

The Evolution of an Idea

36-149 The Tree of Life

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The Fixity of Species

- What is a species?
- Aristotle and Genesis
- The Great Chain of Being
- This view of life, circa 1800.

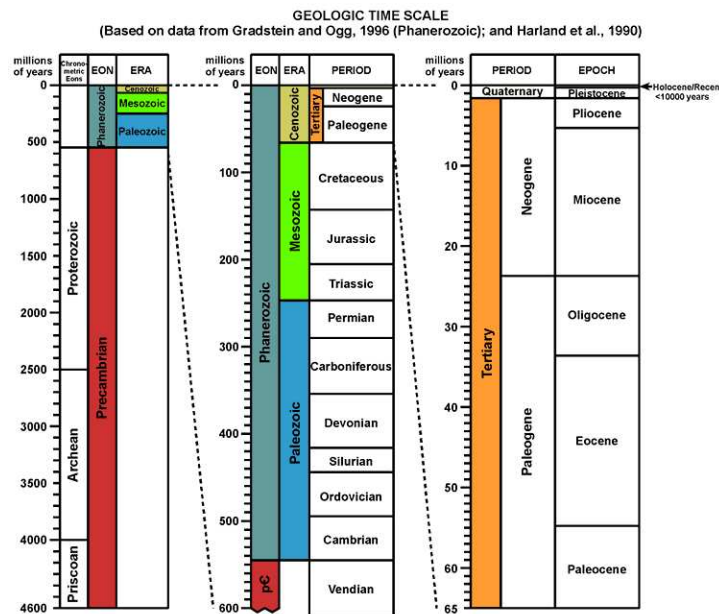
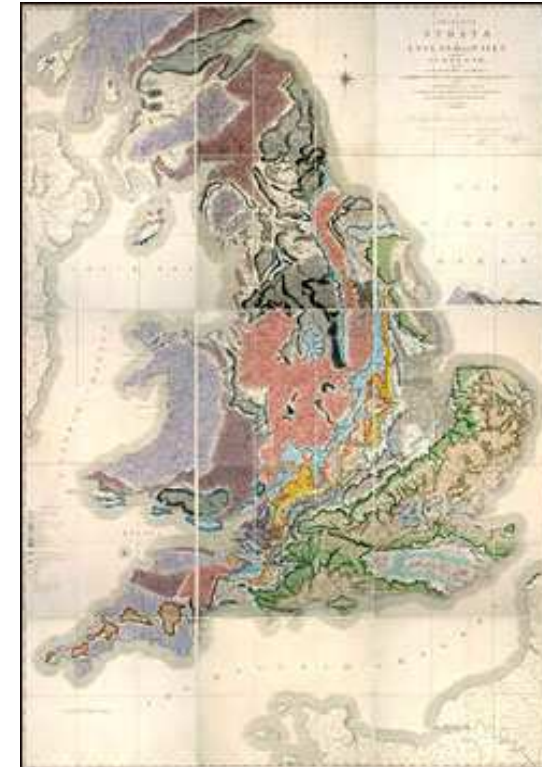
The Man with the Big Head

- Cuvier and the beginnings of paleontology
- Function, transmutation, and the “correlation of parts”
- The Earth is old.
- Extinction! Species disappear.



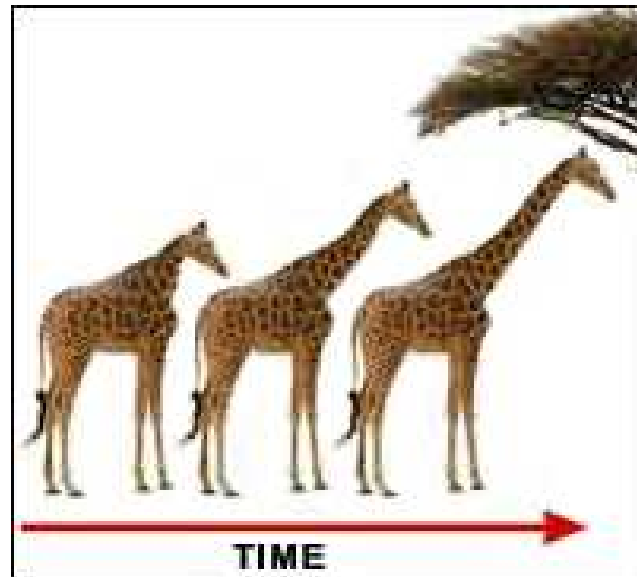
Rock Hard Evidence

- William Smith and the science of stratigraphy
- William Buckland, Gideon Mantell, and the discovery of dinosaurs
- Species appear!
- Sedgwick, Murchison, and the earliest strata
- Progress and complexity: the Great Chain again.



The Giraffe's Neck

- A role for the environment; use and disuse; adaptation.
- Erasmus Darwin: evolution in verse
- Lamarck and the inheritance of acquired characters.
- A discredited theory; what of the environment?

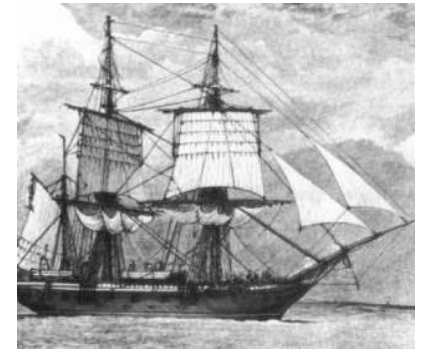


Dust in the Wind

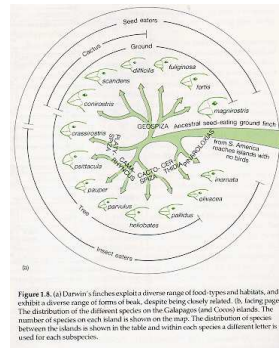
- Catastrophism: the sudden and qualitative changes in the fossil record result from devastating catastrophes that strike periodically, wiping out the majority of life.
- Lyell and Uniformitarianism: the geological processes observed in the present – volcanism, earthquakes, water, and wind – are sufficient to explain the geology of the past.
“The present is the key to the past.”
- Lyell’s earth underwent constant change, but the change was neither progressive nor directed.



The Voyage of the Beagle



- A lucky break for Charles.
- Naturalist or guest, seasick either way
- The road to St. Jago (Cape Verde Islands)
- Tierra del Fuego
- The Galapagos Islands



Secret Writings

- Darwin gathered his evidence, pursued his ideas, and refined his arguments, all in secret.
- But transmutation was in the air.
 - Robert Grant, *Outline of Comparative Anatomy* (1841)
 - Robert Chambers, *Vestiges of the Natural History of Creation* (1844, anonymous)
- *Vestiges* in particular was a tremendous popular success, though not rigorous enough to gain the respect of scientists
- Darwin saw the urgency of his situation and the need for care.

Darwin and Wallace

- Wallace's life and work,
- A note in the mail: the role of connections and class
- A convenient arrangement.
- Natural Selection and *On the origin of Species*.

It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; Inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the external conditions of life, and from use and disuse; a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less-improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.

– Charles Darwin, *On the origin of species*, 1859.

Punchline

Blue Pages

What do you think was the most important idea covered in today's class?

Early Evolutionary Thinker List

Aristotle

Georges-Louis Leclerc, Comte de Buffon

Erasmus Darwin

Jean Baptiste Pierre Antoine de Monet, Chevalier de Lamarck

Georges Cuvier

Étienne Geoffroy St. Hilaire

Adam Sedgwick

Richard Owen

William Buckland

Alfred Russel Wallace

Charles Lyell

Announcements

- Pick up Assignment sheets.
- Book list is available as well.
- Contact me if you have any questions or problems.