EXTINCTION
Accepting the Fact of Extinction

- Historical reasons for not accepting
  - Divine providence – all life was created at once and God would protect it
  - Fossils represented yet undiscovered species
  - The flood – all things were saved
- Creationists now accept extinction but not new forms
Accepting the Fact of Extinction

- “Extinction is the rule, not the exception.” J. Lucas-Clark
- “All species that have ever lived are, to a first approximation, dead” D. Raup
Accepting the Fact of Extinction

- Modern reluctance to accept extinction
  - Conscious that all species eventually become extinct, yet we hate to see it happen.

- Humans are the only animal that actively tries to prevent the extinction of other species
The **California Condor** (*Gymnogyps californianus*) is a **North American species** of **bird** in the **New World vulture** family **Cathartidae** and the largest North American land bird. Although other **fossil members are known**, it is the only surviving member of the **genus Gymnogyps**.
a conservation plan was put in place by the United States government that led to the capture of all the remaining wild condors in 1987. These 22 birds were bred at the San Diego Wild Animal Park and the Los Angeles Zoo. Numbers rose through captive breeding and, beginning in 1991, condors have been reintroduced into the wild. The project is the most expensive species conservation project ever undertaken in the United States. (Wikipedia)
Accepting the Fact of Extinction

- Reasons for resisting extinction of other species
  - Useful to humans in some way?
  - Fear of change?
  - Sentimentality?
  - Others???
- Why are we worried about our impact vis-a-vis extinctions?
Accepting the Fact of Extinction

- Have other species ever had a similar impact on life?
  - Fish?
  - N. American placental mammals?

- Would the world be better off without humans?
Catastrophism

• Georges Louis LeClerc “Buffon” 1778
  • Earth was old and had changing conditions
  • Catastrophes explained unconformities and extinctions
  • Creationist still believe this
Catastrophism

- Cuvier 1796
  - “a world before ours”
  - Earth history = a series of catastrophes
  - Believed in extinction
  - Described many fossil/extinct forms of life
Great Chain of Being

- Various lives continually evolving to more advanced forms. Can’t break the chain or more advanced forms will not appear.
1840’s

- Uniformitarianism
- Dinosaur fossils
- William Smith – Faunal succession
- Charles Lyell – down a side track
Darwin

- Each new fauna out-competed previous fauna
- Survival of the fittest meant generally improving forms of life - “chain of life”
- If an old fauna lived today, it would be out-competed by modern life? – example, South American marsupials and N. American placental
Jurassic Park – would a past animal triumph today? Starve to death?

Put Pleistocene Mammoths in Eocene pantropical conditions.

If world is constantly changing, is “fitness” also changing?
Longevity or Extinction

- There are some long-lived things.

- Tautologies and Circular Reasoning.
  - Lack of evidence in fossil record as to cause
  - Inadequacy of modern analogues

- Darwinian failures to adapt or “Bad Genes”
Condors and Vultures

Replacement by more Adapted species?  Failure to adapt?
Neocatastrophism

- Bad Luck?
  - Asteroids?
  - Small changes in environment?
  - Human interference?

- Extinction resistance
  - Widespread distribution?
  - Longevity – a handicap or advantage?
The Survivorship Curve

- Leigh Van Valen
  - Most Taxa have short lives
  - Few taxa have longer lives
  - Chance of survival same

- Red Queen Hypothesis
  - Constant need to improve
Can Species Improve?

- Punctuated Equilibrium suggests that they can only be replaced by other, improved species.
Mass Extinctions

- Mid 1800’s Time Scale Designations of the larger units based on mass extinctions
- 1980’s asteroid impact hypothesis renewed interest in mass extinction
- Newer theories and new evidence to explain mass extinctions
The Big Five

- Late Ordovician
- Late Devonian
- Permian/Triassic – End of Paleozoic
- Late Triassic
- Cretaceous/Tertiary – End of Mesozoic
- Smaller
  - Eocene/Oligocene
  - Pleistocene Megafauna
A Common Cause