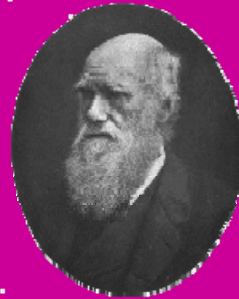


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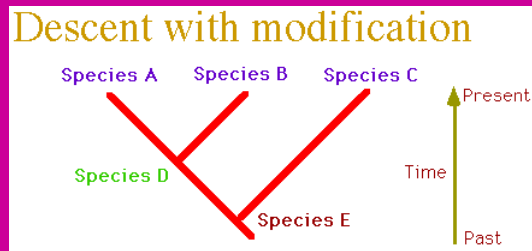
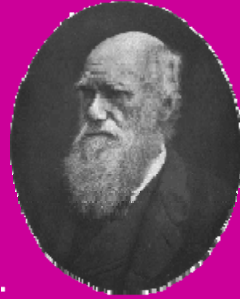
Self, World
& God

EVOLUTION

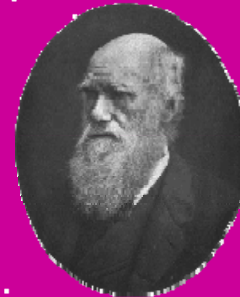


- Technical terms
- Biological change
- History of biological change
- Descent with modification
- Common descent
- Vertical evolution
- Horizontal evolution

DESCENT WITH MODIFICATION

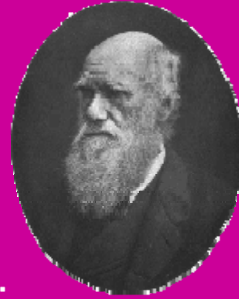


EVIDENCE FOR DESCENT WITH MODIFICATION



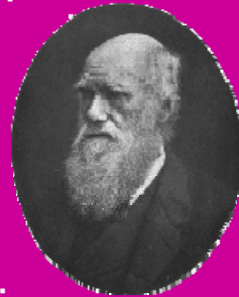
- Inference to the best explanation
- Johnson's "recipe"
- Schematizing
- Evidence in Darwin's time
- Power of Darwin's presentation
- General acceptance of this part

EXPANDED AGE OF THE EARTH



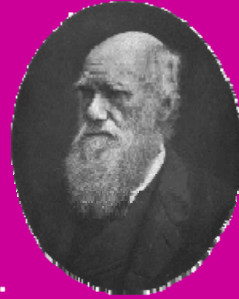
- Biblical calculation
- Tens of thousands of years
- Geological time
- Uniformativism
- Darwin's arguments
- 4.6 billion years

CASE FOR COMMON DESCENT



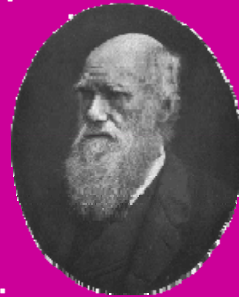
e_1 . Expanded age of the earth.

DATA FROM THE FOSSIL RECORD



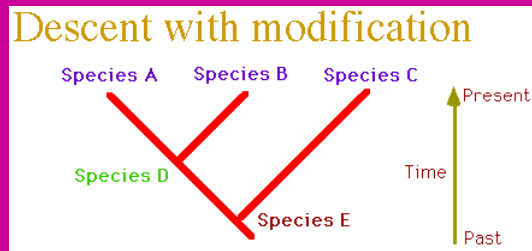
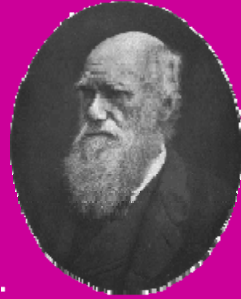
- Fossil record
- Cuts both ways
- Darwin on difficulties of fossils
- Clear evidence of change

CASE FOR COMMON DESCENT

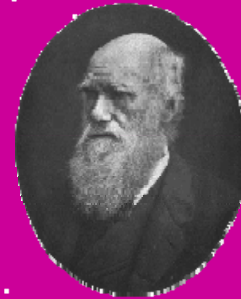


- e_1 . Expanded age of the earth.
- e_2 . Fossil record.

DESCENT WITH MODIFICATION

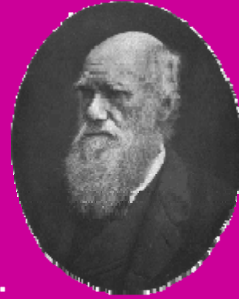


Scala Naturae



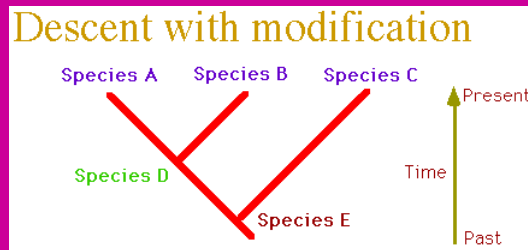
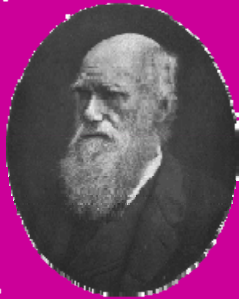
- Natural system problem
- Linnaeus
- Biological categorization
- Where does the order come from?
- Why is it hieratical?

CASE FOR COMMON DESCENT

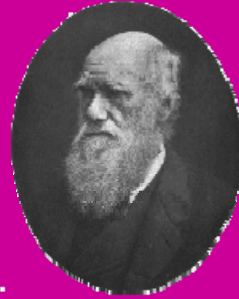


- e_1 . Expanded age of the earth.
- e_2 . Fossil record.
- e_3 . *Scala Naturae*

DESCENT WITH MODIFICATION

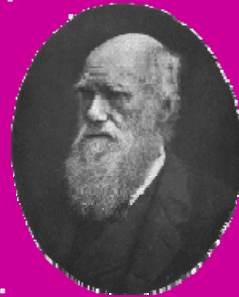


GEOGRAPHICAL DISTRIBUTION



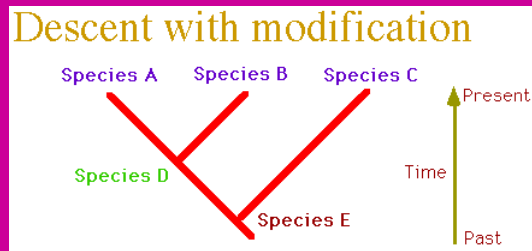
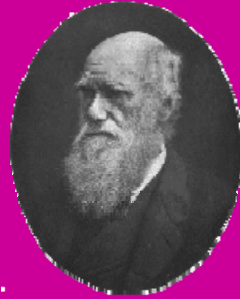
- Biogeography
- First line of *Origin of Species*
- Why the patterns between species and geography?
- The Galapagos

CASE FOR COMMON DESCENT

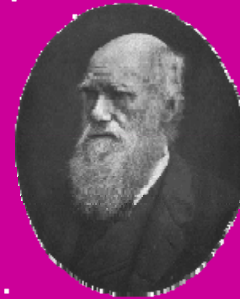


- e_1 . Expanded age of the earth.
- e_2 . Fossil record.
- e_3 . *Scala Naturae*
- e_4 . Patterns of geographical distribution.

DESCENT WITH MODIFICATION

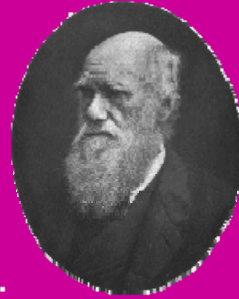


MORPHOLOGY



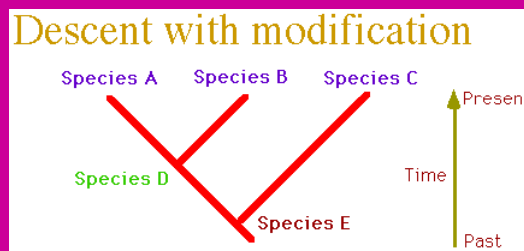
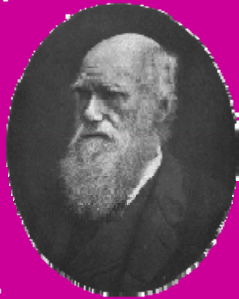
- Etymology
- Study of form
- Examples:
 - Tetrapod structure
 - Structural similarity in birds
 - Forelimbs of mammals
 - Vestigial organs

CASE FOR COMMON DESCENT

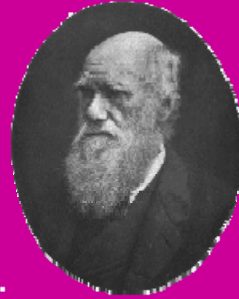


- e_1 . Expanded age of the earth.
- e_2 . Fossil record.
- e_3 . *Scala Naturae*
- e_4 . Patterns of geographical distribution.
- e_5 . Morphological considerations

DESCENT WITH MODIFICATION

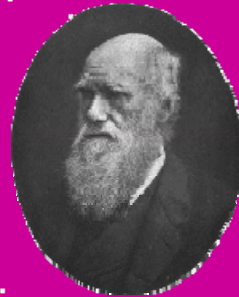


EMBRYOLOGY



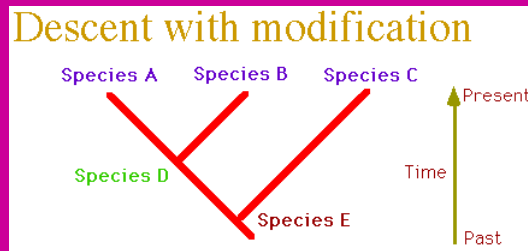
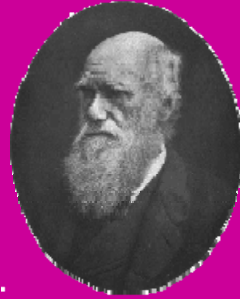
- Ontology
- Links to *Scala Naturae*
- Chickens, fish, humans
- Human embryological development

CASE FOR COMMON DESCENT

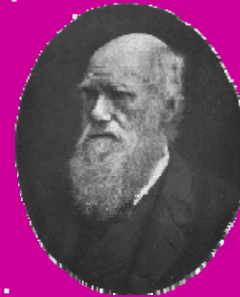


- e₁. Expanded age of the earth.
- e₂. Fossil record.
- e₃. *Scala Naturae*
- e₄. Patterns of geographical distribution.
- e₅. Morphological considerations
- e₆. Embryological development

DESCENT WITH MODIFICATION

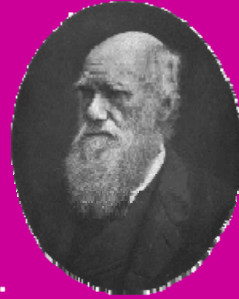


CASE FOR COMMON DESCENT



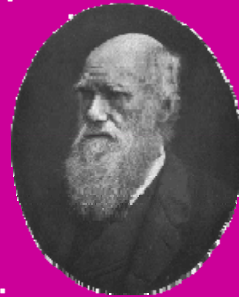
- e_1 . Expanded age of the earth.
- e_2 . Fossil record.
- e_3 . *Scala Naturae*
- e_4 . Patterns of geographical distribution.
- e_5 . Morphological considerations
- e_6 . Embryological development
- =====
- t_0 . Descent with modification

ALTERNATIVE EXPLANATIONS



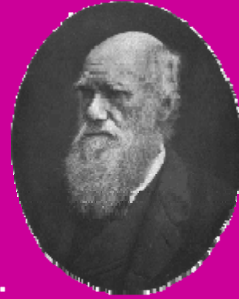
- t₀. Descent with modification
- t₁. Lamarkean evolution
- t₂. Special creation
- t₃. Something as yet undiscovered

RANK ORDER



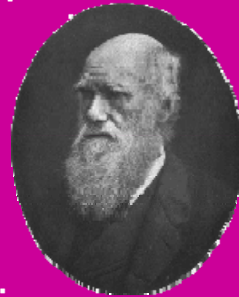
- Darwin's ranking
- Darwin's contemporaries' ranking
- Contemporary ranking
- Your own ranking
 - Doesn't have to deny God
 - What your intellectual conscience tell you - not your heart

Natural Selection



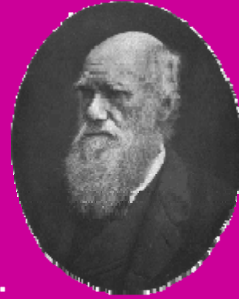
- Why the biological change implied by common descent?
- Lamarckian evolution - acquired characteristics
- Selection metaphor
- Artificial selection
- Background:
 - Expanded age of the earth
 - Malthus

CASE FOR NATURAL SELECTION



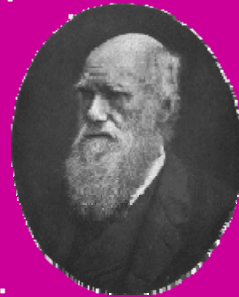
- e_1 . Through e_6 .
- e_7 . Artificial selection

**CASE FOR
NATURAL
SELECTION**



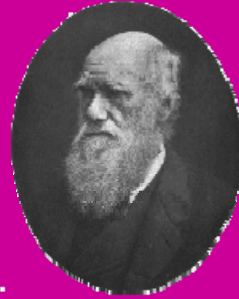
- e_1 . Through e_6 .
- e_7 . Artificial selection
- e_8 . Fecundity of all species

**CASE FOR
NATURAL
SELECTION**



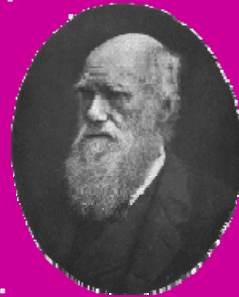
- e_1 . Through e_6 .
- e_6 . Artificial selection
- e_7 . Fecundity of all species
- e_8 . General stability of populations

CASE FOR NATURAL SELECTION



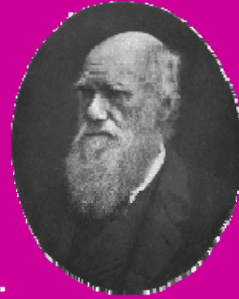
- e_1 . Through e_5 .
- e_7 . Artificial selection
- e_8 . Fecundity of all species
- e_9 . General stability of populations
- e_{10} . Limited natural resources

FIRST INFERENCE



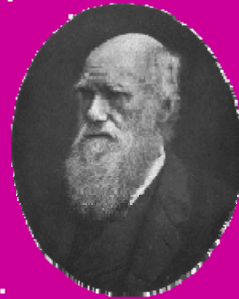
- e_1 . Through e_5 .
 - e_6 . Artificial selection
 - e_7 . Fecundity of all species
 - e_8 . General stability of populations
 - e_9 . Limited natural resources
- =====
- t'_0 . Struggle for existence

**CASE FOR
NATURAL
SELECTION**



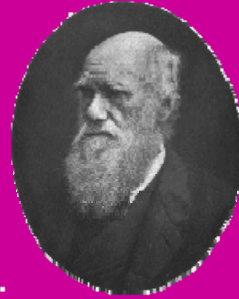
- e_1 . Through e_6 .
- e_7 . Artificial selection
- e_8 . Fecundity of all species
- e_9 . General stability of populations
- e_{10} . Limited natural resources
- =====
- t'_0 . Struggle for existence
- e_{11} . No two individuals are the same

**CASE FOR
NATURAL
SELECTION**



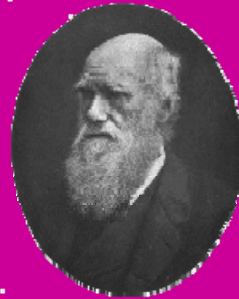
- e_1 . Through e_6 .
- e_7 . Artificial selection
- e_8 . Fecundity of all species
- e_9 . General stability of populations
- e_{10} . Limited natural resources
- =====
- t'_0 . Struggle for existence
- e_{11} . No two individuals are the same
- e_{12} . Much of this variability is heritable

SECOND INFERENCE



- e₁. Through e₆.
- e₇. Artificial selection
- e₈. Fecundity of all species
- e₉. General stability of populations
- e₁₀. Limited natural resources
- =====
- t'₀. Struggle for existence
- e₁₁. No two individuals are the same
- e₁₂. Much of this variability is heritable
- =====
- t''₀. Struggle is not completely random - natural selection

THIRD INFERENCE



- e₁. Through e₆.
- e₇. Artificial selection
- e₈. Fecundity of all species
- e₉. Stability of populations
- e₁₀. Limited natural resources
- =====
- t'₀. Struggle for existence
- e₁₁. No two individuals are the same
- e₁₂. Much of this variability is heritable
- =====
- t''₀. Struggle is not completely random - natural selection
- =====
- t'''₀. Over many generations - origin of new species