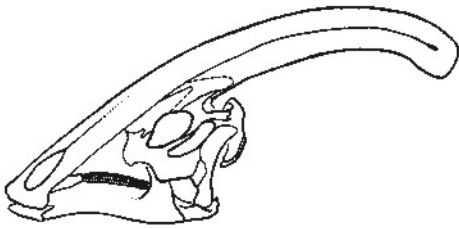
11. The skull shown above is from a [oviraptorosaur | coelophysoid | lambeosaurine].
12. This taxon had a diet primarily of [meat | plants | probably both meat and plants].



13. The manus above is from a(n) [tyrannosaurid | ornithomimosaur | hadrosauriform].
14. This taxon is a [ceratosaur | carnosaur | coelurosaur].

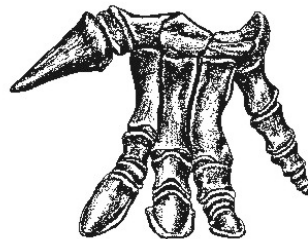
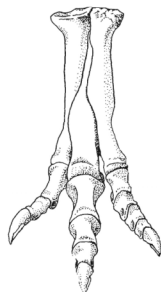


15. The skull above is from a [brachiosaurid | pachycephalosaur | ceratopsian].
16. What was the probable function of its thickened skull dome?

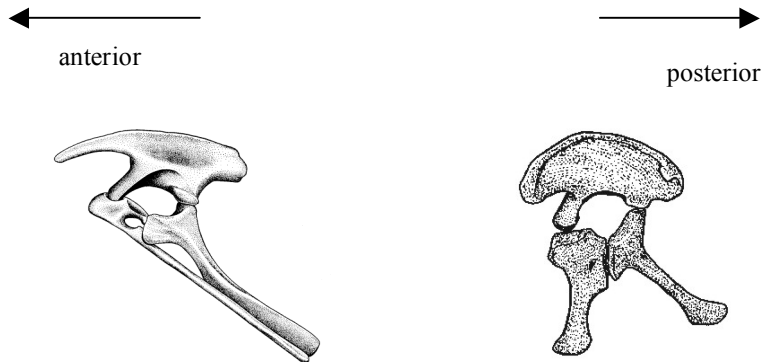


17. The skull above is from a [hadrosaurine | lambeosaurine | ceratopsine | centrosaurine].
18. The skull above is from a(n) [marginocephalian | ornithomimid | thyrophoran].
19. The skull above is from a(n) [ornithischian | saurischian].
Extra Credit) The diet of the dinosaur shown above was most likely [meat | plants].

For questions 20-24, identify which of the objects below is from a **hadrosauriform**, which is from a **tyrannosaurid**, and indicate the **arctometatarsus** and the **opposable digit V** on the appropriate fossil. (NOTE: these are NOT too scale).



Questions 25-26 refer to the pelvises below.

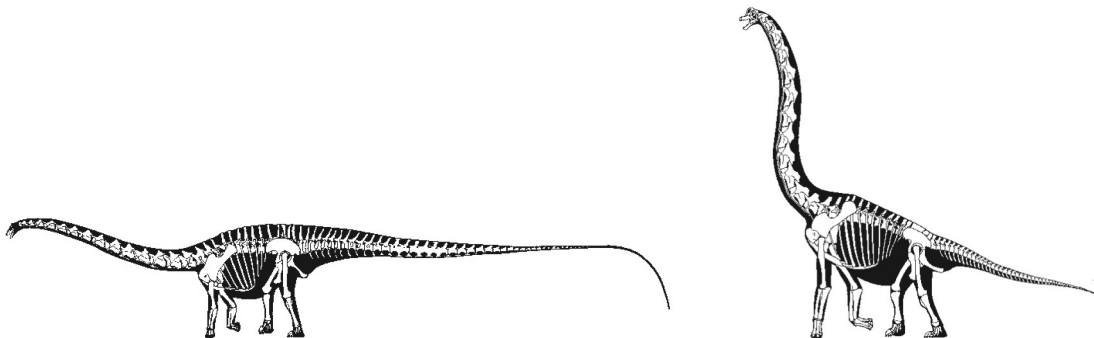


The pelvises above are in left lateral view.

25. The [left | right] pelvis is from a saurischian.
26. The [left | right] pelvis is from an ornithischian.

Extra Credit) In one of these, the main shaft of the pubis points backwards. Why is the backwards-pointing pelvis associated with plant-eating?

Sauropod dinosaurs evolved numerous approaches for feeding high in trees. Below are pictures of the diplodocid *Diplodocus* and the brachiosaurid *Brachiosaurus* (to scale). Match the dinosaur with the number of its tree-feeding strategy.



27. Built uphill, unlikely to have reared up.
28. Able to rear onto its hind legs.

Extra Credit) Identify which dinosaur above is a macronarian, and which is a diplodocoid.