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Continental Drift Theory

The Science Behind the Drift

BY

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The Continental Drift Theory

Piecing It All Together



PERMIAN

250 million years ago

The Atlantic and Indian oceans did not exist, and all the continents were configured into the universal landmass of Pangaea. The land was surrounded by one global ocean, called Panthalassa.

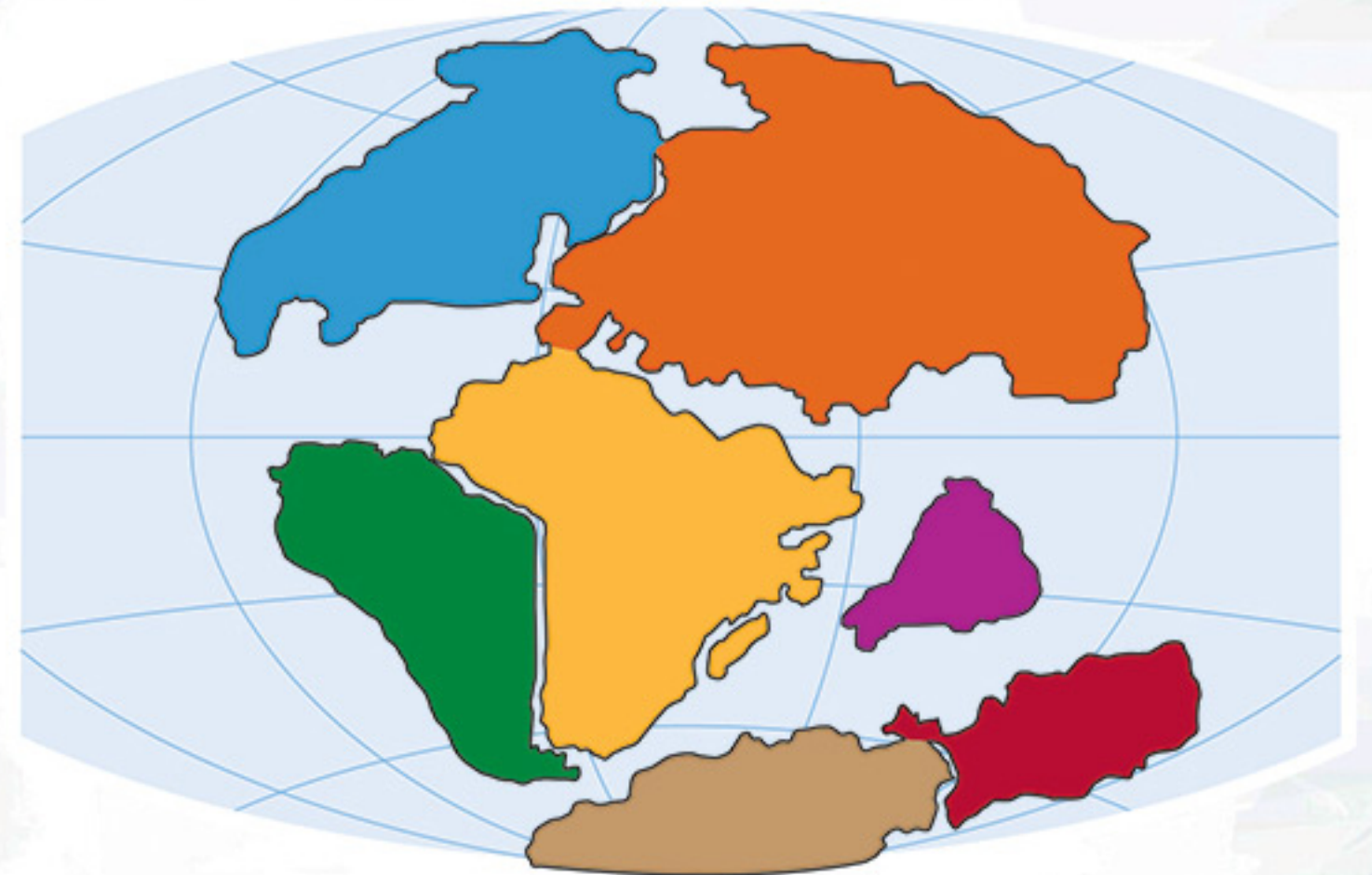


TRIASSIC

200 million years ago

The breakup of Pangaea began. Rifts formed, splitting West Gondwana from East Gondwana. India separated from Antarctica. Laurasia split from South America and Africa.

Two hundred and fifty million years ago, the land masses of Earth were clustered into one supercontinent called Pangaea. As millions of years passed, Pangaea broke apart, and large pieces of land slowly moved away to form the continents as we know them today.



JURASSIC

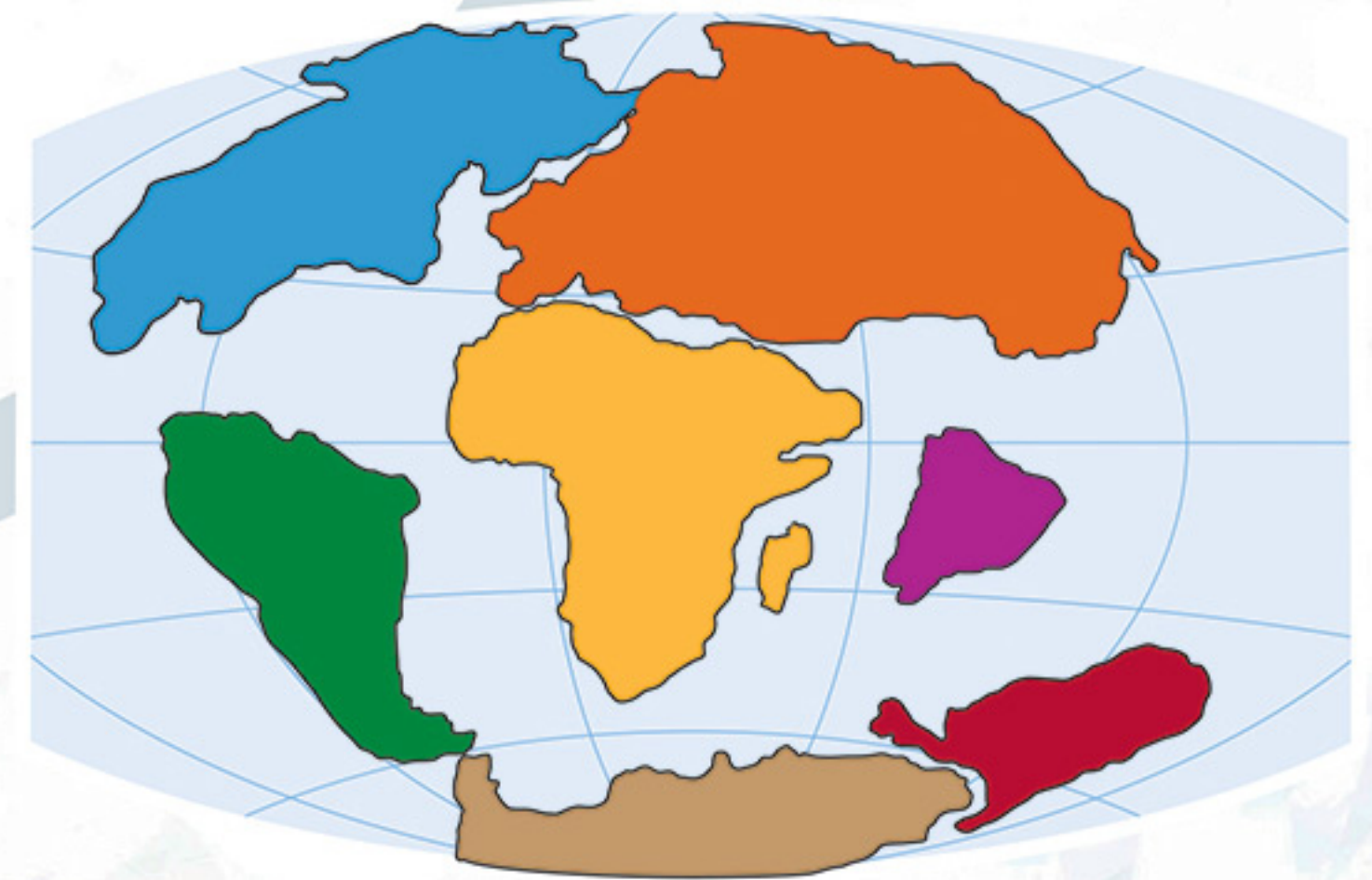
145 million years ago

Seafloor spreading further opened the central North Atlantic and Indian oceans. At the end of the period, a new rift split South America from Africa.



**PRESENT
DAY**

New Zealand is split from Australia's east coast. The North and South Atlantic oceans are more open. Africa is slightly north, and India is joined with Asia.



CRETACEOUS

65 million years ago

The movement continued. Madagascar drifted away from Africa, which continued its move north. The northward drift of India continued, and Australia split from Antarctica.



The Continental Drift Theory

In the early twentieth century, German scientist Alfred Wegener and others observed something peculiar about Earth's continents: They seemed to fit together like pieces in a jigsaw puzzle.

Consider the shapes of South America and Africa. Without the Atlantic Ocean between them, the eastern edge of the American continent could snuggle neatly under the bump of western Africa.

More research revealed other peculiarities. For example, on the shores of both South America and South Africa, scientists discovered fossils of Mesosaurus, a reptile that lived before the dinosaurs. Mesosaurus was a freshwater animal; it could not have crossed the Atlantic. The fact that Mesosaurus fossils existed in both locations suggested that at one time they shared a single environment.

In other examples, mountain rock in South America and Africa has the same mineral content and is the same age. This is also true for mountains in Scotland and eastern North America.

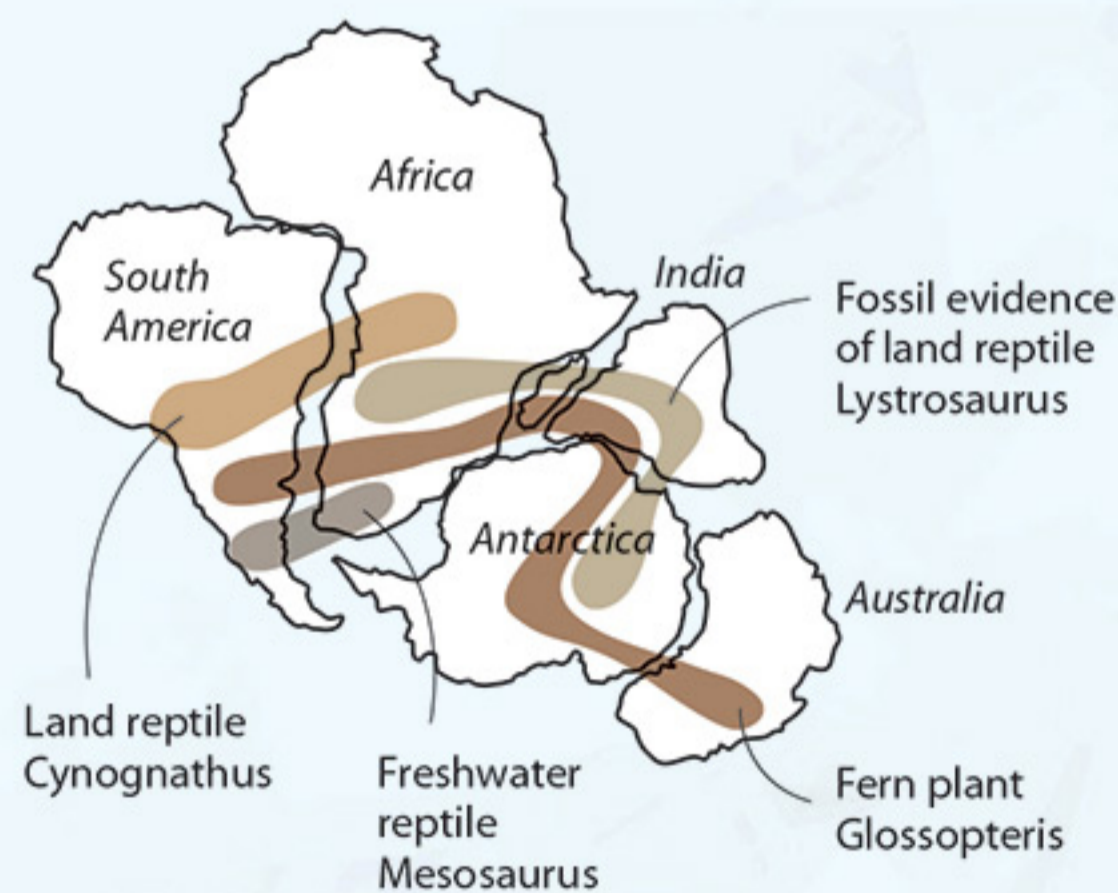
There was more: Fossils of the same species of fern plant were discovered in Africa, Antarctica, Australia, India, and South America. And fossils of the large land reptile Lystrosaurus were found in India, Africa, and Antarctica. Were these just odd coincidences? Wegener didn't think so.

Wegener believed they were examples of a new theory—continental drift, the gradual movement of continents across Earth's surface. In 1915, Wegener published his ideas in a book, *On the Origin of Continents and Oceans*.

According to Wegener's theory, 225 million years ago, all the land on Earth was part of one huge landmass. Wegener named the landmass Pangaea, which means "all lands" in Greek. At a rate of 1–10 centimeters per year (about 1/2–4 inches), Pangaea began to break apart. After 25 million years, it had split into two supercontinents—Laurasia to the north and Gondwana to the south.

The evidence

The locations of certain plant and animal fossils on present-day continents form definite patterns, suggesting the continents were once joined.



By the age of the dinosaurs 135 million years ago, the two supercontinents had begun to break apart. Laurasia separated into what would become North America, Greenland, Europe, and Asia. Gondwana split into the Africa, South America, Antarctica, and Australia of future millennia.

By the time the dinosaurs died out 65 million years ago, South America and Africa were recognizable continents. But North America was still one landmass with Europe and Asia, and Antarctica was still connected to Australia.

The continents continued to drift and separate until they reached their present positions. To us, the continents seem fixed where they are, but they aren't. North and South America are drifting west; Australia is drifting north. What do you think will happen? What will our planet look like 65 million years from now?