

Questions from Last Class

- What is the Great Chain of Being? Why is it important?
 - When did ideas about the world change from this?
- What impact did each of the following people have on evolutionary thought? What ideas are associated with them?
 - Linnaeus
 - Buffon
 - Cuvier

1

And Lamarck...

- What was Lamarck's contribution to evolutionary thought?
- What was right and what was wrong about his evolutionary explanation?

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Jean-Baptiste Lamarck



Inheritance of Acquired Characteristics

proposes that changes occur during the lifetime of an individual, through use or disuse, can be passed on to the next generation

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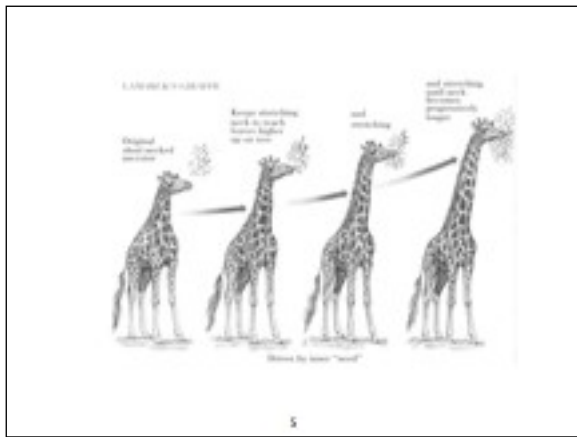
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Elephant's Child?



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Inheritance of Acquired Characteristics

1. Frequent and continuous use of an organ strengthens and enlarges it, permanent disuse causes it to weaken, deteriorate and disappear

2. Acquisitions and losses are preserved through reproduction

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Influences on Darwin

- Buffon
- Cuvier
- Lamarck
- Malthus
- Lyell

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Thomas Malthus

"A struggle for existence"

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Uniformitarianism

the same processes that act on the earth today acted on the earth in the past



Hutton

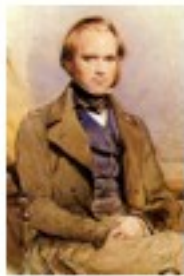


Lyell

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Charles Darwin



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Voyage on the Beagle 1831-1836



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Some of the Finches of the Galapagos



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Organizing the finches



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"I have been now ever since my return engaged in a very prolix and tedious work & which I know no one individual who wd not say a very foolish one. — I was so struck with distribution of Galapagos organisms & & with the character of the American fossil mammals, & & that I determined to collect blindly every sort of fact, which wd bear any way on what are species. — I have read heaps of agricultural & horticultural books, & have never ceased collecting facts — At last gleams of light have come, & I am almost convinced (quite contrary to opinion I started with) that species are not (A is like confessing a murder) immutable. Hesse's friend me from Lamarck's sense of a "tendency to progression" "adaptations from the slow will of animals" ... but the conclusions I am led to are not widely different from his — though the means of change are wholly so — I think I have found out (here's presumption!) the simple way by which species become exquisitely adapted to various ends."

Letter to Hooker

The Darwin Project
<http://www.darwinproject.ac.uk/>

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Letter to Wallace, 1857

"By your letter & even still more by your paper in Annals, a year or more ago, I can plainly see that we have thought much alike & to a certain extent have come to similar conclusions."



To Lyell, 1858: You said this when I explained to you here very briefly my views of "Natural Selection" depending on the Struggle for existence. — I never saw a more striking coincidence. If Wallace had my N.S. sketch written out in 1842 he could not have made a better short abstract! Even his terms now stand as Heads of my Chapters.

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Elements of the Theory

- All species are capable of producing offspring faster than the food supply increases - there will be a struggle for existence

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- **All living things show variation**

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Elements of the Theory

- All species are capable of producing offspring faster than the food supply increases -- there will be a struggle for existence
- All living things show variation
- **Favorable variations will offer an advantage in the struggle for existence**

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Elements of the Theory

- All species are capable of producing offspring faster than the food supply increases -- there will be a struggle for existence
- All living things show variation
- Favorable variations will offer an advantage in the struggle for existence
- **These variations, when heritable will be passed on to the next generation and will increase in frequency over time, changing the population**

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Natural Selection

- Competition
- Variation
- Heritability
- Differential Reproduction

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Example

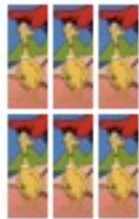
- Two kinds of Sneetches
- Those with bellies without stars and those with stars upon thars



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In the beginning....



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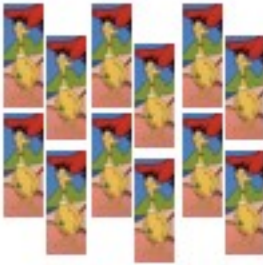



The Star Belly Sneetches had more fun on the beaches

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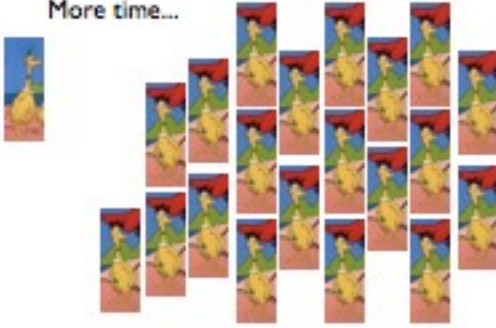
Over time...



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More time...



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And then....



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Natural Selection



(a) Mode of inheritance (b) Variation among individuals (c) Environmental pressure

+ Differential Reproduction

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Elephant's Child?