Geo 302D: Age of Dinosaurs

LAB 1: Introduction to Paleontology and Dinosaurs

Dinosaurs captivate the imaginations of people of all ages, and across all time. Some people decide that they love dinosaurs so much, that they devote their lives to the study of these fascinating creatures. This introductory lab will give you a sense of what the field of paleontology is, as well an overview of the major types of dinosaurs that you will learn more about throughout the rest of the semester.

Paleontology is the study of the fossilized evidence of ancient organisms. You will learn more about what a fossil is and the different types of fossils later in the semester, but for all intents and purposes of this lab, a fossil is any evidence of past life (bone, footprint, etc.). Because paleontology is the study of life forms preserved in the rock record, paleontologists must be well-versed in both geology and biology.

Why study fossils (i.e., why do I have to know this)? Apart from being interesting and pretty, fossils are integral in how we understand the history of life, the history of the Earth, and they even affect our day to day activites. There are many benefits of studying paleontology, four of which are listed below:

1. **Biostratigraphy** – Fossils provide relative ages of rock layers. Specific organisms live at specific points in time. By identifying the fossils in a layer of rock, we can determine the age of those rocks. Fossils can be used to identify rocks of the correct age to yield oil, for instance.

2. **Evolution** – Over 99.9% of all organisms that ever lived are now extinct. Fossils are the only direct record of the history of life, and they add a fourth dimension to biology – time. Several organisms, including *Tyrannosaurus* and *Triceratops*, are known exclusively from fossils.

3. **Paleoecology** – Fossils provide information about ancient environments. Specific organisms often live in specific environments. For example, if you find fossils fish, they most likely were deposited in a river, lake, or ocean.

4. **Paleogeography** – Fossils provide information about the ancient arrangements of the continents. Fossils were used as evidence for continental drift, and ultimately plate tectonics. Fossils are also useful in determining the past geographic distribution of plants and animals.

Paleontologists study all forms of life, from the tiniest microbe to the largest whale. You will learn a little bit about the history of all vertebrates (the animals with background) in this course, but let's get onto the dinosaurs!

Dinosauria, the group to which all dinosaurs belong, comes in two major flavors:

1. **Ornithischia** – This group contains many of the plant-eating dinosaurs.

Triceratops (a member of the group Ceratopsia)

Styracosaurus (a member of the group Ceratopsia)

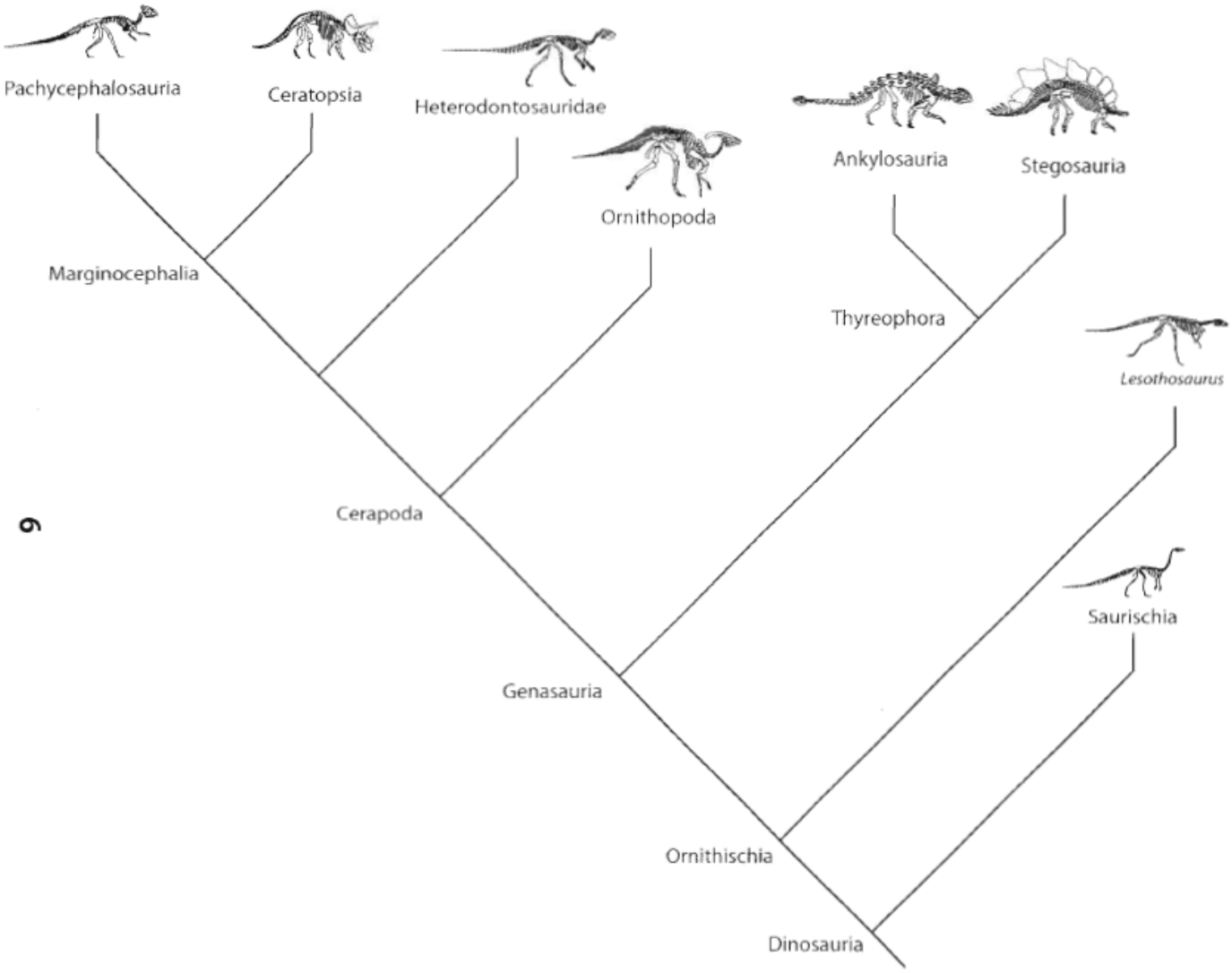
Protoceratops (a member of the group Ceratopsia)

Stegosaurus (a member of the group Stegosauria)

Pachycephalosaurus (a member of the group Pachycephalosauria)

Iguanodon (a member of the group Ornithopoda)

Parasaurolophus (a member of the group Ornithopoda)



2. **Saurischia** – This group contains the meat-eating dinosaurs (theropods) and the large plant-eating sauropods.

Apatosaurus (a member of the group Sauropodamorpha)

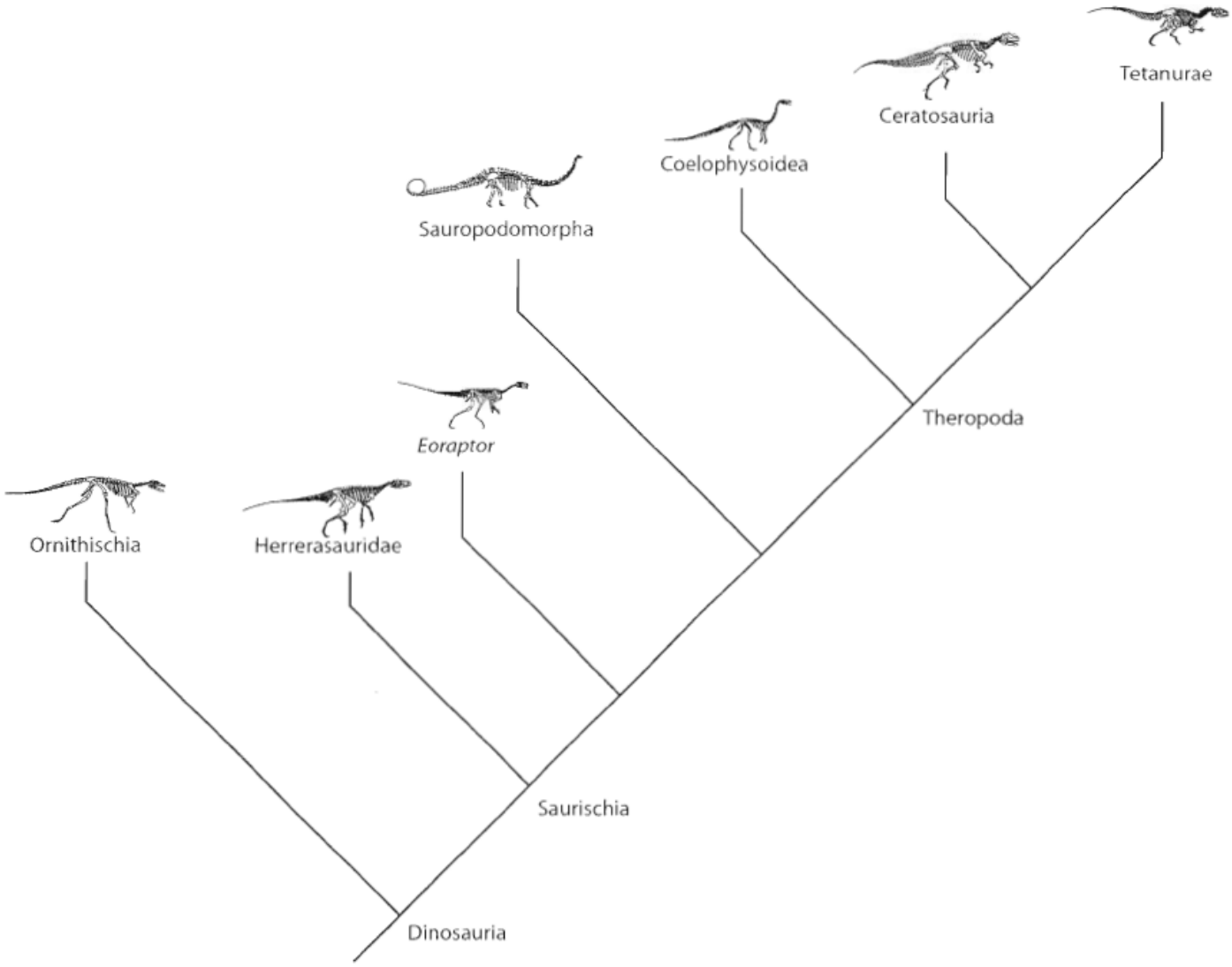
Diplodocus (a member of the group Sauropodamorpha)

Brachiosaurus (a member of the group Sauropodamorpha)

Allosaurus (a member of the group Tetanurae)

Tyrannosaurus (a member of the group Tetanurae)

Velociraptor (a member of the group Tetanurae)



Exercises:

1. Before beginning, list (at least) three things that you know about dinosaurs.

2. BE VERY CAREFUL! These models are very fragile, so take care when you touch them. Examine the various Ornithischia and Saurischia skeletal models. List one feature you notice that is unique about each taxon. By what criteria do you think that these animals were grouped into these separate groups?

3. This is a model of *Carnotaurus*. To which of the two major dinosaur groups (Ornithischia or Saurischia) do you think that *Carnotaurus* belongs? Why?

4. Take a look at the skeleton of the bird (Aves) – a pigeon to be exact. Birds are a specific type of dinosaur. To which of the two major dinosaur groups (Ornithischia or Saurischia) do you think that birds belong? Why?

5. Many vertebrate paleontologists want to work on dinosaurs, but the dinosaur fossil record is not unlike the material in this box. These are actual pieces of dinosaur bone. Keep this box of bones in mind as we proceed this semester.