

EVOLUTION

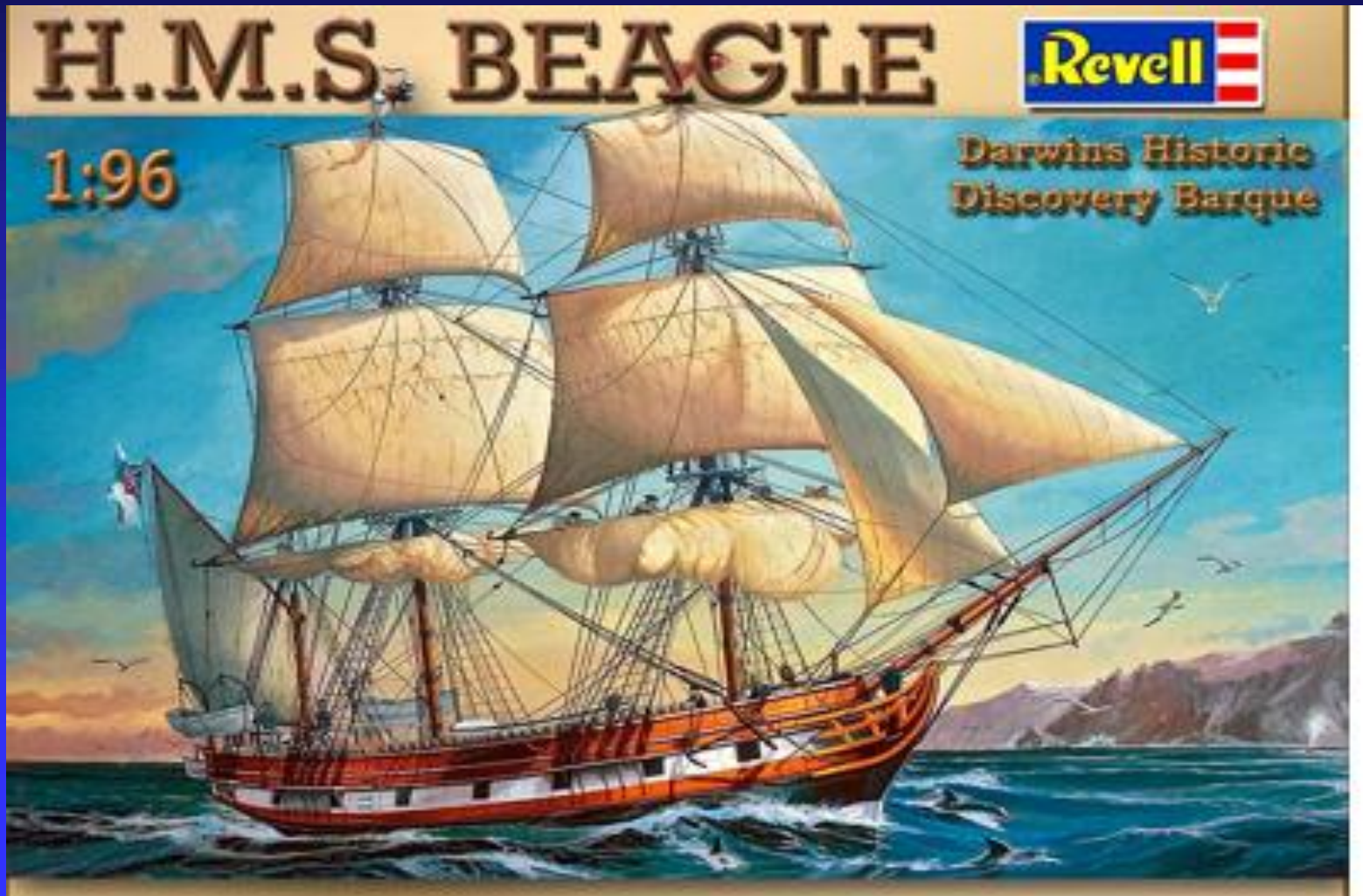
It is change in the heritable characteristics of biological populations over successive generations. These characteristics are the expressions of genes that are passed on from parent to offspring during reproduction

Darwin's Theory of Evolution

- Evolution, or change over time, is the process by which modern organisms have descended from ancient organisms.
- A scientific theory is a well-supported testable explanation of phenomena that have occurred in the natural world.

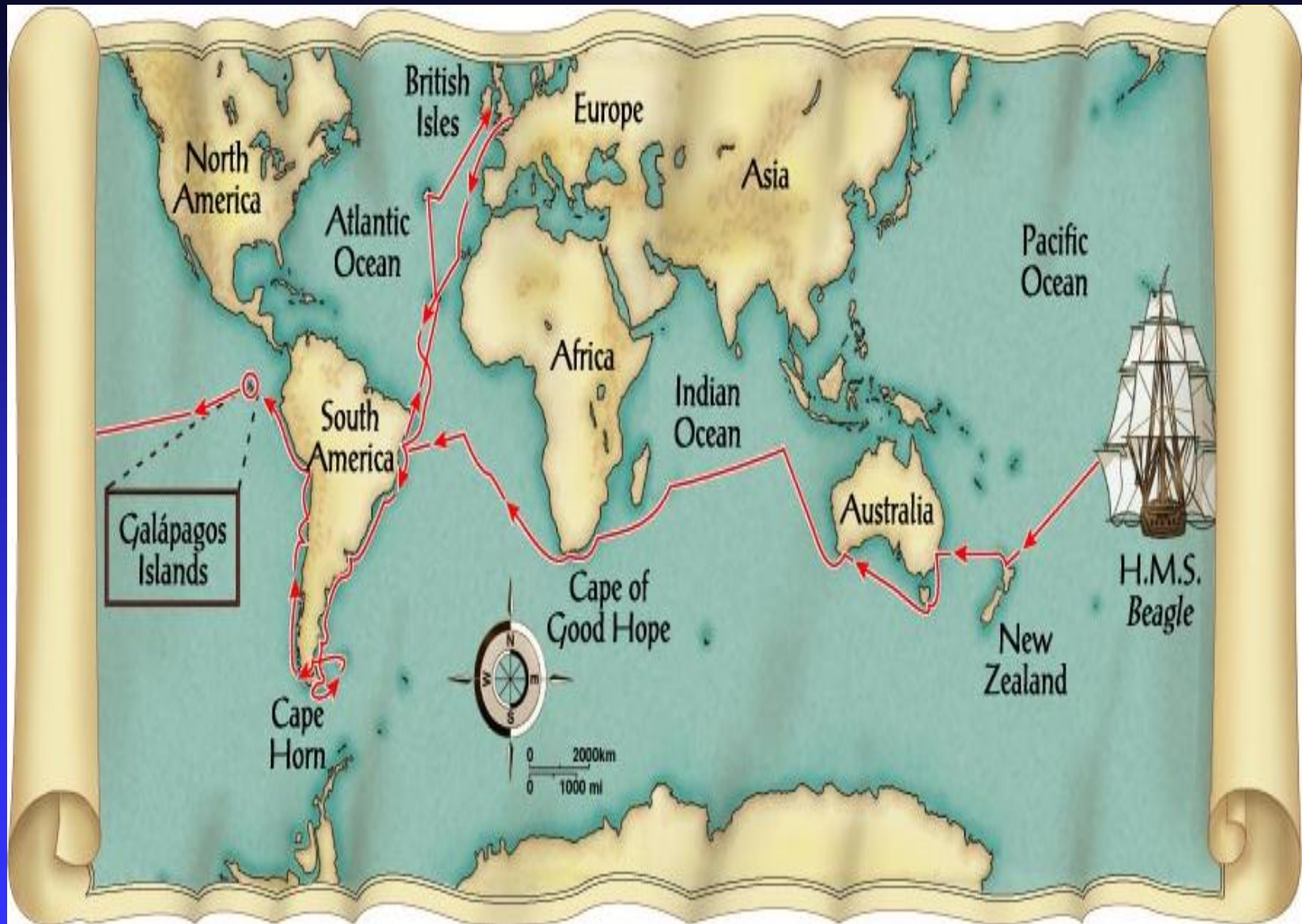
How do you think Darwin came up with his theory?

Voyage of the Beagle



Voyage of Beagle

- Dates: February 12th, 1831
- Captain: Charles Darwin
- Ship: H.M.S. Beagle
- Destination: Voyage around the world.
- Findings: evidence to propose a revolutionary hypothesis about how life changes over time



Patterns of Diversity

- Darwin visited Argentina and Australia which had similar grassland ecosystems.
 - ◆ those grasslands were inhabited by very different animals.
 - ◆ neither Argentina nor Australia was home to the sorts of animals that lived in European grasslands.

Patterns of Diversity

- Darwin posed challenging questions.
 - ◆ Why were there no rabbits in Australia, despite the presence of habitats that seemed perfect for them?
 - ◆ Why were there no kangaroos in England?

Living Organisms and Fossils

- Darwin collected the preserved remains of ancient organisms, called fossils.
- Some of those fossils resembled organisms that were still alive today.

Living Organisms and Fossils

- Others looked completely unlike any creature he had ever seen.
- As Darwin studied fossils, new questions arose.
 - ◆ Why had so many of these species disappeared?
 - ◆ How were they related to living species?

Fossils

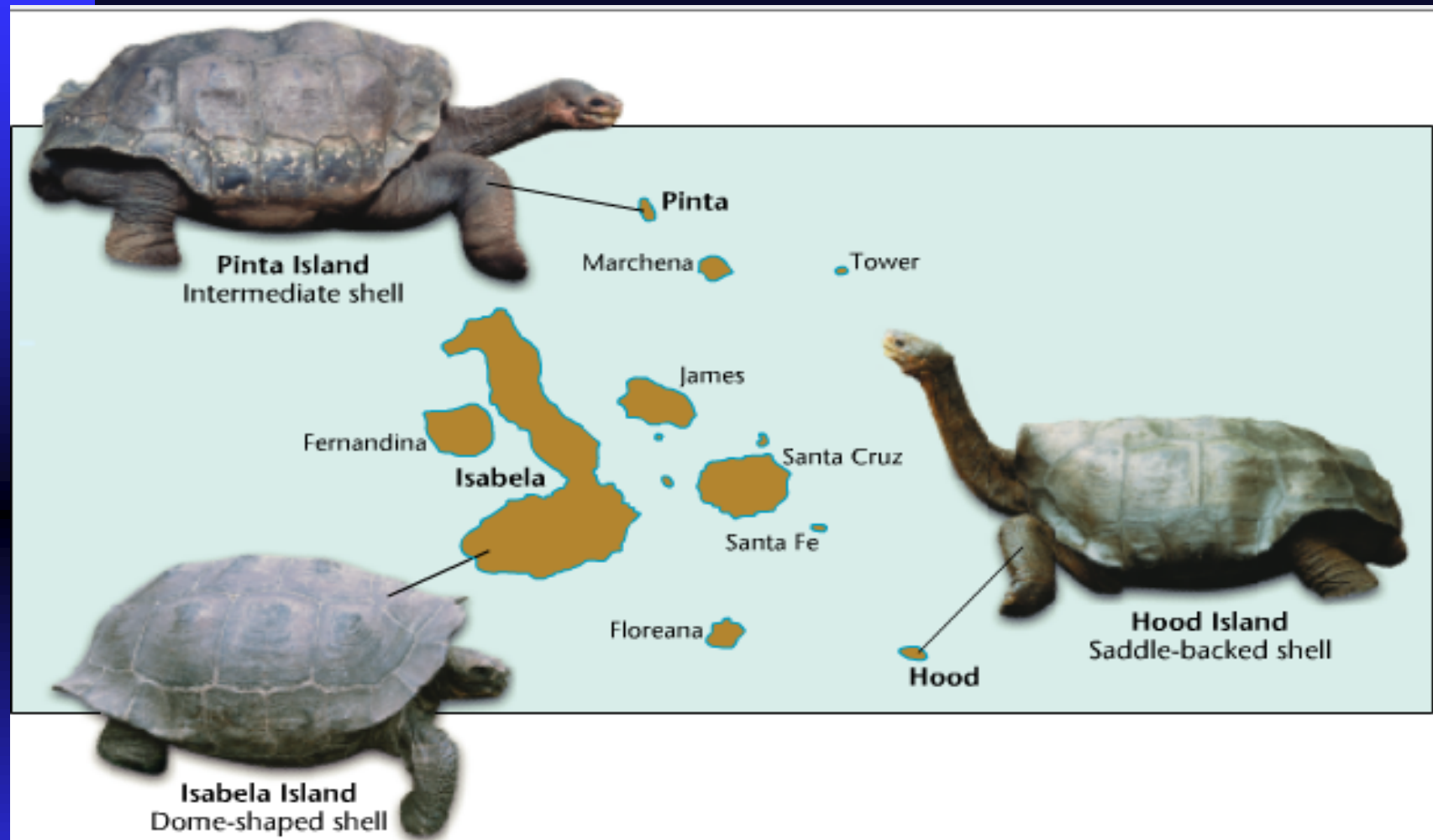


The Galapagos Island

- The smallest, lowest islands were hot, dry, and nearly barren-Hood Island-sparse vegetation
- The higher islands had greater rainfall and a different assortment of plants and animals-Isabela- Island had rich vegetation.


The Galapagos Island

- Darwin was fascinated in particular by the land tortoises and marine iguanas in the Galápagos.
- Giant tortoises varied in predictable ways from one island to another.
- The shape of a tortoise's shell could be used to identify which island a particular tortoise inhabited.



t. © D. Cavagnaro/DRK Photo; b.r. © David Cavagnaro/DRK Photo;
b.l. © D. Cavagnaro/DRK Photo

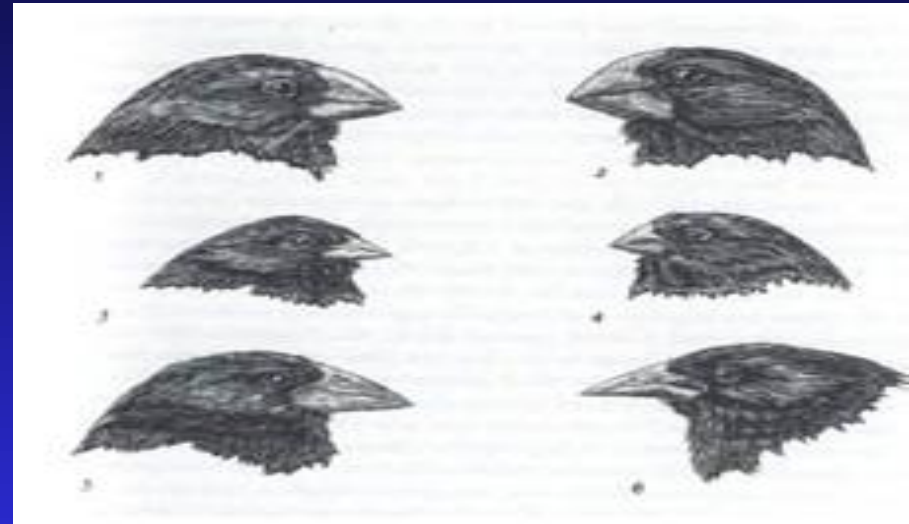
Variation Among Tortoises

 Darwin observed that the characteristics of many animals and plants varied noticeably among the different Galápagos Islands. Among the tortoises, the shape of the shell corresponds to different habitats. The Hood Island tortoise (right) has a long neck and a shell that is curved and open around the neck and legs, allowing the tortoise to reach the sparse vegetation on Hood Island. The tortoise from Isabela Island (lower left) has a dome-shaped shell and a shorter neck. Vegetation on this island is more abundant and closer to the ground. The tortoise from Pinta Island has a shell that is intermediate between these two forms.

Animals found in the Galapagos

- Land Tortoises
- Darwin Finches
- Blue-Footed Booby
- Marine Iguanas

Animals

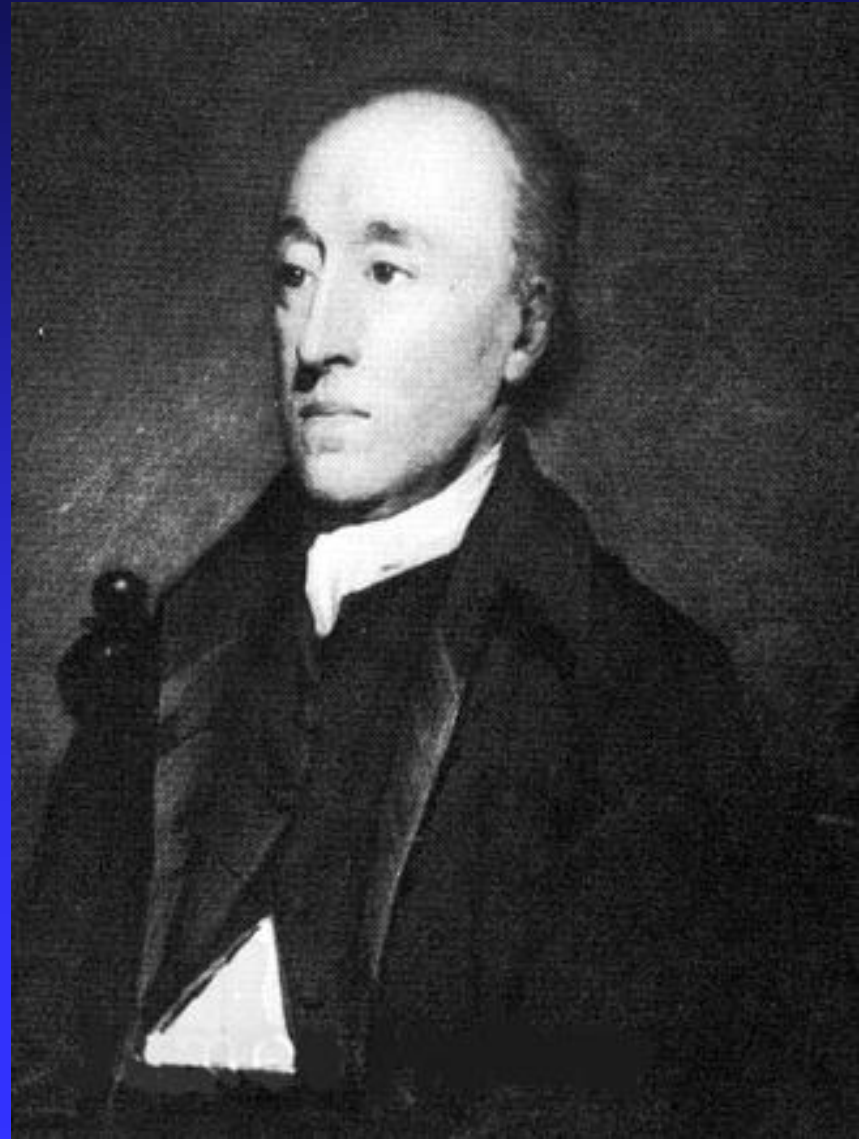


The Journey Home

- Darwin Observed that characteristics of many plants and animals vary greatly among the islands
- **Hypothesis:** Separate species may have arose from an original ancestor

Ideas that shaped Darwin's Thinking

- **James Hutton:**
- 1795 Theory of Geological change
 - ◆ Forces change earth's surface shape
 - ◆ Changes are slow
 - ◆ Earth much older than thousands of years



Ideas that Shaped Darwin's Thinking

- **Charles Lyell**
- Book: *Principles of Geography*
- Geographical features can be built up or torn down
- Darwin thought if earth changed over time, what about life?

