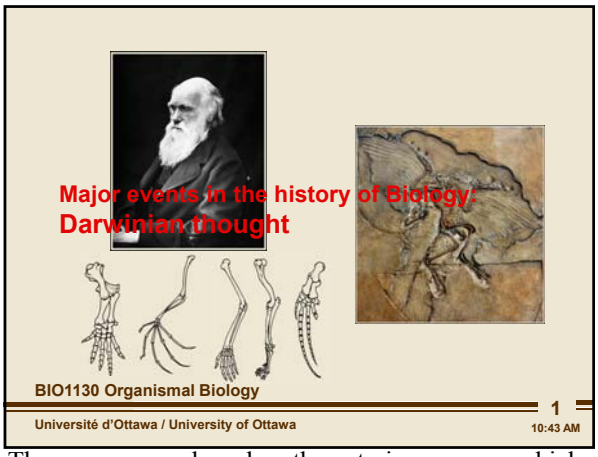
Darwinian thought



He says the scala is wrong and that the earth is much older than it is said to be.

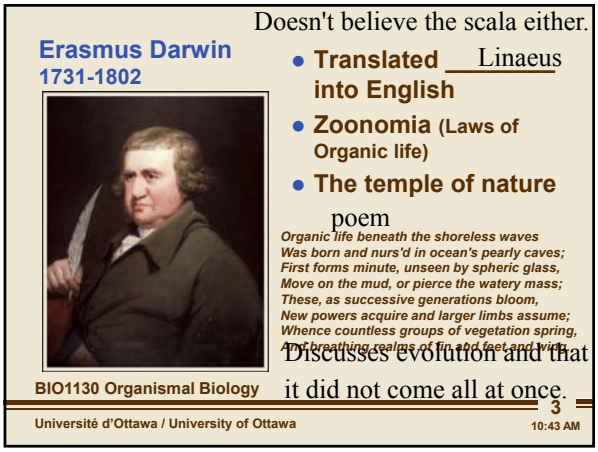
The essence was based on the exterior essence, which causes variation in a particular animal. Georges-Louis looked at the change in life and talks about the cooling of the life.

Georges-Louis, Conte de Buffon wrote descriptive essays about nature (l'histoire naturel) 3 major ones, organic, plant(not touched), animals

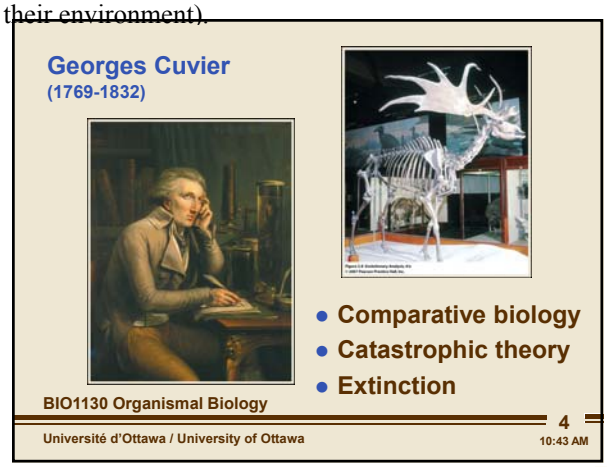
Animals adapt to the location that they inhabit.

Stated that there are fossils in Antartic of animals that no longer exist. Elephant like animals started up in the poles and as they came down, they changed in their appearance (as they changed their environment).

Temple of nature poem: Gradual change over time and they did not arrive all at once (animals).



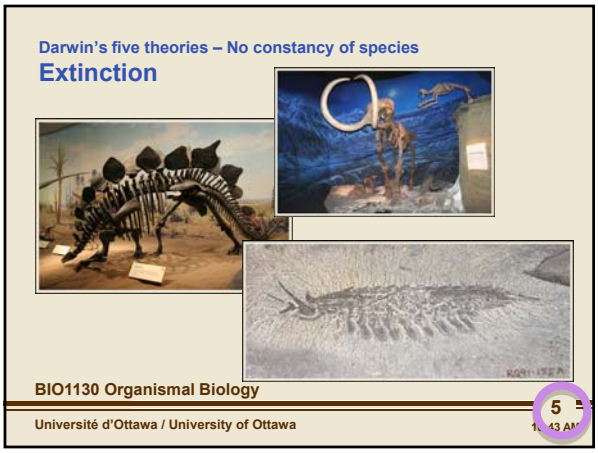
Cuvier mentions climate/geological catastrophe that could have wiped out certain species.



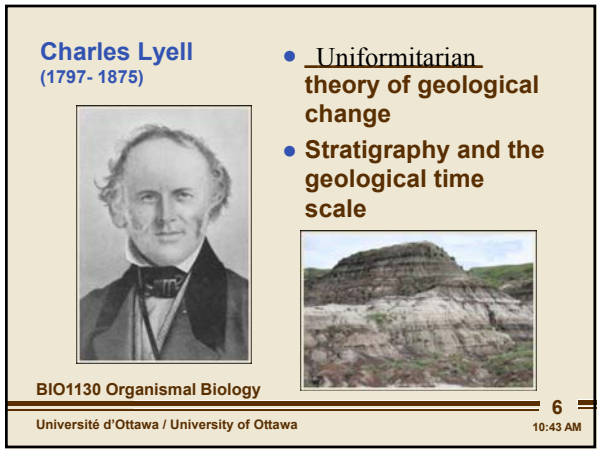
Sees that animals are missing and that there must have been something wrong with the original animals (that arrived years ago).

Finding unheard of organisms. He questions the scalae nature and mentions that some organisms are extinct. Asks why they have gone extict.

FLOOD Biblical.



Wrote about 23 different species and identified the flood



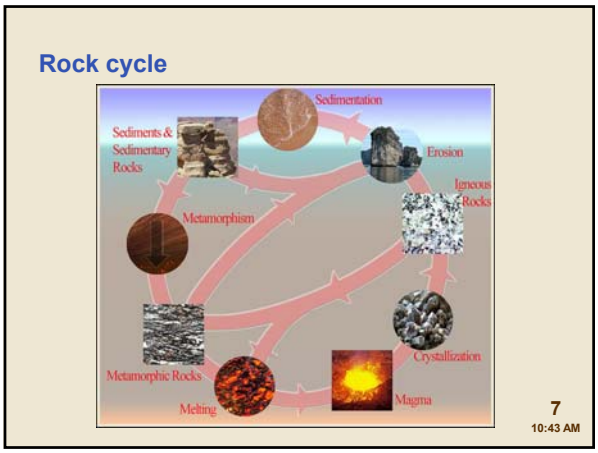
Long slow gradual process and change in the earth reflected by the rocks. Cuvier and Lyell have different views about time.

Slow graduate changes are happening on the earth (uniformitarianism). Speaks about layers and how over time you can create a geological time line because of the huge compositional changes in the rocks. He notices that there are fossils.

Cuvier-Fast
Lyell- Slow

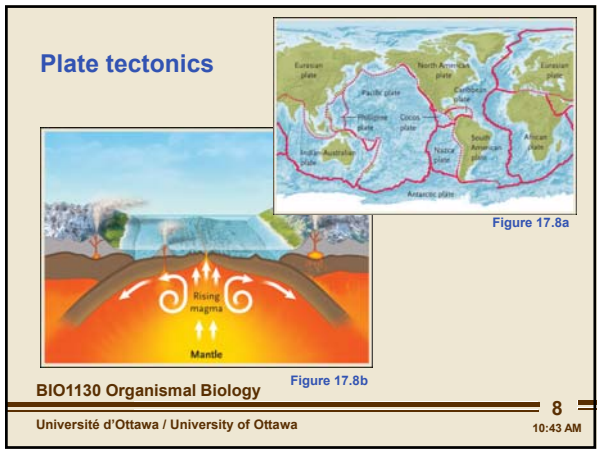
Darwinian thought

Earth is gradually changing over time and is not aware that the cause is by the plate tectonics.



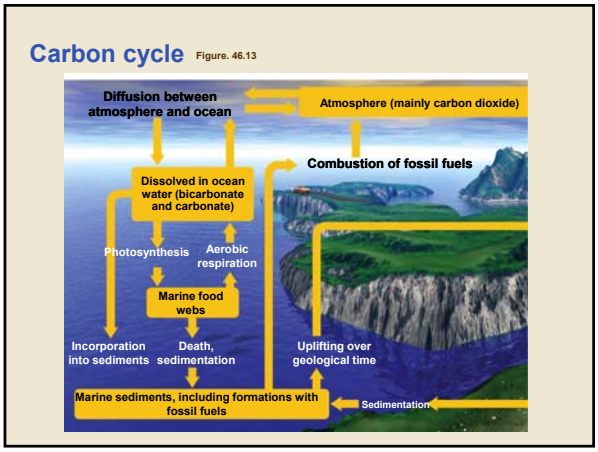
The root of all rocks is the magma that eventually erodes.

Lyell noticed (unknowingly) that the rock returns into a molten form.

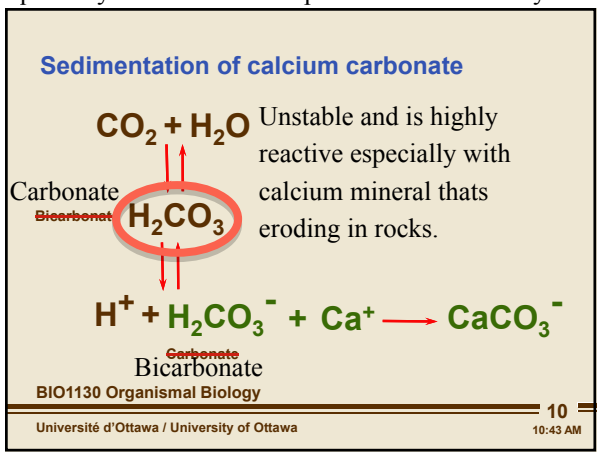


The concept of continent displacement.

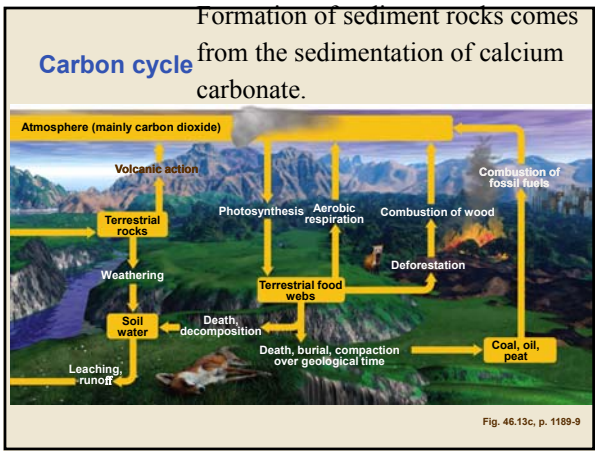
This pathway helped build complex organisms. This pathways was critical for specific areas in history.



Carbon is dissolved in the oceans.
It takes years to make sediments.

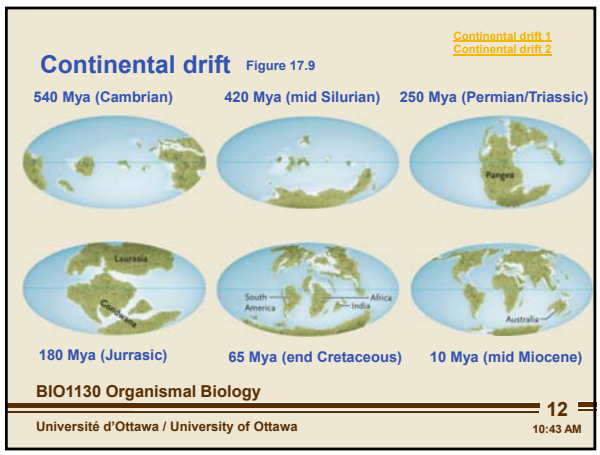


This is how sediment minerals are made through this process.



Formation of sediment rocks comes from the sedimentation of calcium carbonate.

Organic carbon, the biggest sink of carbon is found in the oceans



Continental drift, from Pangea. Animals evolved differently from where they evolved from. All the continents formed in a large land mass (and was seperated by continental drift).

Groups of animals showed proof of continental drift. This was accepted in the 1960s. This explained a lot about the difference of specific animal groups this also explained why there are fossils.

Darwinian thought

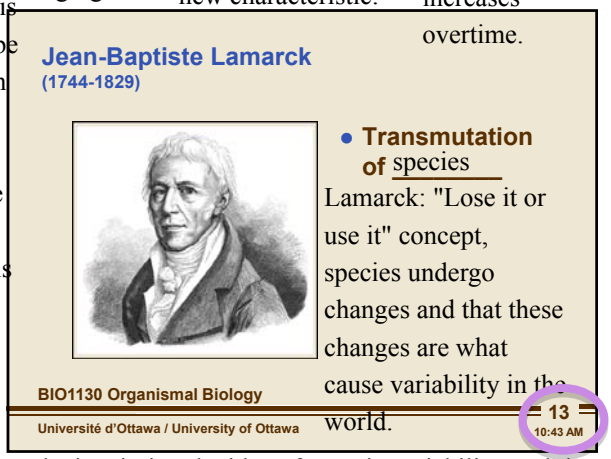
Transmutation : changing.

Infusoria: the essence (over time) will get new characteristic.

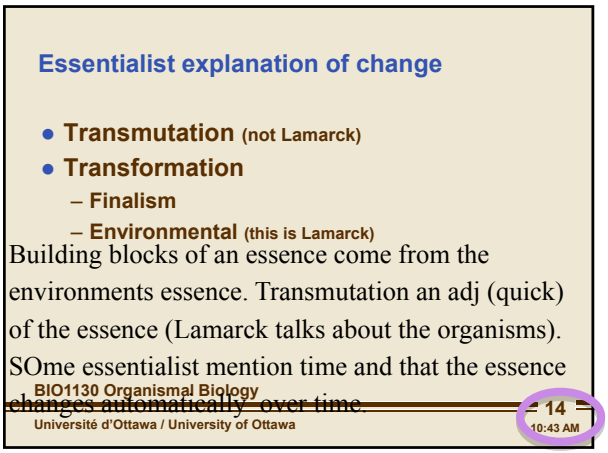
Complexity of organisms increases overtime.

Lamarck is accepted and says essence changes slow because of the environment.

A mechanism is born to describe the diversity in animals however he gets wrong the genetic variation that is passed on. Wrong about inheritance of aquired traits.



Lamarck: "Lose it or use it" concept, species undergo changes and that these changes are what cause variability in the world.

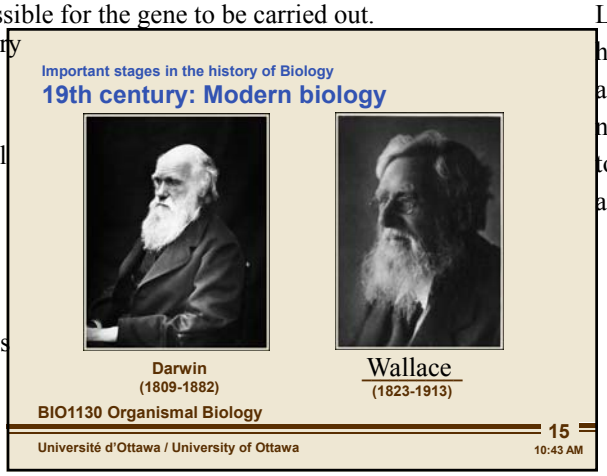


Building blocks of an essence come from the environments essence. Transmutation an adj (quick) of the essence (Lamarck talks about the organisms). SOme essentialist mention time and that the essence changes automatically over time.

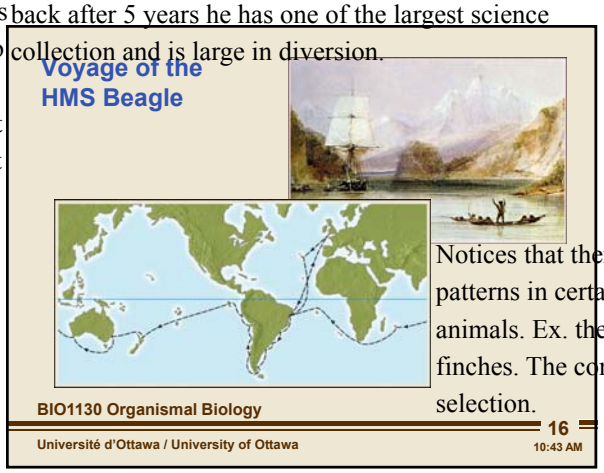
However he is missing the idea of genetic variability, and that the aquired traits were not passed on and he did not know how egg and sperm work. The mutation is not in the genome and it is physically impossible for the gene to be carried out.

Darwin is very rich and when he goes on the beagle he collects as much as he wants and he has a photographic memory and he took extensive notes. WHen he gets back after 5 years he has one of the largest science collection and is large in diversion.

Darwin: Never produced a theory of evolution (he proposed the theory of natural selection). He gives us population thinking where some individuals may be more successful in mating than others (because of there variability. This means the trait will be passed on.



Lyell gets him a job as a naturalist to collect and

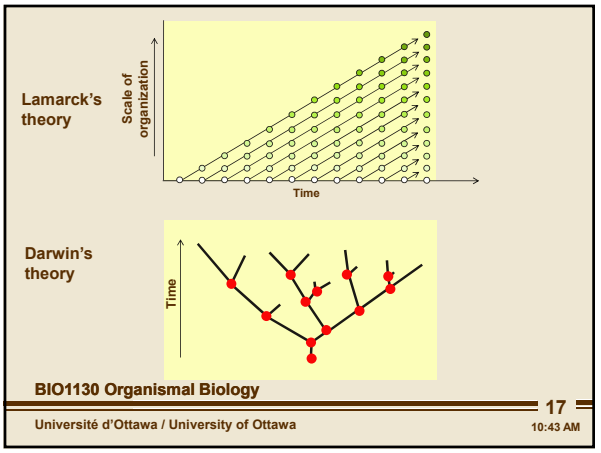


Notices that there are specific patterns in certain groups of animals. Ex. the beaks of the finches. The concept of natural selection.

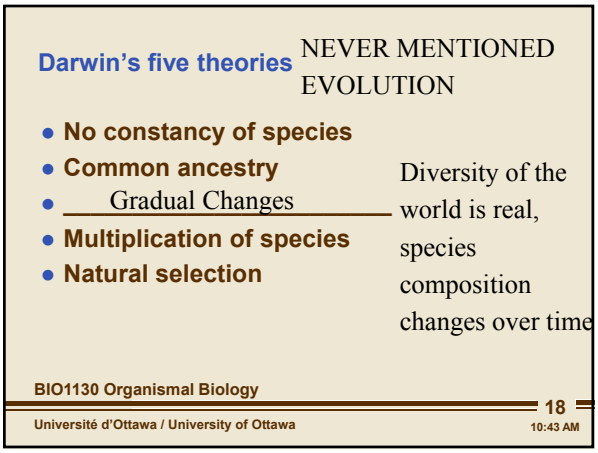
Wallace mails to Darwin he's similar idea and both presented their papers and they are both the founders of the concept of natural selection.

People accepted Lyels ideas.

Darwin gives us to views: Natural selection and common ancestory.



Takes the lamarck view and says that everything has a common ancestor. He gives the concept of a common ancestor.



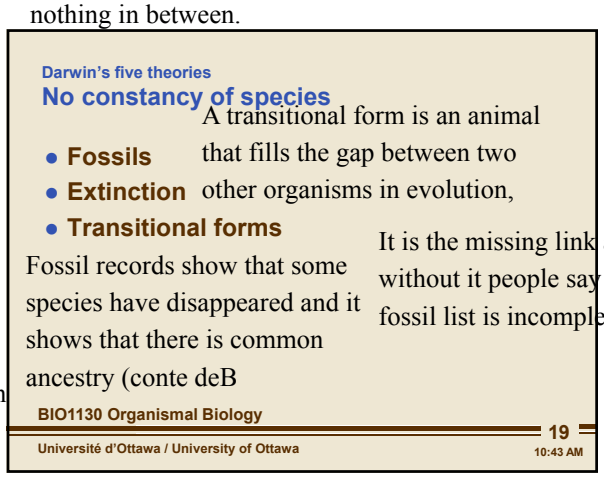
What happens and what is the gradual change and what is the inherited material (this is explained in the modern theory of evolution),

Branching pattern creates more variability and over time they gradually appear. He provides the mechanism and Darwinian Fitness.

Changes have increased the number of species. He gets immediate acceptance on no constancy of species and common ancestry. The other three theories are not accepted. Reason being there is no idea as to what is being inherited. No

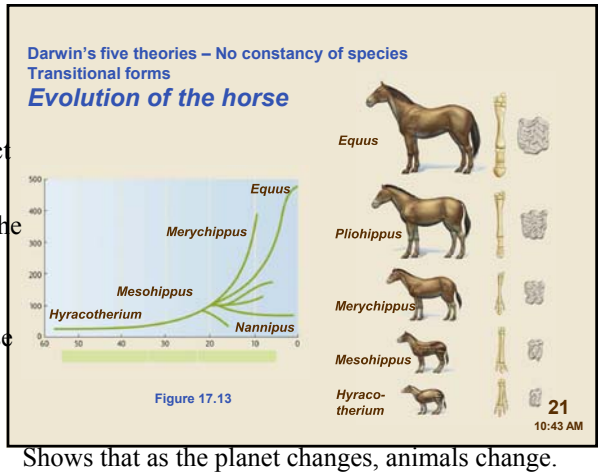
Darwinian thought

Fossils show that the species composition changes over time. Fossil records are incomplete and there is nothing in between.



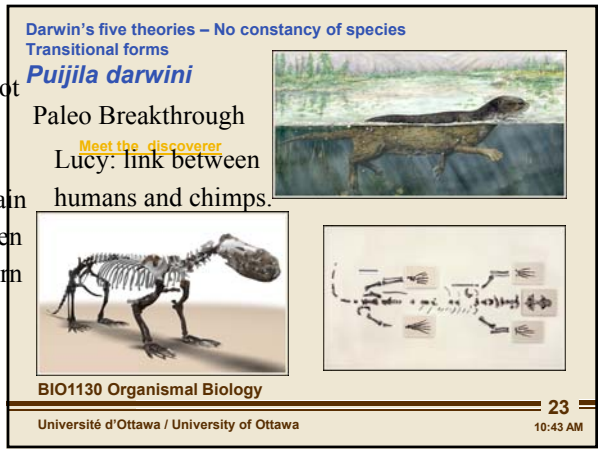
Conte de Buffon

Transition fossils in horses are an example



Grass also changed in order to protect itself with its cell wall and the molars of the horse had to change because of this.

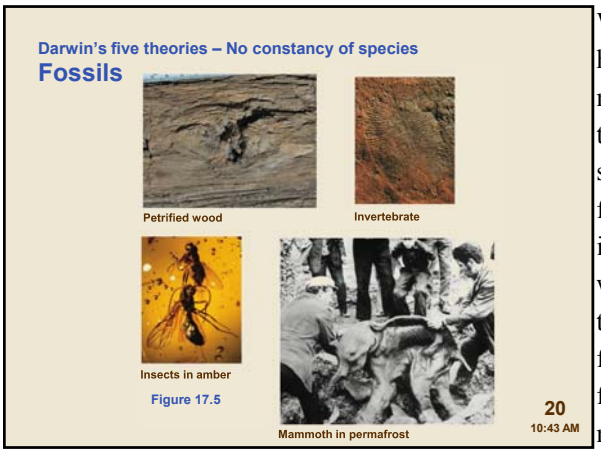
Shows that as the planet changes, animals change. For example how to feed. Horse: length change in the horse (by natural selection) in order to feed and run fast too.



Darwian did not have the transitional fossils to explain the link between past and modern organisms.

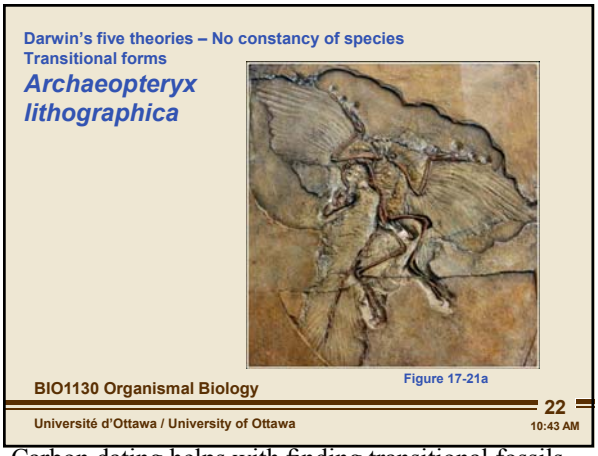
Transitional fossils are becoming very common. Ex. The evolution of young mammal (seals). Lived in the high arctic. It is a lot like seals and it was also able to live on land and water.

Conditions for fossils is rare and takes awhile. Soft body invertebrates were usually seen as incomplete because the transitional forms were always missing, however they were found in shale. There was hundreds of those animals found in the shale (found in the ocean) Bridge of shales.

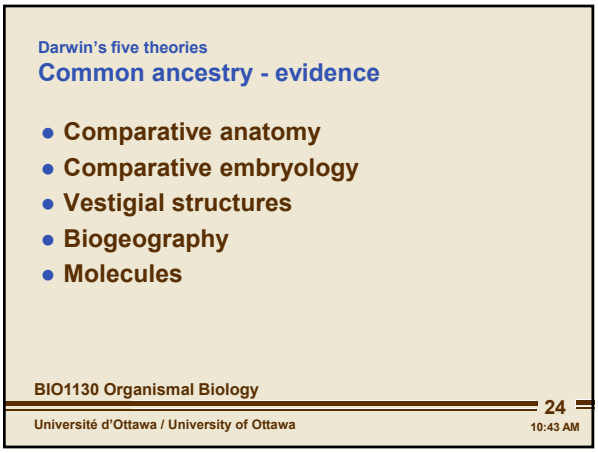


We didn't know how the rocks moved and thats why we saw that the fossils were incomplete and why the transitional forms of the fossils were missing.

This was the first flying organism found in a shale. It was like a reptile (it had teeth). This was a transitional fossil between reptiles and birds.

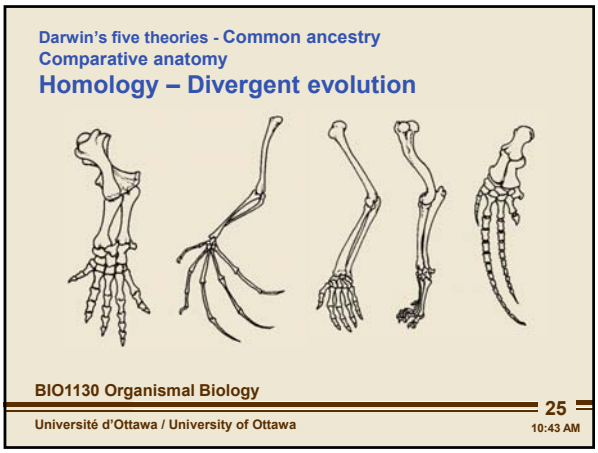


Carbon dating helps with finding transitional fossils.



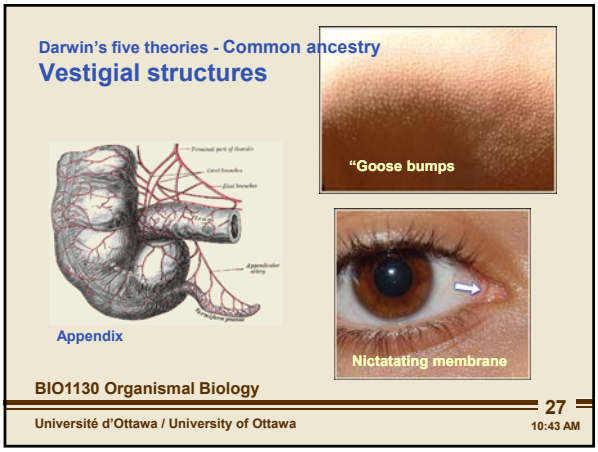
Darwinian thought

Structures that share the same internal structure (can help determine common ancestry).

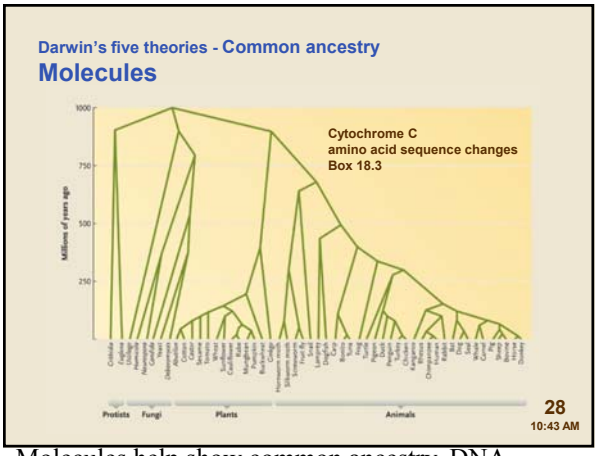


It would be hard to determine common ancestry between whales and bats unless we look closely at the homology of species.

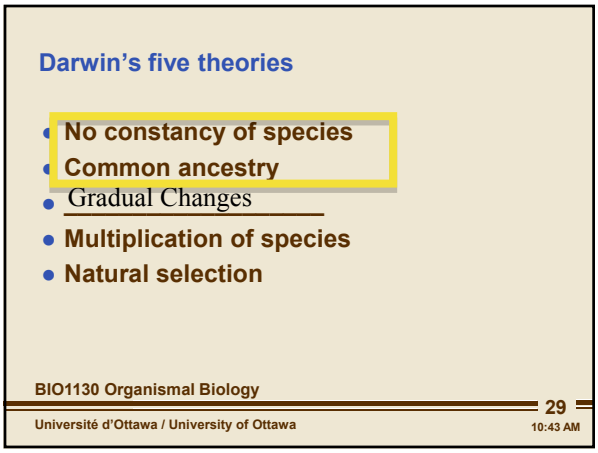
By looking into embryology we can determine common ancestry. Gives us a way to look at the internal structural changes in the organisms in order to compare. It is hard to determine what the organism will be in the first few weeks of the embryos growth because it is so common in many organisms and species.

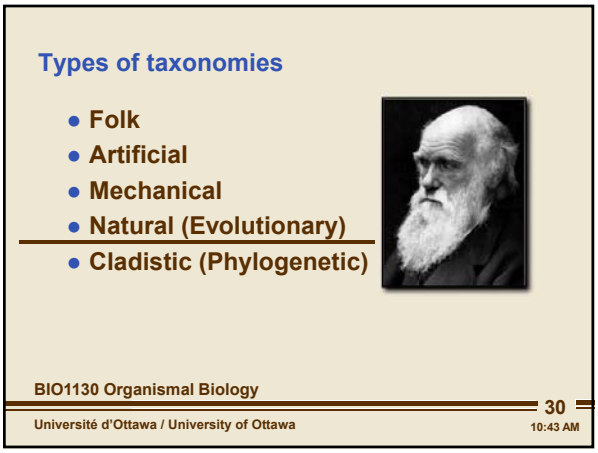


*Nictating membrane



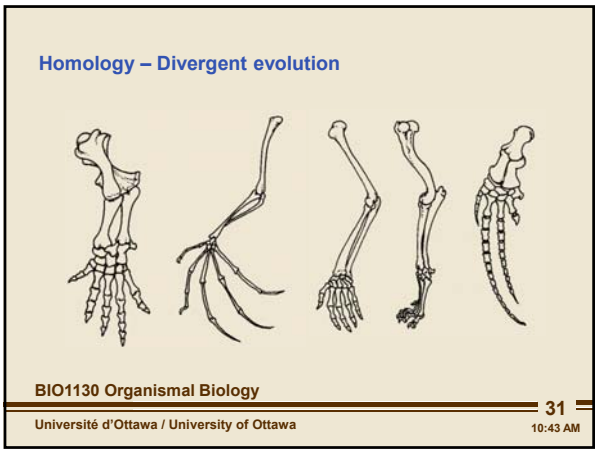
Molecules help show common ancestry. DNA sequencing (was not available to Darwin).

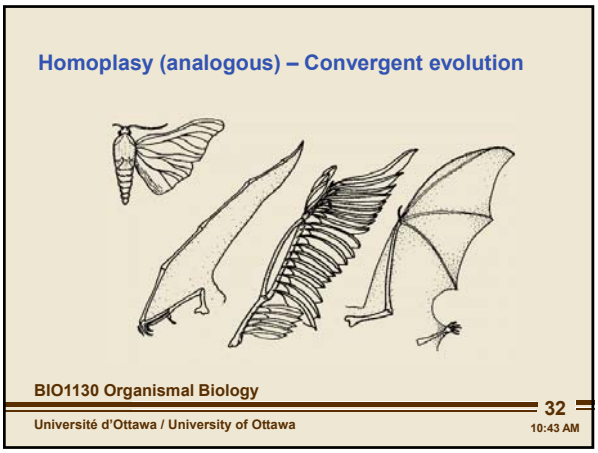




Darwin helps develop natural (evolutionary) (phylogeny of a group).

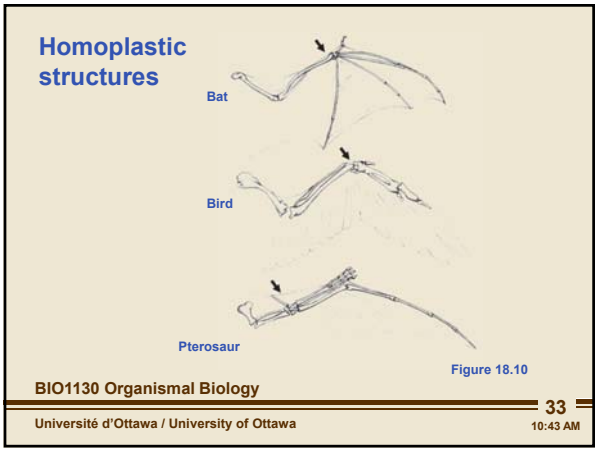
Biologist look closely at divergent evolution which hides the common ancestry.

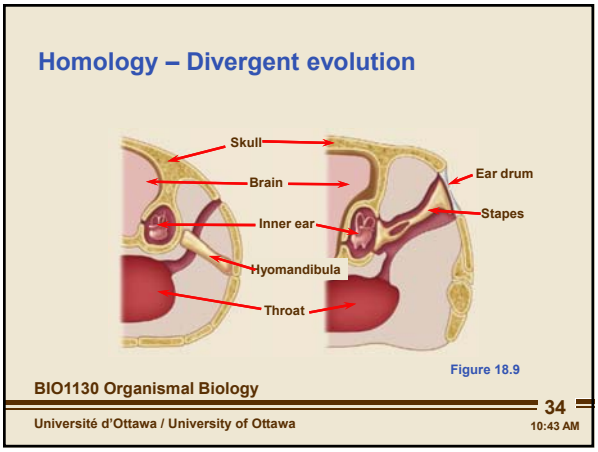




When animals come on land the bone modification occurs.

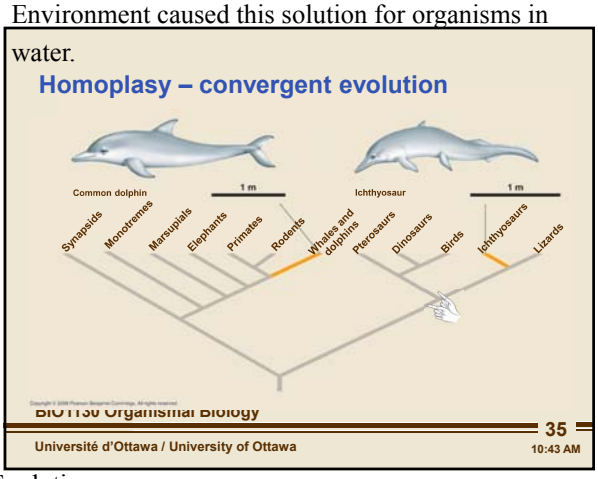
Dramatically different



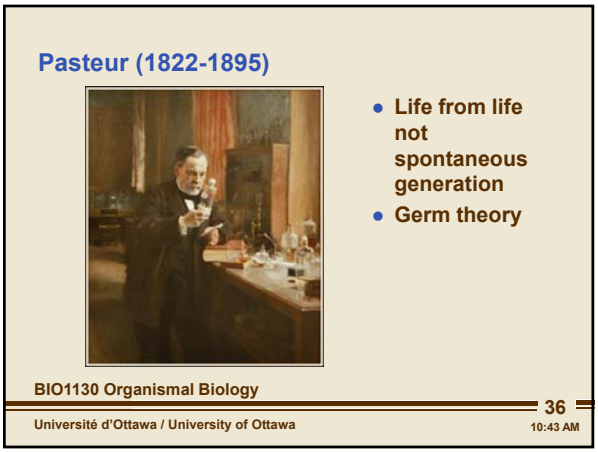


Breaks the rule of spontaneous generation.

Environment caused this solution for organisms in water.



Evolutionary sequence.
ancestry stories are thus created.



Darwinian thought

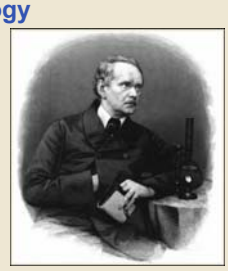
They used microscopes to help identify cells and how they work.

Cell theory not law and the only way to get new cells is from old cells and there is no spontaneous

Important stages in the history of Biology

19th century: Modern biology

- **Cell theory**
  (Schleiden and Schwann – 1860)
  - The basic unit of all organisms is the cell
  - Individual cells have all the characteristics of life and
  - All cell come from the division of other cells



Schleiden
(1804-1881)

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Mendel
(1822-1884)

- **Rediscovered 1900.**
- **Law of segregation of characters**
- **Law of** independent assortment

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What cells are and why they are important.
Scwann-animals
Schleiden-plants