

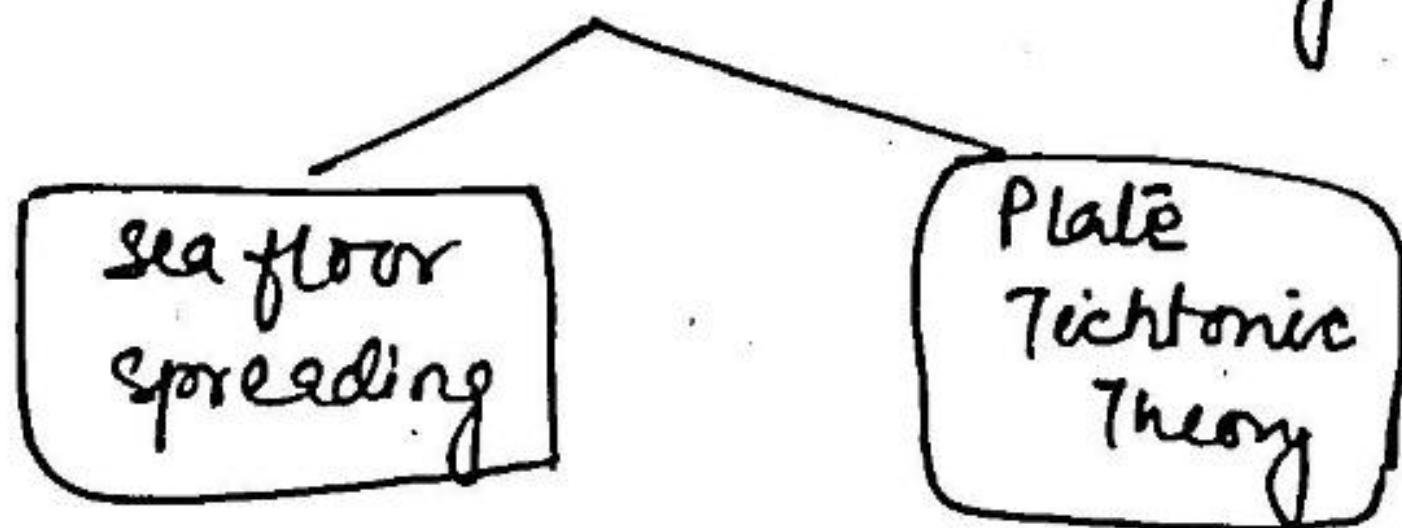
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Geomorphology 3 important feature :-

- ① continental landmass & oceanic bed
- ② Oceanic feature developed over the continents
(Mountains, plateaus etc)
- ③ Exogenic forces.

→ Alfred Wegener Theory = Continental drift theory

→ Thermal Convection Current Theory



→ Thermal Convection Current Theory :-

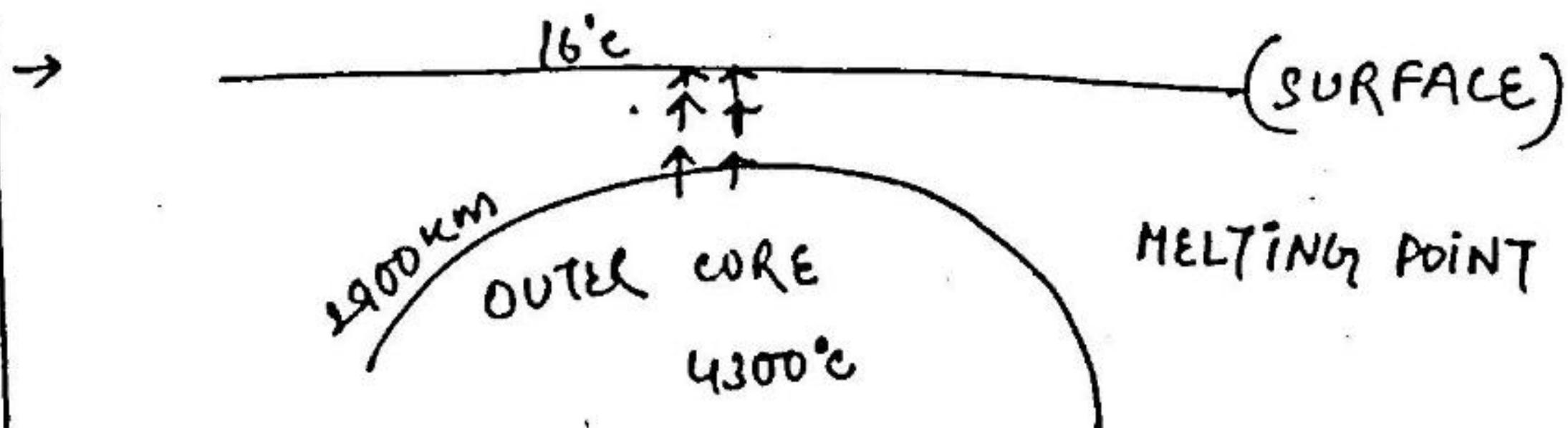
→ 1928, Arthur Holmes, (Endogenetic forces)

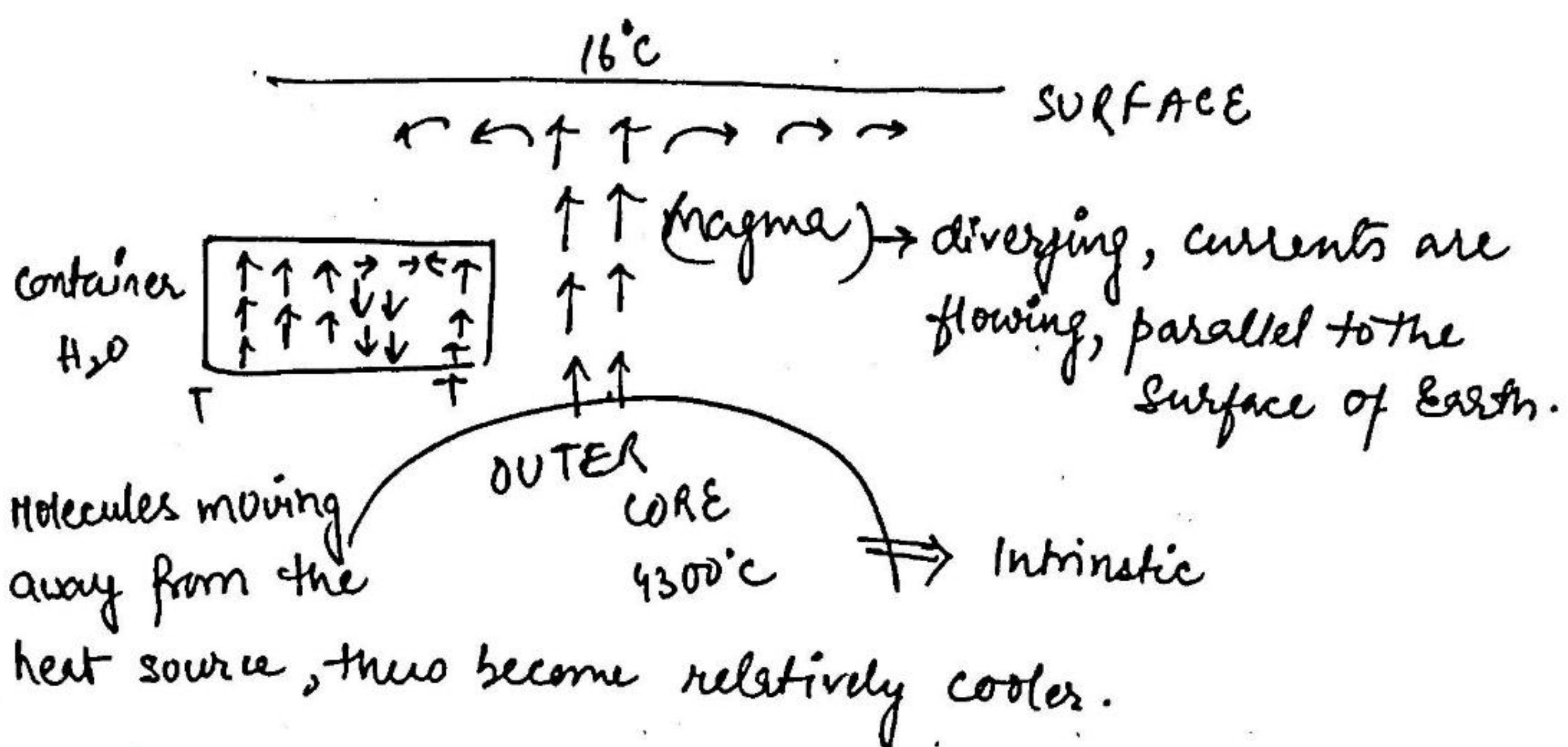
→ Rayleigh principle

→ Temperature gradient between the 2 area is more than melting point of the medium.

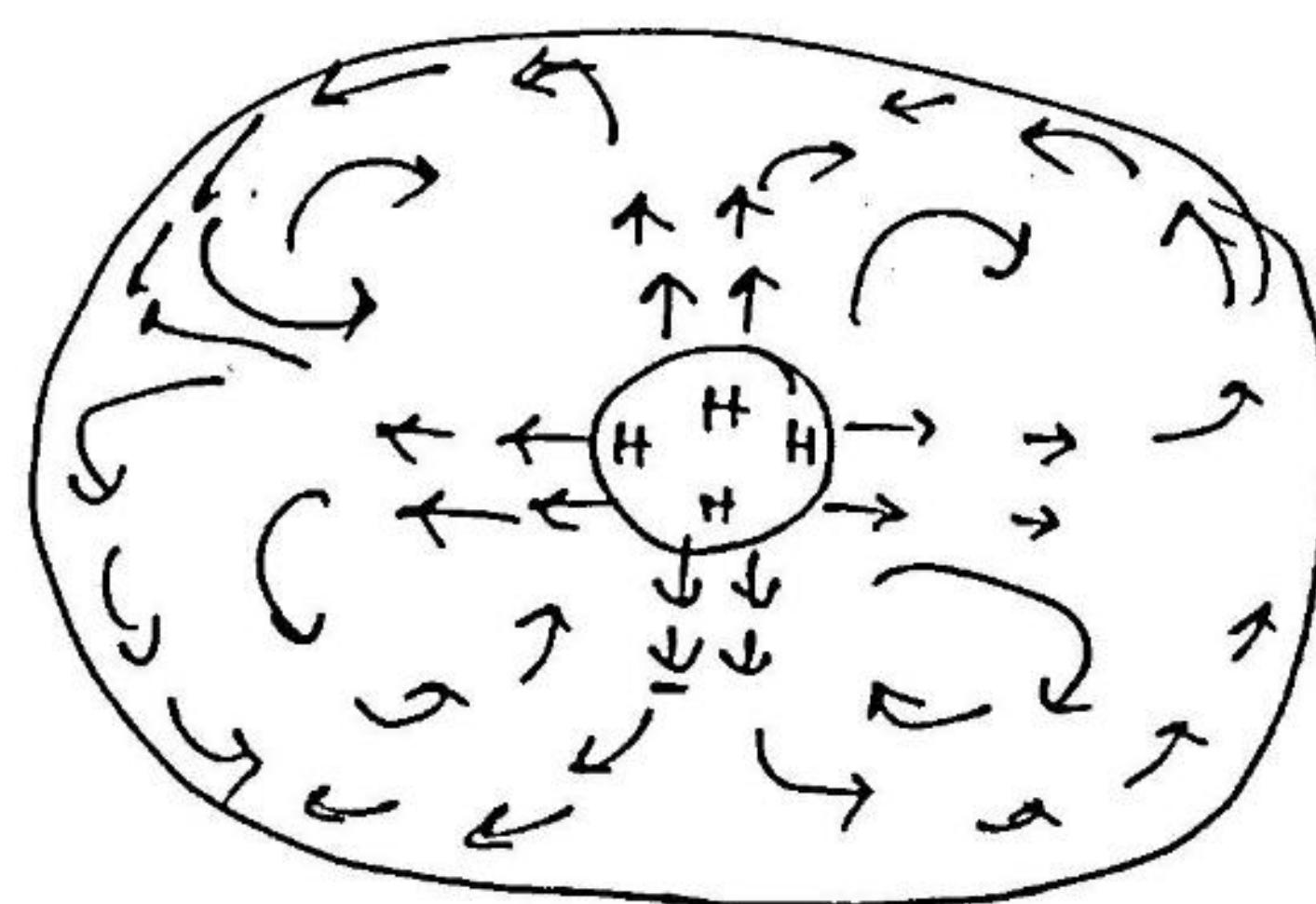
→ High curie point

→ Transfer of energy = convection not conduction.





- There are some zones from where the convectional currents are rising = HOTPOT. = boundary b/w Mantle & Core
- This cycle is called "CONVECTION CYCLE",
- According to Layleigh principle the difference between the temperature of 2 medium, the medium being rock. The transfer of temperature between the high temperature to the low temperature will always be in the form of convection. The same temp. diff prevails between the centre & surface.
- Convection cycle is responsible for the endogenic forces.



Due to bad conducting nature of Earth crust, which

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contain oxides and silica, these impulsive convection carrying magma started diverging from the boundary of mantle and crust and start running parallel to the surface & they sink back to the centre of the Earth. The cycle continues = "CONVECTION CYCLE"

Endogenic forces

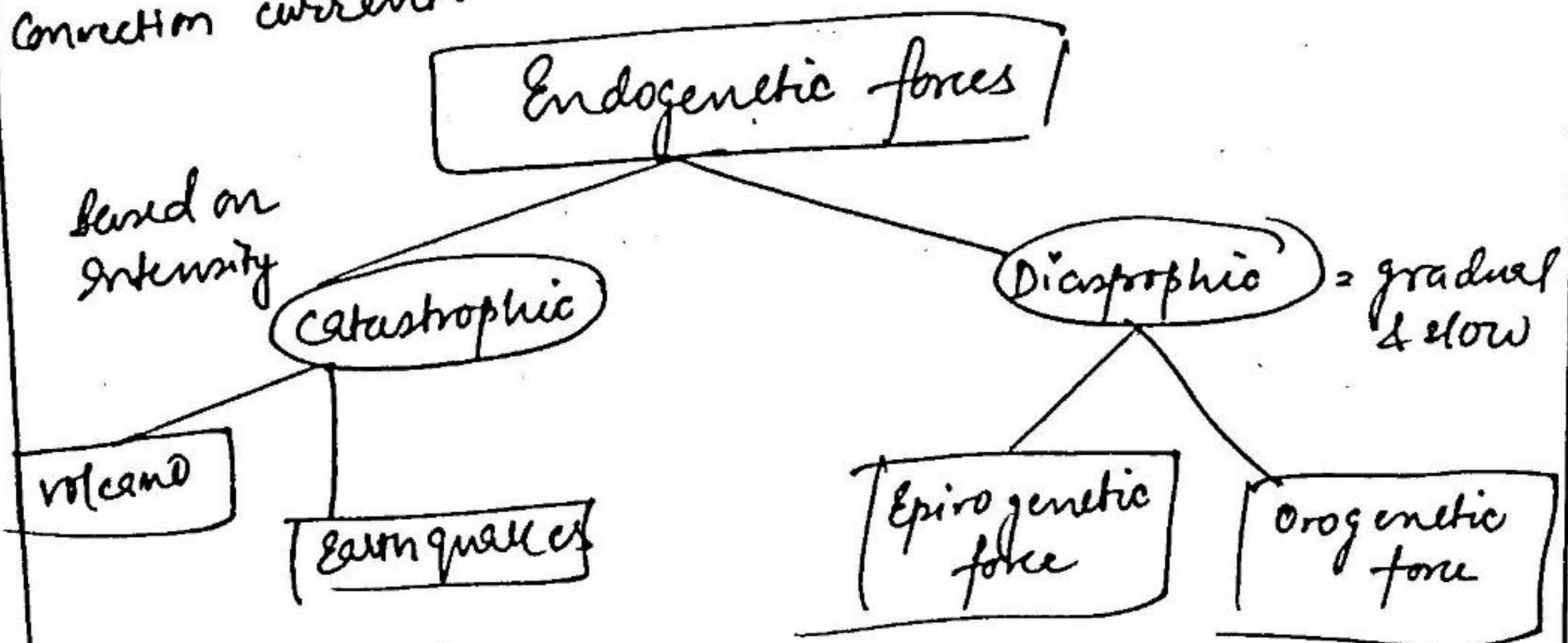
It was proposed by Arthur Holmes in 1928-29, as a reformatory purpose of overcoming all the limitations and shortcomings of predecessor Continental drift Theory.

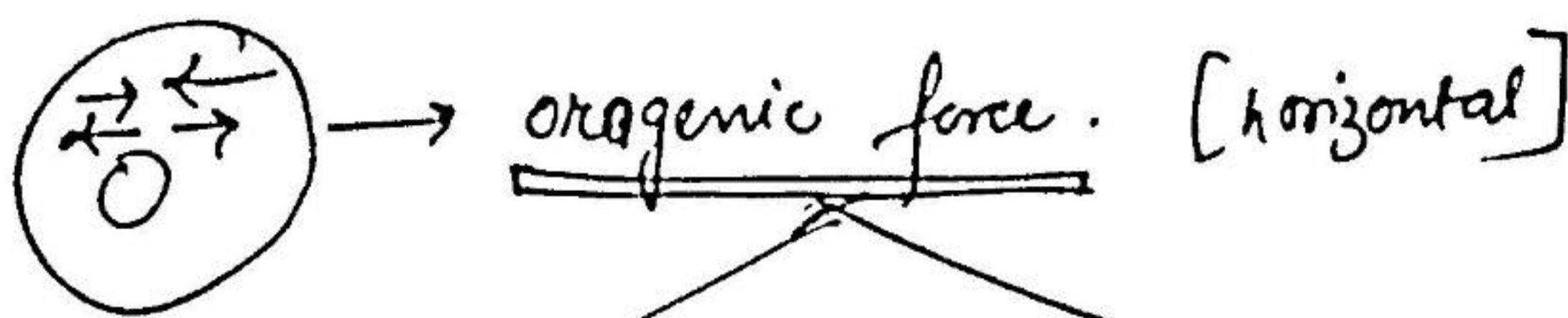
The theory profounded a new mechanism of Endogenic forces based on & empirical studies and supporting evidences.

The Convection Current Theory of Arthur Holmes adopted the universal principle of Rayleigh for the transfer of energy from one place to another, is more than the melting and curing point of the medium, then the transfer of energy would always take place in the form of convection not conduction.

According to Holmes, same situation prevails between the intrinsic and outer layers of Earth subsequently. Intense thermal convection current originates from the boundary of mantle and core with the purpose to approach towards the surface of the Earth.

In their path, they carry magma of asthenosphere with them and advances towards the surface of Earth. Reaching boundary of mantle & crust, due to bad crust of nature, they diverge horizontally and runs parallel to the surface of the Earth. According to the convection current, the energy is rising from the sequential hot-spots along the boundary of mantle and core. At the same time, after convergence near surface of the Earth the propagating convergent current also sink back towards the centre of Earth between the 2 hotspots. By this, resultant phenomenon, cycle and circulation of convection impulses developed between the centre and surface of Earth to regulate whole mechanism of endogenetic force. It means the impact of endogenetic forces over the surface of Earth depends on direct & impulsive action of thermal convection current.





Compressional forces

Tensional forces

fold

= Himalayas

= Alps

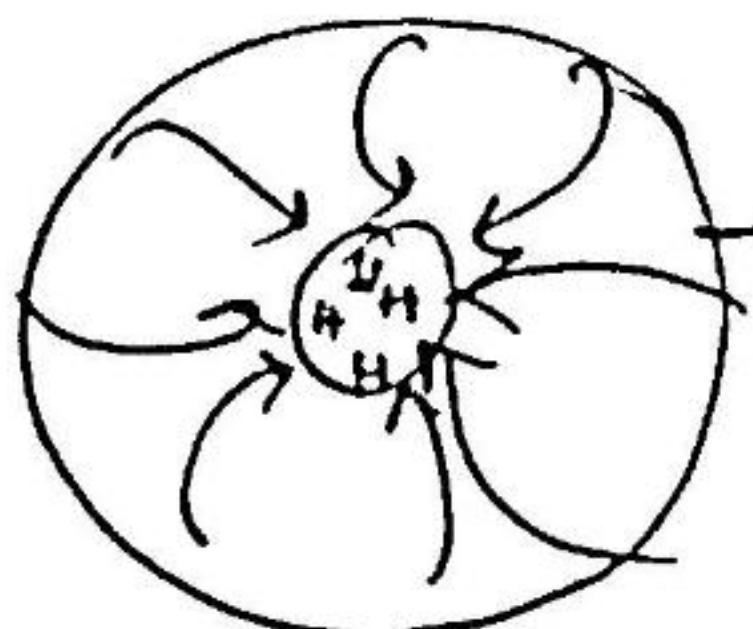
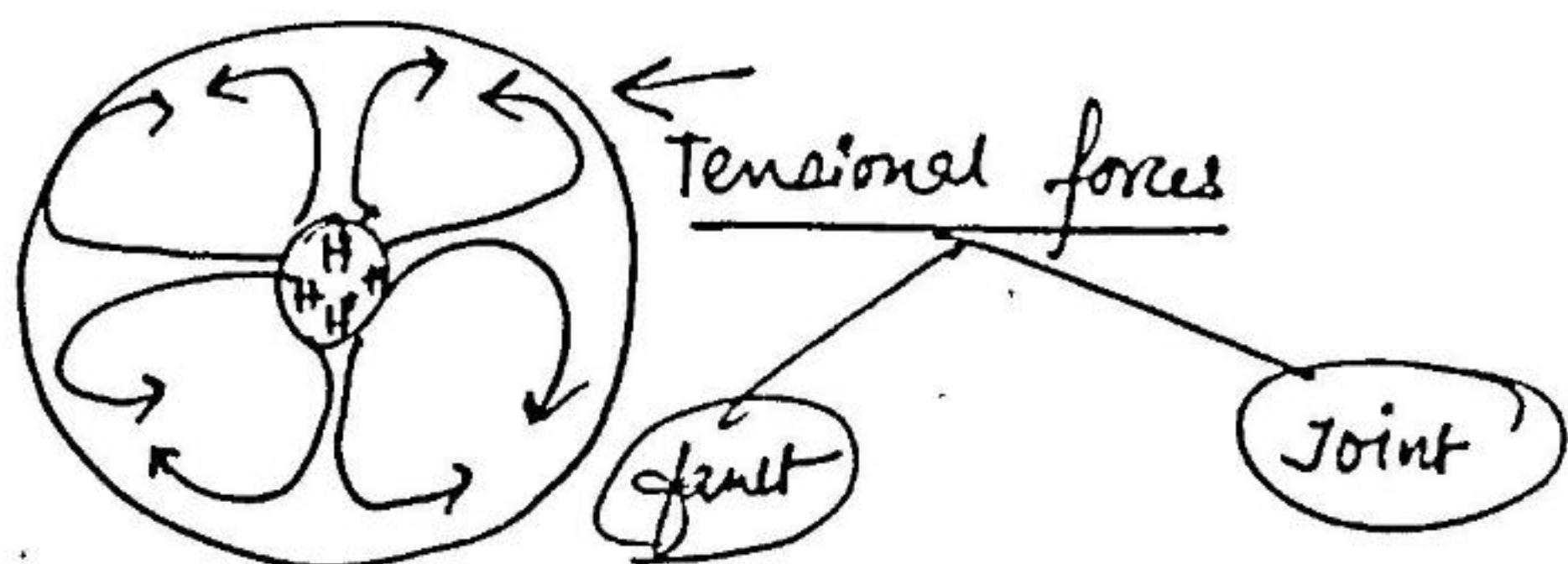
etc ...

warp

→ Plateaus

fault

Joint



Orogenic forces

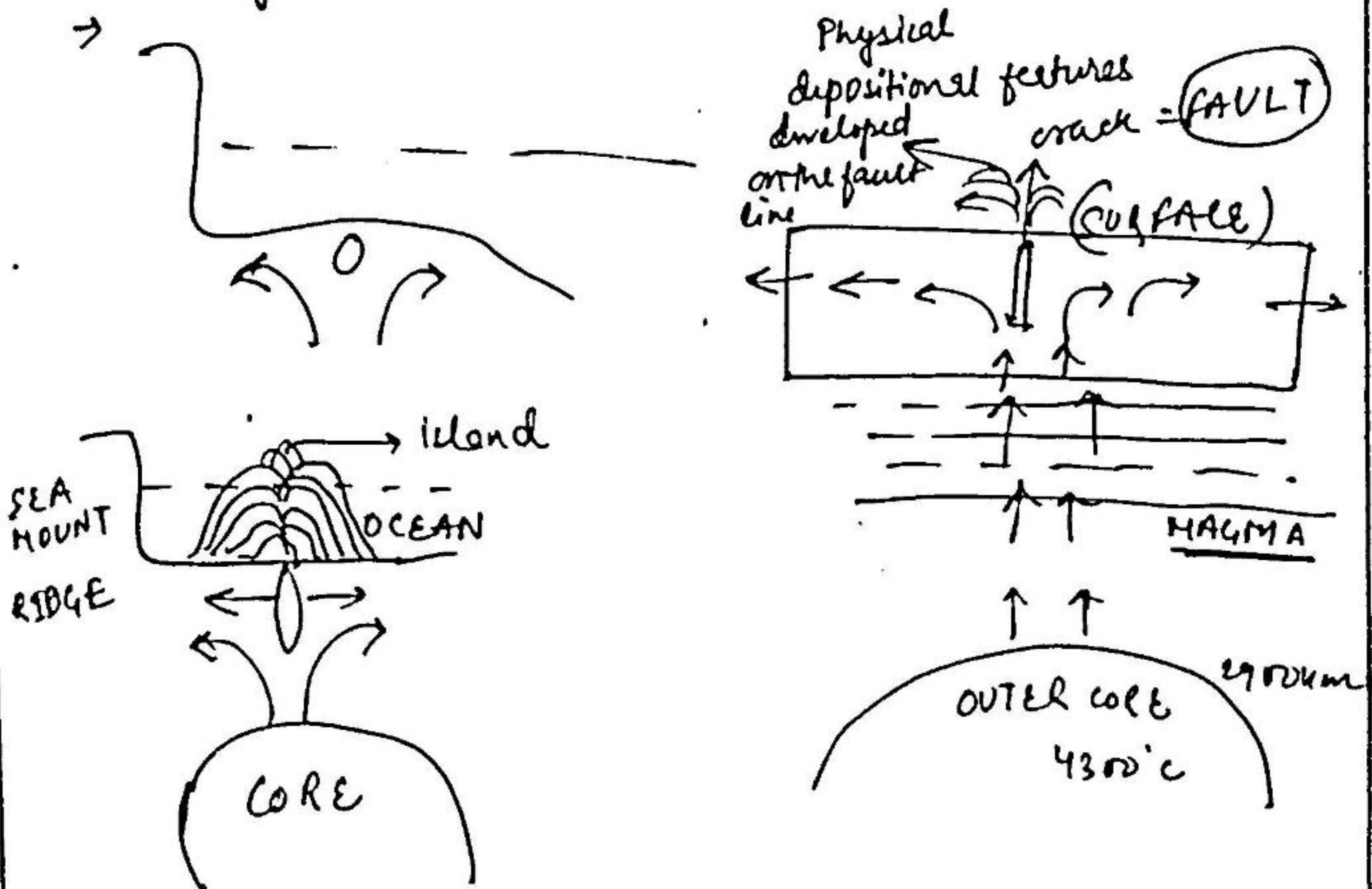
→ See floor spreading
→ Plate Tectonic

According to thermal convection current theory, the regions along the boundary of mantle & crust where convection currents are diverging with each other. The orogenic tensional forces remain operational with the surface of the earth to create physical structures like fault & joint in the slab of lithosphere.

Other hand, areas where convection current are converging along the boundary of mantle & crust, the orogenetic compressional forces would show its prominence to develop physical structures like fold and warp. At the same time, direction of thermal convection current also regulates the impact of vertical epigenetic forces which lead to emergence or submergence of surface.

sea floor spreading :-

→ Harry Hess (1960-61)



→ sea floor spreading :- It was proposed by Harry Hess 1960-61, by taking the attributes from earlier theories of continental displacement & thermal convection current. Although, the theory is lightly

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motivated by the mechanism of Thermal convection current. The basic argument of this theory was that oceanic floor are as mobile as continental blocks and the mobility of oceanic floor depends on direction and action(impressive) of Thermal convection current. In this regard seafloor spreading is different from theory of continental displacement.

According to this theory, convection current originating from the boundary of mantle and core diverging from boundary of mantle and crust would apply orogenetic tensional force in atmosphere too. They break the lithosphere apart and create fracture line in the zone of lithosphere too, break the lithosphere apart & create fracture lines or ~~or~~ areas in the zone of lithosphere. These broken fracture areas are regarded as fault, along which the fault developed as fault line. In the course of time, by the regular diversion of convection impulses carrying magma, the fault become much more wider in its horizontal dimension. The widening of fault would provide an opportunity for the magma of atmosphere to upraise along the fault line & except over the fault line as silent volcano. This process of volcanism over the fault line ~~as~~ would develop several physical features like mountain & plateaus over an adjacent to the fault line and create some disturbance over the surface of earth. It

be noted that, if the same tectonic phenomenon of faulting divergence of rocks along the fault line & silent type of volcanic eruption over the fault line takes place over the oceanic floor then relief features like sea mounts, ridges, island, archipelago would develop over the surface of the earth. It should be noted that divergence of rocks along the fault line also increase the surface area of oceanic base to get designation of a phenomenon called = sea floor spreading.

- Paleomagnetism (magnetic polarity)
- According to the theory of seafloor spreading the particular geomorphological phenomenon of fault formation, divergence of rock formation along the fault line, silent type of volcanic eruption, and creation of several physical features like highest island etc... is much more visible over the Atlantic and Indian Ocean. In the centre basin of both the ocean, a long fault line is created or located over which physical features like mid Atlantic ridge & Indian Oceanic ridge have evolved. At the same time, the elevation of mid oceanic ridge decreases from the centre to the peripheries. It means the formation of fault & silent type of volcanic

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is taking place in the central basin of respective oceans. Apart from this, composition of rocks over the fault line is different from that of rocks over the fault line. are much more recent, while the lateral rocks show high level of metamorphism. At the same time, reversal of magnetic property has also taken place in the rocks away from the fault line. Similarly, some new islands have also evolved in the centre of mid atlantic & Indian Ocean & the surface area of atlantic ocean have also increased in the recent past.

The theory of sea floor spreading provides several scientific and supporting evidences about the formation of several second order relief features on the surface of Earth, but the theory is also characterised by inherent Limitations.

- (1) The particular geomorphological phenomenon was not explained over continental phenomenon.
- (2) The theory provide evidences about formation of several relief features.
- (3) The theory provide evidences about the increase in surface area along the fault line & formation of new crust but the theory cannot simplify the disintegration of the earth crust.