

8.1 Scientific Contribution to a Theory of Evolution

SBI3U

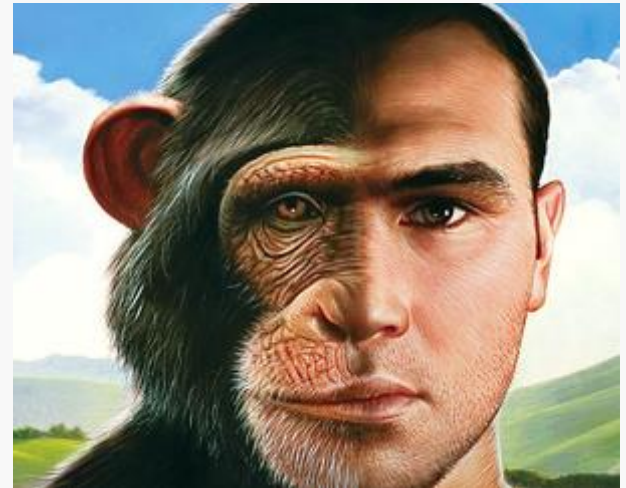
MS. DE SOUSA

Georges- Louis Leclerc (1707-1788)

Challenged the idea that life forms were unchanging. He noticed similarities between humans and apes suggesting they had a common ancestor



Based on his assumptions he assumed that earth was much older than 6000 years.



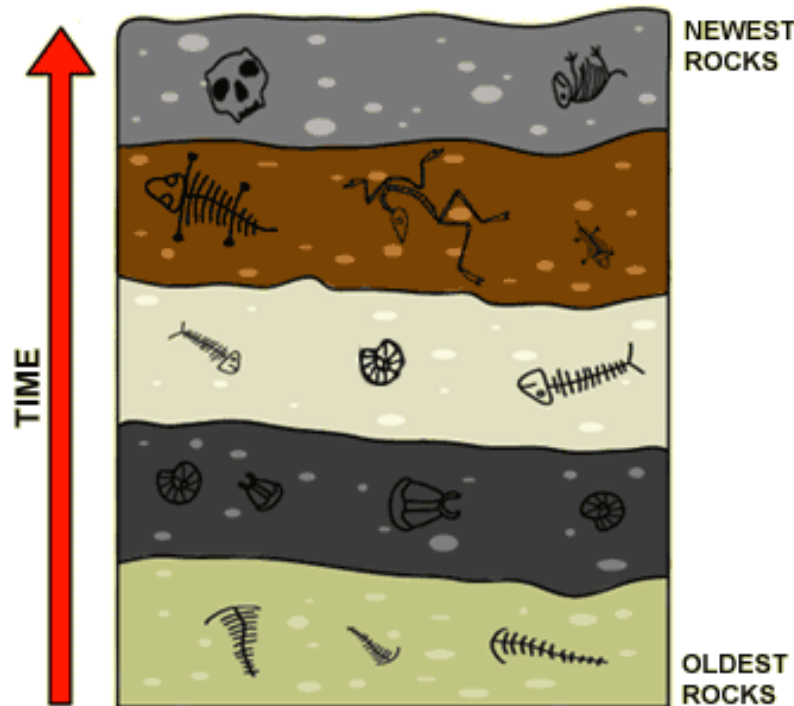
Georges Cuvier

Analysed Mary Anning's studies of fossils in England. Developed the science of *paleontology*; a study of fossils as a way to examine ancient life.



Georges Cuvier

When Cuvier looked through the fossils, it showed evidence that organisms were appearing and disappearing from the layers. The strata showed evidence of extinction.



Strata are sedimentary rock that have compacted into layers over many generations. Considering that each layer was compacted at a different point in time, the fossils within them are presumed to have been from that era.

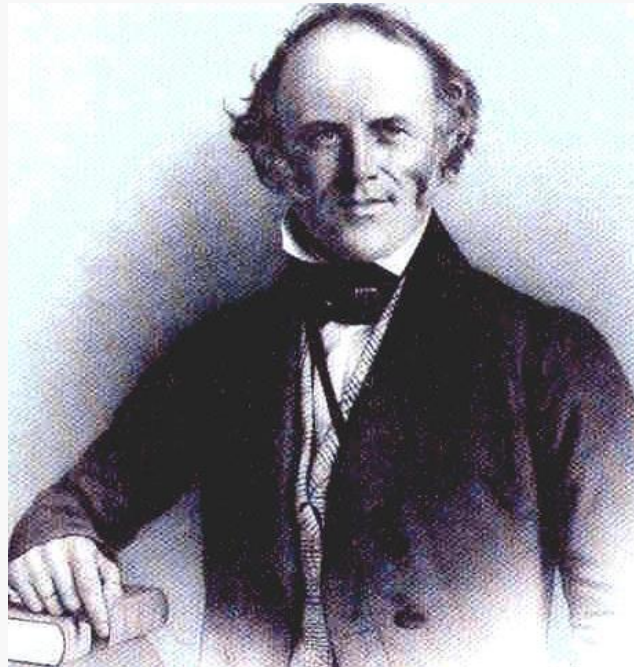
Georges Cuvier & Catastrophism

Cuvier speculated that earth had undergone many natural disasters killing various species.

Cuvier used catastrophism as a theory to explain his observations in the strata layers.

Charles Lyell (1797- 1875)

Believed in Uniformitarianism. He believed that the earth was more than 6000 years old and that the differences seen in species were due to *slow subtle changes*.



Jean-Baptist Lamarck (1744-1829)

Lamarck compared the fossils to today's species and thought that species changed over time. He concluded that there was a line of descent between ancestral species and today's species

Lamarck believed that species became increasingly more complex overtime until they reached perfection and were better adapted to their environment.

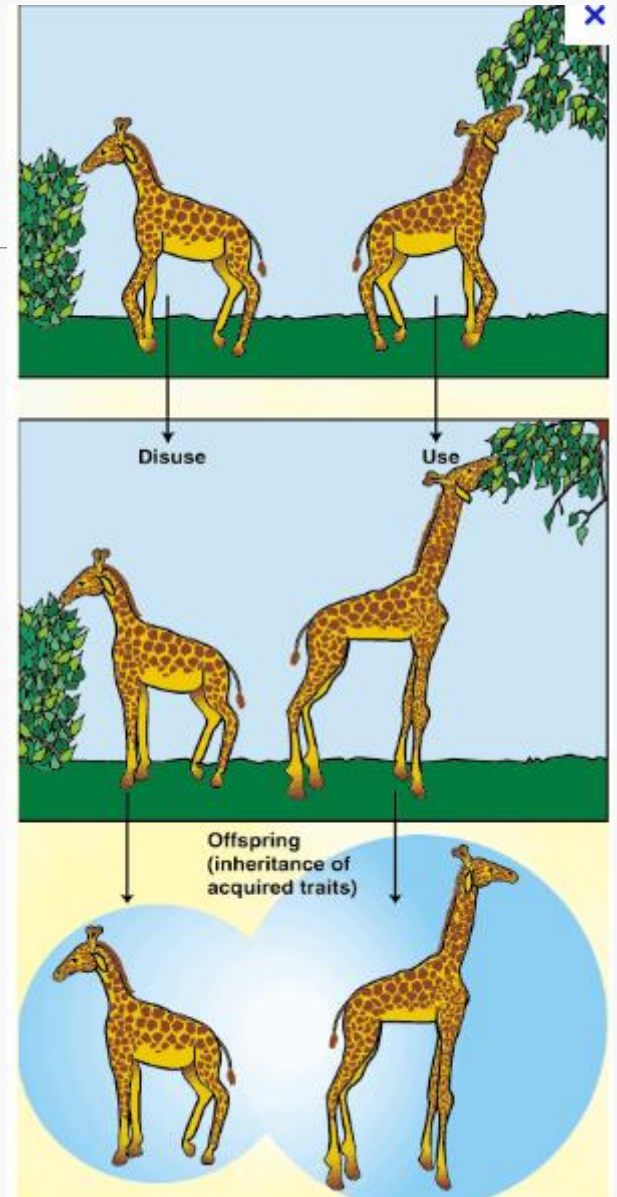


Lamarck's Theory

Law of Inheritance of acquired characteristics:

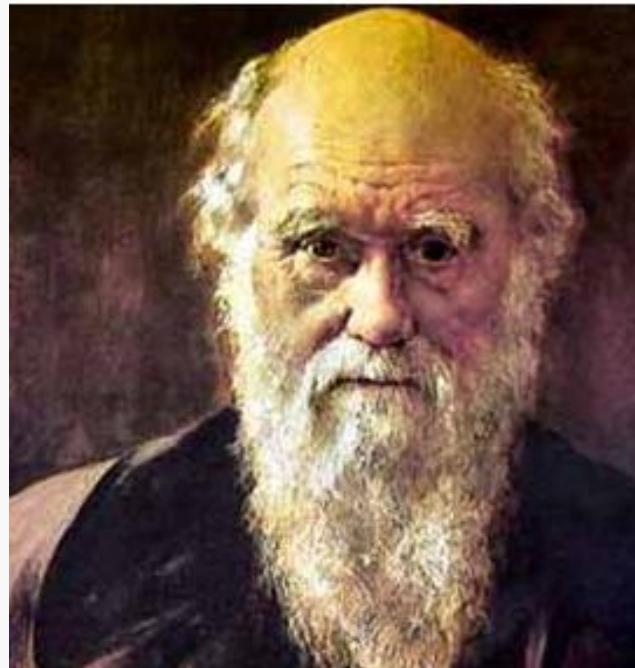
Overtime organisms became increasingly more **adapted to their environment.**

The body parts that were used more often would become more prominent and better suited for the environment.



Charles Darwin (1809-1882)

Through the theories prior to him and his observations, Darwin was able to develop the ***Theory of Evolution by Natural Selection.***



The Voyage of the Beagle

Charles Darwin took a trip to the Galapagos Islands to further understand the variation of species.

The ship he travelled was known as the Beagle .



The Voyage of the Beagle

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



Observation 1:

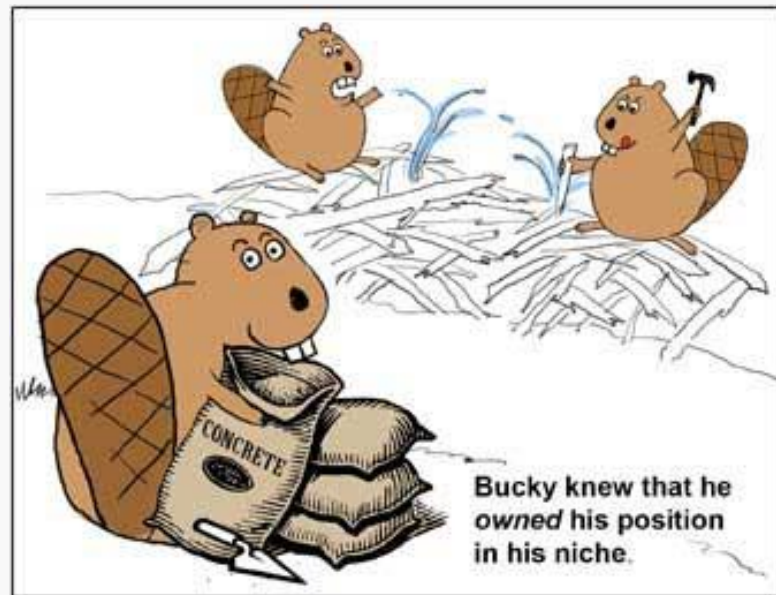
Many organisms found throughout South America were structurally similar to one another. Both existing and extinct species.



Observation 3:

Darwin wondered why continents separated by large distances would have entirely different species occupying similar niches

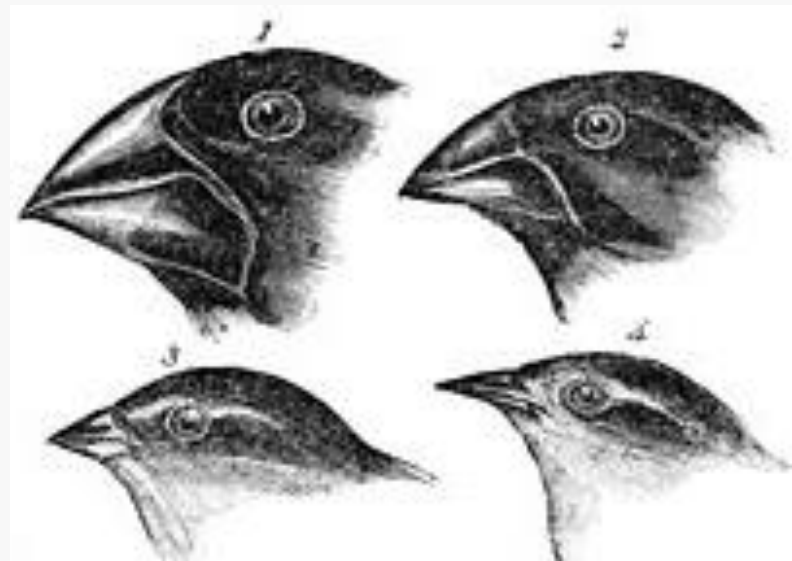
Niche: The place where an organism lives and the roles that an organism has in its habitat.



Observation 4:

When Darwin visited the Galapagos Islands, he observed that the finches varied slightly from island to island.

It seemed that each finch had adapted to eating different food. Their beaks differed in response to this environmental change.



Common ancestor

Darwin's Finches

Based on his observations, Darwin believed the following about the finches:

- 1) Storm may have blown the flock from South America
- 2) No birds occupied the different niches available on the Galapagos. Thus, the finches were able to move into new ways of feeding without competition and survive.

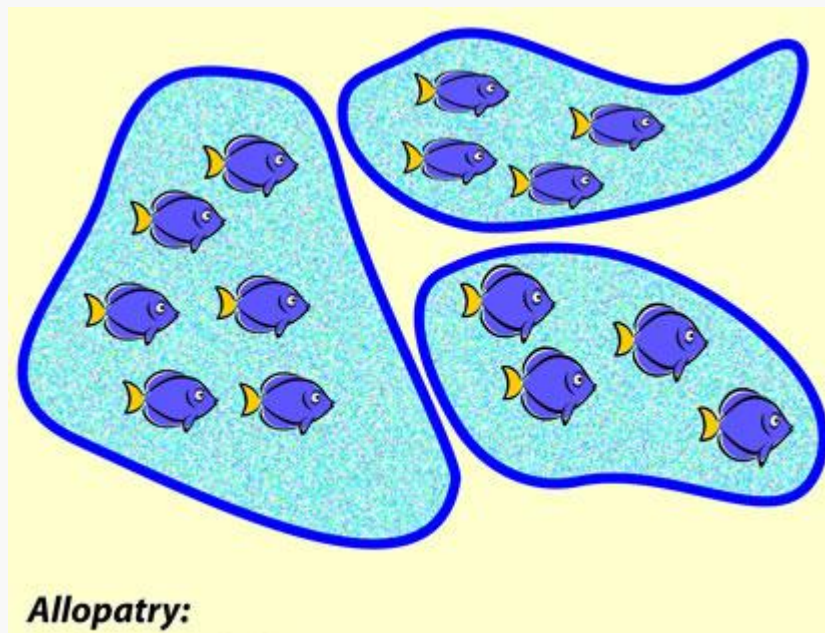
Darwin's Finches

3) Over many generations, the birds with adapted beaks that were successful in getting food survived and successfully raised their offspring.

The variation inherent in the population is selected for and results in differential reproduction.

Darwin's Finches

- 4) Islands separated by oceans (30km) prevented interbreeding and barrier lead to ***separate gene pools*** on each island.



Darwin's Finches

5) Overtime, enough mutations may have accumulated in the gene pool so that they would be unable to *interbreed* with birds of other populations.

Darwin's Analysis

- 1) Populations change over time. According to Malthus, this change happens due to the starvations or disease of the other species that did not have a selective advantage.



Darwin's Analysis

2) *Survival of the Fittest:*

Individuals with a selective advantage survive in their local environments allowing them to pass on these advantageous traits to the offspring.

Darwin's Analysis

3) All life descended from some unknown organism (common ancestor).

Because the descendants spread into different regions, organisms developed adaptations that enabled them to survive in local environment.

Homework

1) Complete the question sheet given out in class

2) Textbook: p.331 # 1, 5,8 & 11