

EARLY THEORIES OF EVOLUTION

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Theories of Evolution

Jean Baptiste Lamarck- 1809 French Biologist

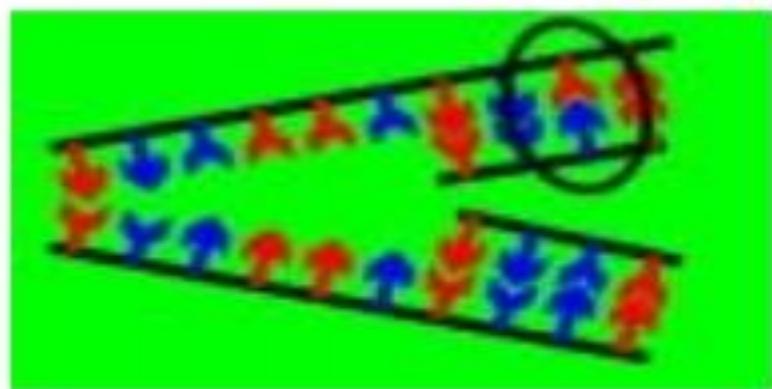
- Proposed that life evolves or changes.
- Explained evolution as a process of adaptation.
- Law of Use and disuse. -New organs arise according to the needs of an organism, and their size is determined by the degree to which they are used.
- Inheritance of acquired characteristics.- Useful characteristics acquired by an individual during its lifetime can be passed on to its offspring.
- No evidence to support this theory.

Theories cont....

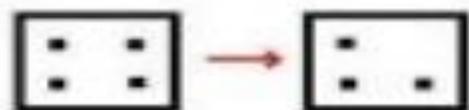


August Weissman-

- Helped to disprove Lamarck's theory of Inheritance of Acquired Traits.
- Conducted experiments involving the removal of the tails of mice over several generations.
- Found that the offspring of the tail-less mice did not pass on that characteristic to their offspring.



Theories cont.....

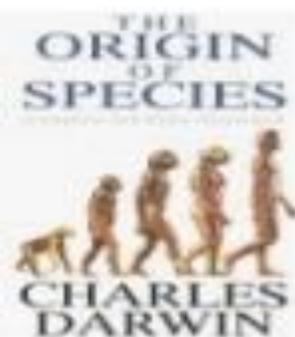
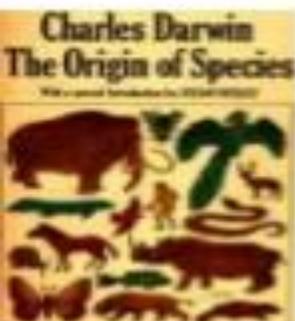
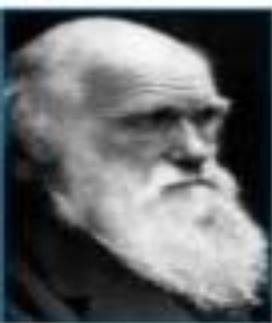


Mutations are Always a loss of existing information

Hugo DeVries-

- Discovered mutations and proposed that it was these mutations that were the source of new traits that permitted evolution to occur.
- This was the one area, in Darwin's theory, that was weak. Darwin's theory did not account for the genetic basis for variations.

Charles Darwin- 19th century English Naturalist



- Proposed that evolution occurred as the result of **Natural Selection**.
- **Overproduction**- within a population more offspring are produced in each generation than can survive, because of limitations of space and food.
- **Competition**- individuals compete for the available food and opportunity to mate and reproduce.
- **Variation**- within each generation some individuals are better fitted to survive than others because of variations in characteristics.
- **Survival of the Fittest**- those individuals better fitted to survive are more likely to live long enough to reproduce.
- **Transmission of Favorable Traits (Reproduction)**- offspring of the fittest individuals will inherit the favorable variations that enabled their parents to survive and reproduce.
- Evolution of Species (**Speciation**)- accumulation of favorable variations will gradually lead to the appearance of new species better adapted to their environment.
- Weakness in Darwin's Theory is that it **does not account for genetic basis of variations**. At the time, not much was known about the mechanisms of genetic inheritance.

Natural Selection

- **Natural selection** is the process where **inheritable traits** that make it more likely for an **organism** to survive long enough to **reproduce**, become more common over successive **generations** of a **population**.
- It is a key mechanism of **evolution**.
- The Galapagos finches provide an excellent example of this process. Among the birds that ended up in arid environments, the ones with beaks better suited for eating cactus got more food. As a result, they were in better condition to mate. Similarly, those with beak shapes that were better suited to getting nectar from flowers or eating hard seeds in other environments were at an advantage there. In a very real sense, nature selected the best adapted varieties to survive and to reproduce. This process has come to be known as **natural selection**.

**Something was happening in the cities
of England at this time,
What could that have been?**

Industrial Revolution

•A greater number of factories were being created, which meant more pollution!

WRITE:

•What do you think was happening to the peppered moths as a result of industrialism?

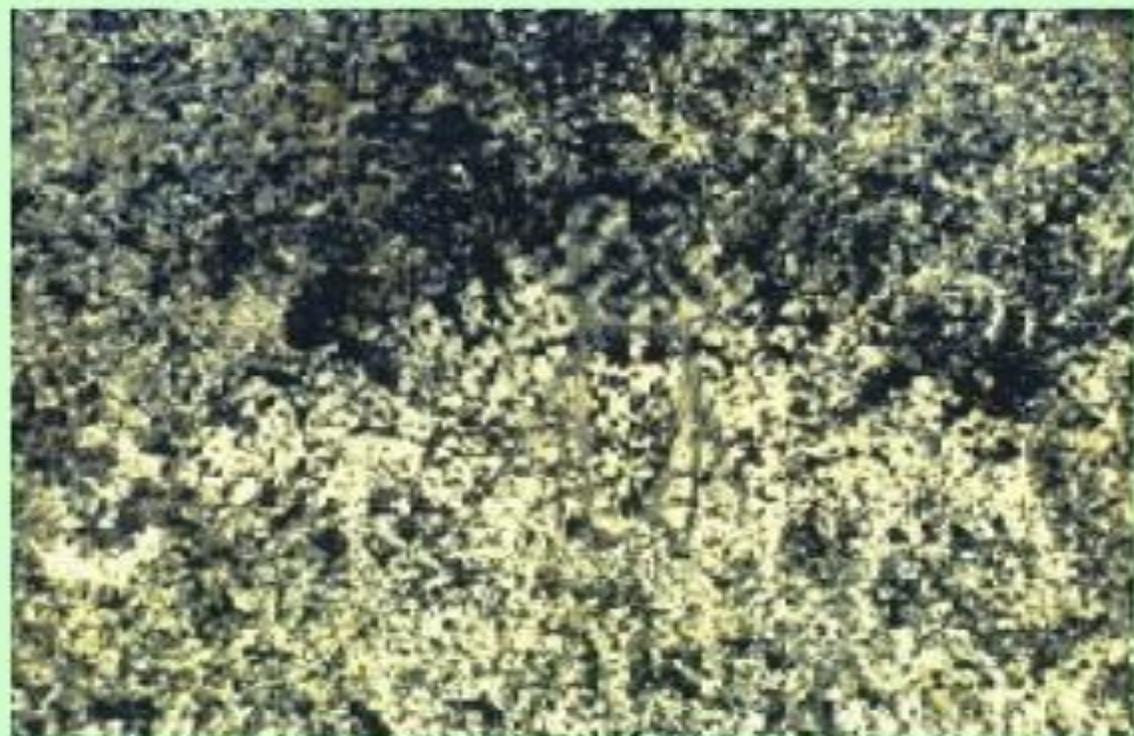
WHAT'S HAPPENING!



- Around 1850, black-colored peppered moths started to become more common than cream, usually in heavily industrialized areas.

Why did the frequency of black moths increase with the growing industries?

Can you find the moth on the tree trunk?



- During the early 1800's in Birmingham, England there were dark and cream colored moths. However, almost all peppered moths were cream colored because the tree trunks were light colored.

Would it be an advantage or disadvantage for the moth to be light?

Darwin's Theory of evolution
by natural selection suggests a
hypothesis.



White tree trunks were
blackened by heavy pollution
from factories.



Which Moth is better adapted to its environment?
Explain why?



- Perhaps dark moths sitting on soot-darkened bark escaped being eaten by birds because it was too hard for the birds to see the dark moths against the dark background.



- Light-colored moths would have stood out against a dark background and would have been easy prey for hungry birds. Therefore, more dark moths survived.

This is an example of Natural Selection!

WHAT IS NATURAL SELECTION?

- Natural Selection- is a gradual change in a species in response to the demands of its environment.

Do Now:

- Write how the peppered moth during the 1800's was an example of natural selection in action!

THANK YOU