

Evolution and the Origins of Species
STS.003, Fall 2010

Unit 2: Nature

A detailed landscape painting showing a vast mountain range in the background, with a river flowing through a lush, green valley in the foreground. The scene is filled with dense foliage, including large trees on the right side, and a small waterfall cascading into the river. The sky is filled with soft, white clouds, and the overall atmosphere is serene and majestic.

(1a) Are humans part of nature? Are they distinct from nature? Do they make nature?

(1b) Are living things, in particular species, changing or unchanging?

(2) Science and commerce

You are here

CAROLI LINNÆI

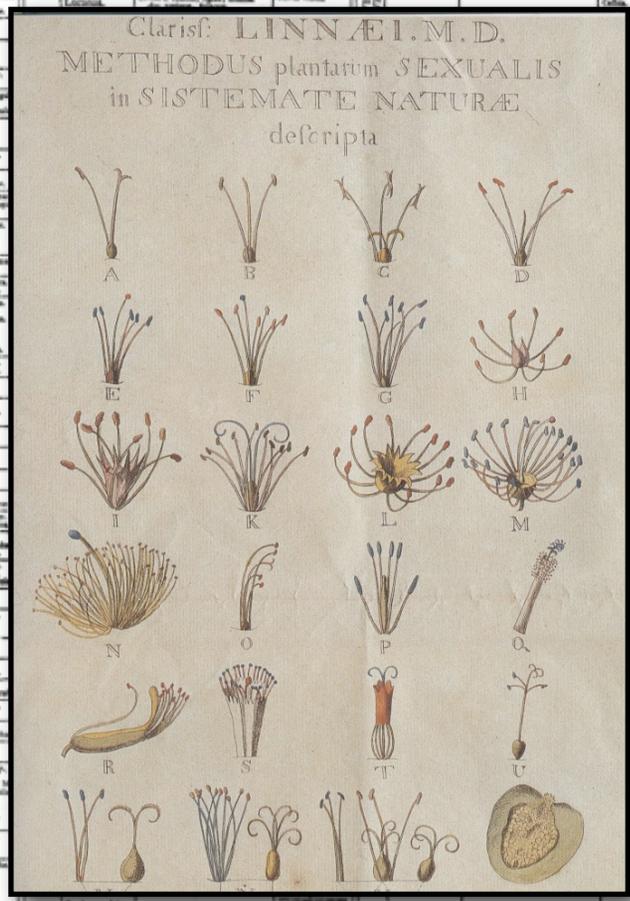
REGNUM ANIMALE.

I. QUADRUPEDIA. II. AVES. III. AMPHIBIA.

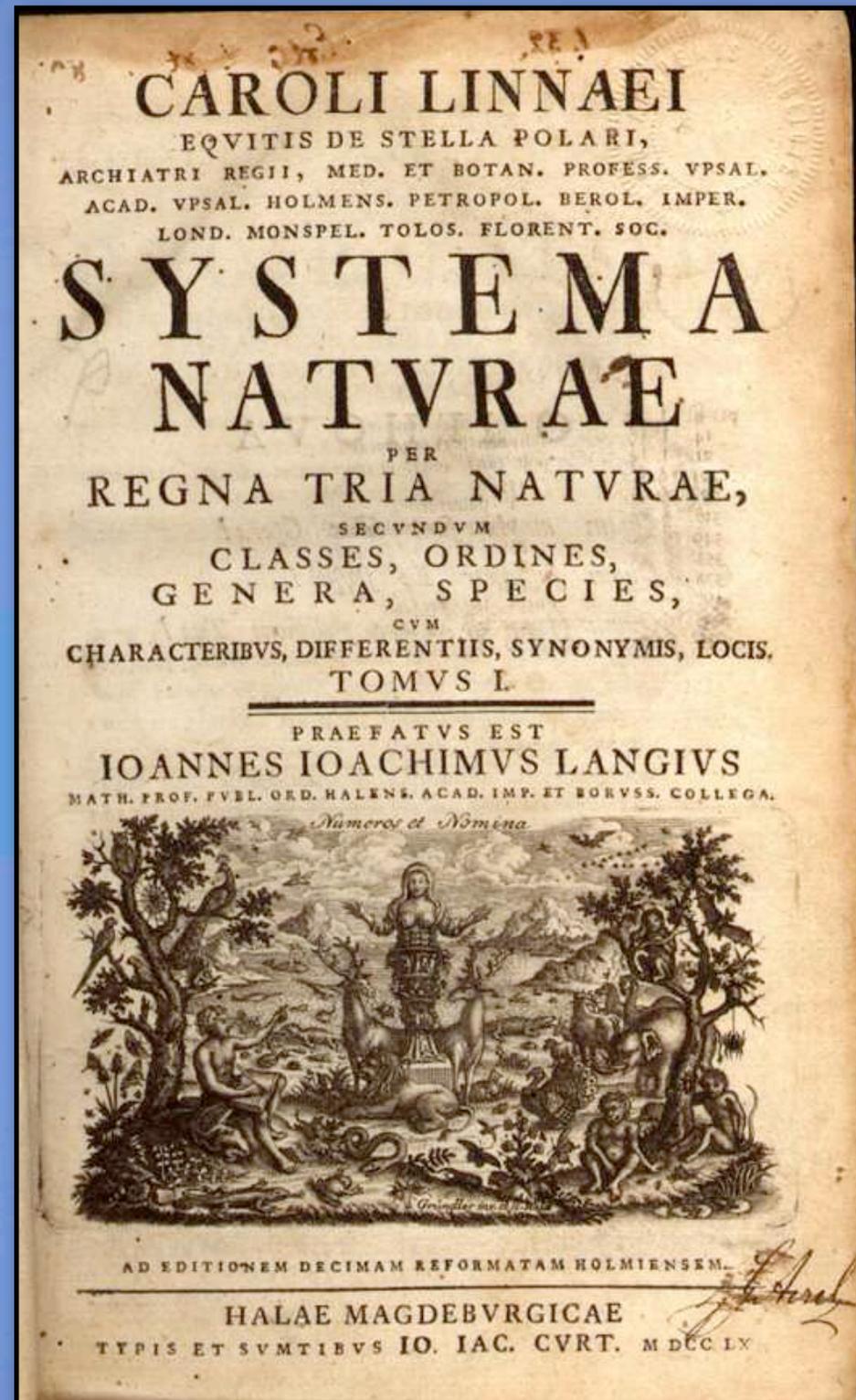
IV. PISCES. V. INSECTA. VI. VERMES.

Table of animal classification for Quadrupedia, Aves, and Amphibia, including sub-headers like I. QUADRUPEDIA, II. AVES, III. AMPHIBIA and various animal groups.

Table of animal classification for Pisces, Insecta, and Vermes, including sub-headers like IV. PISCES, V. INSECTA, VI. VERMES and various animal groups.



- Why classify?
- Science: “the great alphabet of nature”
- Theology: “Surely for no other reason than that the observer of the wonderful work might admire and praise its Maker.”
- Commerce: “All that is useful to man originates from these natural objects”



Overview:

- Do the things of nature change? Darwin's argument for evolution
- What relations between humans and nature? The challenging consequences of Darwin's theory
- What relations between science and commerce? Darwinian evolution and Victorian capitalism

The Fossil Question

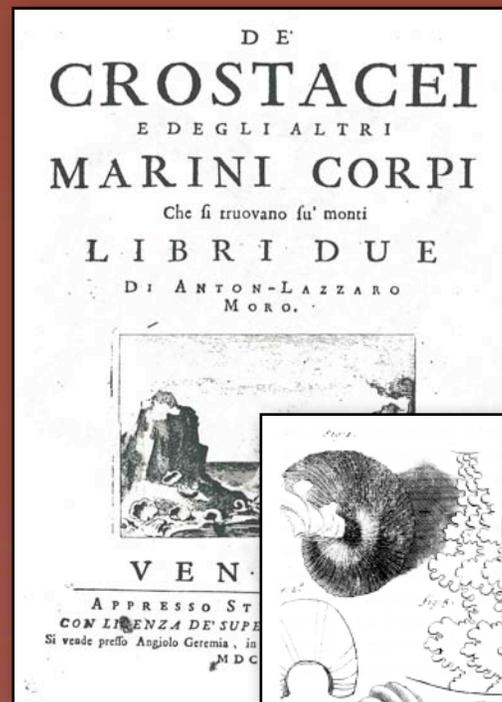
IMAGE OF "THE FIRST FOSSIL HUNTERS PALEONTOLOGY IN GREEK AND ROMAN TIMES," ADRIENNE MAYOR, REMOVED DUE TO COPYRIGHT RESTRICTIONS.

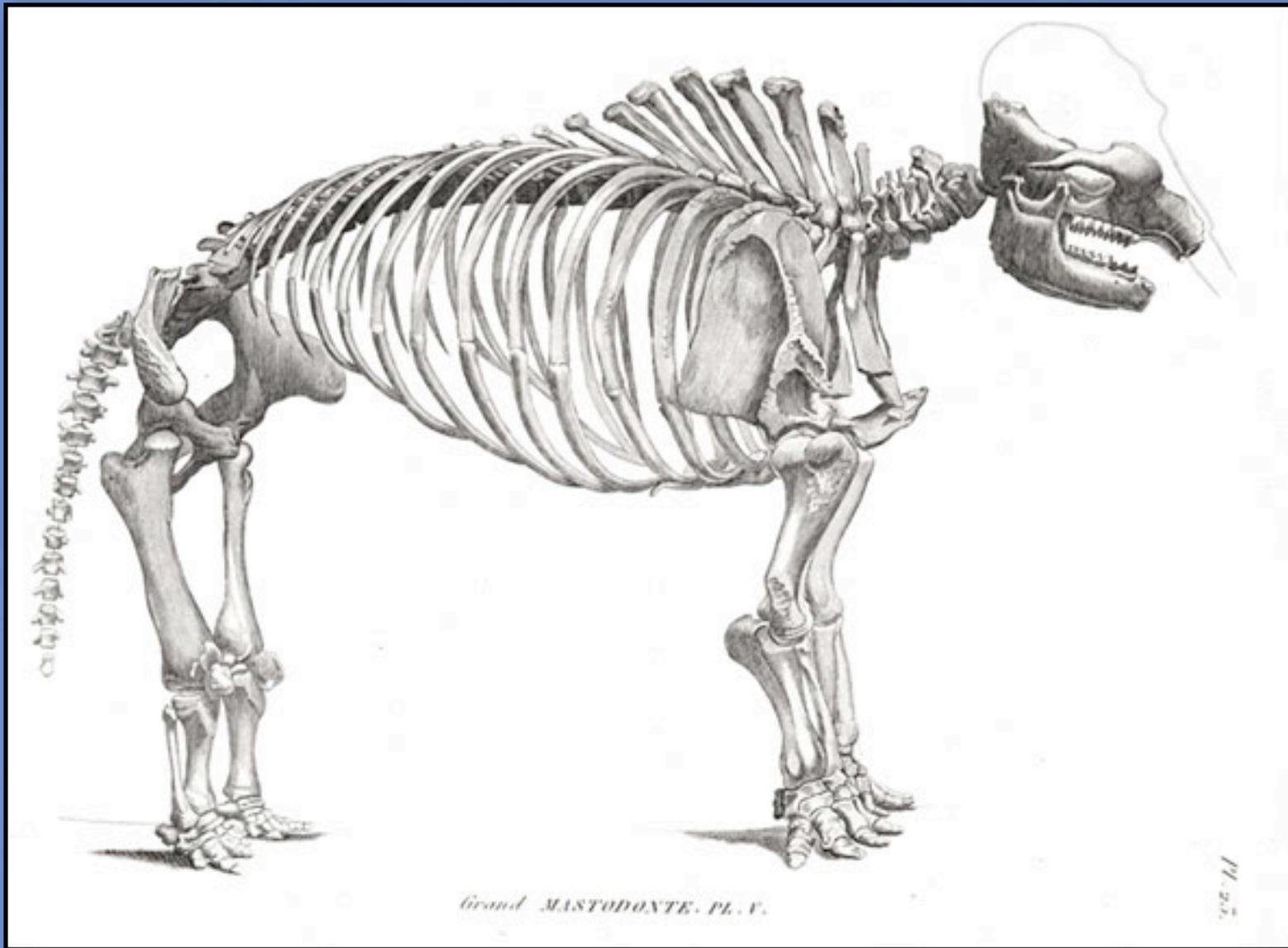


Photo courtesy of [IslesPunkFan](#) on Flickr.

Fossil Theories, c. 1600-1720

- Athanasius Kircher: “spiritus plasticus”
- Nicolaas Steno, analogies of fossil and living shark teeth
- Robert Hooke: remains can be found in various stages of mineralization
- Anton Lazzaro Moro: rising volcanoes and fossils on mountains

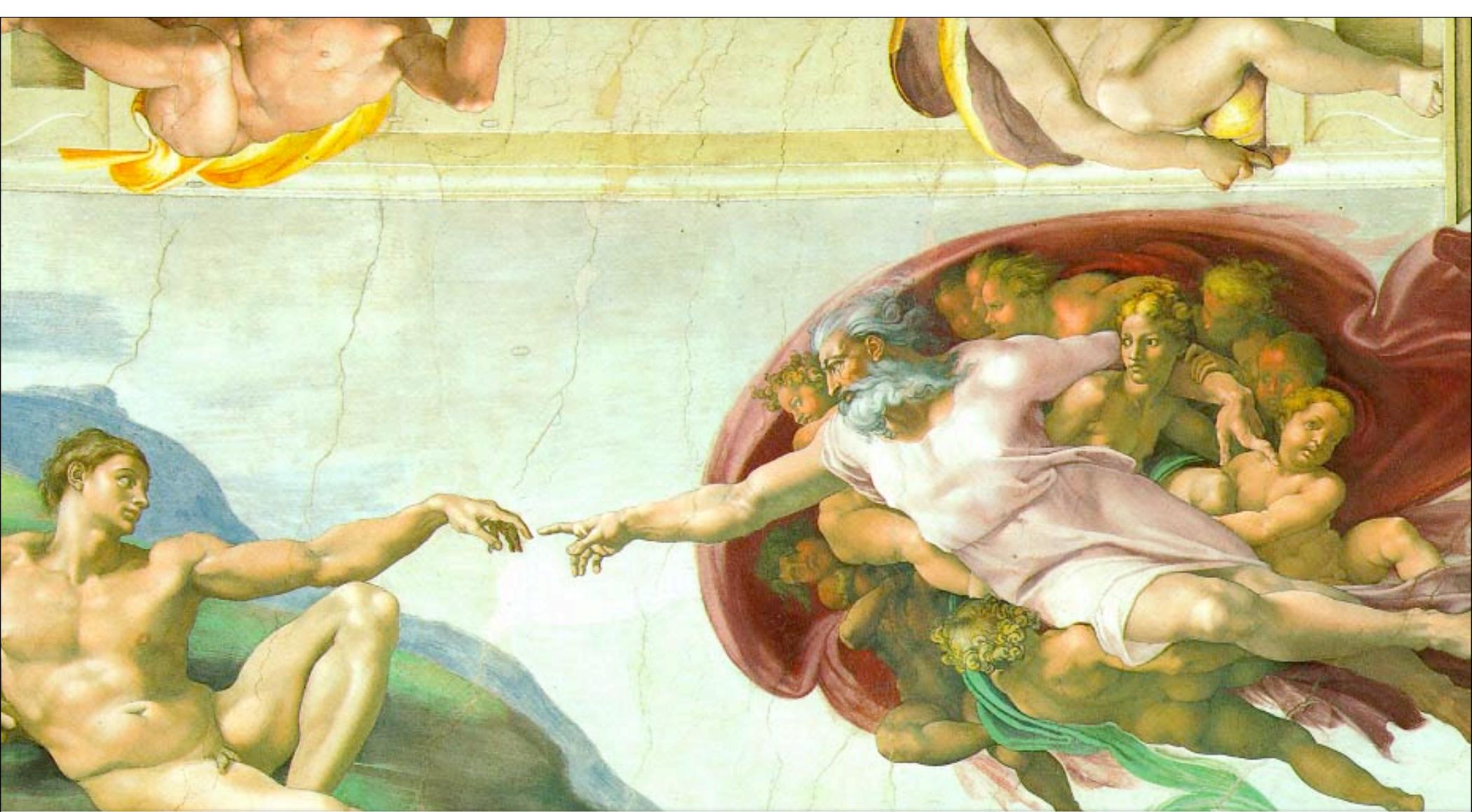




Mysterious Bones: Mastodon
On display in Philadelphia, 1801

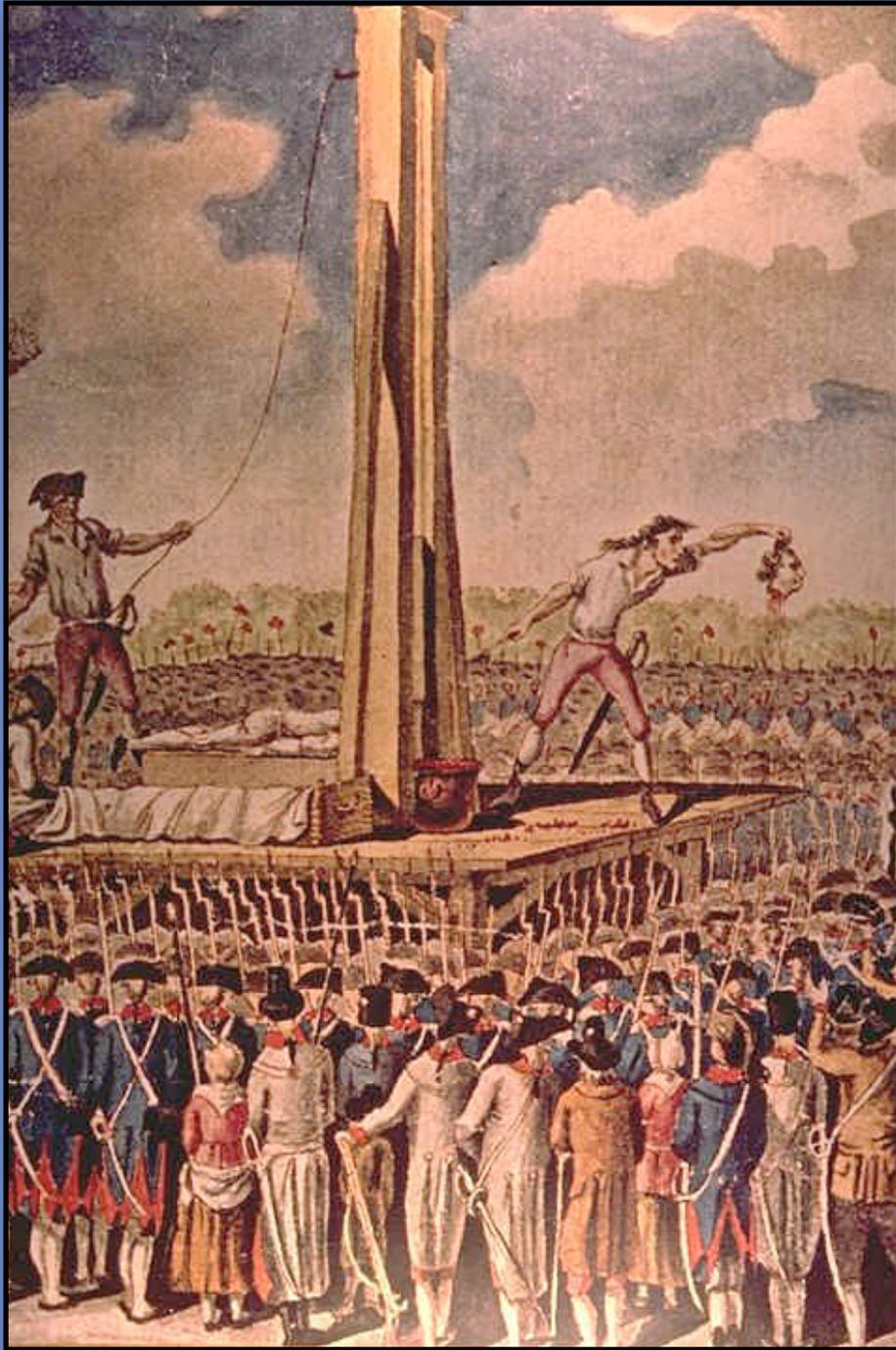
“Dinosaur”: Richard Owen, 1842





“And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind ... And God said, Let the waters bring forth abundantly the moving creature that hath life, and fowl that may fly above the earth in the open firmament of heaven ... And God said, Let the earth bring forth the living creature after his kind, cattle, and creeping thing, and beast of the earth after his kind: and it was so ... God created man in his own image.”

Revolutions, Evolution, Catastrophe, and Extinction

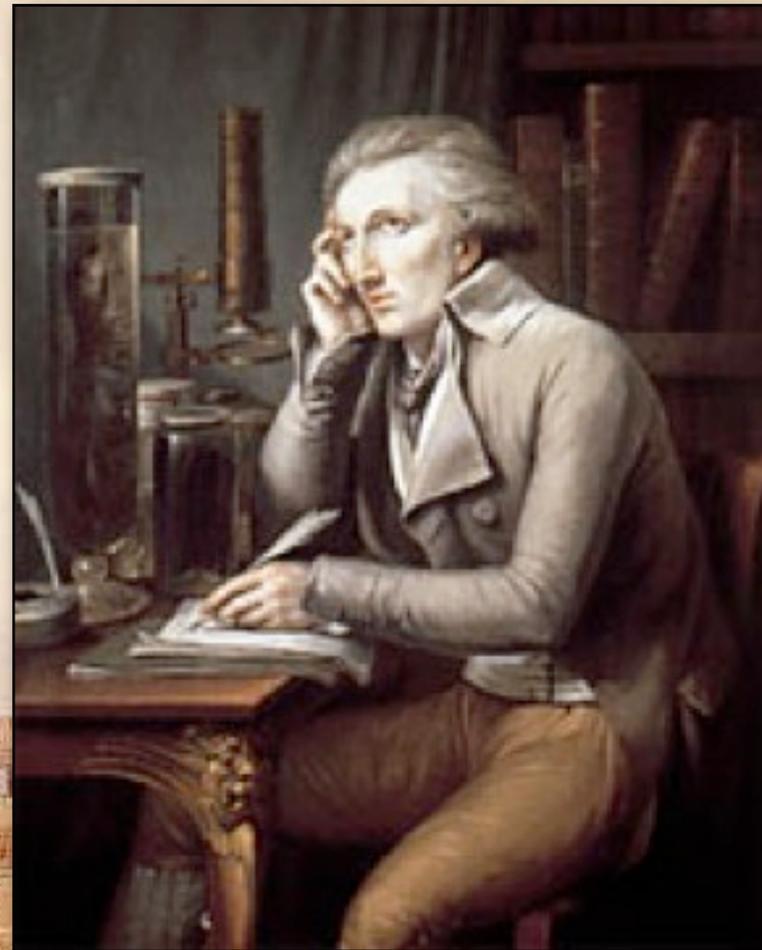




Mummified



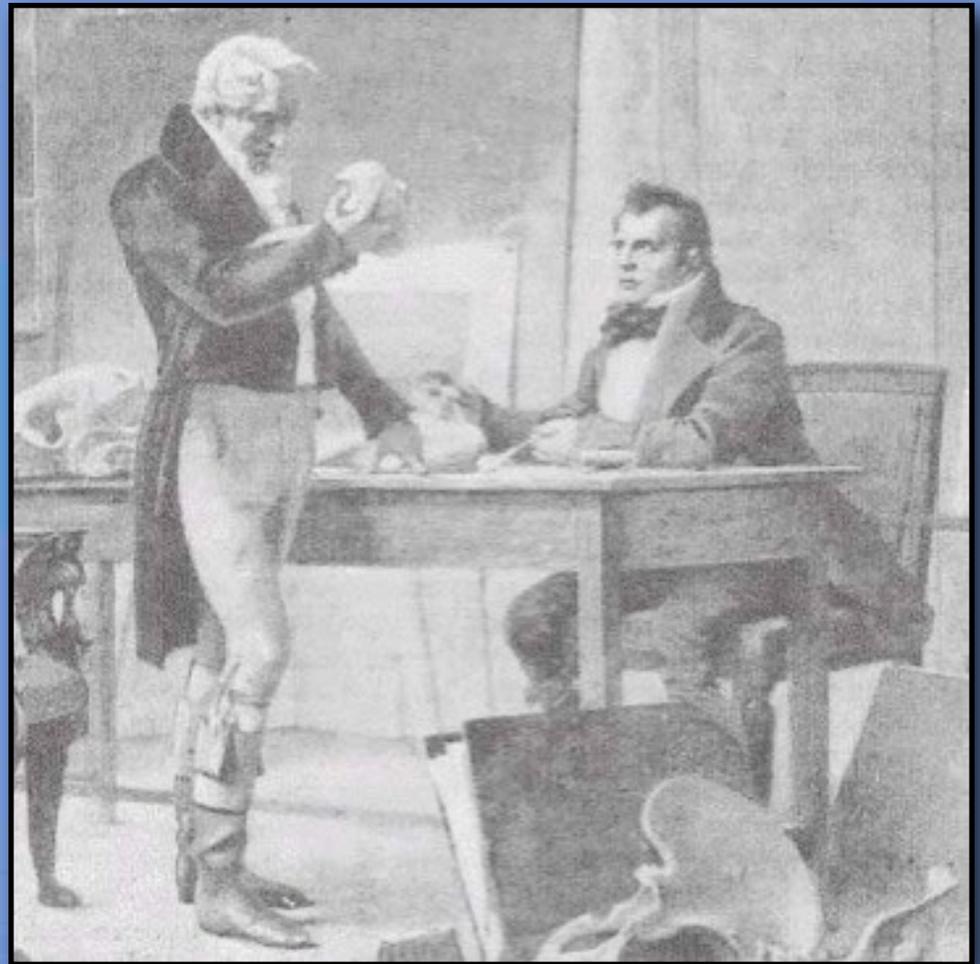
Modern



Georges Cuvier's Egyptian Specimens:
Fixity of Species



Cuvier, Extinctions, Environmental Catastrophes





Romanticism and Transmutation

Organic Life beneath the shoreless waves
Was born and nurs'd in Ocean's pearly caves
First forms minute, unseen by spheric glass,
Move on the mud, or pierce the watery mass;
These, as successive generations bloom,
New powers acquire, and larger limbs assume;
Whence countless groups of vegetation spring,
And breathing realms of fin, and feet, and wing.

-- Erasmus Darwin, 1803

Darwins and Wedgwoods



Medical School and Surgery

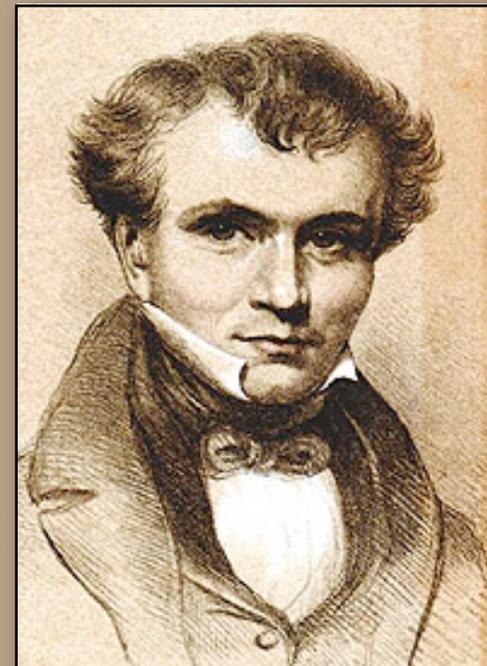




William Paley:
“Design must have had a designer”

Photo of Christ College, University of Cambridge, removed due copyright restrictions.

William Whewell:
“inexplicable and unintelligible, except
by ... an intelligent author”

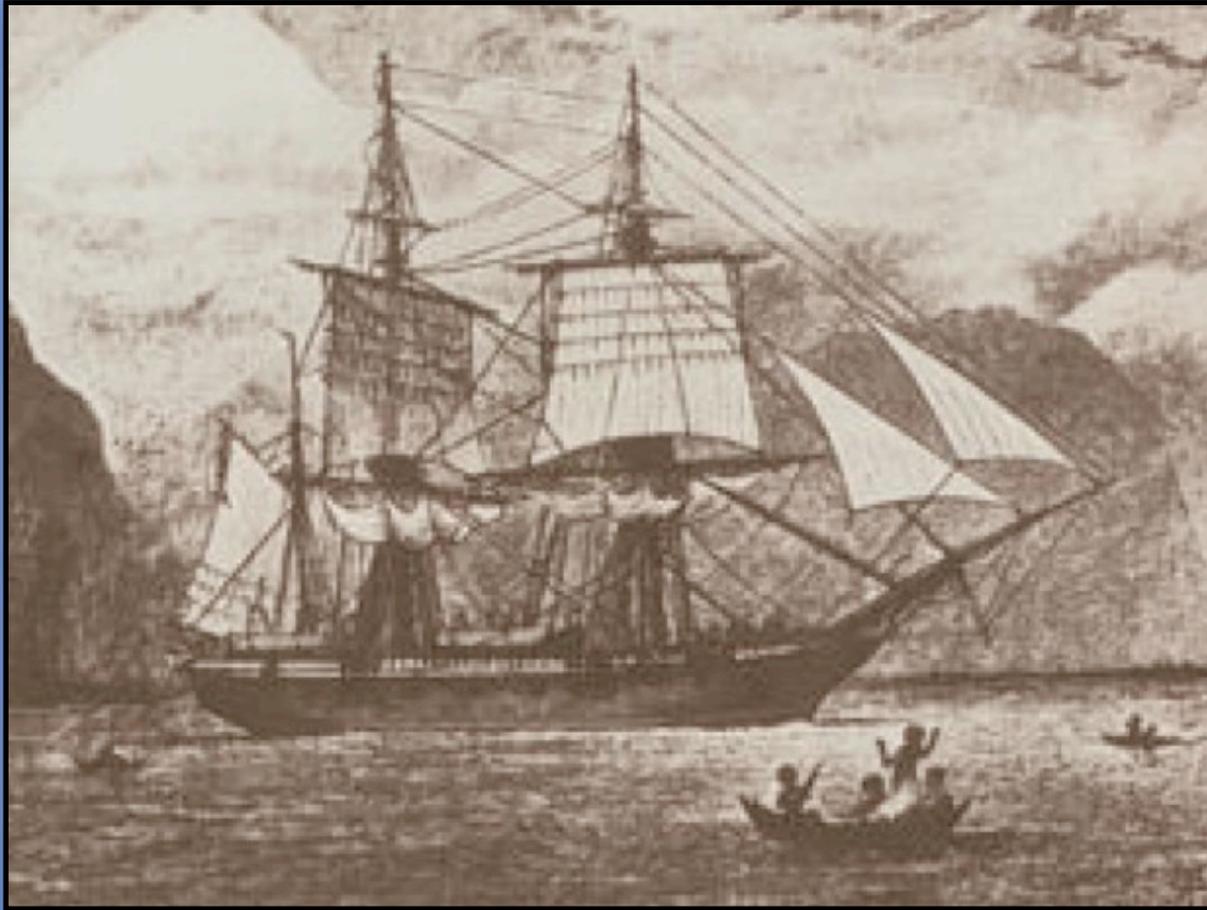


Geology of Wales, Summer 1831

Photo of the Welsh countryside removed due to copyright restrictions.



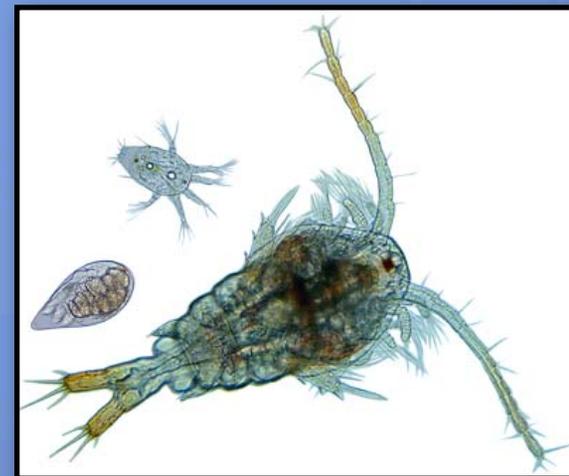
Adam Sedgwick



H.M.S. Beagle,
1831-1836
Capt. Robert Fitzroy

Map showing the course of the *Beagle* removed due to copyright restrictions.

“most exquisite in their forms & rich colors”





Brazil: "a chaos of delight"

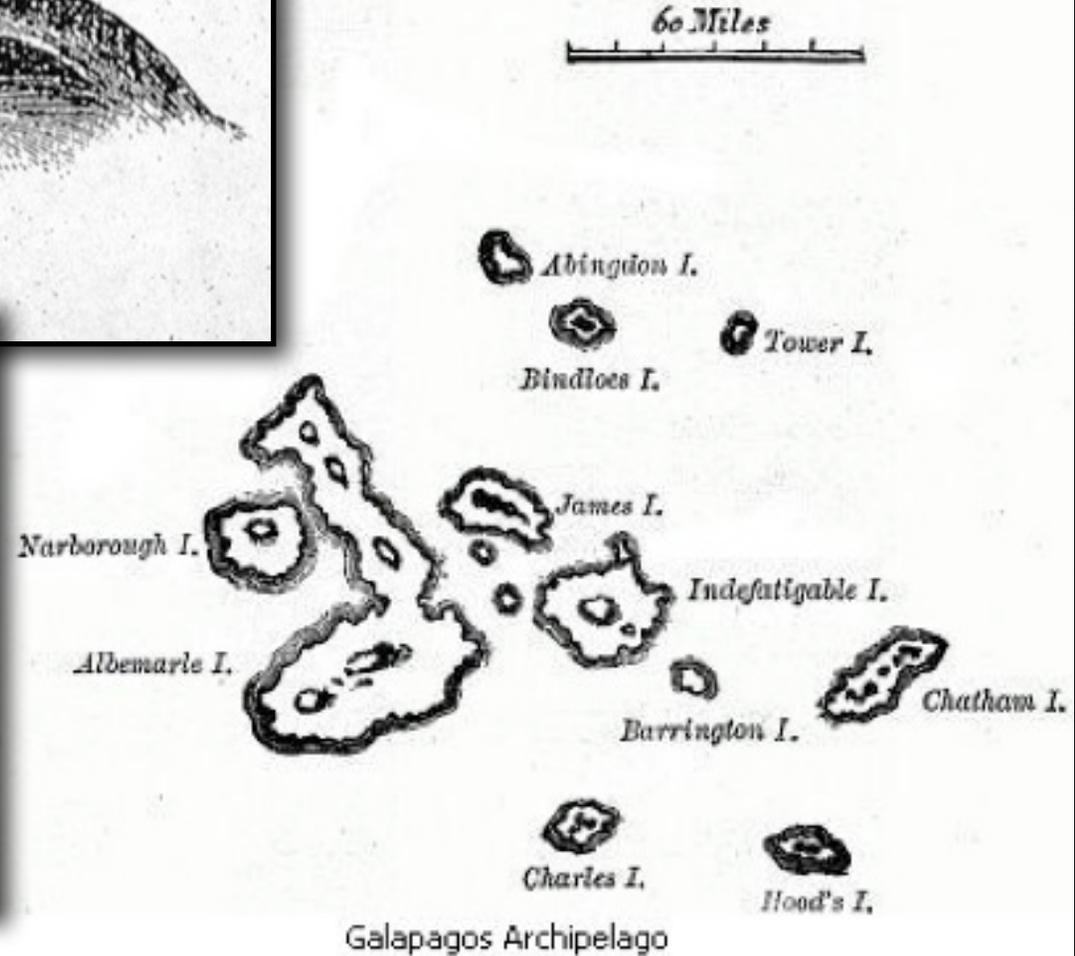
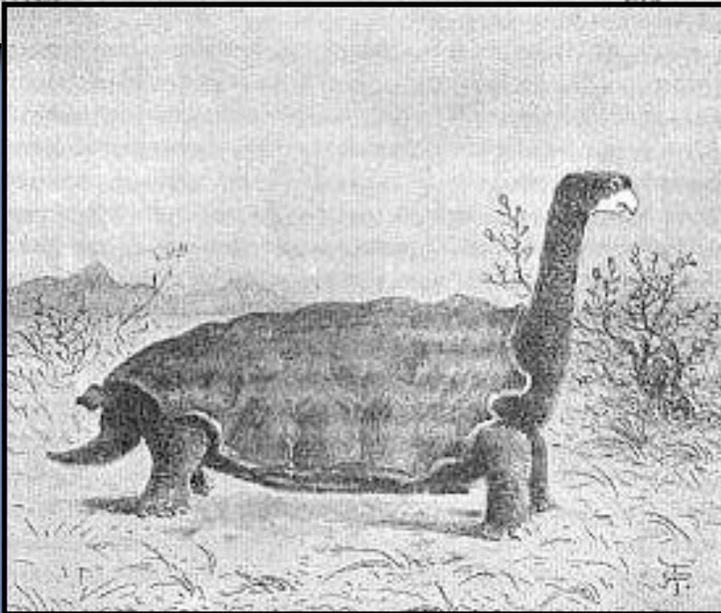
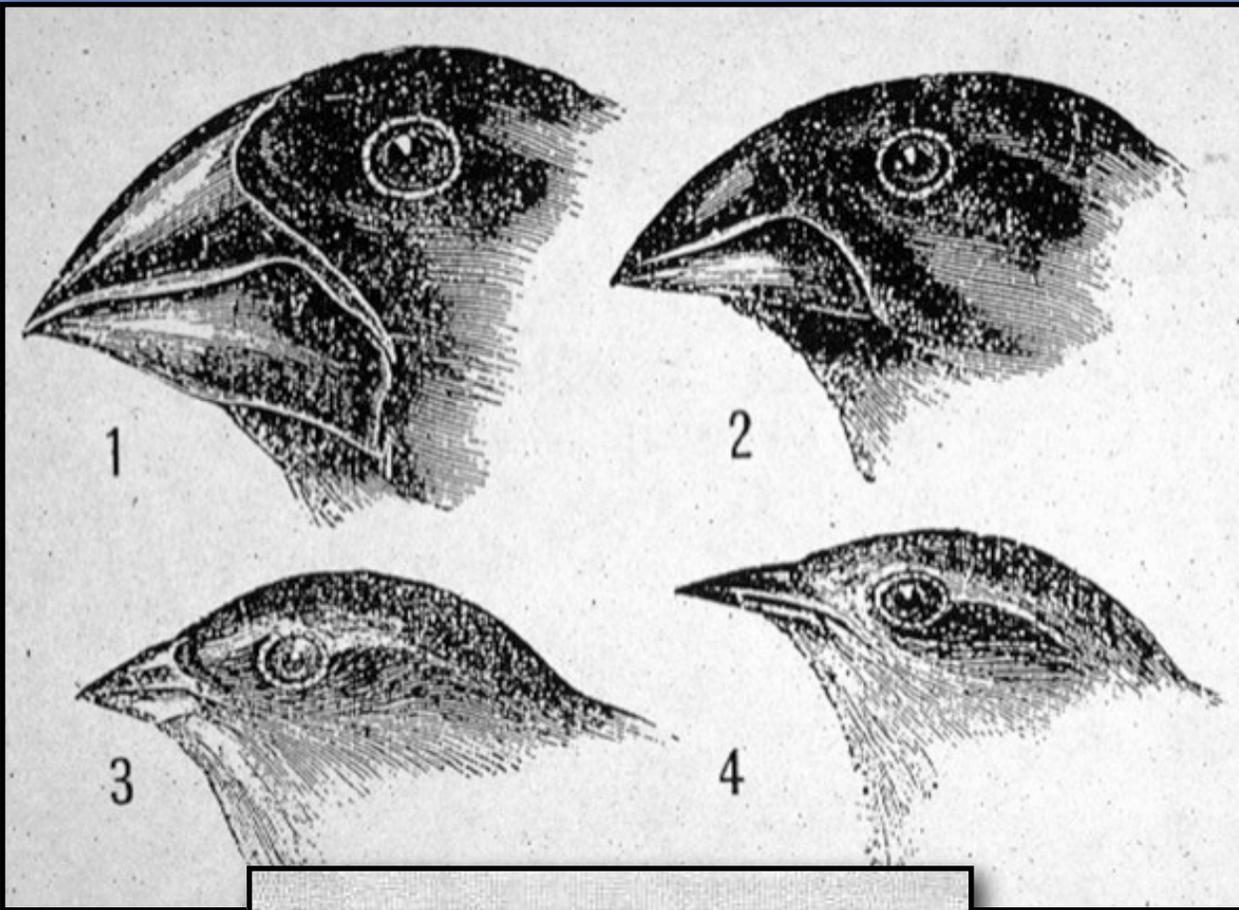


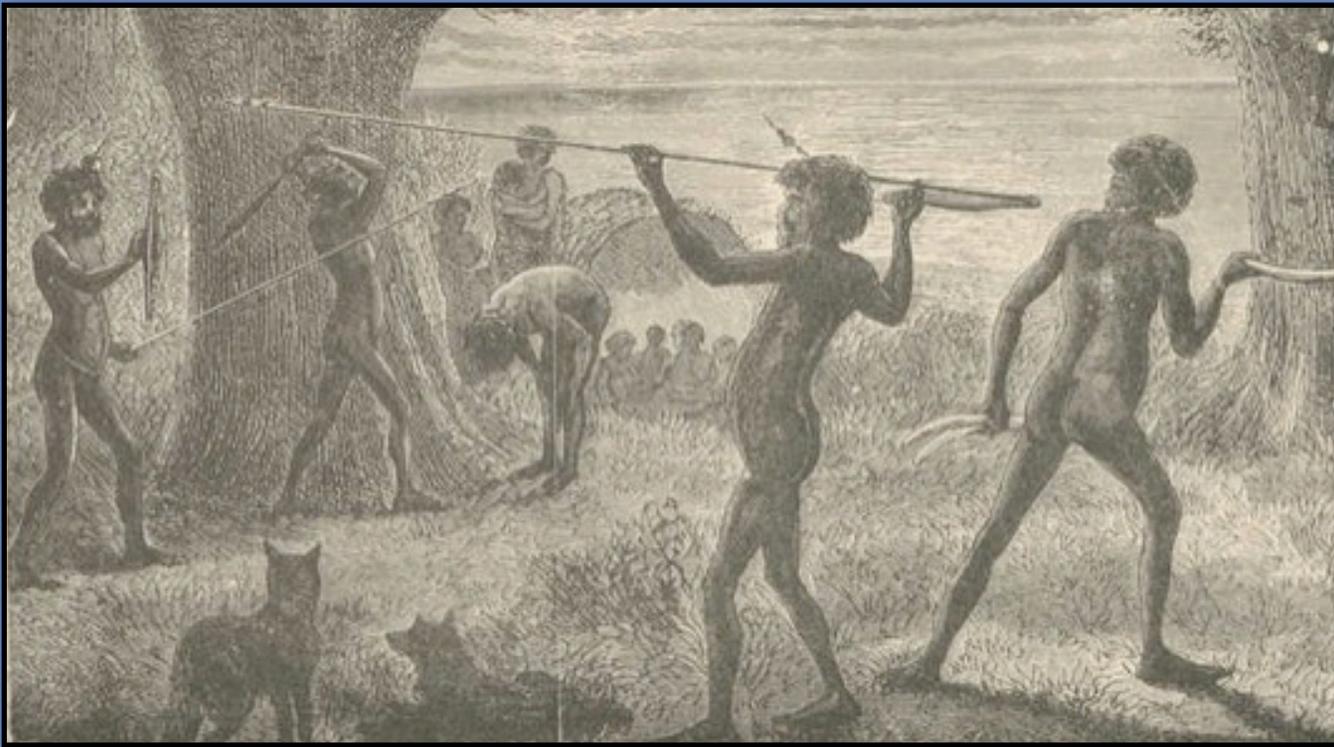
Fuegians



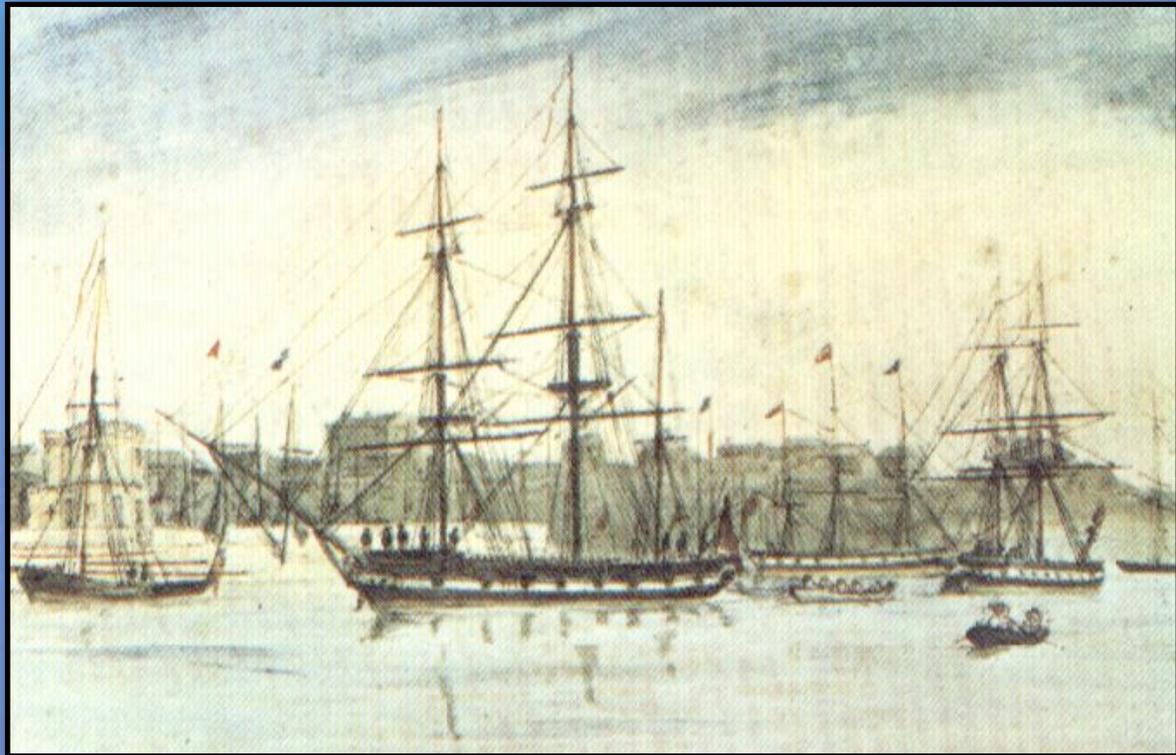
Cape Horn, December 1832

Galapagos, September 1835



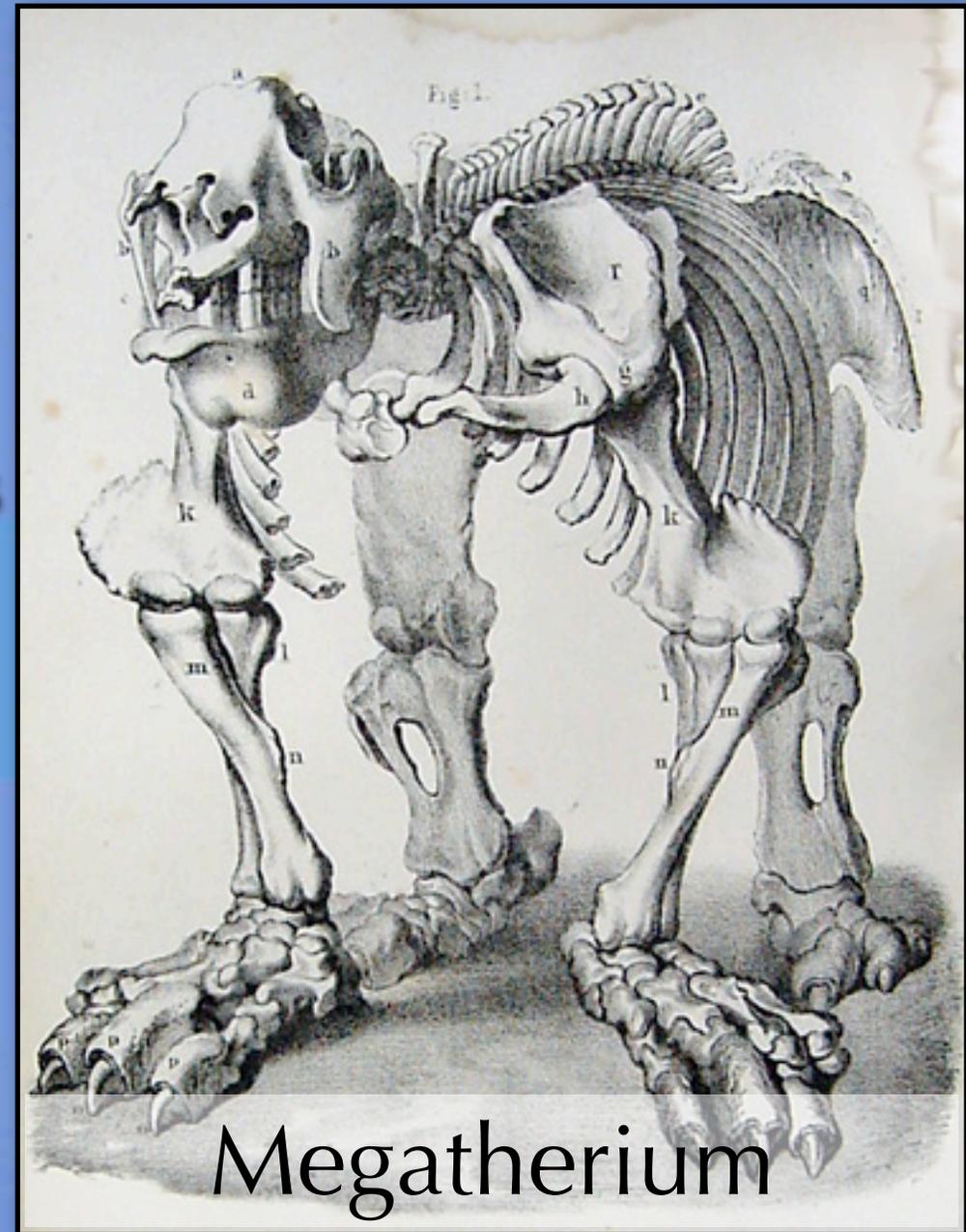


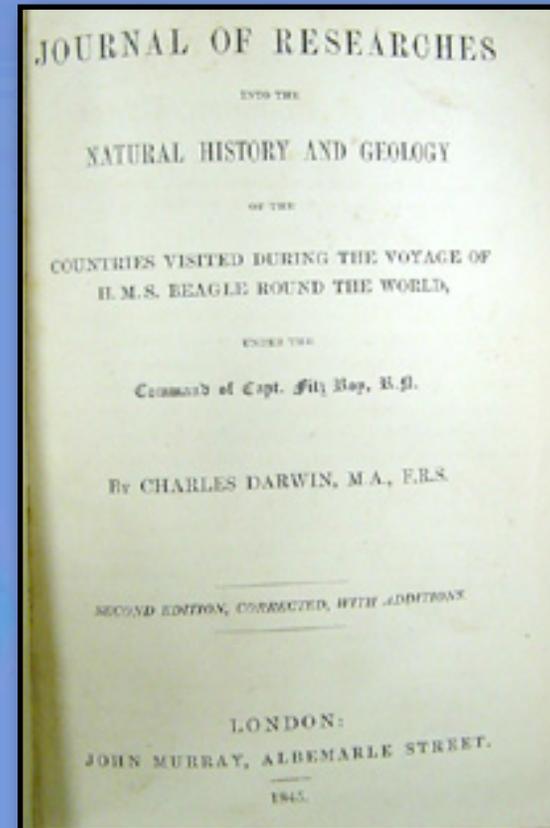
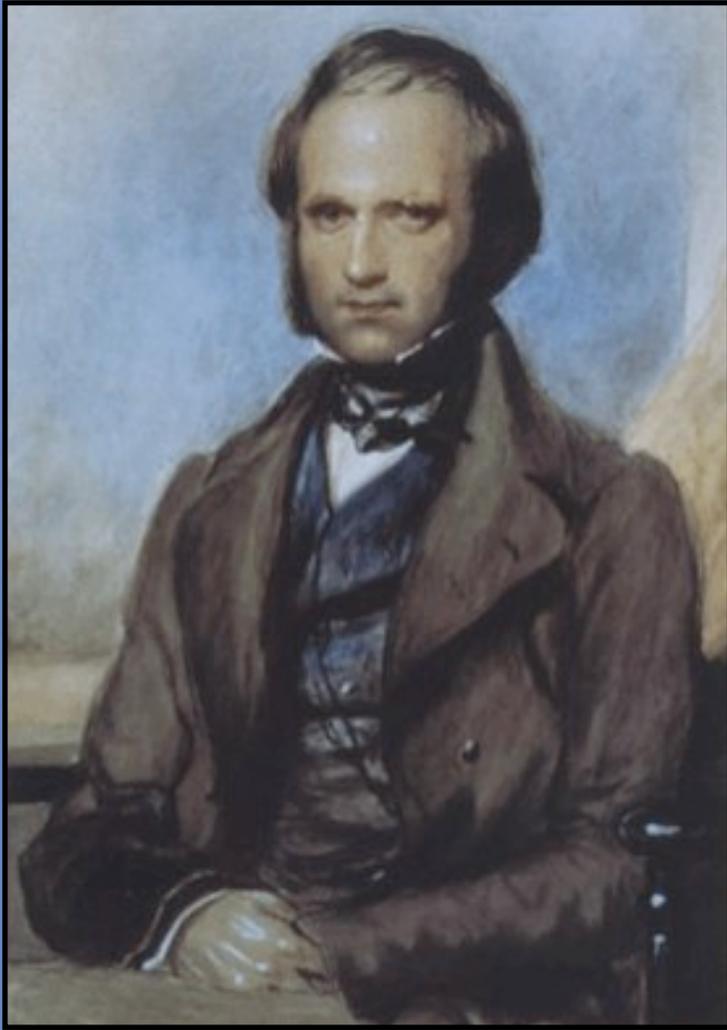
Australia,
January 1836



Darwin's Collections

- Writings:
 - Diary, 770 pages
 - Geology notes, 1383 pages
 - Zoology notes, 368 pages
- Specimens:
 - In alcohol: 1529
 - Skins, Bones, others: 3907



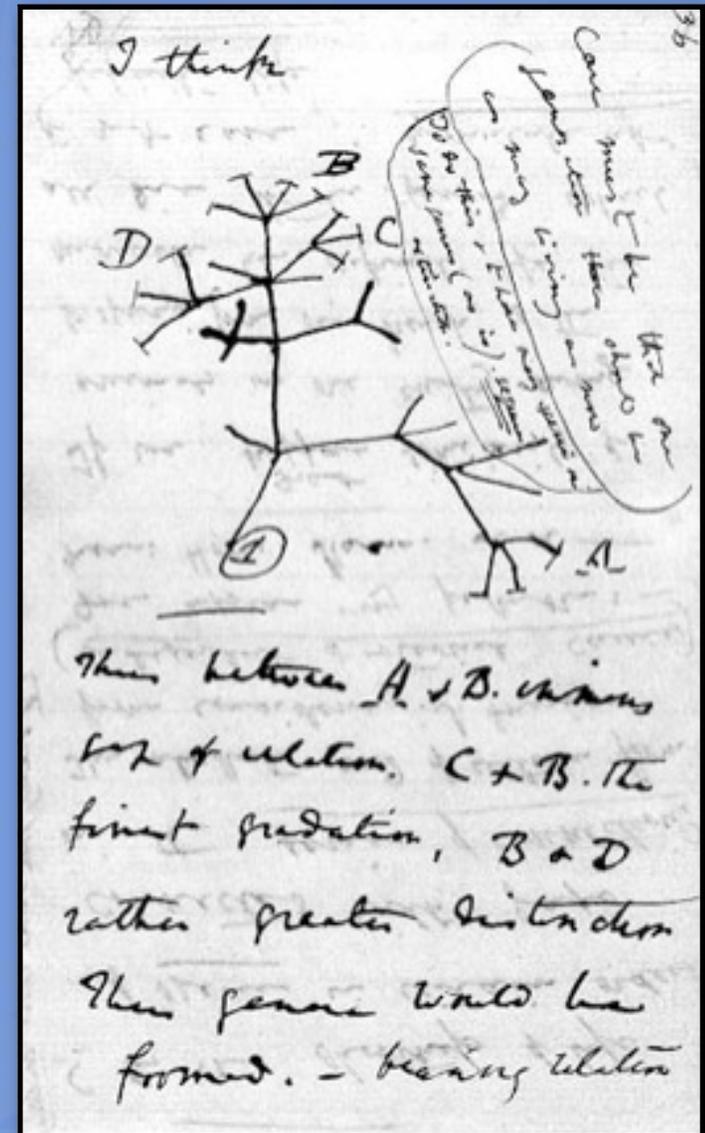


Darwin in London:

Paper on Andes at Geological Society, January 1837

Journal of Researches, 1839

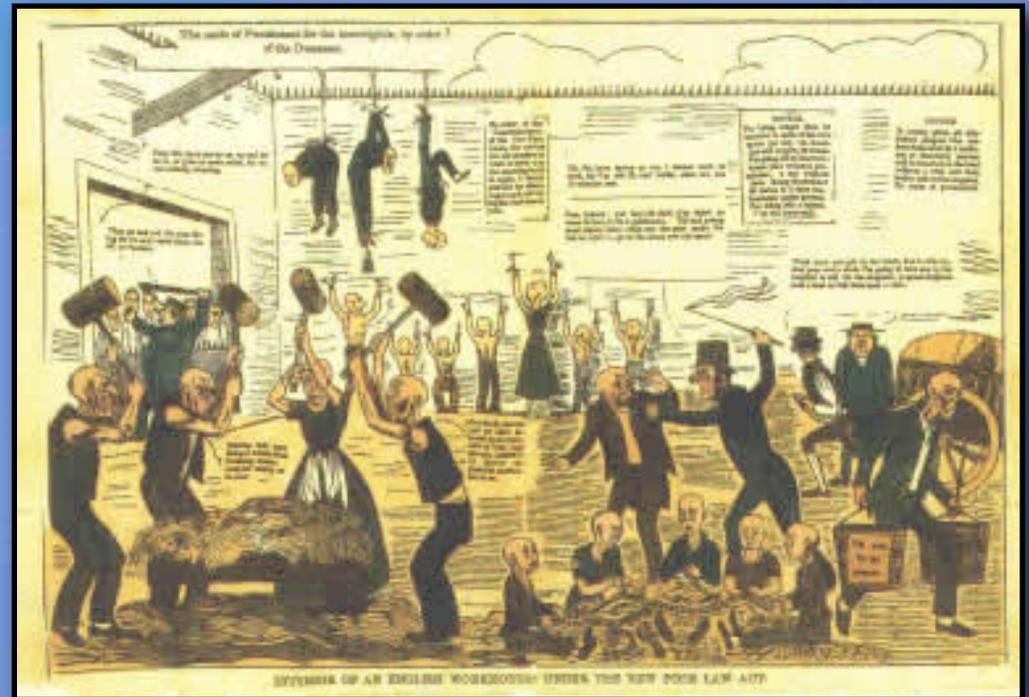
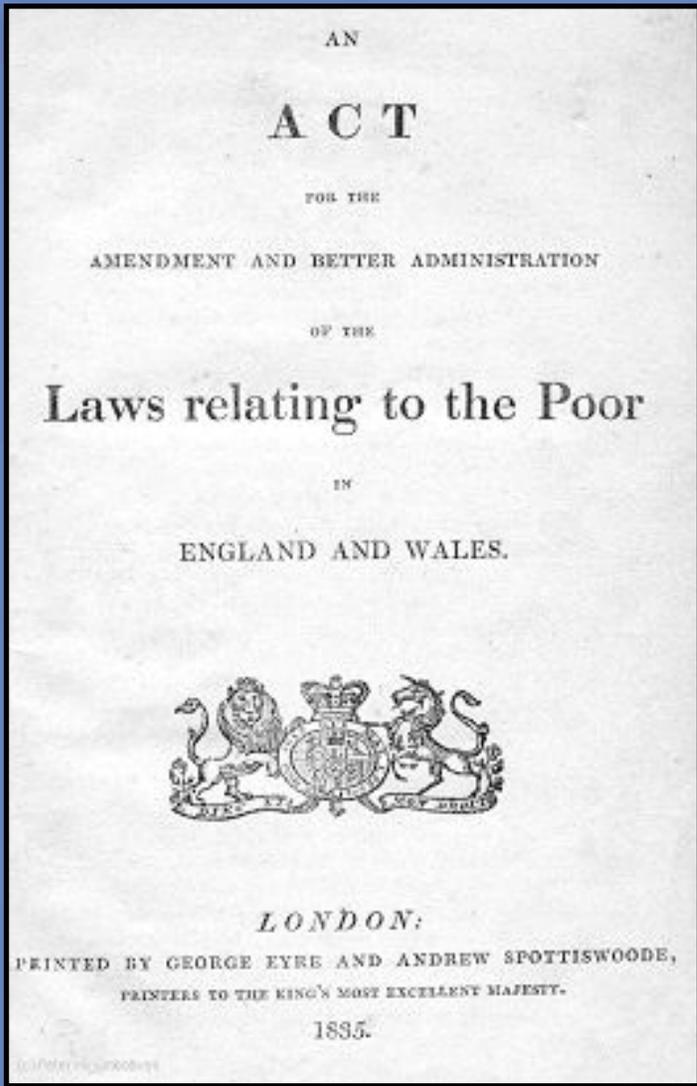
Photo of finch specimens removed due to copyright restrictions.



Finches and Geographic Speciation, March 1838



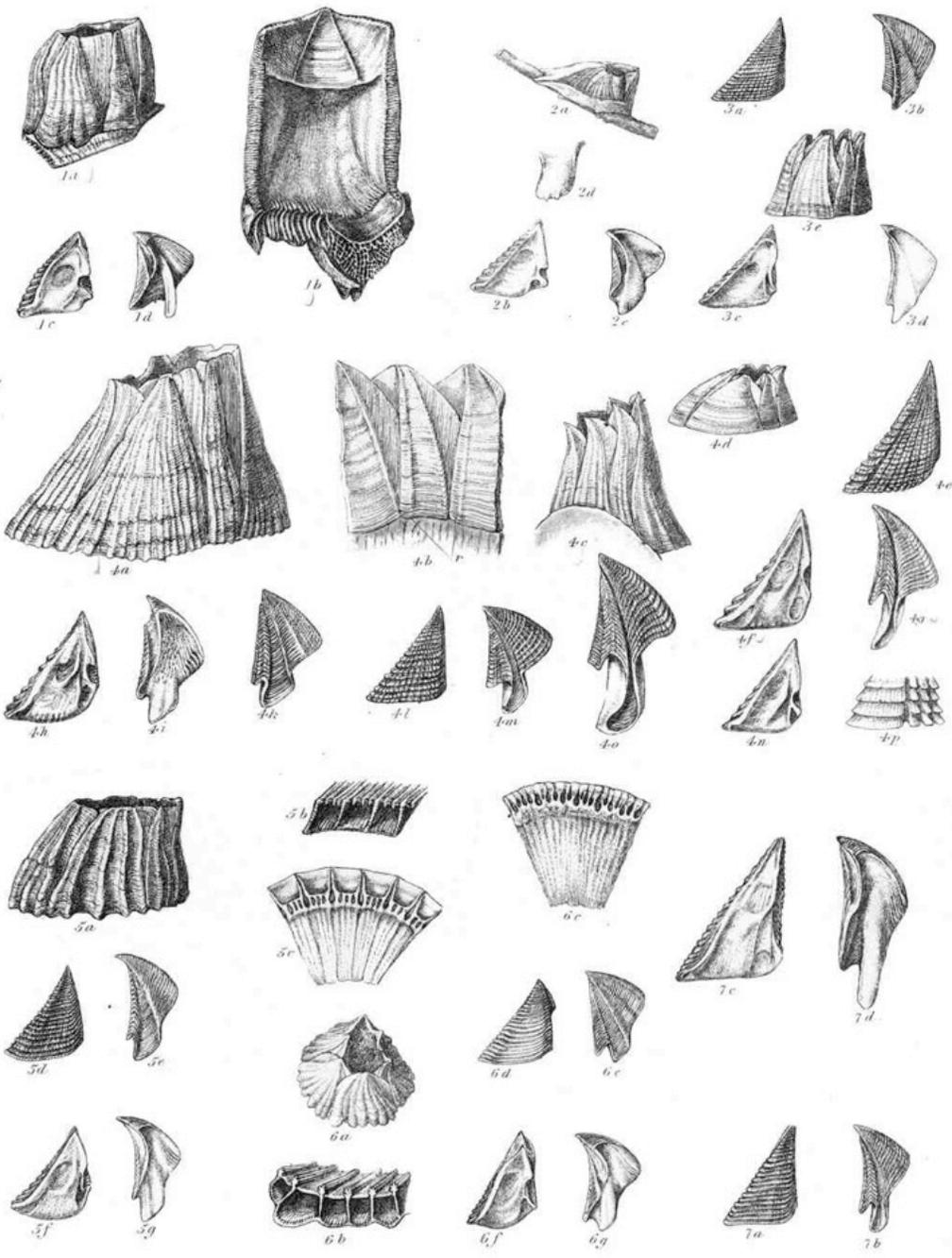
Darwin Reads Malthus, September 1838



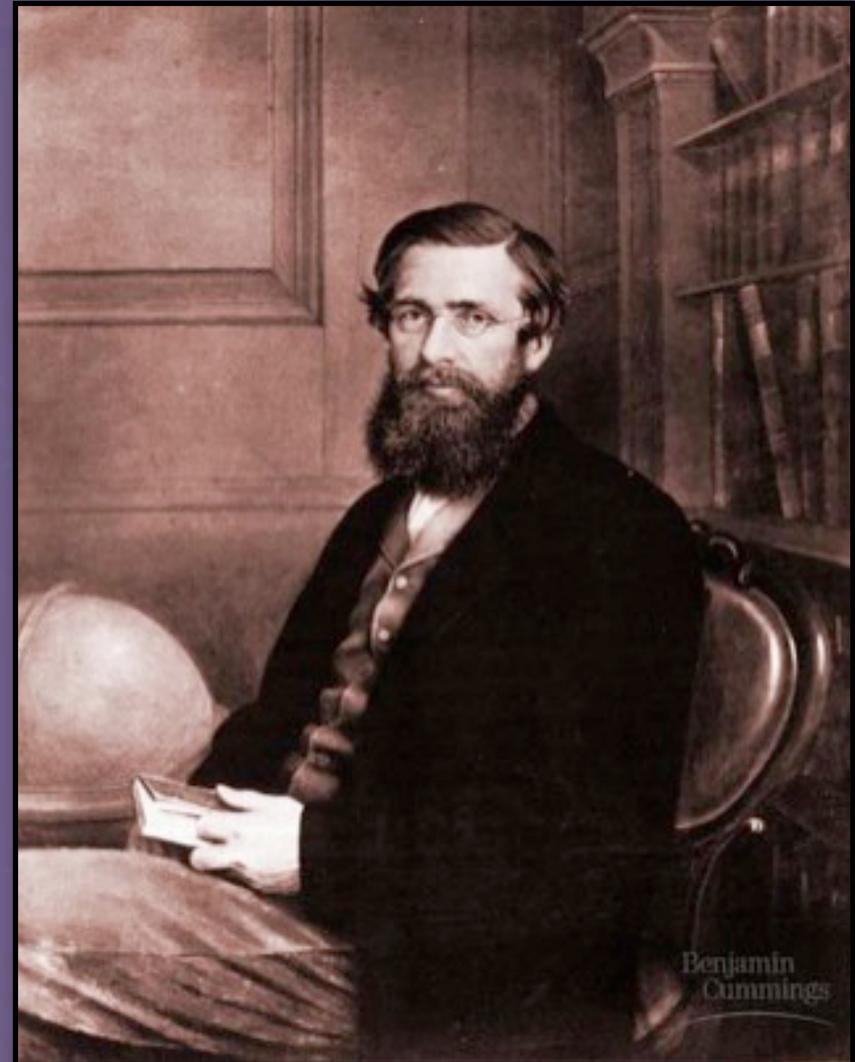
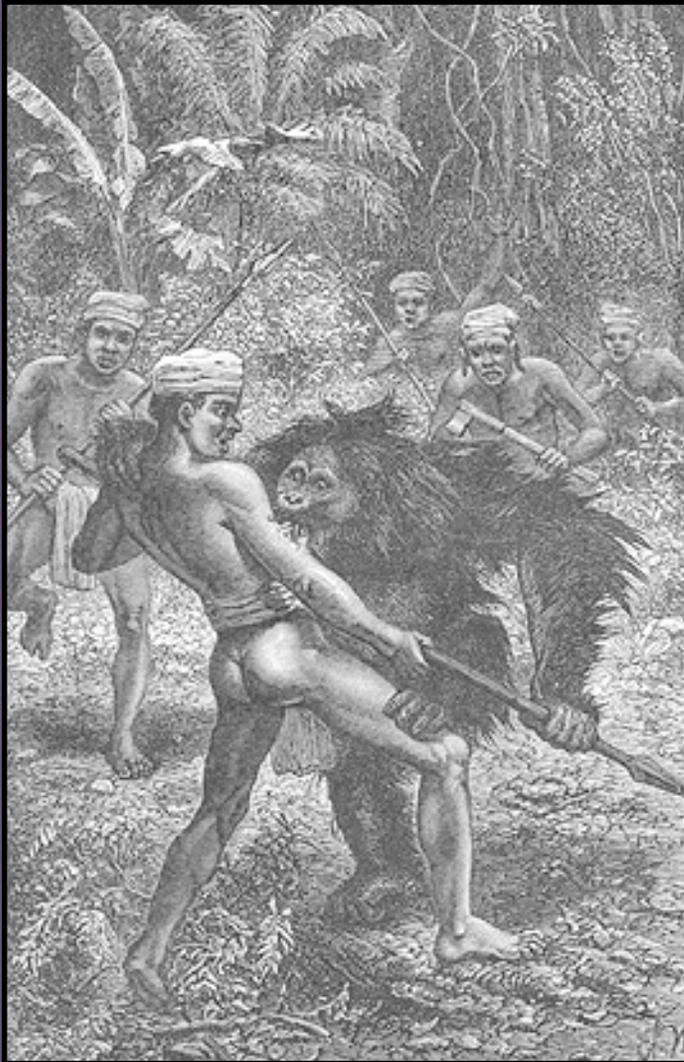
Unrest and Backlash
Economies and Theories?



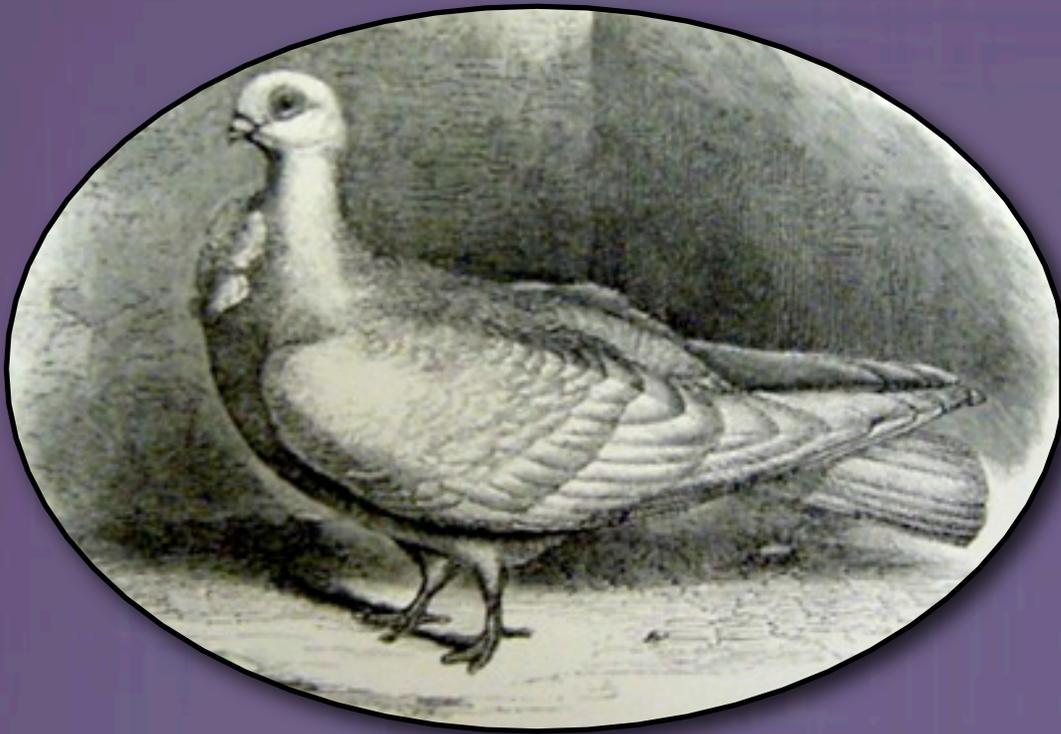
1839: Marries Emma Wedgwood
1842: Moves from London to Kent



1846-1854:
 Three books
 about
 barnacles



Alfred Russel Wallace, 18 June 1858:
“The life of wild animals is a struggle for existence”



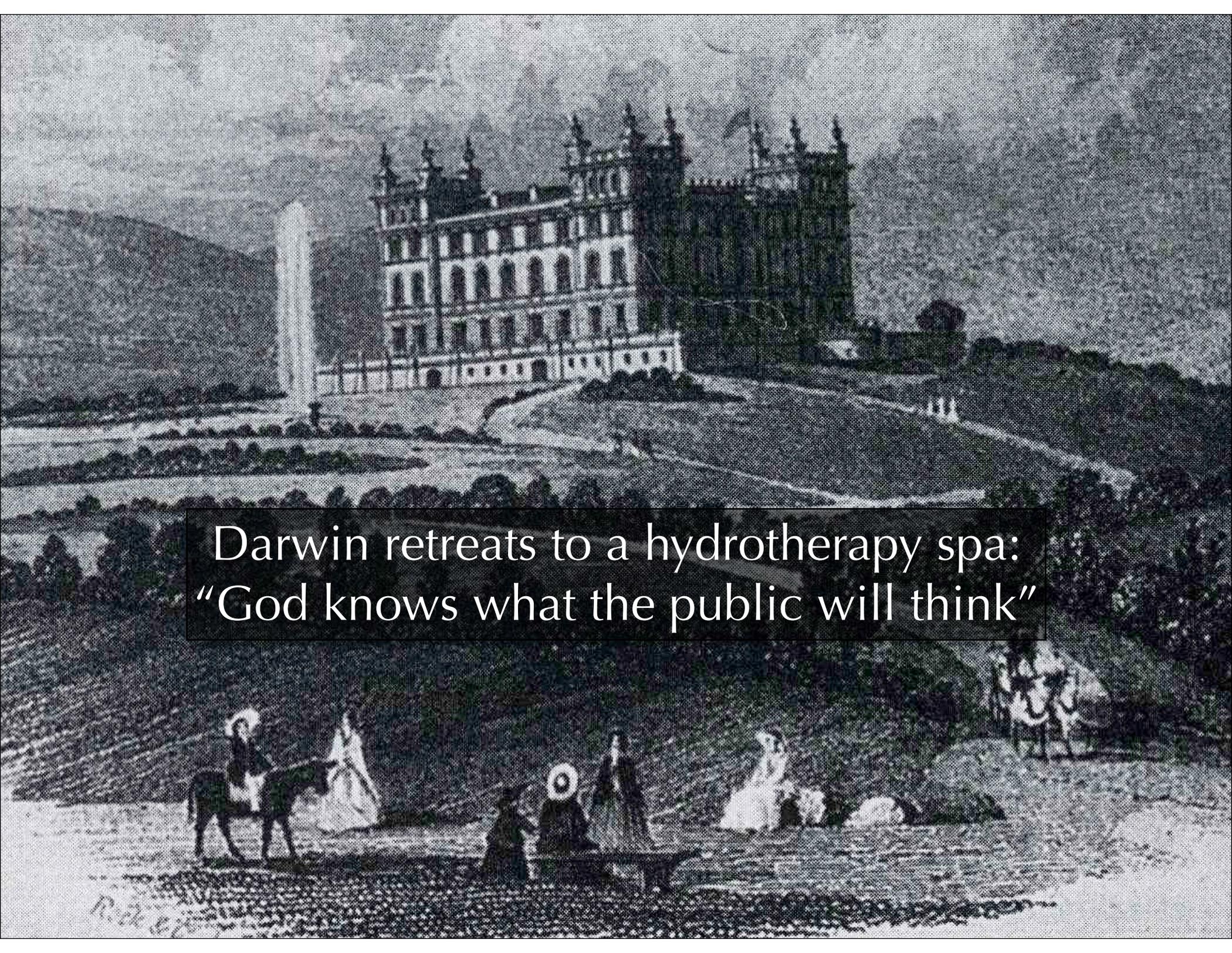
“How fleeting are the wishes and efforts of man! how short his time! and consequently how poor will his products be, compared with those accumulated by nature during whole geological periods.”

ON
THE ORIGIN OF SPECIES
BY MEANS OF NATURAL SELECTION,
OR THE
PRESERVATION OF FAVOURED RACES IN THE STRUGGLE
FOR LIFE.

By CHARLES DARWIN, M.A.,
FELLOW OF THE ROYAL, GEOLOGICAL, LINNEAN, ETC., SOCIETIES;
AUTHOR OF 'JOURNAL OF RESEARCHES DURING H. M. S. BEAGLE'S VOYAGE
ROUND THE WORLD.'

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1859.

The right of Translation is reserved.



Darwin retreats to a hydrotherapy spa:
"God knows what the public will think"

Rock & Co.

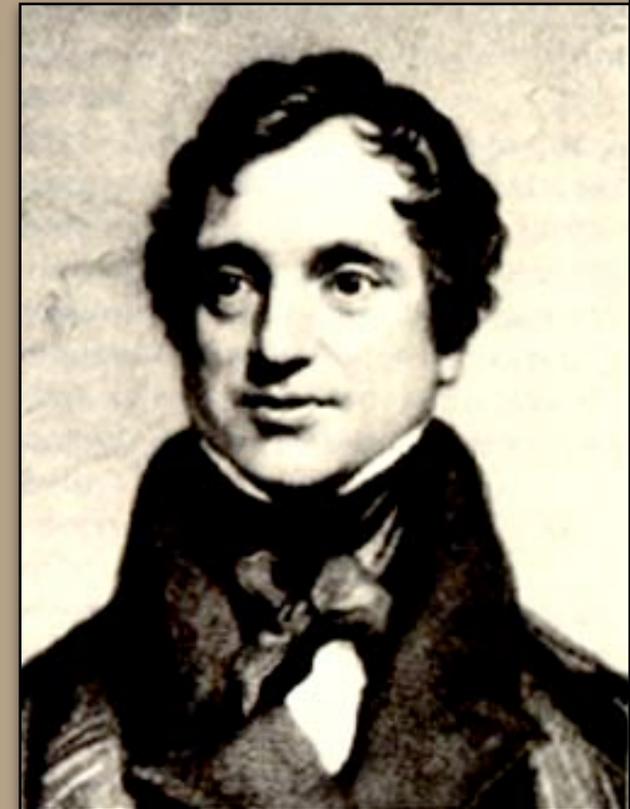


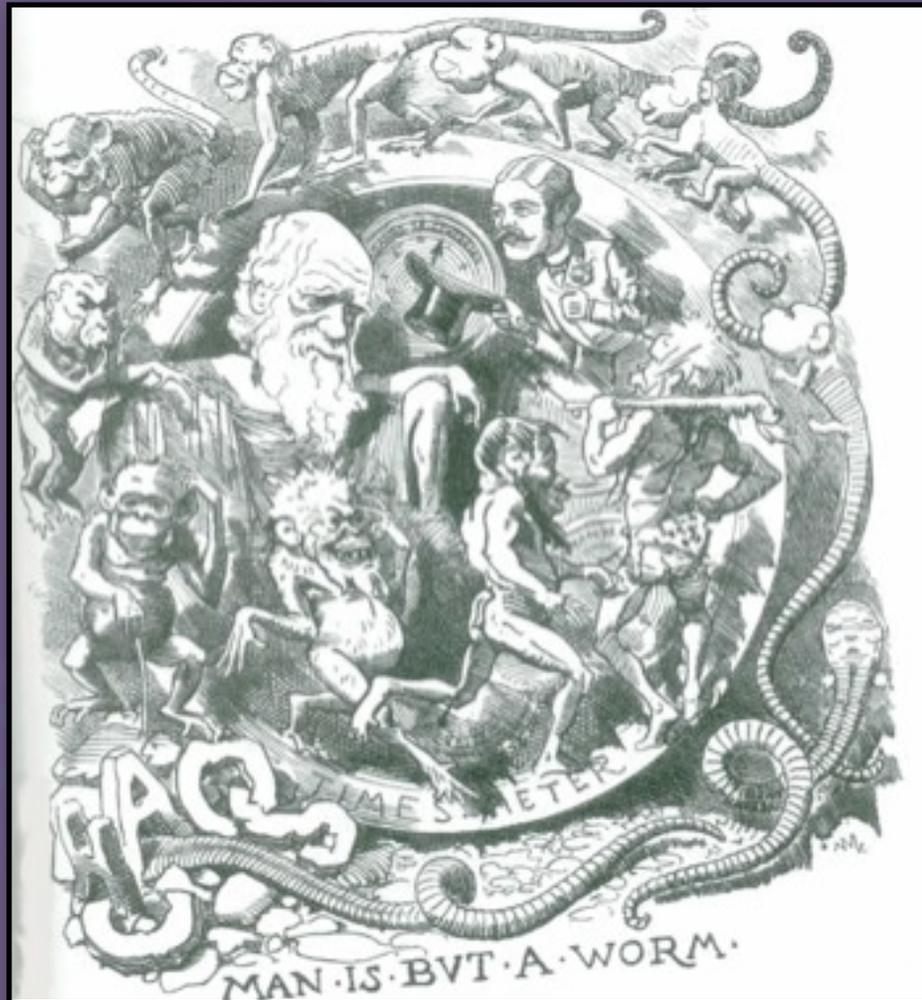
“A system which is repudiated by history, by the traditions of all peoples, by exact science, by the observation of facts, and even by reason itself, would seem to have no need at all of refutation.”

-- Pope Pius IX

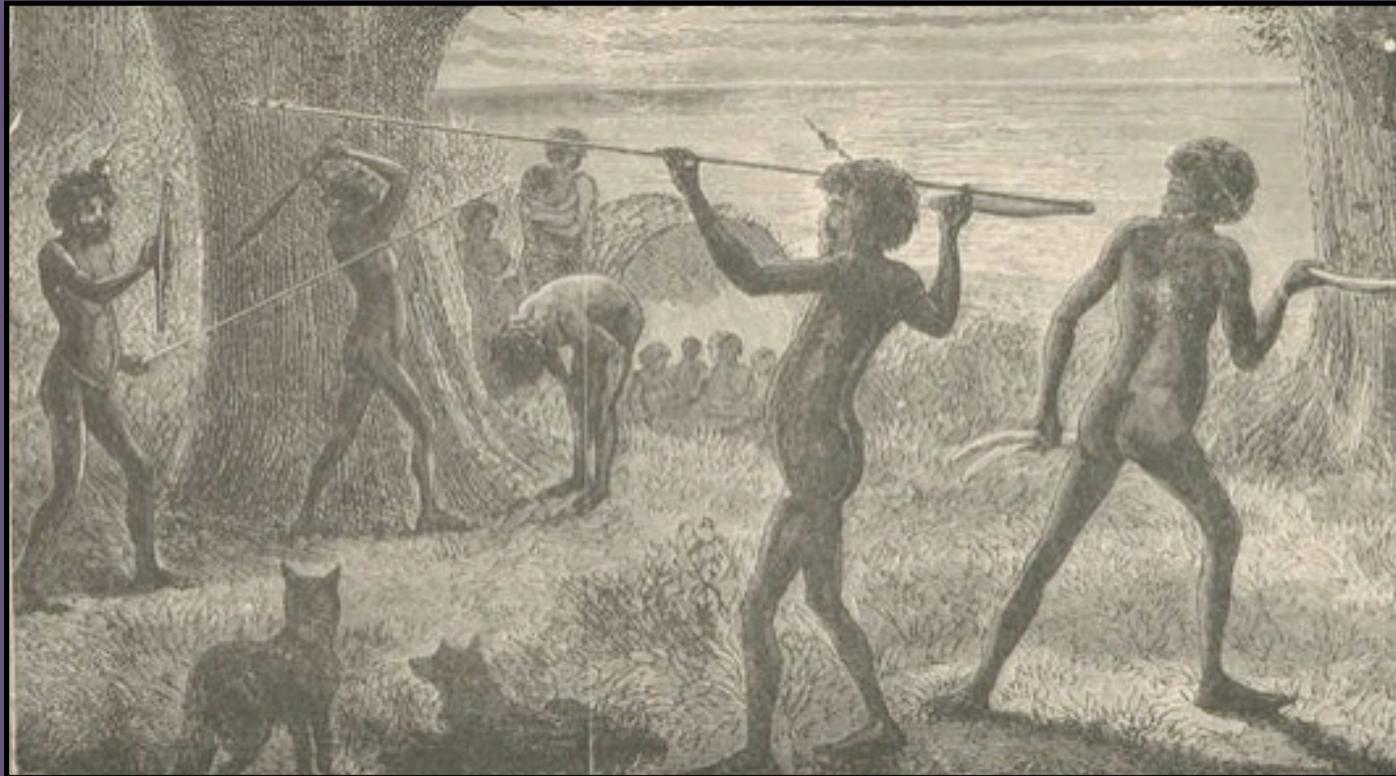
“I cannot conclude without expressing my detestation of the theory, because of its unflinching materialism;--because it has deserted the inductive track, the only track that leads to physical truth;--because it utterly repudiates final causes, and thereby indicates a demoralized understanding on the part of its advocates.” -- Adam Sedgwick

Photo of Christ College, University of Cambridge, removed due copyright restrictions.





Evolution Accepted,
Natural Selection Rejected

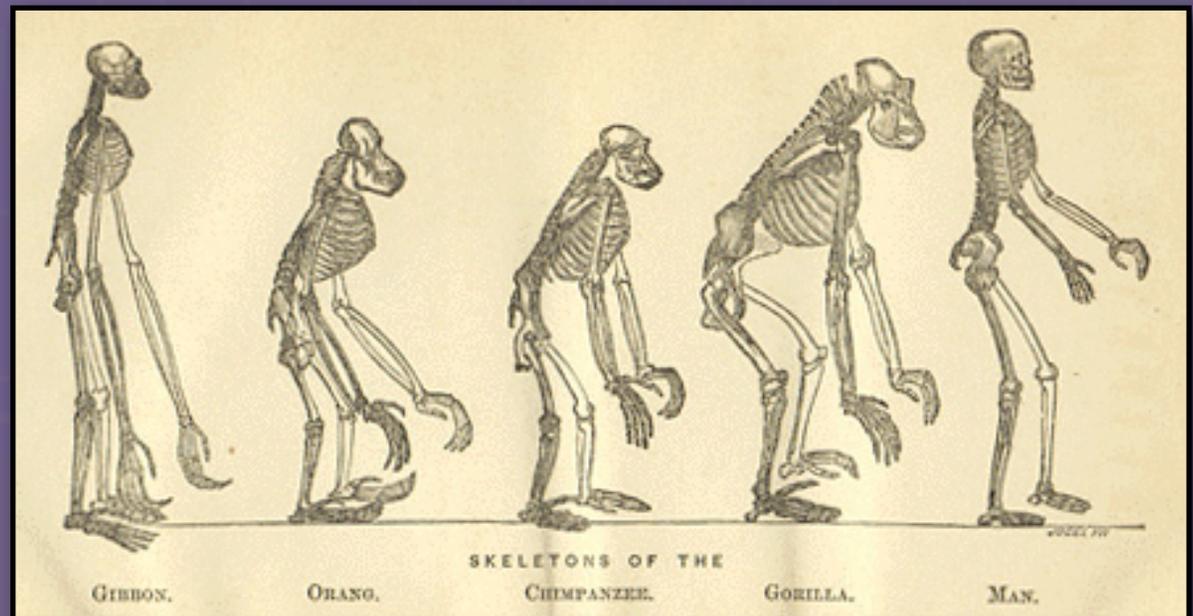


“Much light will be thrown on the
origin of man and his history”
-- Darwin, Origin of Species



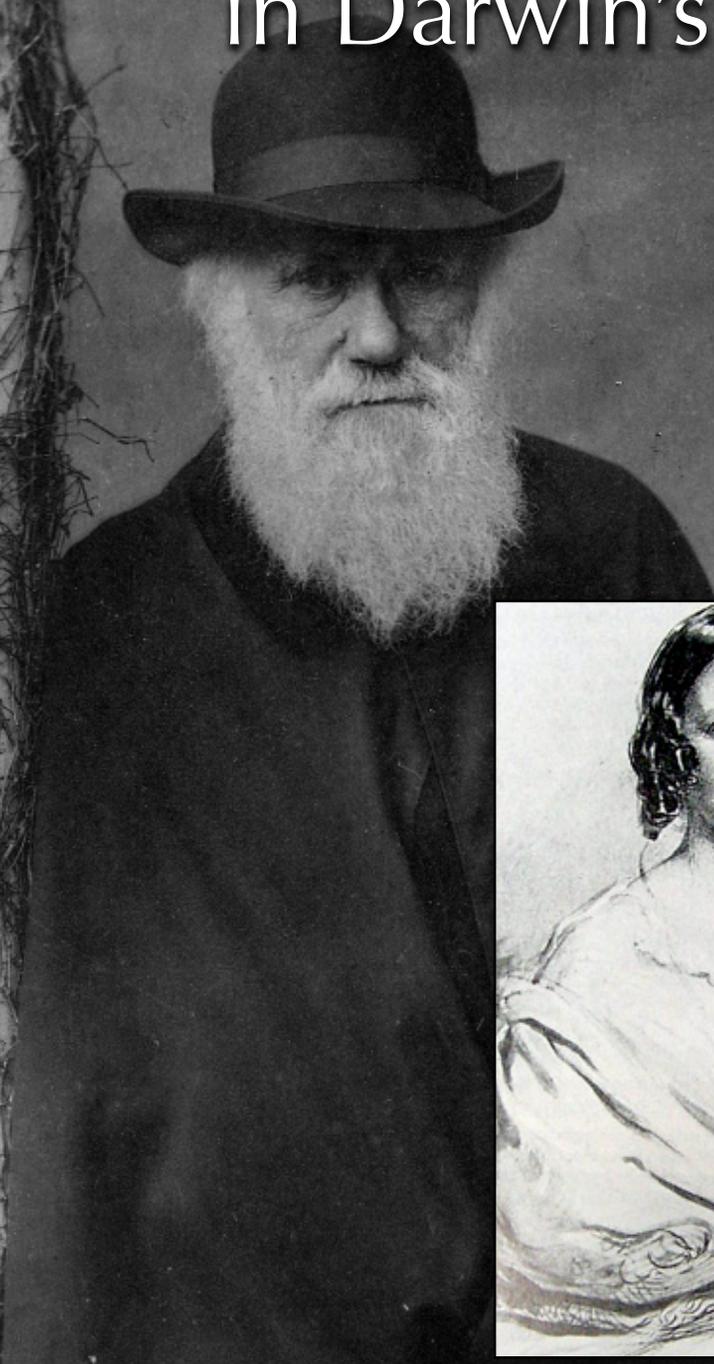
“One’s mind hurries back over past centuries, & then asks could our progenitors be such as these?”

-- Darwin, *Origin of Species*

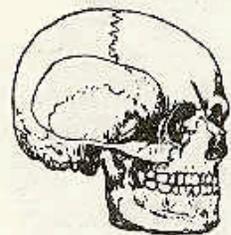


The Descent of Man, and Selection in Relation to Sex, 2 vol. (1871)
The Expression of the Emotions in Man and Animals (1872)

Race and Gender Bias in Darwin's Theories



Apollo Belvidere



Greek



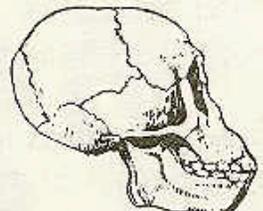
Negro



Creole Negro

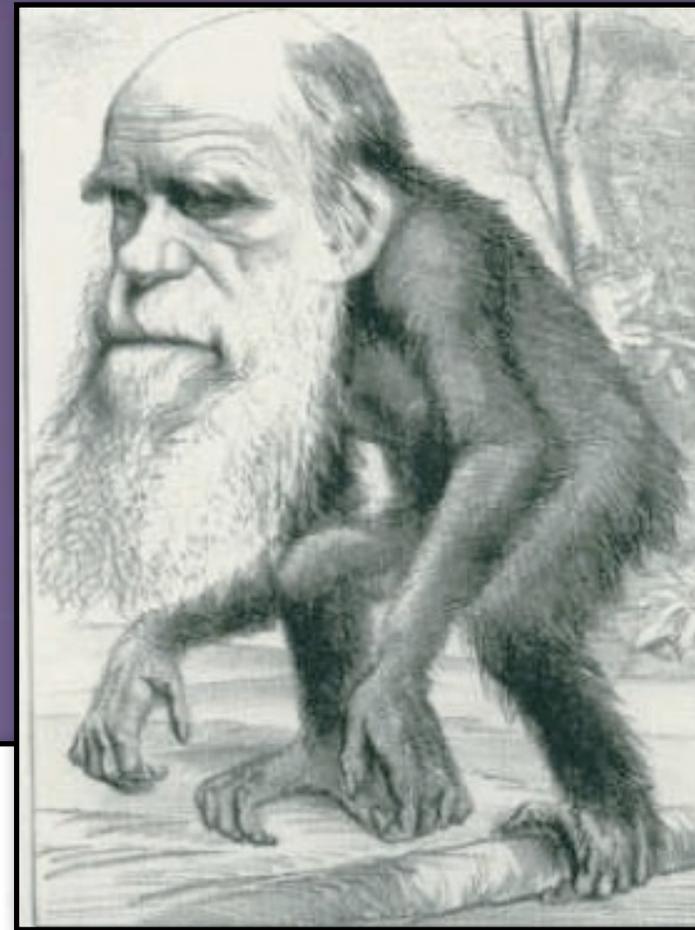


Young chimpanzee

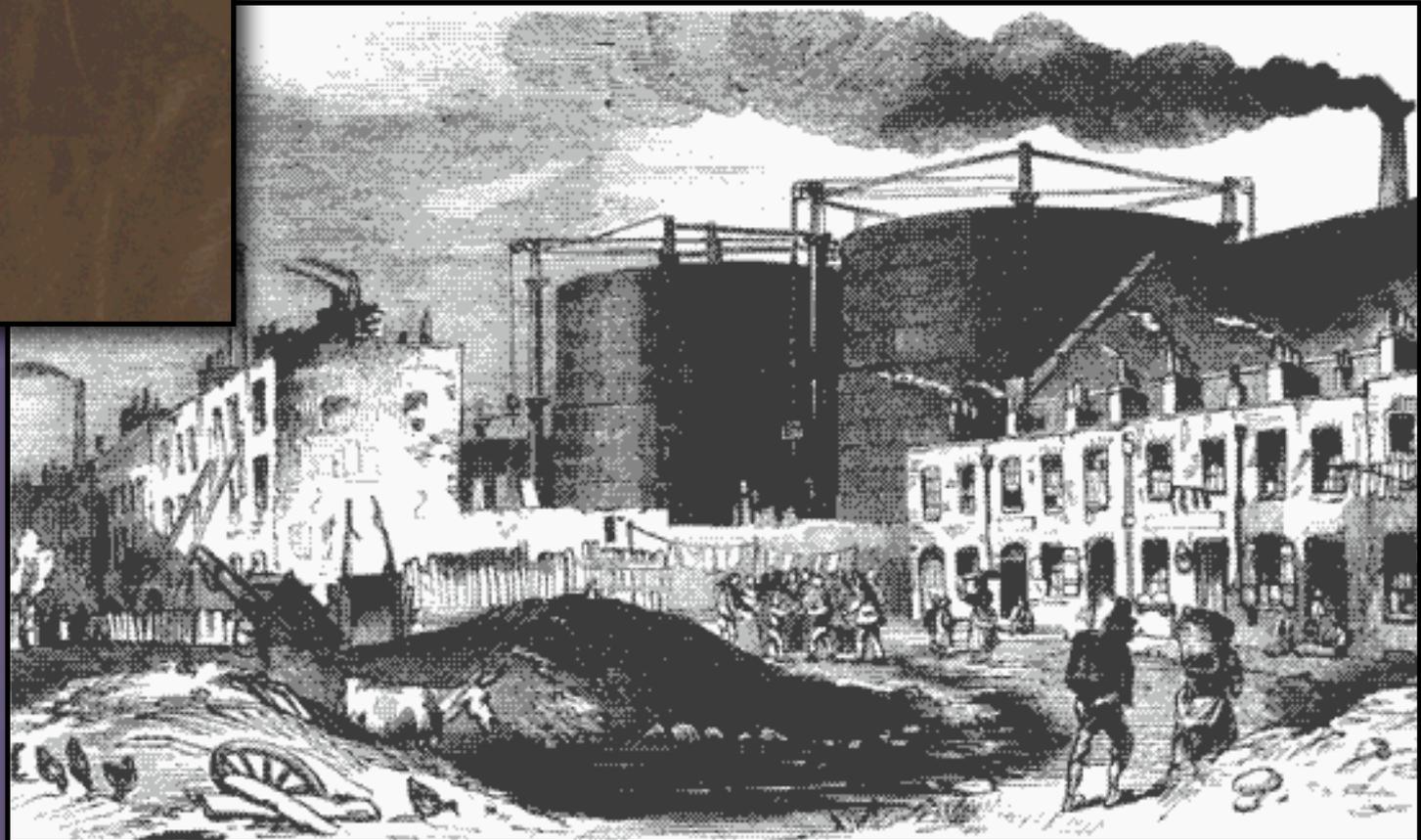
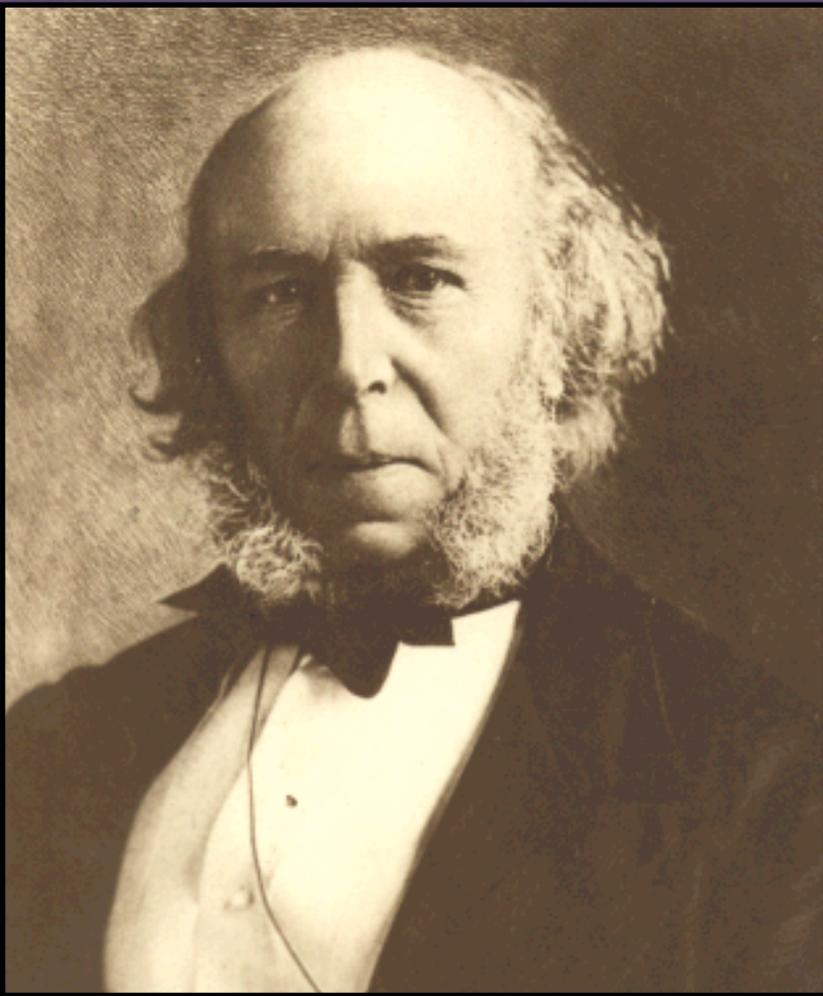


Young chimpanzee

Discomfort with *Descent of Man*



Herbert Spencer,
Social Darwinism
“survival of the fittest”



Theory and Justifications of Empire

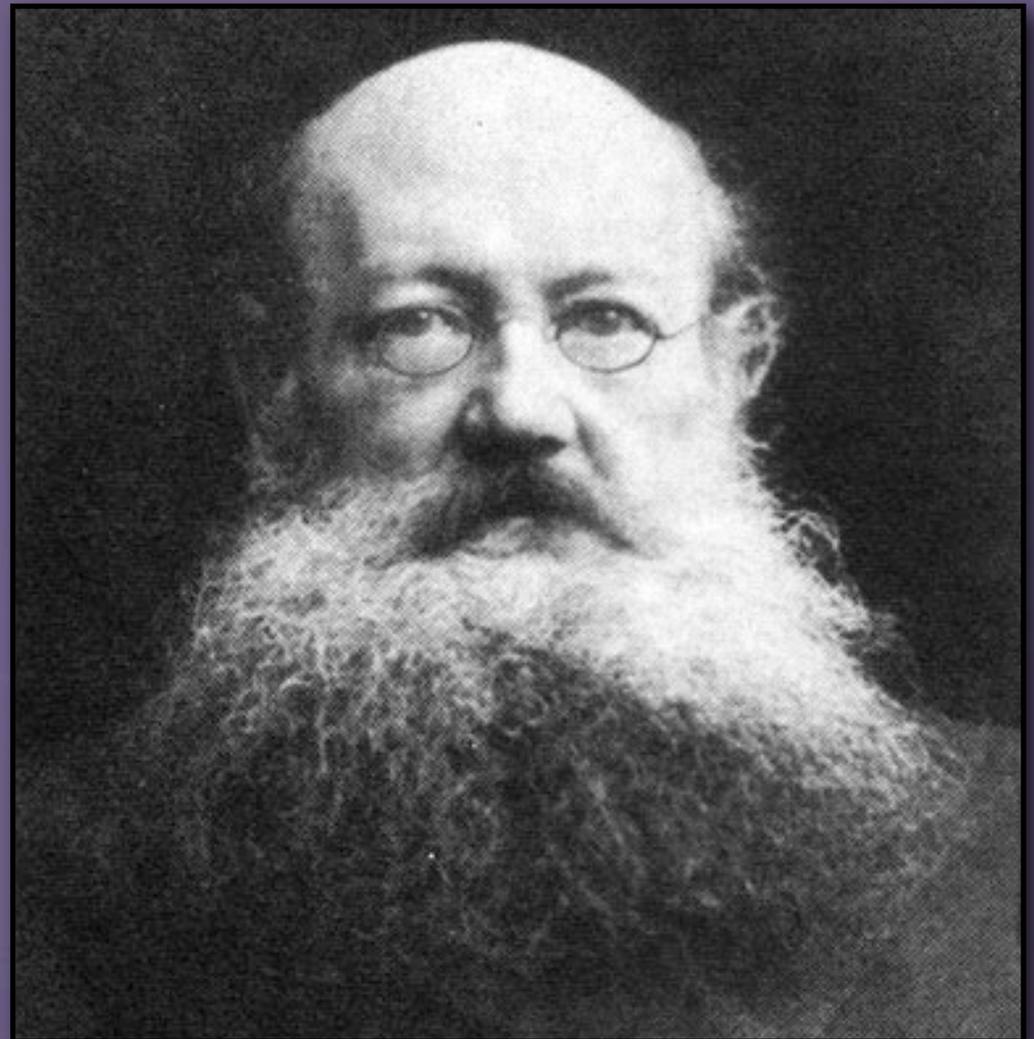
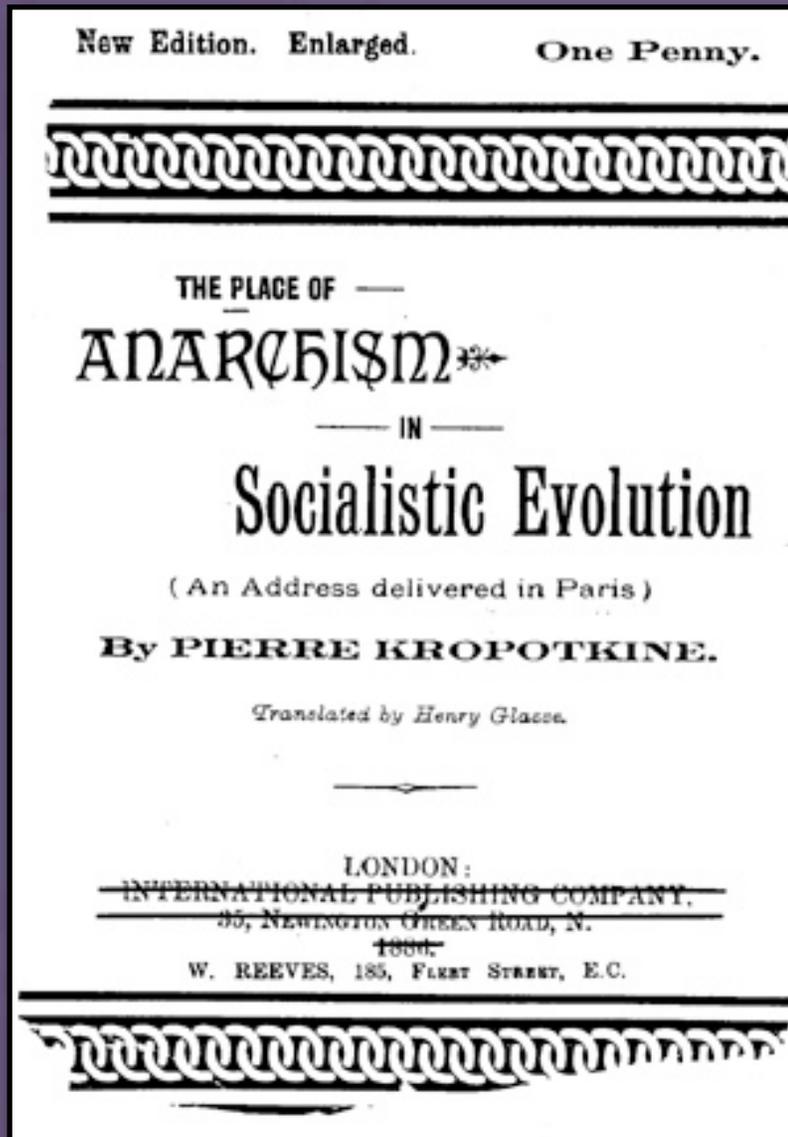


Peter Kropotkin, on life in Siberia: Cooperation, Not Competition

Photo of dog sledding removed due copyright restrictions.



Evolution and Ideology



Review:

- Undeniable evidence that species change over time
-- but what mechanism?
- Darwin's theory bore striking parallels to the economic and political conditions in which he wrote
- His theories were quickly applied in economic and political policy
- Debates over place of humans in nature

Second Paper Assignment

Due date: Monday, 18 October 2010, in class. *No late papers will be accepted.*

Length: 1800 - 2100 words (6-7 double spaced pages).

Grade: Your grade on Paper 2 will contribute 15% of your final course grade. This paper will be re-written as part of the CI requirement. The rewrite will be due Wednesday, November 10, and will contribute another 15% of the final course grade. Further details will be provided closer to that due date.

Few areas of modern science have become more contentious than global warming. Is warming happening? Are humans causing it? Must we restructure our energy production and economy to minimize its consequences? The debates engage the central questions of our Nature block: what is the relation between humans and nature, are the things of nature changing or unchanging, and what are the relations between science and commerce.

Find two primary sources (from newspapers, magazines, scientific journals, blogs, websites, movies, etc.) that offer conflicting perspectives on global warming. *Do not offer a judgment about which is right or wrong.* Instead, informed by the article by Oreskes and Conway and the ideas presented in lectures, *offer an interpretation / make an argument about why the disagreement exists.* For example, do the authors reflect competing commercial or political interests? Do they rely on different assumptions about the relationship between humans and nature? The type of arguments that you choose to make will depend on the details of your sources and your own interests.

Your task will be easier if you find two good sources. What is a good source? Something concise (a 1-2 page op ed) is easier to work with than a movie. Something which makes its own argument will provide better fodder for your own arguments. Something with authors who can be identified and situated (i.e., you can determine where the author is coming from) is more useful than something with unclear authorship.

Paper 1 Feedback

- Ungrounded generalizations, assertions made without evidence or citations
- Misreading and misunderstanding of the sources
- Quoting from sources without explaining relevance
- Illogical or inconsistently executed arguments
- Problems with organization, grammar, style

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STS.003 The Rise of Modern Science
Fall 2010

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