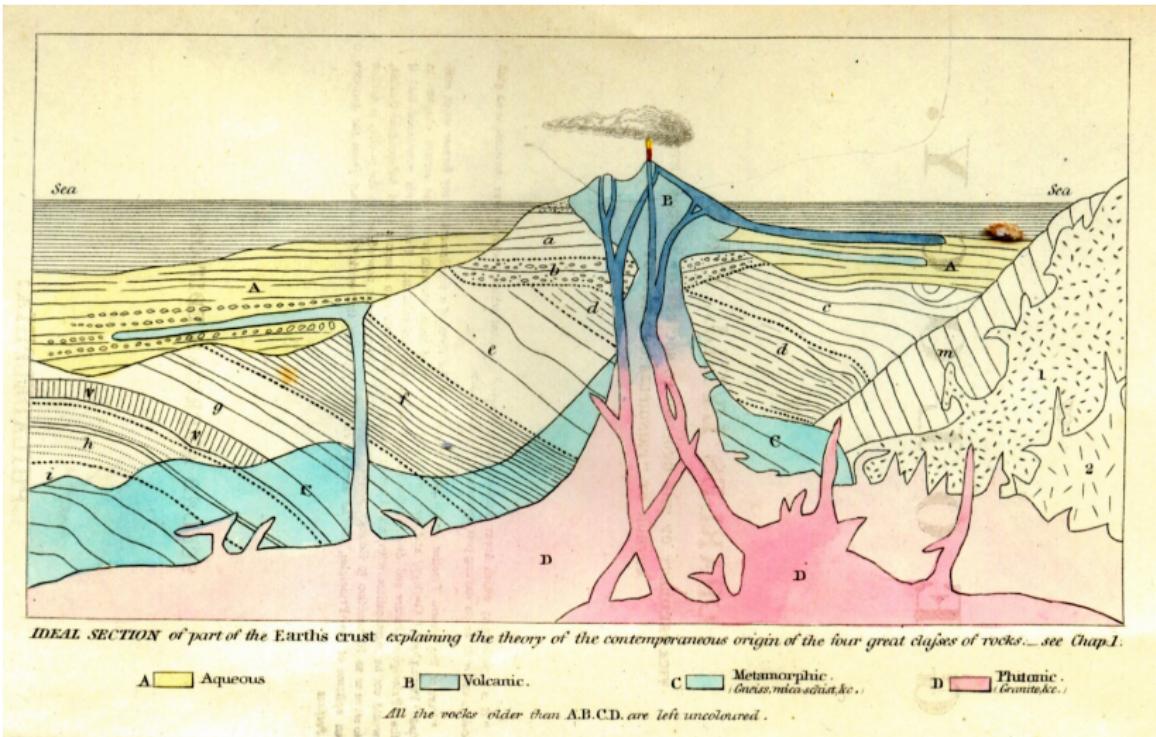


Influences on Darwin

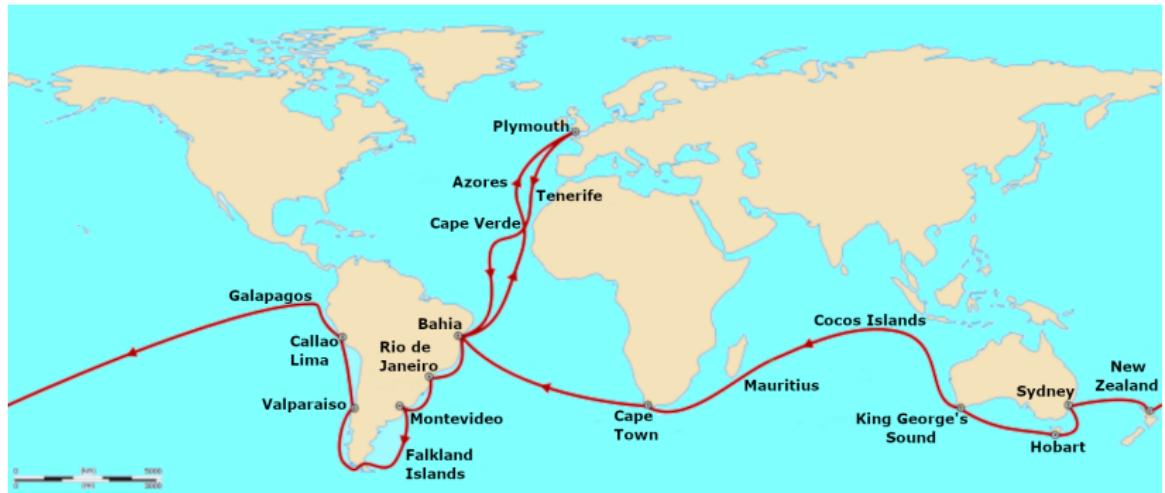
Influences on Darwin: Charles Lyell



¹Lyell, Charles, Sir. (1830). *Principles of geology : being an attempt to explain the former changes of the earth's surface, by reference to causes now in operation* (v. 3). John Murray.

²Image: Public Domain

Influences on Darwin: Voyage of the Beagle



¹Darwin, C. (1839). *The voyage of the beagle*. Wordsworth Editions.

²Image: [Public Domain](#)

Darwinian Evolution: Two key points

1. Descent with modification
2. Natural selection

Descent with modification

- ▶ Branching process with common ancestry
- ▶ Species formed by gradual evolution
- ▶ Not progressive, but determined by local environmental conditions
- ▶ Incorporates formation and extinction of species

Natural selection

- ▶ Process in nature that causes evolution through differential reproductive success among members of a population
- ▶ Success depends on genetically-based, heritable variation in characteristics that confer a relative advantage or disadvantage to the bearer
- ▶ Leads to adaptation (i.e., the appearance of design)

Fitness and adaptation

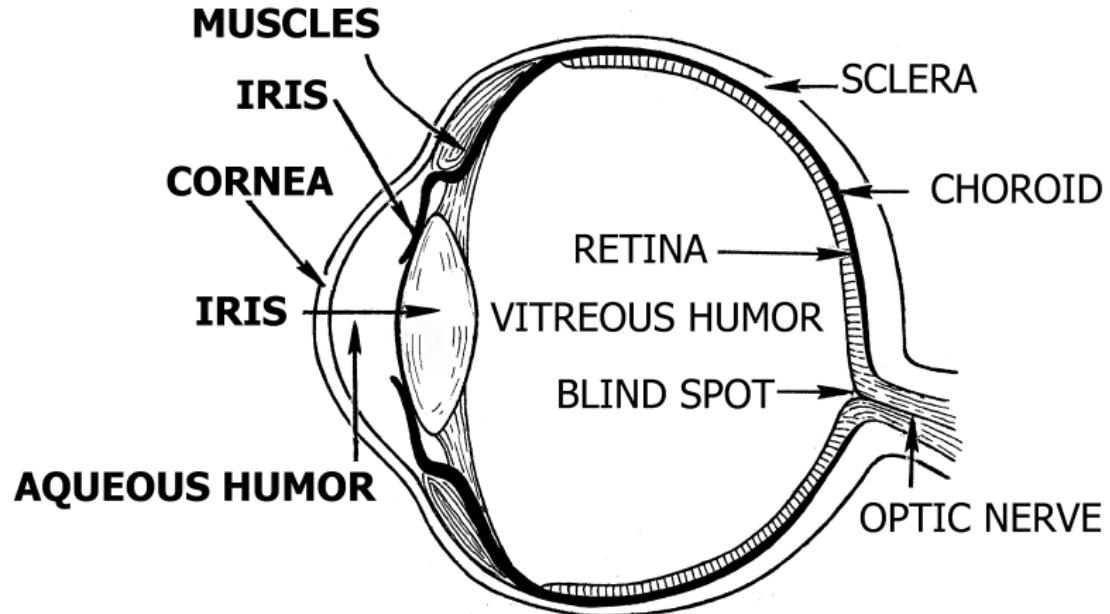
- ▶ **Fitness:** The ability of an individual to survive and reproduce *relative* to the ability of other individuals of the same population
- ▶ **Adaptation:** Characteristics of organisms that increase their fitness *relative* to individuals without the trait

Adaptive evolution



¹Image: Public Domain

Adaptive evolution



¹Image: Public Domain

Early support for adaptive evolution

- ▶ After first formulating the concept of adaptive evolution via natural selection, Darwin spent 20+ years gathering evidence
- ▶ In 1858, Alfred Russell Wallace wrote the article, *On the Tendency of Varieties to Depart Indefinitely from the Original Type*¹
- ▶ Wallace presented jointly with Darwin's *Extract from an Unpublish Work on Species* in July 1858
- ▶ Darwin² publishes *On the Origin of Species* in 1859

¹Wallace, A. R. (2009). *On the Tendency of Varieties to Depart Indefinitely From the Original Type* (1858).

²Darwin, C. (1959). *The origin of species*. William Collins.