

B.Sc. Sem.III, Palaeontology -Unit I

Origin of Life

It is also known as “**Biopoiesis.**” It is a phenomenon by which the first life came into existence on Earth. It is the natural process by which life has arisen from nonliving matter.

The Biopoiesis has been differently explained by different workers from time to time, such as:

1. Theory of Special Creation
2. Theory of Catastrophism
3. Theory of Spontaneous Creation
4. Cosmic theory
5. Theory of Eternity
6. Modern theory or Chemosynthetic theory of Alexander Oparin (1924) and John B.S. Haldane (1929).

This is the most accepted theory which explains the origin of life from non-living (Abiogenesis) which took place under the primitive conditions that provided as the Earth such as:

- a. Very high temperature
- b. Reducing environment
- c. Absence of life
- d. Presence of UV light.

As these conditions have under gone an irreversible change. Therefore abiogenesis at present is not possible.

This theory of Oparin and Haldane explain the origin of life from non-living matter by a process of chemical evolution which took place over a time of years as follows:

- i. The formation of inorganic components.
- ii. Formation of Simple organic compounds
- iii. Formation of Complex organic compounds
- iv. Formation of molecular aggregate called **Coacervates**
- v. Formations of **Eobionts**

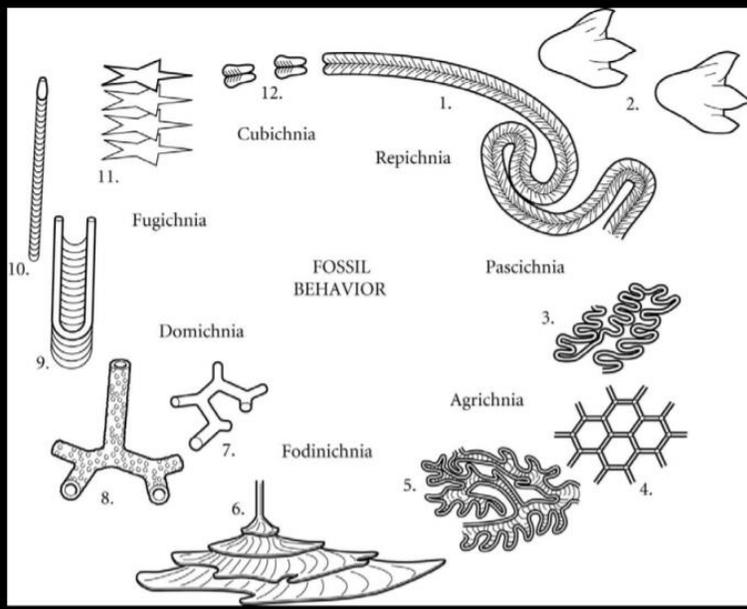
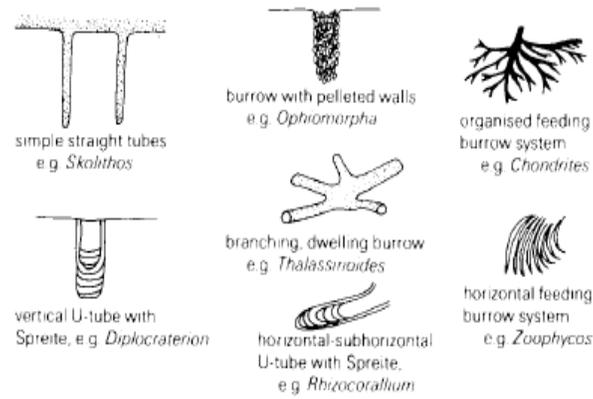
- vi. Formation of first living system at about 3600 Ma at the base of sea bed in the form of **Cynobacteria**, which were **Prokaryotic**.

Trace Fossils

Trace fossils are also known as **Ichnofossils**. Burrows, boring, trails, footprints, feeding marks, coprolites, stromatolites these are indirect evidences of preexisting life preserved as fossils.

Type of Trace fossils:

- 1) **Crawling traces:** (Repichnia) trails, uncomplicated pattern; linear or sinuous.
- 2) **Grazing traces:** (Pascichnia) more complicated surface trails, symmetrical or ordered pattern; coiled, radial, meandering.
- 3) **Resting trace:** (Cubichnia) impression of where animal rested during life (but not a fossil mold).
- 4) **Dwelling structures:** (Dominichnia) simple to complex burrow systems but without suggestion of systematic working of sediment; burrows can be lined or pelleted.
- 5) **Feeding structures:** (Fodichnia) simple to complex burrow systems, three dimensional, commonly with well-organized and defined branching pattern indicating systematic reworking of sediment.



Cubichnia = Resting
 Repichnia = Crawling
 Pascichnia = Grazing
 Agrichnia = Farming
 Fodinichnia = Deposit Feeding
 Dwelling = Domichnia
 Fugichnia = Escape

The behavioral classification of trace fossils, showing the major categories, and some typical examples of each. Illustrated ichnogenera are: 1, *Cruziana*; 2, *Anomoepus*; 3, *Cosmorhapha*; 4, *Paleodicyton*; 5, *Phycosiphon*; 6, *Zoophycos*; 7, *Thalassinoides*; 8, *Ophiomorpha*; 9, *Diplocraterion*; 10, *Gastrochaenolites*; 11, *Asteriacites*; 12, *Rusophycus*. (Based on Ekdale et al. 1984.)