

# Darwin

EEB464 Fall 2019

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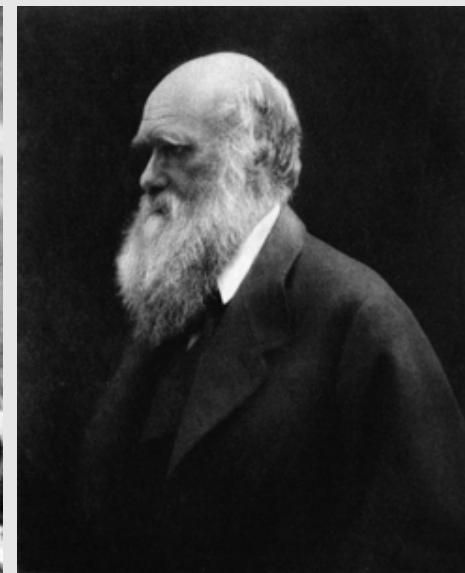
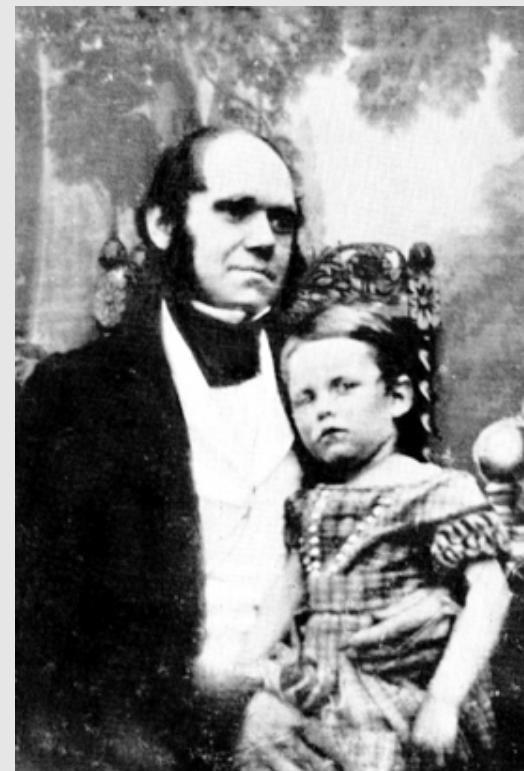
# Learning objectives

Understand background of Darwin

Coral reef formation theory as example of gradual thinking

Scooping in science

*Charles Darwin*



1809-1882

1809 (age 8): Mother died

1825 (age 16): Summer as an apprentice as a doctor  
with his father

1825 (age 16): Starts at University of Edinburgh Med  
School

1825 (age 16): Begins learning taxonomy from John  
Edmonstone (a freed slave)

1825-27 (age 16-18): Darwin does poorly in med school

1827 (age 18): Darwin pulled from med school by his father

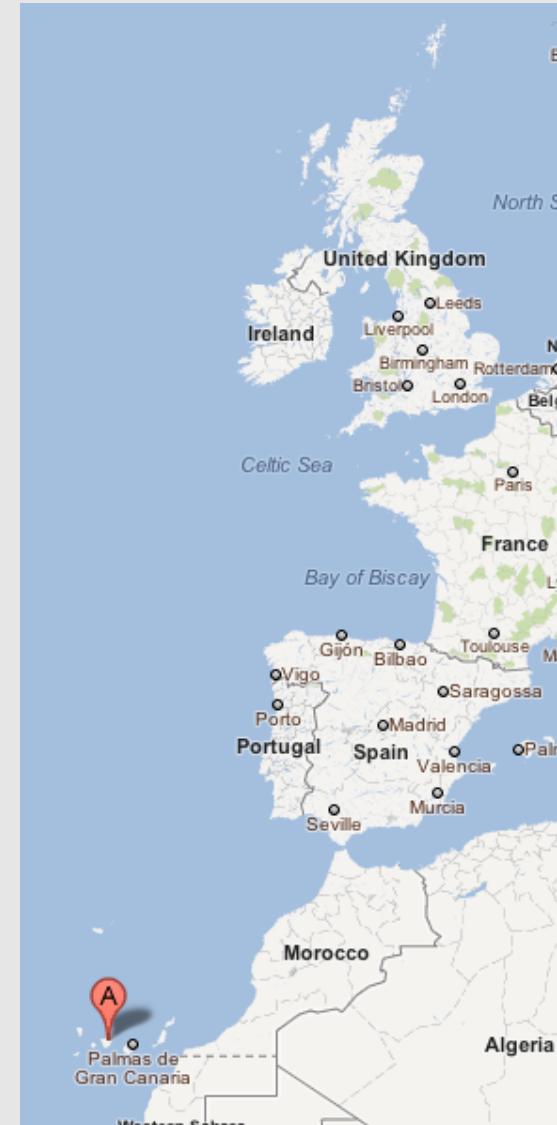
1828 (age 18): Goes to Christ's College, Cambridge for a Bachelor's, with plan to become a clergyman

1828 (age 19): Becomes friendly with John Henslow, a botany professor. Becomes more deeply interested in natural history

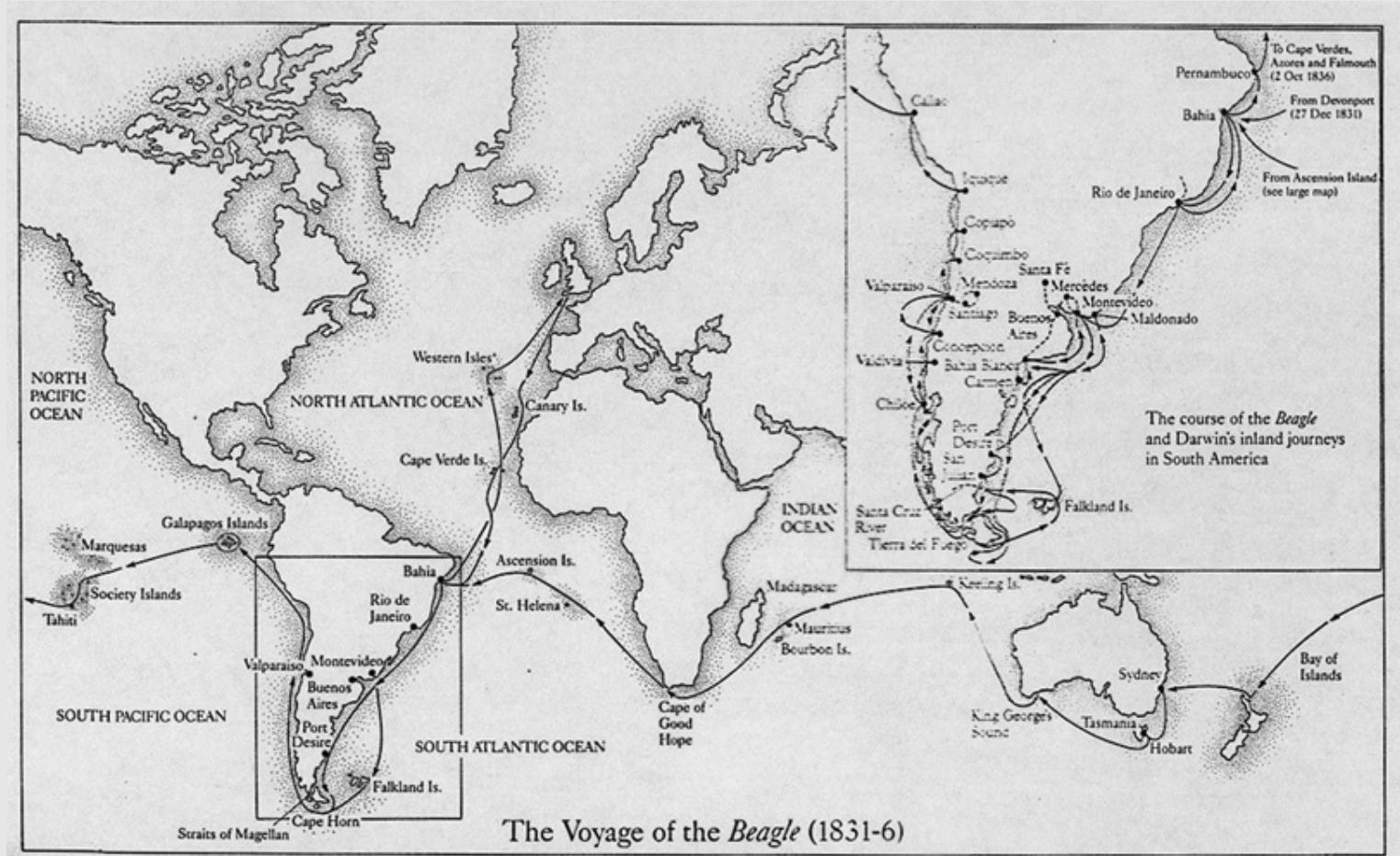
1831 (age 22): Begins learning geology from prof. Adam Sedgwick

1831 (age 22): Graduates (places 10/178 graduates). Plans to visit Tenerife.

1831 (age 22): Tenerife plans fall through when his friend passes away.

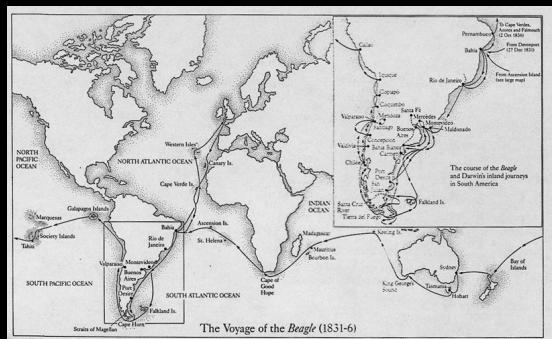


1831 (age 22): Darwin invited to be naturalist (and captain's companion) on 2-yr (turns into 5-yr) surveying voyage





BBC Galapagos



1831 (age 22): Begins Beagle voyage. FitzRoy gives him Vol 1 of Lyell's *Principles of Geology*

1836 (age 27): Ends Beagle voyage

1837 (age 28): Seriously thinking about evolution

1839 (age 29): Marries cousin Emma Wedgwood. Given money by parents allowing them to live quite comfortably off investment income.

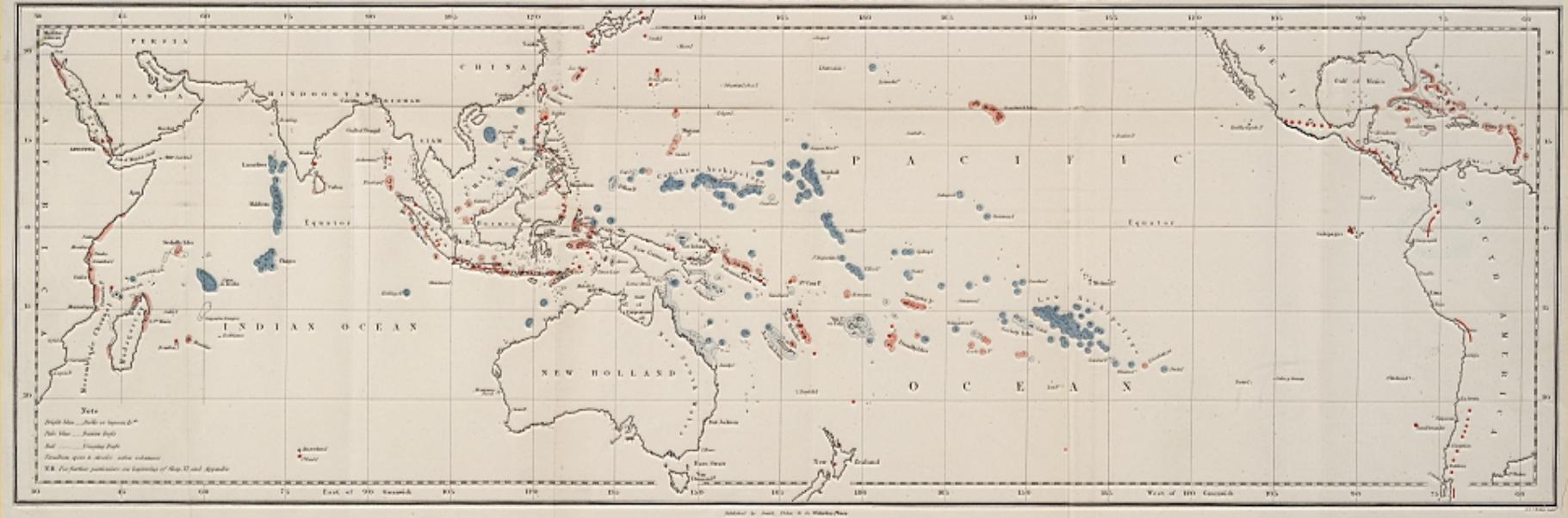
1839 (age 30): Darwin's book on the Beagle voyages appears

1837-1858 (ages 28-50): Darwin refines ideas about evolution, gathers evidence (letters to breeders, naturalists, etc.; raising pigeons; work on barnacles; many experiments)

1847 (age 39): Book on coral reefs published

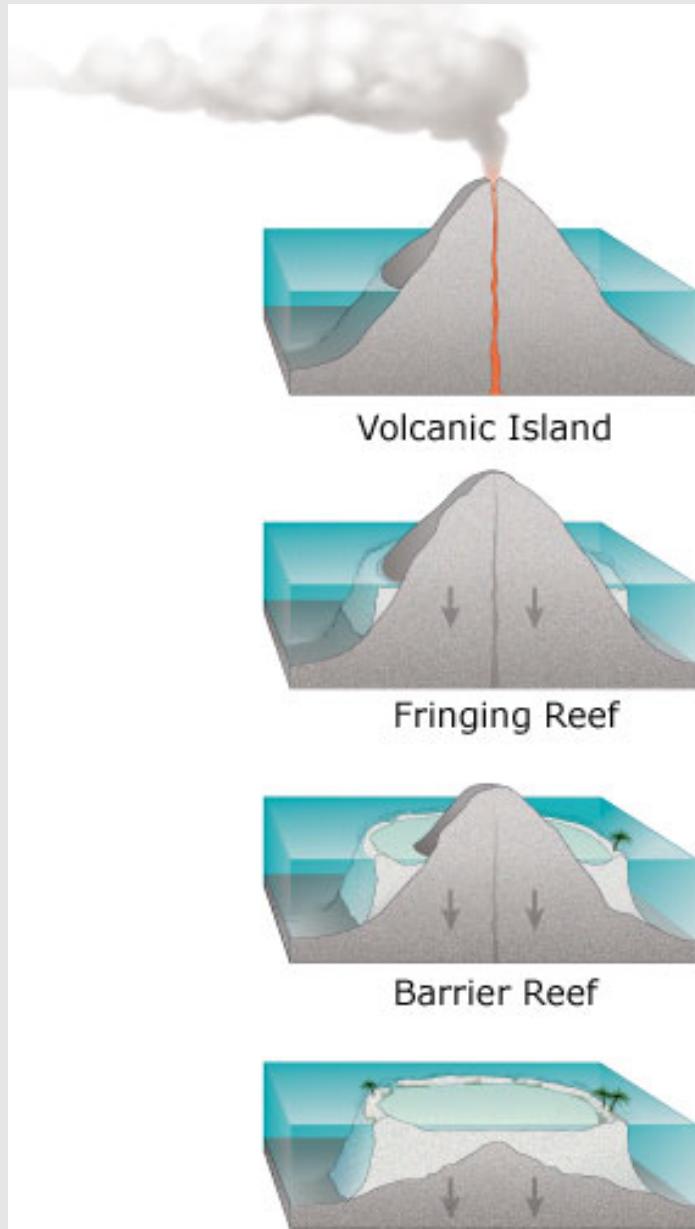


PLATE 2. SHOWING THE DISTRIBUTION OF THE DIFFERENT KINDS OF CORAL REEFS, TOGETHER WITH THE POSITION OF THE ACTIVE VOLCANOS IN THE MAP. (SEE NOTE IN LEFT-HAND CORNER.)



# Barrier/Atoll reefs

# Fringing reefs



1858 (age 50): Darwin receives letter from Wallace asking him to communicate Wallace's essay on "On the Tendency of Varieties to Depart Indefinitely from the Original Type"

1858 (age 50): Darwin and Wallace writings read at meeting of Linnean Society in London

1859 (age 51): *Origin of Species* published and becomes best-seller

1859-1882: Darwin writes other books on insectivorous plants, human evolution, expression of emotions, orchids, and earthworms

1882 (age 73): Darwin dies. Popular and elite pressure leads to him being buried in Westminster Abbey, 20 feet from Isaac Newton

- Every species is fertile enough that if all offspring survived to reproduce the population would grow (fact).
- Despite periodic fluctuations, populations remain roughly the same size (fact).
- Resources such as food are limited and are relatively stable over time (fact).
- A struggle for survival ensues (inference).
- Individuals in a population vary significantly from one another (fact).
- Much of this variation is heritable (fact)
- Individuals less suited to the environment are less likely to survive and less likely to reproduce; individuals more suited to the environment are more likely to survive and more likely to reproduce and leave their inheritable traits to future generations, which produces the process of natural selection (inference).
- This slowly results in populations changing to adapt to their environments, and ultimately, these variations accumulate over time to form new species (inference).

It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the external conditions of life, and from use and disuse; a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less-improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.