COMPARATIVE VERTEBRATE ANATOMY

Biology 447 Spring 2009

- Review of syllabus
- Study methods
  - Observation of phylogentic changes through time
  - Lean evolutionary history of lineages and structures

Relate structure to function

Understand and use correct terminology

Proper names

Anatomy is a new language

Many terms are Latin or Greek

Break words into parts; assemble

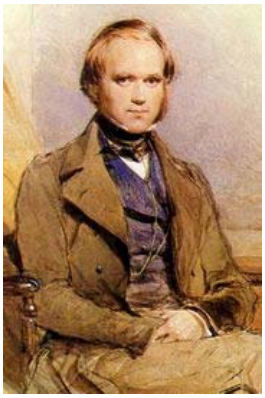
Use Glossary, p. 738 (Kardong)

- **Anatomy is the study of body structure**
  - Greek = dissect = "to cut up"
  - Morphology = the study of form
  - Study of similarity and difference among groups = comparative anatomy
  - Combining knowledge of structure with function = "functional morphology"

- **History of anatomy**
  - Essential primitively because animals were a food source
  - Medical purposes
    - Trepanation vented increased cranial pressures and surgical subjects survived
    - In some cases several different degrees of healing were observed on a single skull

Diogenes 5th century – described human blood vessel plan

Aristotle 4th century
Earliest comparative animal anatomy studies
Established taxonomy based on morphology
Scala naturae – organisms move up ladder to perfection

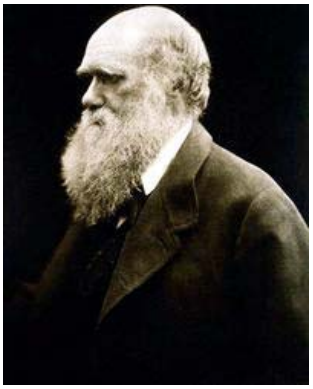


Charles Darwin as a young man

Erasistratus 3rd century

Physician

Named sigmoid and tricuspid heart valves related heart to blood flow

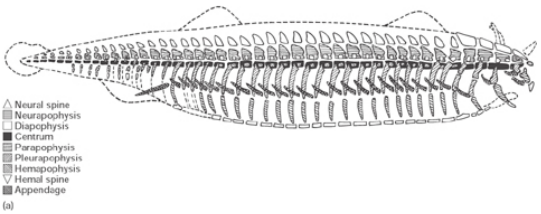


Charles Darwin as he is more commonly depicted

H. M. S. Beagle

T. H. Huxley

Huxley as Darwin's champion

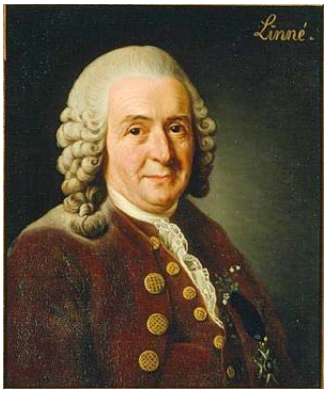


Archetype – a concept of Sir Richard Owen. The underlying patterns in the vertebrate body were a repeating series of vertebral units

Sir Richard Owen

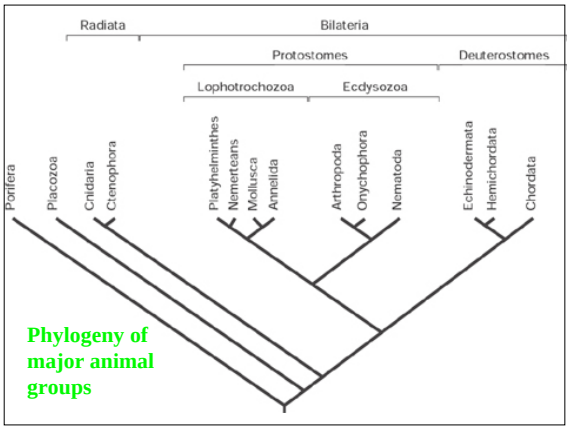
- Anatomist who first described *Archaeopteryx lithographica* and invented the name "Dinosauria"
- Studied many extinct species as well as living ones
- Difficult to interact with on a personal level, as remains true today with many scientists

Tried to take credit for finding *Iguanadon* from Gideon Mantell



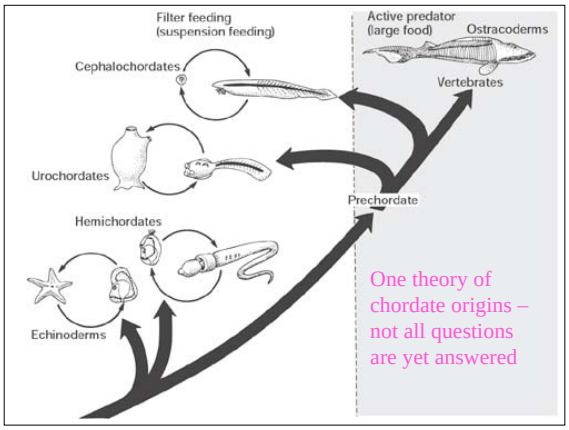
Carolus Linnaeus Created the modern system of binomial names

Louis Agassiz Founded the Museum of Comparative Zoology at Harvard



Phylogeny of major animal groups

- **Two different body plans**
- **Radiata**
  - Animals showing radial symmetry, such as echinoderms
- **Bilateria**
  - Animals showing bilateral symmetry, with two sides to the body form that are mirror images of each other



Phylum Chordata

- Subphylum **Urochordata**
- Subphylum **Cephalochordata**
  - These two groups seen in lab, so will not be discussed in lecture.
- Subphylum **Vertebrata**
  - Superclass **Agnatha**
    - Class **Myxini - hagfishes**
    - Class **Petromyzoniformes - lampreys**
    - Class **Conodonta***
      - *Not seen in lab, but do reading in text (pp. 87-89)

Chordate characters

- **Five main characters also discussed in lab**
  - Notochord
  - Pharyngeal slits
  - Hollow, dorsal nerve cord
  - Postanal tail
  - Endostyle or thyroid
- Protochordates include **Hemichordates**
  - Acorn worms as seen in lab – contain some chordate characters