Chapter 22

Descent with Modification: A Darwinian View of Life

• Aristotle: scala naturae
• Linnaeus - taxonomy

• Cuvier: catastrophism (災難說)
• Lyell: uniformitarianism (均變說)
• Lamarck: use and disuse of body parts; the inheritance of acquired (養成) characteristics
The Origin of Species

- Darwin developed two main ideas:
  - Descent with modification (世代修飾)
  - Natural selection
Overproduction of offspring

Camouflage

Camouflage

Percent of HIV resistant to 37°C

0 2 4 6 8 10 12

0 25 50 75 100

Weeks

Patient No. 1

Patient No. 2

Patient No. 3

Bristolis insolens
Bristolis bristolensis
Bristolis harringtoni
Bristolis mohavensis

Latham Shale dig site, San Bernardino County, California

(a) Pakicetus (terrestrial)
(b) Rhodocetus (predominantly aquatic)
(c) Dorudon (fully aquatic)
(d) Balaena (recent whale ancestor)
**Homologous structures**

- Humerus
- Radius
- Ulna
- Carpals
- Metacarpals
- Phalanges

**Human**

**Cat**

**Whale**

**Bat**

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**Pharyngeal pouches**

- Chick embryo (LM)

- Human embryo

- Vestigial structures

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**Evolutionary tree**

- Branch point (common ancestor)

- Tetrapod limbs

- Amphibians

- Mammals

- Lizards and snakes

- Crocodiles

- Ostriches

- Hawks and other birds

- Feathers

- Amnion

- Homologous characteristic

- Convergent evolution

- Analogous features

- Sugar glider

- Flying squirrel

- North America

- Australia