Ch 22.1 Notes

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Vocab

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Evolution: Descent with modification, a phrase Darwin used in proposing that Earth’s many species are descendants of ancestral species that were different from the present-day species  
Strata: New layers of sediment cover older ones and compress them into super imposed layers of rock called  
Paleontology: The study of fossils, was developed in large part by French scientist Georges Cuvier

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Notes

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Evolution

Descent with modification

Generational

* NOT over one lifetime

Population

NOT individual

Scala Naturae

* Aristotle
* Arrange life on ladder scale of increasing complexity
* Life unchanged from ladder
* Matched with Old Testament= people liked it

Carolus Linnaeus

* Binomial nomenclature
* Not linear like Aristotle
* Grouped similar organisms together
  + NOT because of evolution, but pattern of creation= still OK with religious groups

Darwin

NOT the first

* Evolution
* Life changing

Linnaeus’ classification should be based on evolutionary relationships

* Many of them already were

Fossil evidence

Remains (or traces) of organisms from the past

Strata

* Layers of rock
* Fossils stuck in them
* Closer to surface= younger
* Different species in each layer
* Older layers= more different compared to current species

Fossil disappear= extinct

Cuvier

* Anti-evolution
* Catastrophic events happened frequently (why fossils missing)

Not all scientists thought changes happened only quickly/catastrophically

Geologists

Old-timers thought Earth was only a few thousand years old. New geologists were challenging that.

James Hutton

* How geological processes have shaped Earth
* Processes that make rock and move that up to the surface to make mountains happen slowly= gradualism
* SO slowly, that the Earth has to be way older than previously thought

Charles Lyell

* Built on the work of Hutton
* Said that the laws of nature are constant over time= uniformitarianism
  + Processes that happened a long time ago are still happening today
* Volcanoes release lava now, just like they did a long time ago
* Water from rivers erodes away at rocks slowly now, like it did a long time ago
  + - Therefor Earth is old.

Early ideas about evolution

Darwin was NOT the first to suggest evolution

* Fossil record already provided strong evidence for it
* How it happens had not been explained

Jean-Baptiste Lamarck (French naturalist)

* Proposed a way evolution happens
* Individual organisms could evolve over their lifetime based on what traits they did or did not use= use and disuse
* Those traits could pass on to their offspring
* He called this inheritance of acquired characteristics
* Said organisms have an innate drive for “perfection”, they are not fixed (stuck the way they are)

Was Lamarck, right?

Yes

* Species change over time (not fixed)
* Change over time is related to the environment

No

* Organisms have an inborn urge for perfection
* Organisms pass on acquired traits

Population growth

Thomas Malthus= more offspring made than can survive

* If a population gets too big, there won’t be enough resources for all of them
* Humans= War, famine, disease

Darwin took Malthus’ ideas and applied them to other organisms too

* These species can make lots of offspring, but they aren’t overrunning things
* What’s happening?
* Started the groundwork for his ideas about natural selection.

Summary (22.1)

Hutton and Lyell

* Natural processes take a long time and happen the same way over time
* The Earth is old enough for natural processes to occur
* *Evolution is a natural process that requires a very long time to occur*

Lamarck

* Species change over time
* Changes are inherited
* Based on the environment
* *Evolution is the change of a species over time based on adaptations to habitat*

Malthus

* Available resources eventually influence population growth
* *Competition for resources provides a mechanism for evolution: Natural selection*