

# GEOGRAPHY CRASH COURSE



# CONTINENTAL DRIFT THEORY

Before



**refers  
to the  
separation  
of the  
Earth's  
continents,**

**drifting across the oceanic bed.**

After



- It was Alfred Wegener – a German meteorologist - who put forth a comprehensive argument in the form of “the continental drift theory” in 1912.
- Wegener was a climatologist who wanted to explain the change of climates in the geological past.
- Wegener was a climatologist who wanted to explain the change of climates in the geological past. There are several geological evidences to show that there have been important and large scale changes in the climates of the world in the geological past
- He came to the conclusion that either the climatic zones have moved or if they have not, then there has been movement of the landmasses.

- According to Wegener, all the continents formed a single continental mass, a mega ocean surrounded by the same. The super continent was named PANGAEA, a Greek word which meant all earth. The mega-ocean was called PANTHALASSA, meaning all water.
- Wegener argued that, around 200 million years ago, the Pangaea began to split. The initial two blocks – Gondwanaland and Laurasia – started drifting away and in between a shallow sea emerged by filling up the water from Panthalasa.
- It was known as Tethys Sea.
- The present shape and relative position of the continents is the result of fragmentation of Pangaea by rifting and the drifting apart of the broken parts.





225 million years ago



150 million years ago

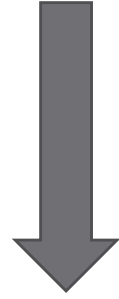


100 million years ago



Earth today

# Evidence in support of Continental Drift



Apparent Affinity of  
Physical Features

Rocks of Same Age Across  
the Oceans

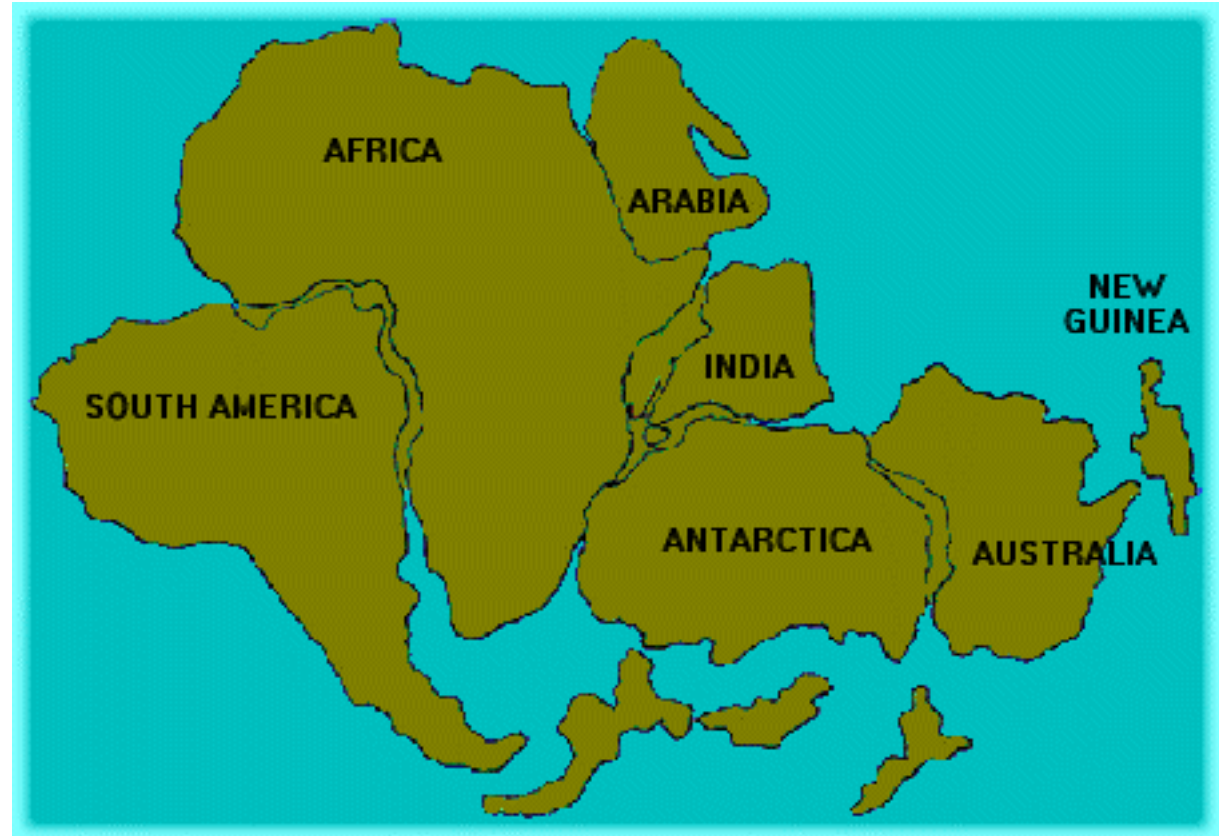
Distribution of  
Fossils

Tillite

Placer Deposits

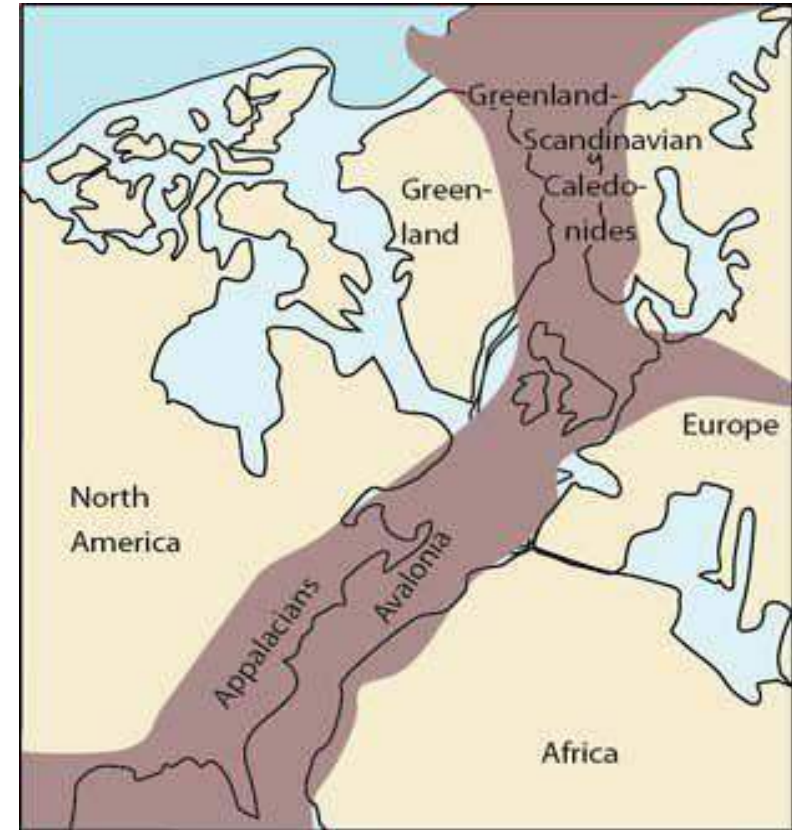
# Apparent Affinity of Physical Features

- The bulge of Brazil (South America) seems to fit into the Gulf of Guinea (Africa).
- Greenland seems to fit in well with Ellesmere and Baffin islands of Canada.
- The west coast of India, Madagascar and Africa seem to have been joined.
- North and South America on one side and Africa and Europe on the other fit along the mid-Atlantic ridge.



# Rocks of Same Age Across the Oceans

- The belt of ancient rocks of 2,000 million years from Brazil coast matches with those from western Africa.
- The earliest marine deposits along the coastline of South America and Africa are of the Jurassic age.
- This suggests that the ocean did not exist prior to that time. Similarly, Appalachian mountains of North America which come right up to the coast and then continue their trend across the North Atlantic Ocean in the old Hercynian fold mountains of South-West Ireland, Wales and Central Europe.





# Tillite

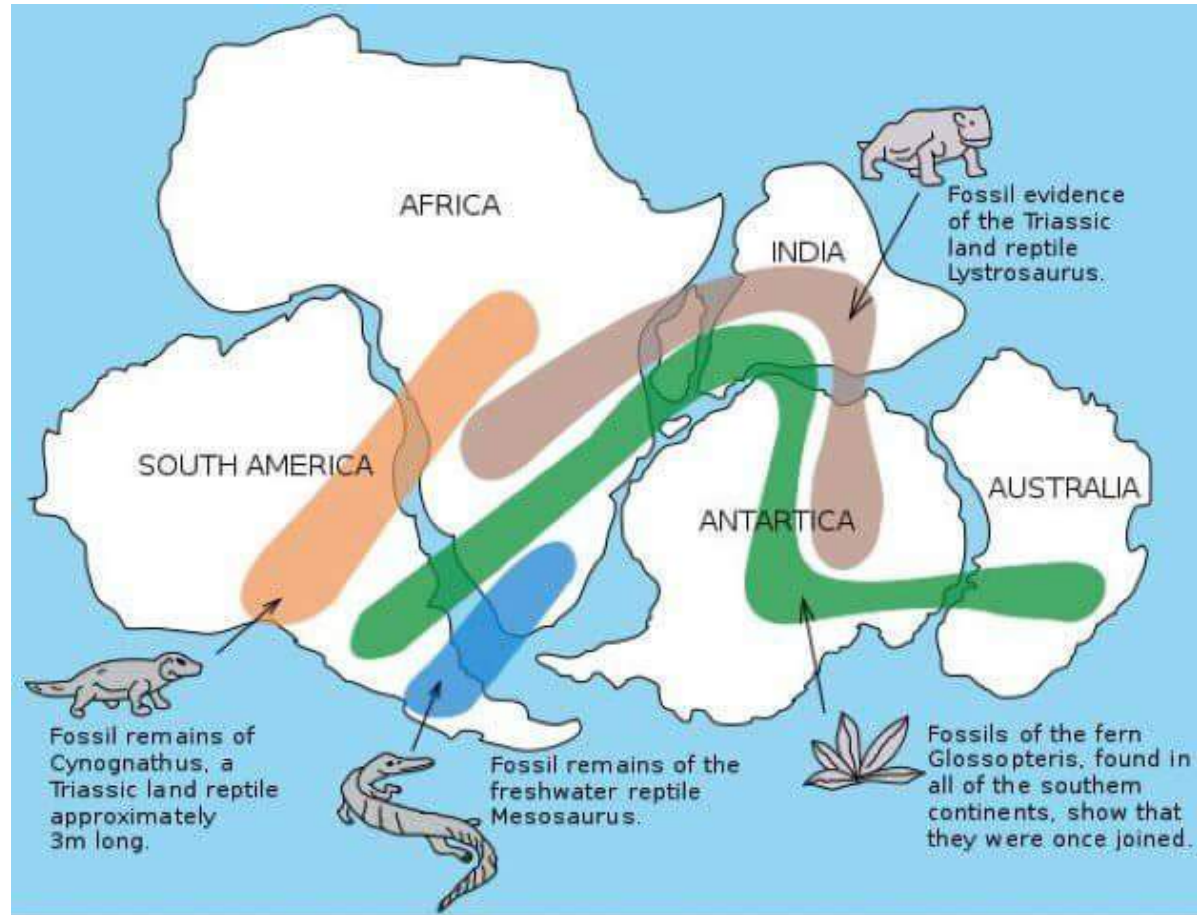
- It is the sedimentary rock formed out of deposits of glaciers.
- The Gondawana system of sediments from India is known to have its counter parts in six different landmasses of the Southern Hemisphere.
- At the base the system has thick tillite indicating extensive and prolonged glaciation.
- Counter parts of this succession are found in Africa, Falkland Island, Madagascar, Antarctica and Australia besides India.
- It clearly demonstrates that these landmasses had remarkably similar histories.

# Placer Deposits

- The occurrence of rich placer deposits of gold in the Ghana coast and the absolute absence of source rock in the region is an amazing fact.
- The gold bearing veins are in Brazil and it is obvious that the gold deposits of the Ghana are derived from the Brazil plateau when the two continents lay side by side.

# Distribution of Fossils

- The observations that Lemurs occur in India, Madagascar and Africa led some to consider a contiguous landmass “Lemuria” linking these three landmasses.
- Mesosaurus was a small reptile adapted to shallow brackish water.
- The skeletons of these are found only in two localities: the Southern Cape province of South Africa and Iraver formations of Brazil.
- The two localities presently are 4,800 km apart with an ocean in between them.
- Such presence of identical plants and animals is possible only when they lived on a common landmass.





# Forces behind the drifting of continents

- Equator wards due to the interaction of forces of gravity, pole-fleeing force (due to centrifugal force caused by earth's rotation), and
- westwards due to tidal currents because of the earth's motion (earth rotates from west to east, so tidal currents act from east to west, according to Wegener).

# Criticism

- The greatest criticism has been the force of continental drift proposed by him. Tidal force need to be ten thousand million times stronger than at present to move the continents.
- The jig-saw-fit of the opposing coasts of Atlantic Ocean was not so complete.
- Rocks of the same age and similar characteristics are found in other parts of the world too.
- Proofs heavily depend on assumptions that are generalistic.