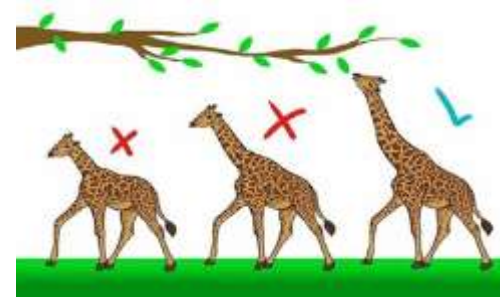


Charles Darwin

NATURAL SELECTION



Living things with plans best suited to their conditions (the *fittest*) will survive. Those not suited, will die out – as will their plan.

And in this way, as conditions change, **Nature** will **Select** which variations of the plan will survive.

Evolution is defined as the **gradual development of a species** from earlier forms.

For these changes in the plans of the species to gradually take place, you need the following conditions:

- A species with genetic ***variation*** (= plans not identical).
- A ***change*** to occur in the environmental conditions.
- Big ***competition*** from over-population of many children.

Galapagos Islands





GALAPAGOS FINCHES



Darwin visited the Islands of Galapagos. He saw a South American species of bird (called Finches), but they differed from each other in the shapes of their beaks. Some beaks were designed to eat seeds, some for fruit, some for insects. His hypothesis was as follows:

A group of South American finches made their way in stages (using floating logs to rest on) to the Galapagos Islands. All ate seeds. They reproduced. When there was not enough seeds for all, some had beaks that could eat fruit – this plan they passed on to their children. Then when they were at capacity for both seeds and fruits, some had beaks sharp enough to eat insects – this plan they passed on.

And so **Nature Selected** the different beak shapes.

DARWIN'S FINCHES

Darwin observed that the finches on the islands were different from those in Ecuador. Their beaks were adapted according to how they obtained their food. Beak shape is an **adaptation** that helps the finches survive.

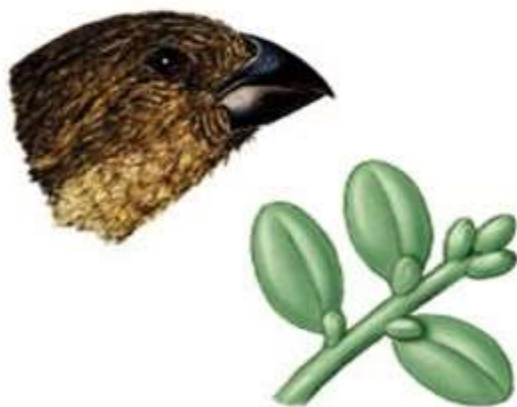
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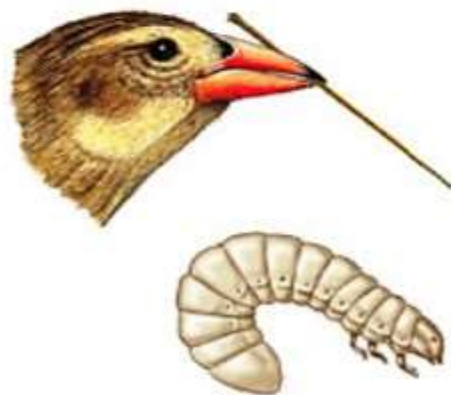
Large ground finch (seeds)



**Cactus ground finch
(cactus fruits and flowers)**



Vegetarian finch (buds)



Woodpecker finch (insects)

Darwin's Galapagos Tortoises

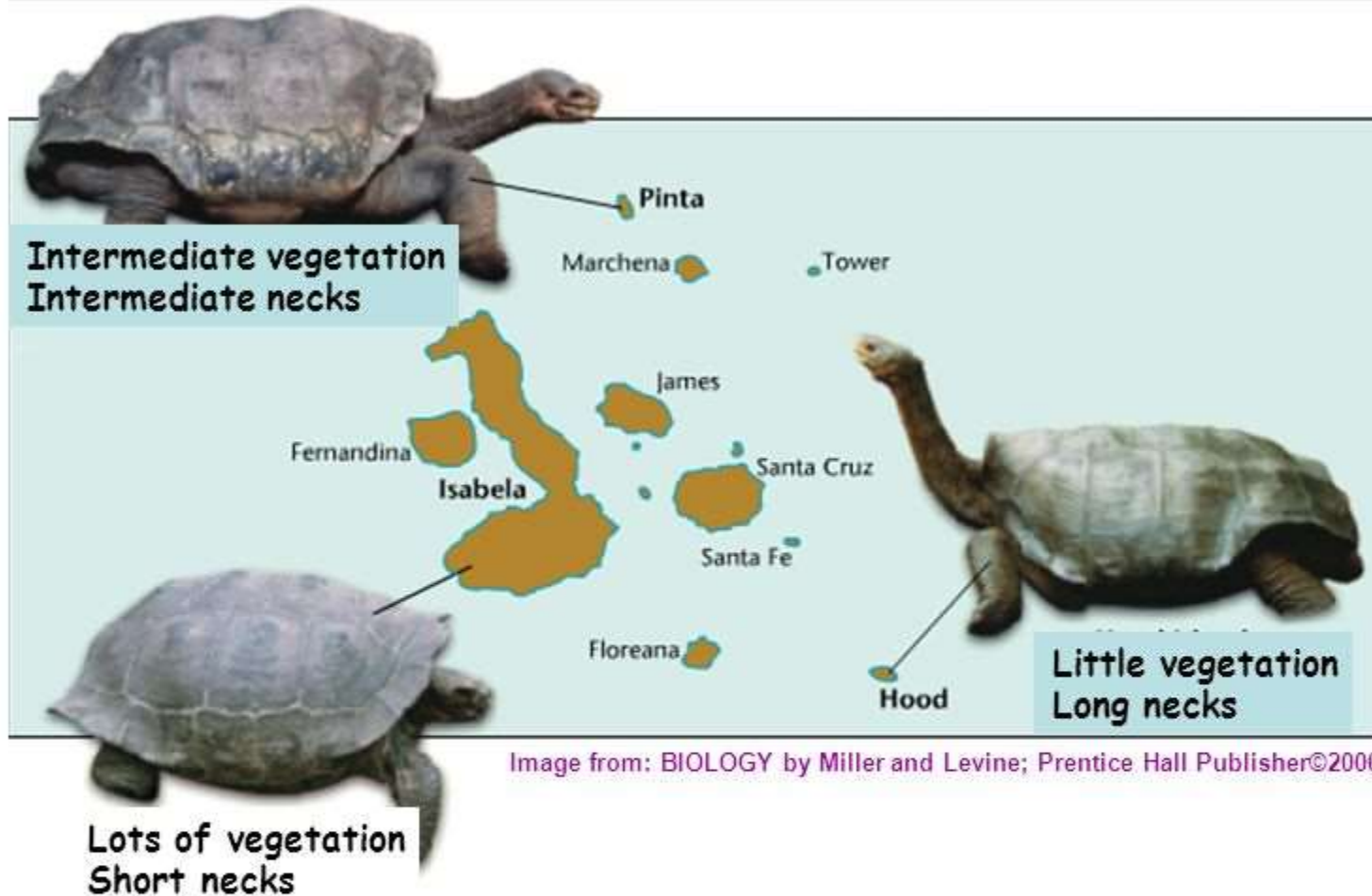
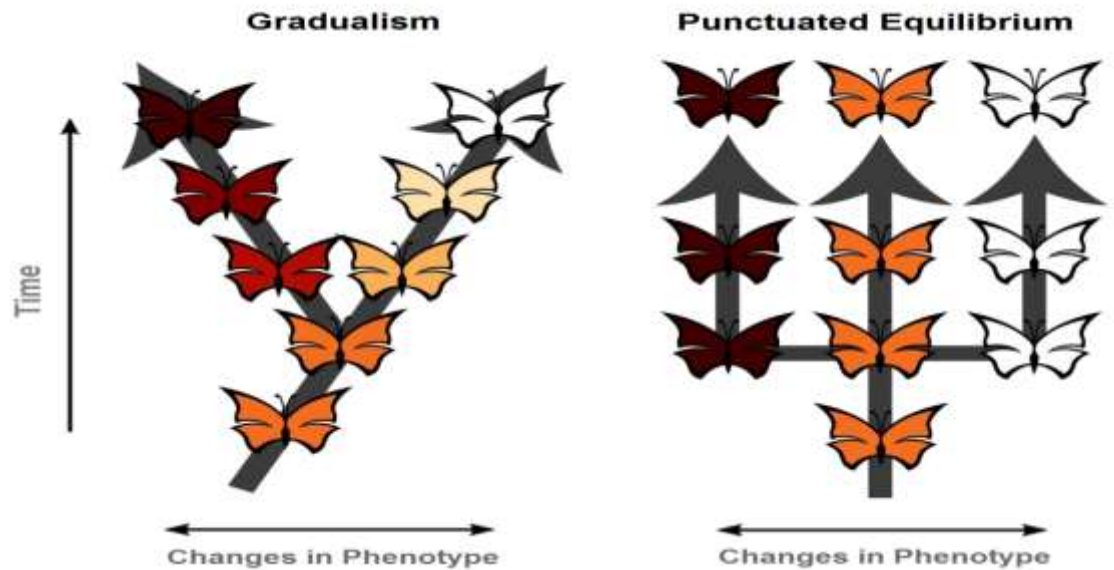


Image from: BIOLOGY by Miller and Levine; Prentice Hall Publisher©2006

Tortoises adapted to different habitats as they spread from the mainland to the different islands.

PUNCTUATED EQUILIBRIUM



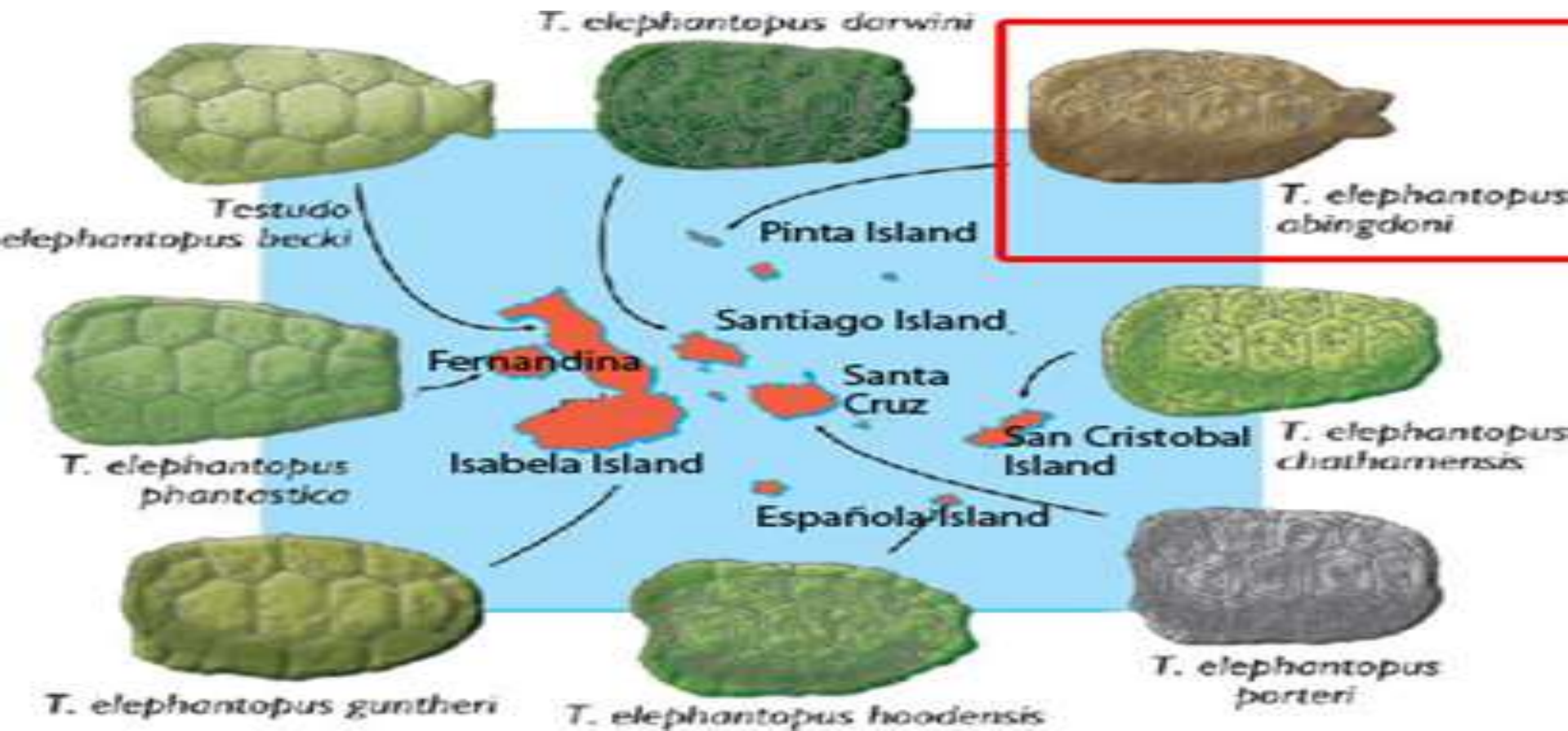
Darwin saw Evolution from Natural Selection as happening **gradually**, over a **long** period of time.

Punctuated Equilibrium hypothesises that **no** changes happen at all for a long time. This **equilibrium** is then **punctuated** suddenly by **quick**, extreme changes in a short time.

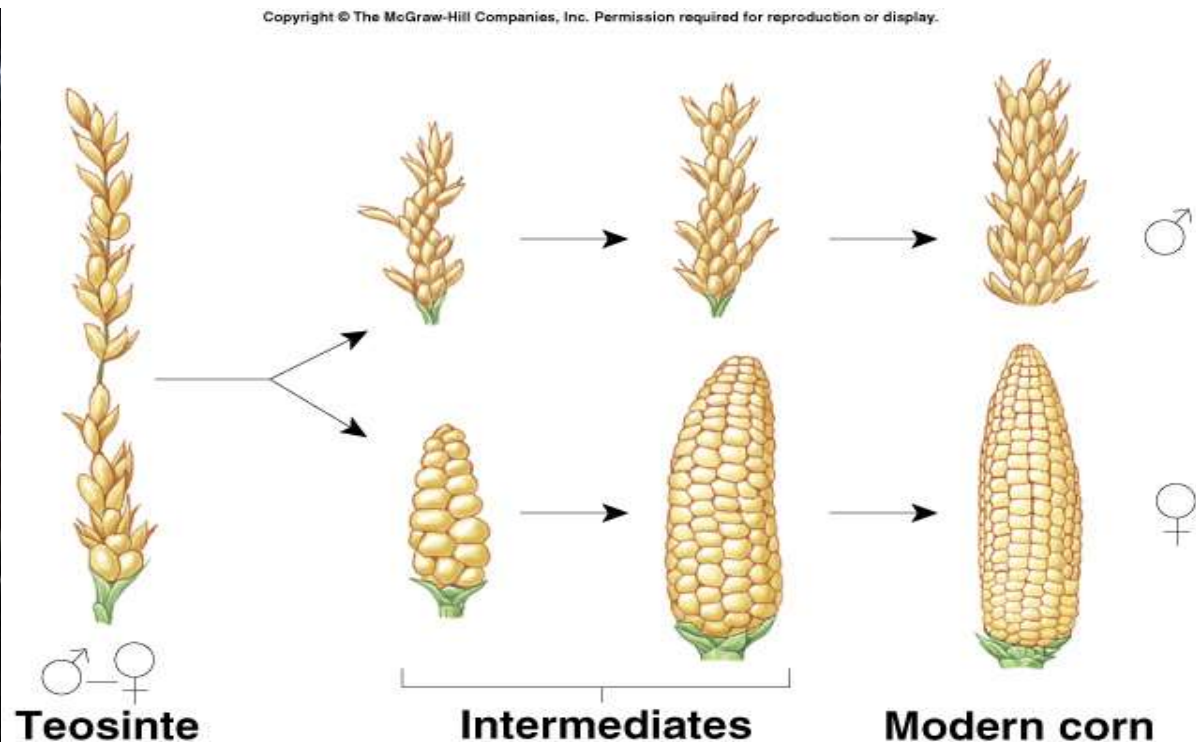
This might explain the missing links between certain stages of the evolutionary tree.

ARTIFICIAL SELECTION

Darwin saw differences in patterns on Galapagos Turtle shells, allowing different camouflages in different surroundings. (**Natural** selection.)



Peppered moths (page 82) showed adaptations to pollution. (**Natural** Selection.)



He then successfully bred pigeons (selectively) for specific characteristics. (**Artificial** Selection.)

See how dogs were bred from wolves, how cattle have evolved, as have mealies (pages 83-84).



Gray wolf
(Common ancestor)

