Stromatolites

Prelims *– General issues on Environmental ecology, Bio-diversity and Climate Change.*

Why in news?

Recently, 600-million-year-old stromatolite outcrop has been discovered in Chambaghat, Solan district, Himachal Pradesh.

- **Stromatolites** – They are reef-like **bio sedimentary structures** formed by cyanobacteria (blue-green algae) in ancient shallow seas.

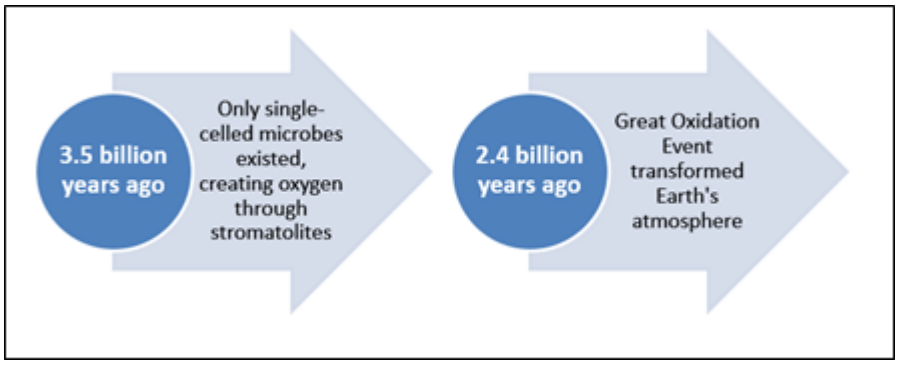
- **Time period** – It dates from 3.6 billion years old (Australia) to 600 million years old (recent Himalayan discovery).
- **Distinction from fossils** – If original organism is preserved, it's technically a fossil; if only the *mineralised structure (calcium carbonate precipitates)* is preserved, it's a biosedimentary structure.

Recent Discovery in the Himalayas

- **Location** – Pine-clad ridges of Chambaghat in Solan district, Himachal Pradesh.
- **Age** – 600 million years old.
- It is found at 5,000-6,000 feet above sea level in entire hill covered with stromatolites, not just isolated samples.
- **Younger stromatolites** – This is the youngest stromatolites in India.

Oldest stromatolites are found in Dharwad in Karnataka, which are at least 2,500 million years old.

- **Geological significance –** It is part of the Krol Group of sedimentary rocks that is formed in shallow marine environment of the ancient Tethys Sea.
- It helps to reconstruct the theory of a vanished Tethys Sea in the Himalayan region.
- These structures indicate the shallow marine conditions that once existed before the Indian plate collided with Eurasian plate.
- **Historical significance** – Earth's atmosphere doesn't contain oxygen when it is formed and it is composed of carbon dioxide, methane, and water vapor.



- **Oxygen production** – Cyanobacteria in stromatolites began producing oxygen through photosynthesis around 3.5 billion years ago.
- This contributed to the **Great Oxygenation Event**, making Earth habitable for complex life.

Great oxidation event occurred around 2.4 billion years ago, transforming Earth's atmosphere and enabling multicellular life.

- **Threat –** Risk of permanent loss due to development and natural processes such as mining activities, construction and erosion.

Other Stromatolite Sites in India
• **Uttarakhand** – Mussoorie, Nainital (Krol Belt formations) • **Haryana** – Morni Hills (dolomite formations) • **Uttar Pradesh** – Chitrakoot (Vindhyan limestones), Salkhan (fossil park) • **Rajasthan** – Jhamarkotra (mining threatened), Zawar, Jaisalmer Fossil Park, Bhojunda, Bilara Group • **Andhra Pradesh** – Kadapa Basin (Cuddapah Supergroup) • **Madhya Pradesh** – Kadapa mountains • **Chhattisgarh** – Chandi Formation • **Sikkim** – Buxa Formation (declared Geoheritage site)

Reference

Indian Express| 600-million-year-old stromatolites found in Himalayas

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