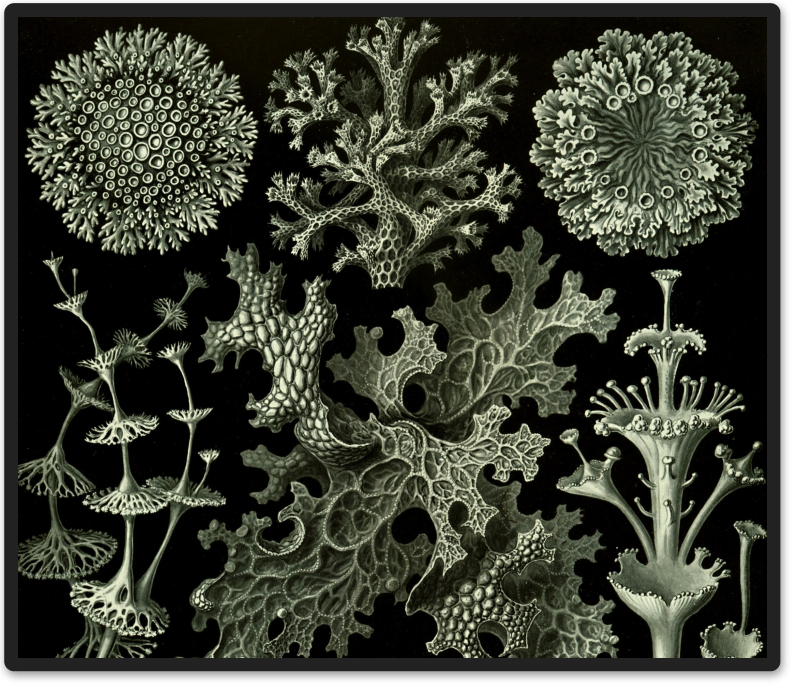
Evolution

explaining life



George Matthews, Plymouth State University

2020

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

Life on Earth

?

- *Explaining is a form of storytelling, but what is the difference between scientific and other forms of storytelling?*
- *Why should we take scientific stories more seriously than other modes of storytelling?*

Scientific Explanation

Scientific Explanation

To explain something scientifically is to give an account of its CAUSES, in a way that shows WHY it happened and that enables the PREDICTION of what will happen in similar cases.

Scientific Explanation

To explain something scientifically is to give an account of its CAUSES, in a way that shows WHY it happened and that enables the PREDICTION of what will happen in similar cases.

The best explanations are…

Scientific Explanation

To explain something scientifically is to give an account of its CAUSES, in a way that shows WHY it happened and that enables the PREDICTION of what will happen in similar cases.

The best explanations are...

- **Testable**: they might turn out to be wrong.
- **Fruitful**: they lead to surprising but true predictions.
- **Broad in scope**: they account for many phenomena.
- **Simple**: they avoid too many assumptions.
- **Conservative**: they do not conflict with established truths.

Assumptions before Darwin

- Living things are not just made of matter -- they also have a "vital spark," that distinguishes them from inanimate things.
- Species do not go extinct or change over time.
- The Biblical story of creation of the earth and all organisms is basically true.
- The earth is a few thousand years old.
- Large scale geological features of the earth like mountain ranges, continents, rivers and oceans have not changed very much since they were formed.

Paley's Watch

William Paley
1743-1805

Paley's Watch

William Paley
1743-1805

If you found a watch on the beach you'd be right to think it was not a product of chance but of design.

The organisms we "find" in nature are even more complex than a watch.

Thus all living organisms must have been designed and not be a result of the blind forces of nature operating at random.

Paley's Watch

William Paley
1743-1805

If you found a watch on the beach you'd be right to think it was not a product of chance but of design.

The organisms we "find" in nature are even more complex than a watch.

Thus all living organisms must have been designed and not be a result of the blind forces of nature operating at random.

Paley thought that the **best explanation** for the variety and adaptations of living organisms was that they had been designed by God, but he also considered this argument a proof that God does in fact exist.

The Facts of Life

The Facts of Life

A scientific account of life on earth has to explain:

The Facts of Life

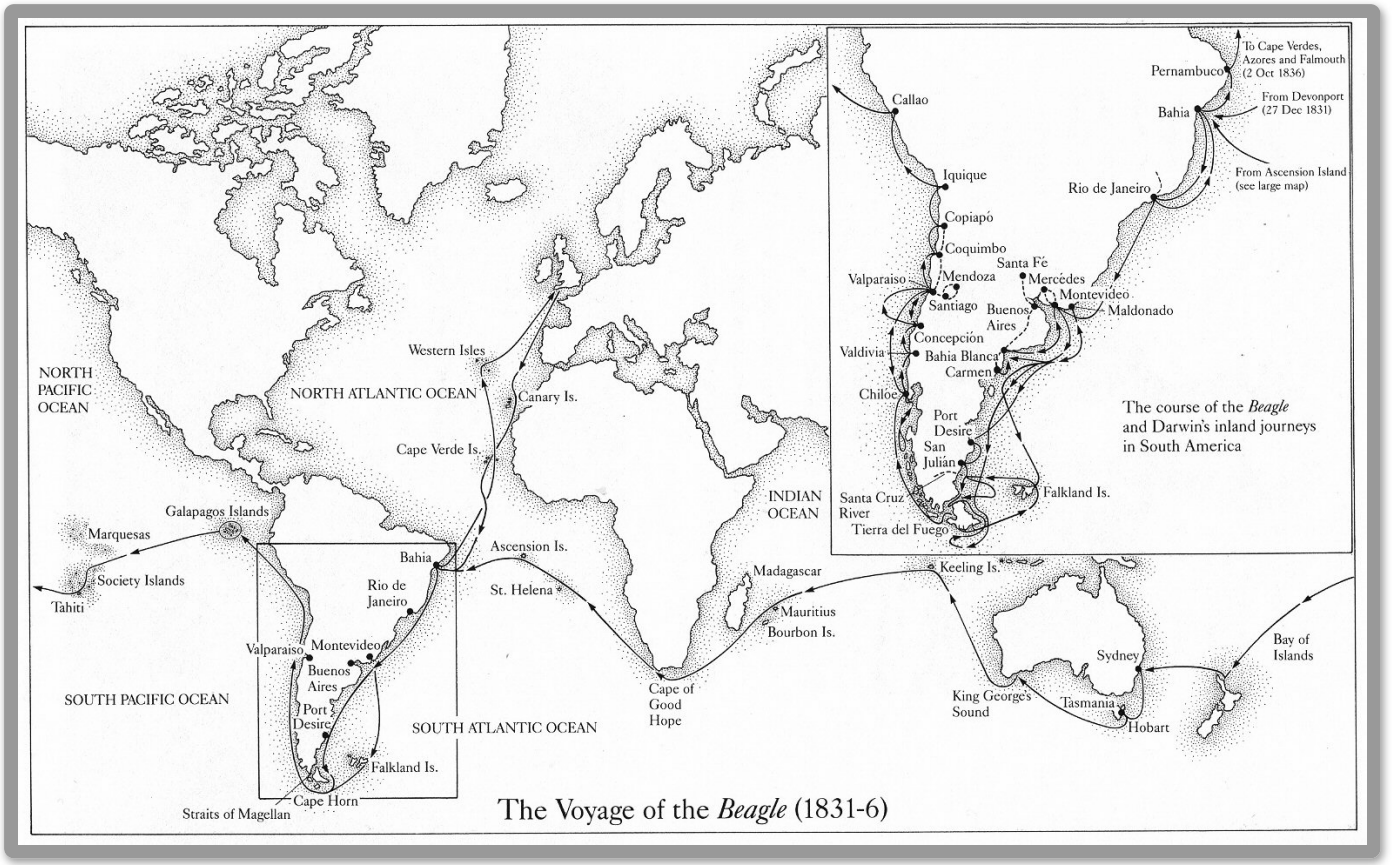
A scientific account of life on earth has to explain:

- The difference between living and non-living things.
- The huge variety of living organisms.
- Their adaptations to their environments.
- The patterns of their distribution around the globe.
- The ways they can be grouped -- by common forms, habitats, ways of living, etc.
- The patterns among their fossil remains.

Darwin's Voyage

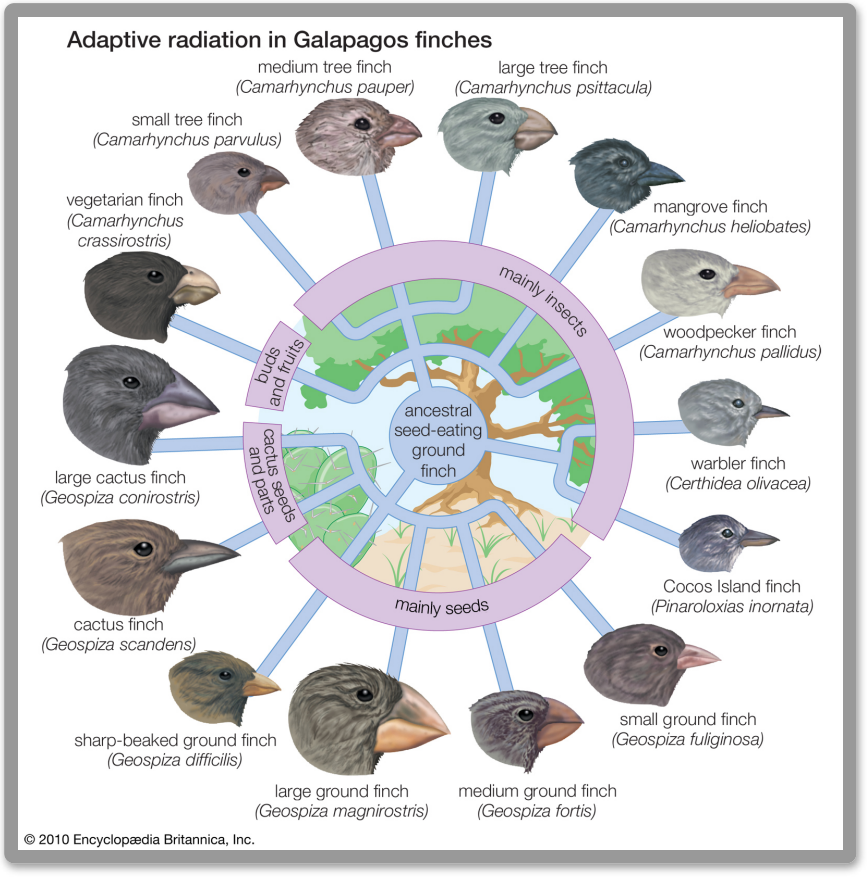
Darwin's Voyage

Darwin's Voyage



Darwin's Voyage

Darwin's Voyage



Darwin's Voyage

Darwin's Voyage

Darwin's Big Idea

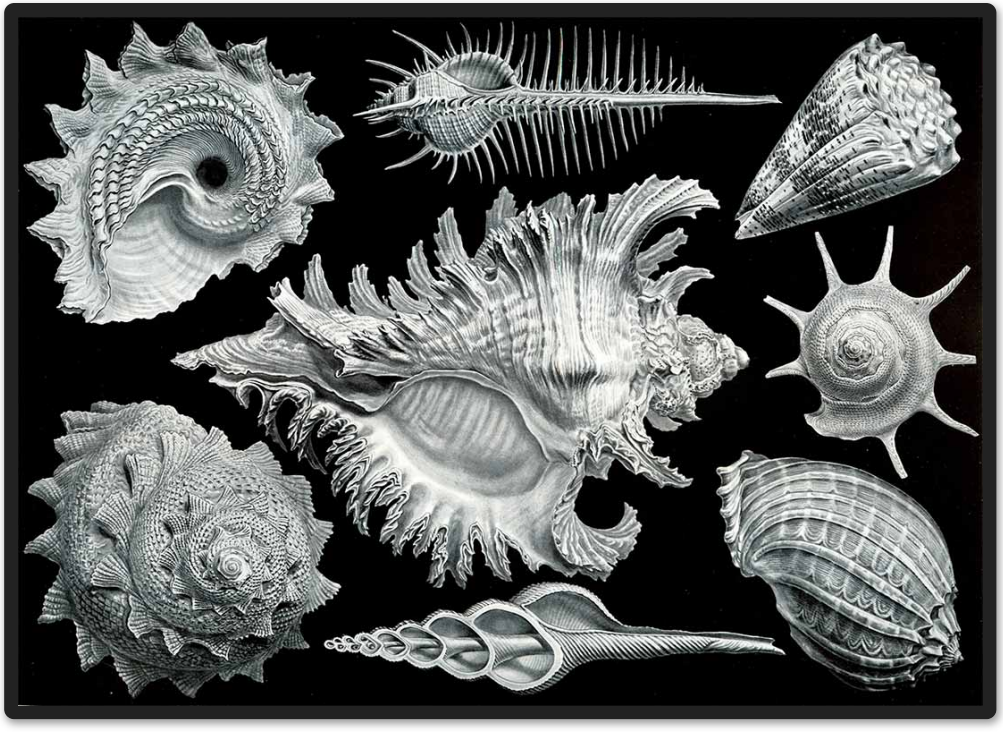
Evolution by natural selection

If you start out with a population of living organisms,

- and their offspring have a natural source of **variation** ...
- and they **compete** for food, safety and mates...
- and their variability is **inherited** by *their* offspring,

Over time they will diversify, giving rise to new species.

Given enough time this can account for enormous variety and adaptations of life on Earth.



Credits

Built with:

Rstudio

xarignan html presentation framework

download this presentation or print it

editorial suggestions and comments: requires a (free) GitHub account.