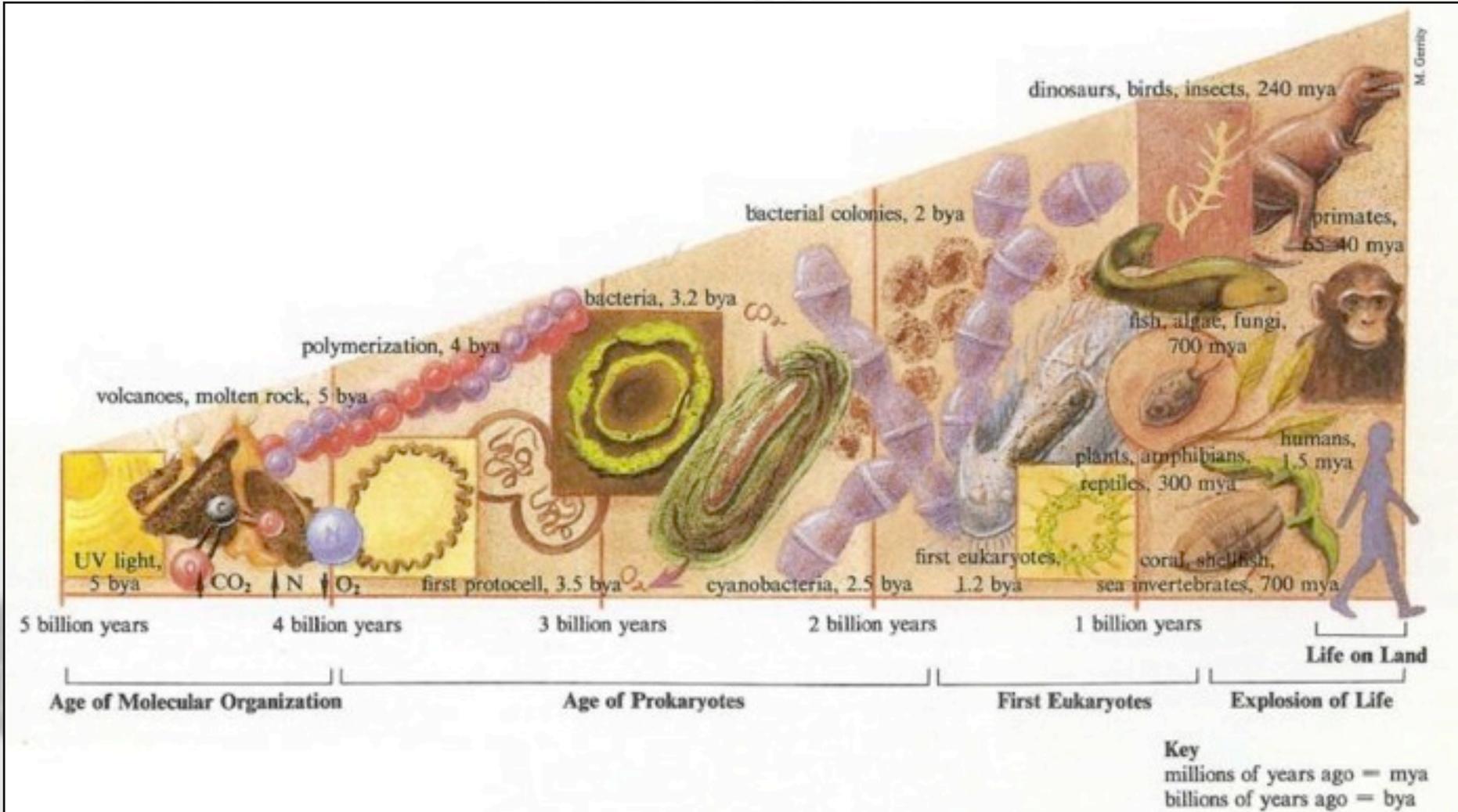


CHAPTER 11

ORIGINS OF EVOLUTIONARY SCIENCE

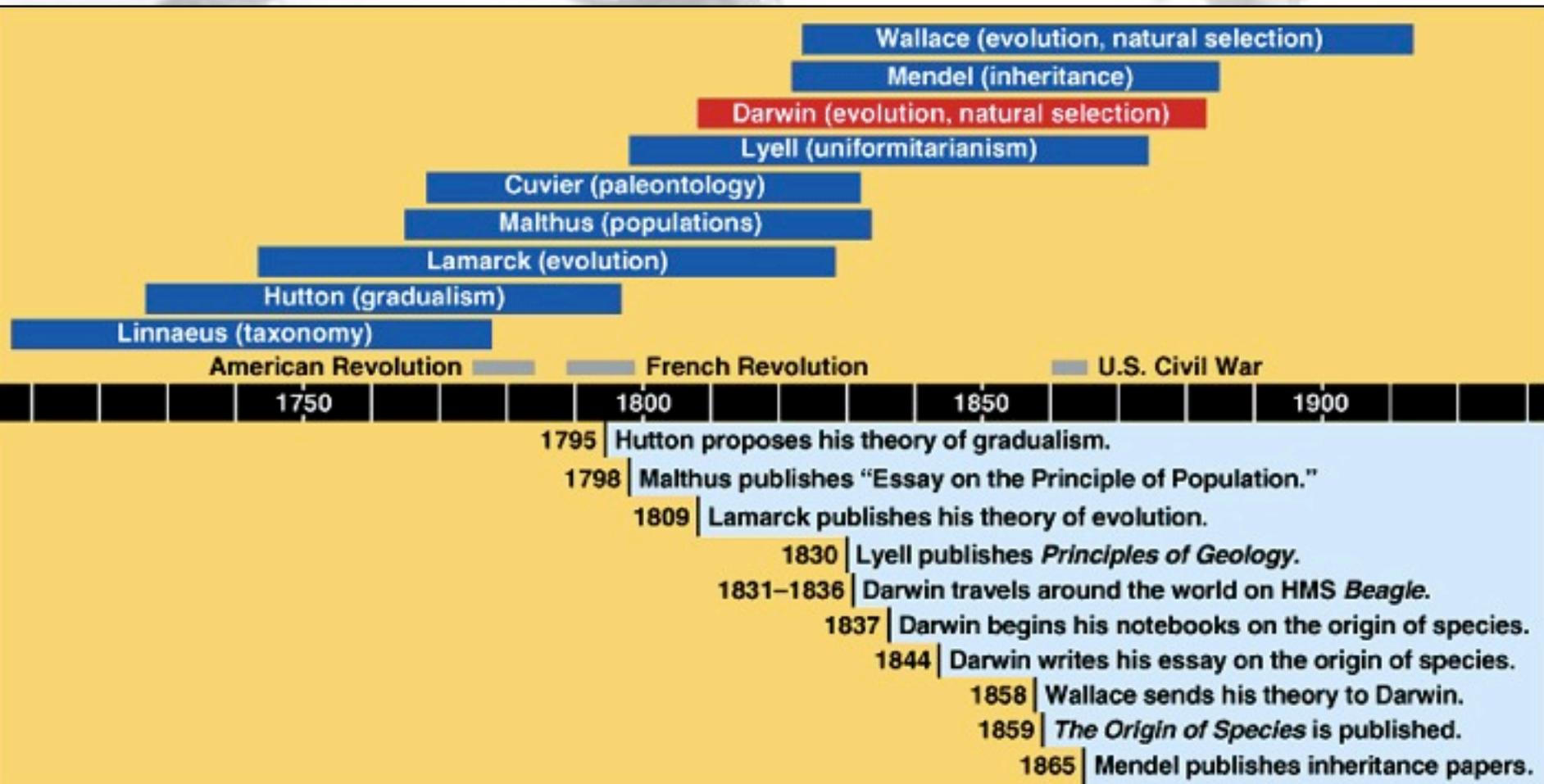


Fossils

- Examination of the fossil record reveals changes in life forms throughout the Earth's history
- Majority of fossils are hard body parts (bone, teeth, shells)
- Some fossils are traces of activity (footprints, burrows)
- Rarely found are entire bodies (insects in amber, mammoth in ice)
- The most numerous fossils are microscopic (pollen, foraminifera)
- The study of fossils is PALEONTOLOGY
- Modern fossil record is comprised of more than 1/4 million species

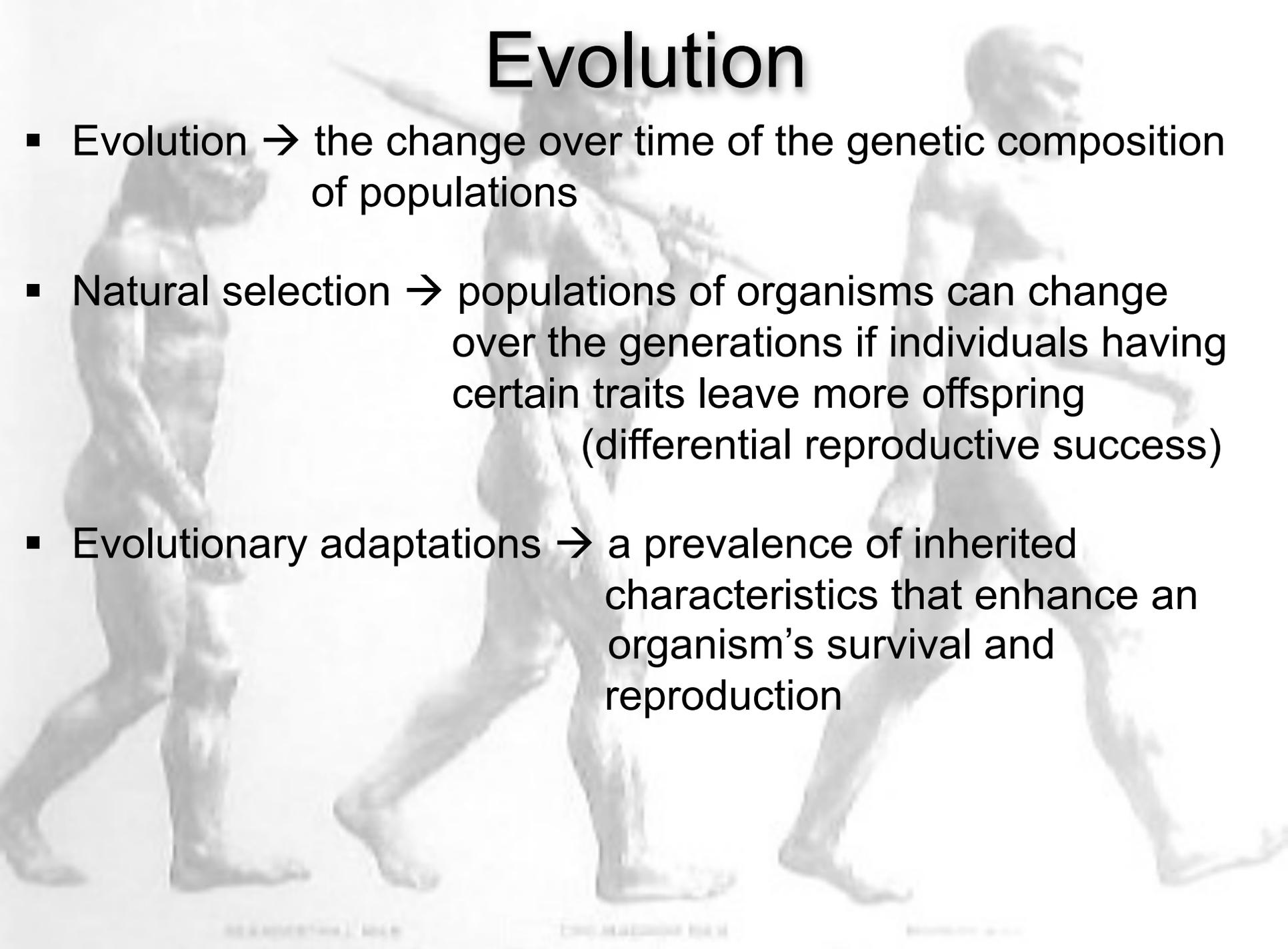


Evolutionary Concepts

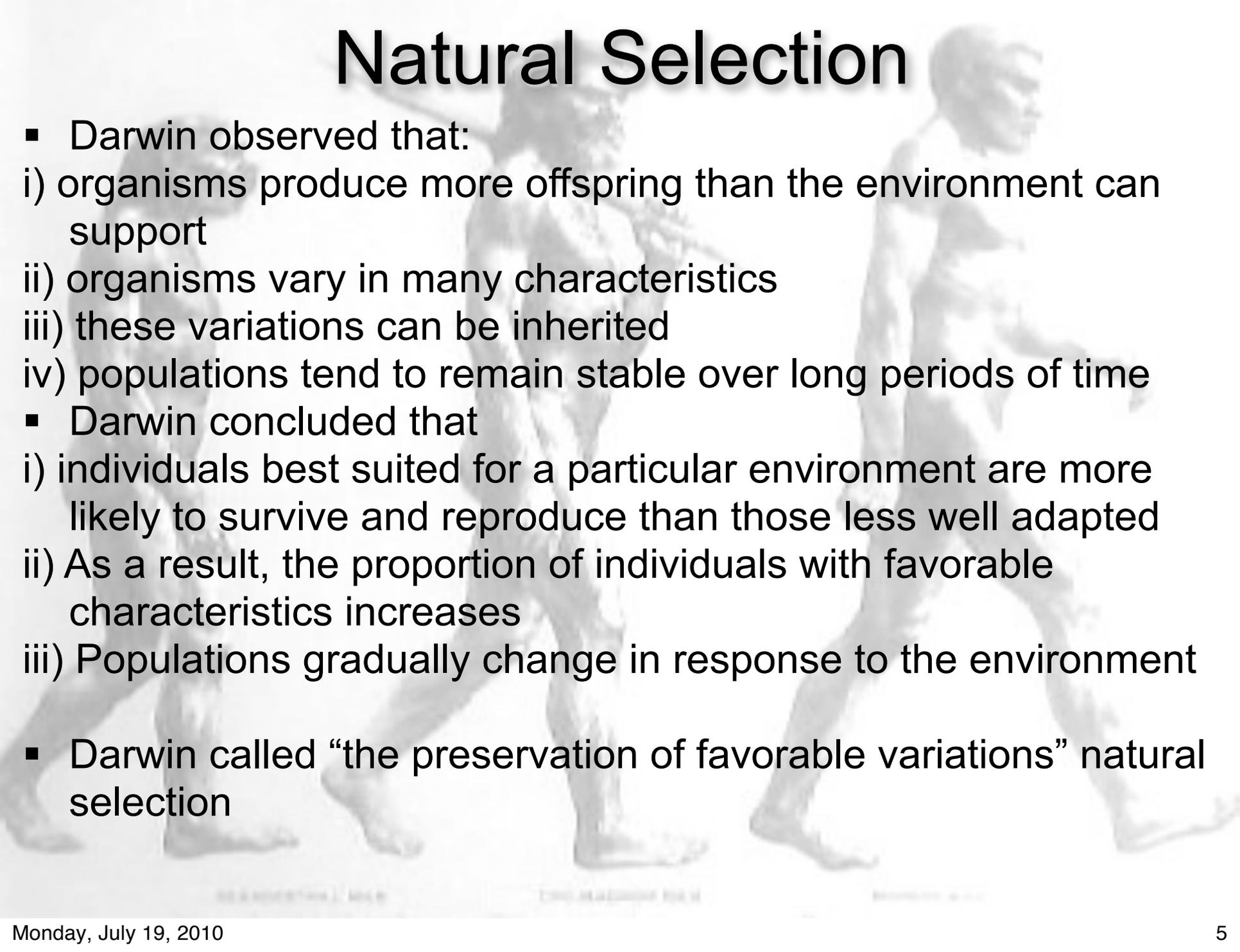


Evolution

- Evolution → the change over time of the genetic composition of populations
- Natural selection → populations of organisms can change over the generations if individuals having certain traits leave more offspring (differential reproductive success)
- Evolutionary adaptations → a prevalence of inherited characteristics that enhance an organism's survival and reproduction

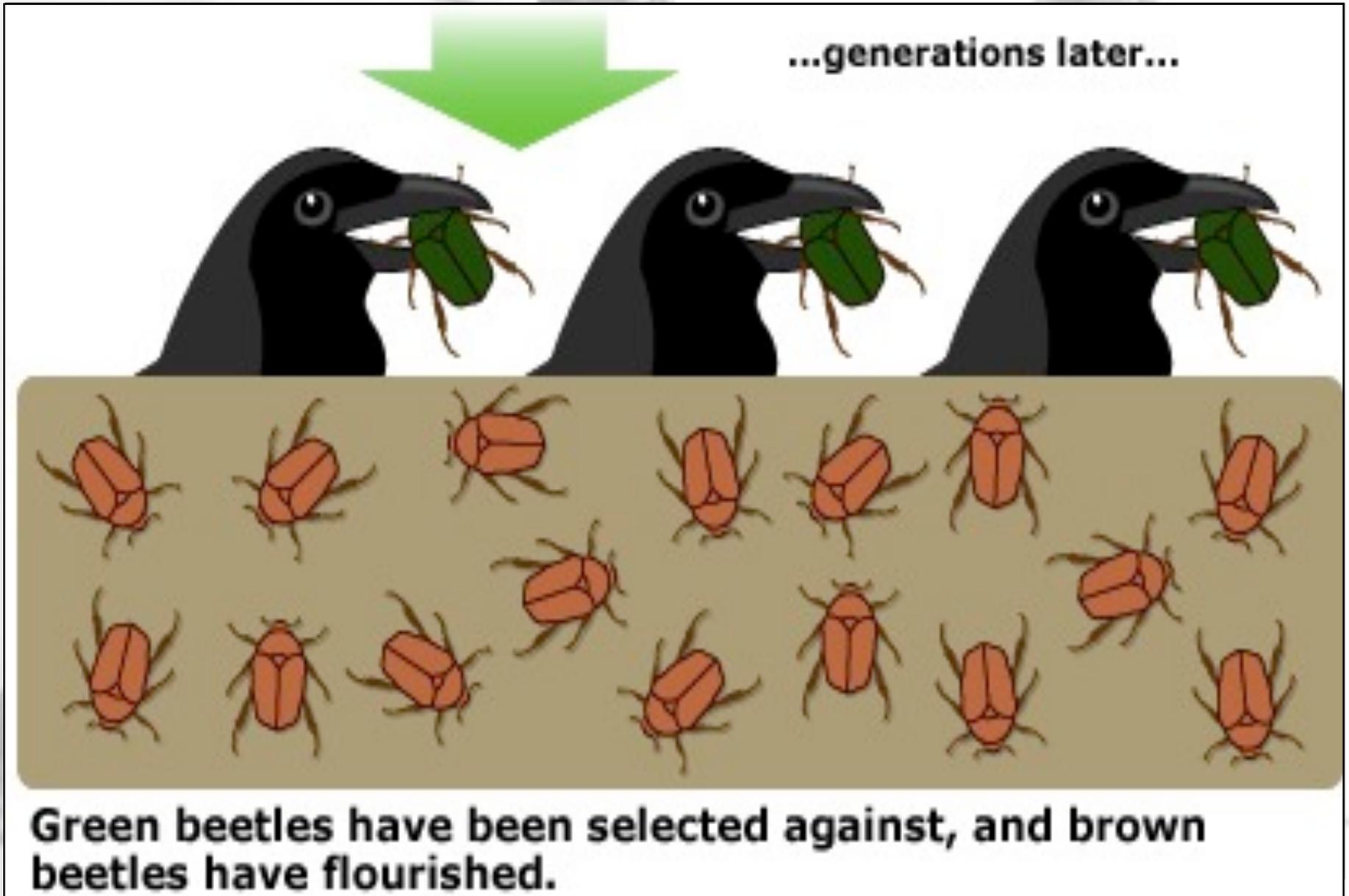


Natural Selection



- Darwin observed that:
 - i) organisms produce more offspring than the environment can support
 - ii) organisms vary in many characteristics
 - iii) these variations can be inherited
 - iv) populations tend to remain stable over long periods of time
- Darwin concluded that
 - i) individuals best suited for a particular environment are more likely to survive and reproduce than those less well adapted
 - ii) As a result, the proportion of individuals with favorable characteristics increases
 - iii) Populations gradually change in response to the environment
- Darwin called “the preservation of favorable variations” natural selection

Natural Selection



Green beetles have been selected against, and brown beetles have flourished.

Evidence for Evolution

- BIOGEOGRAPHY → study of the location and distribution of organisms
(ie. similarity amongst organisms on different continents)
- FOSSIL RECORD → shows a succession of forms over time
→ displays transitional links between species
→ suggests vertebrate descent
- COMPARATIVE MORPHOLOGY → analogous features
→ structures that share common function but not origin



Evidence for Evolution

- COMPARATIVE MORPHOLOGY → homologous features
→ structures that share common origin but perform different functions

