Geo-27

CONTINENTAL DRIFT THEORY

Continental drift states that the Earth's continent is drifted over a Geological period of time relative to each other across the ocean bed

Alfred Wegener, a German meteorologist postulated the Continental Drift theory in 1916.

According to Wegener, all the continents formed a single continental mass and a mega ocean. The Super continent is known as 'Pangea' mean all Earth and mega ocean is known as 'Panthalasa' means all water.

Wegener argued that around 200 million years ago, the Super continent PANGEA began to split. Due to Tethys Sea, PANGEA first broken into two parts i.e LAURASIA and GONDWANA comprising north and South component respectively.

Subsequently, Laurasia and Gondwana continued to break into various small continents that exist today.

* PROCESS OF THEORY:- The main aim of wegener behind the postulation of this theory was to explain major climatic changes which are reported to have taken place in the past geological history of the earth. Besides, wegener also attempted to solve other problems of the earth i.e origin of mountains, island arcs and festoons, origin of continent and ocean basins etc

① Forces responsible for drifting:
Wegener suggested that the movement responsible for the drifting of the continent was of two types:-

① Pole-fleeing:- It relates to the rotation of earth. It-hers the bulge on the equator. The bulge is due to the rotation of earth

② Tidal force:- It is due to the attraction of moon & sun that developes tides in oceanic water

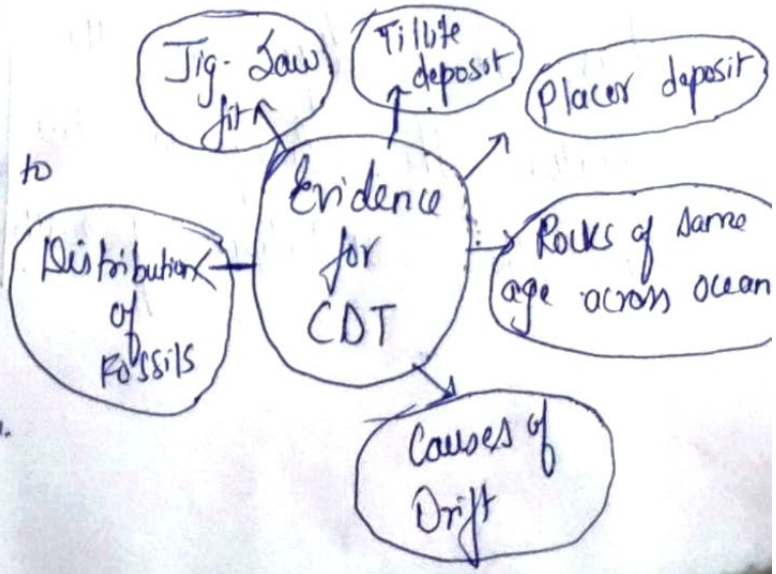
② Mountain building:- Wegener attempted to solve the problem of the origin of folded mountain of tertiary period. The frontal edges of westward drifting continental blocks of North and S. Americas were crumpled and folded against the resistance of the rocks of the sea-floor (Sima) and and thus the western cordilleras of the the Americas (e.g. Rockies and Andes mountains) were formed.

③ Origin of Island arcs:- When the Asiatic block was moving westward, the eastern margin of this block could not keep pace with the westward moving major landmass, rather lagged behind, Consequently the island arcs and festoons ~~Const.~~ consisting of Kurile, Japan, Philippines etc were formed.

* EVIDENCE IN SUPPORT OF CONTINENTAL DRIFT:-

(i) Jig-Saw-Fit:-

⊙ S. America and Africa seems to fit in each other, especially the eastern bulge of Brazil fit with Gulf of Guinea.



- Greenland seems to fit in well with Ellesmere and Baffin Island of canada
- The west coast of India, Madascar and Africa seems to have been joined

JIG-SAW FIT evidence

(2) Rocks of Same age Across the Oceans :- The belt of ancient rocks of 2000 millions years ago from the coastal areas of Brazil matches with those from Africa.

(3) Tillite deposits:- Tillite is a sedimentary rock formed due to Glacier Deposits. The Gondwana System of sediment of India have the counterpart in 6 different landmasses of Southern hemisphere (i.e Africa, Madagascar, Australia, Falkland Island, Antartica)

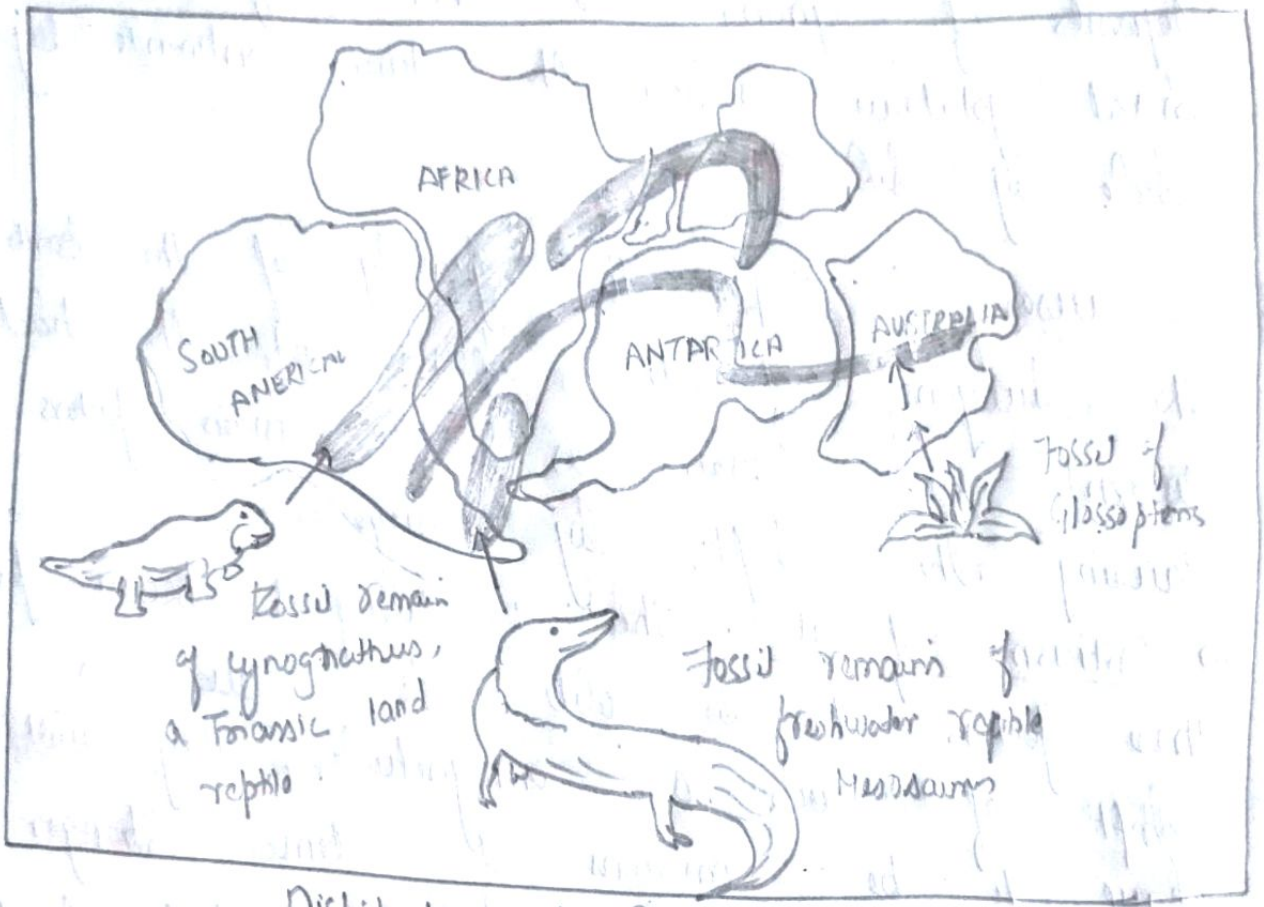
④ Placer Deposits:- Rich placer deposits of gold are found on the Ghana coast (W. Africa) but the source (gold-bearing veins) are in Brazil, and it is obvious that the gold deposits of Ghana are derived from the Brazil plateau, when the two continents lay side by side.

⑤ Causes of Drift:- The gravity of the earth, the buoyancy of the seas and the tidal currents were given as the main factors causing the drift, by wegener.

→ Criticism of it:- This is illogical because for these factors to be able to cause a drift of such a magnitude, they will have to be millions of times stronger.

⑥ Distribution of fossils:- Alfred studied about the ancient fossils of plants and animals, geographical features on the border of the continents and mineral resources and found similar results on the boundaries of the other continent.

The observations that Lemurs occur in India, Madagascar and Africa led some to consider a contiguous landmass 'Lemuria' linking these three landmasses.



Distribution of Fossil across the Gondwanaland

* DRAWBACK OF CDT :-

→ Wegener failed to explain why the drift began only in Mesozoic era and not before

→ The theory doesn't consider oceans.

→ Forces like buoyancy, tidal currents and

gravity are too weak to be able to move continents.

→ Modern theories (Plate tectonics) accept the existence of Pangea and related landmasses but give a very different explanation to the causes of drift.

Though scientifically unsound on various grounds, Wegener's theory is a significant milestone in the study of tectonics, and it laid a strong foundation for future the theories like seafloor spreading and plate tectonics.