

Current Affairs 24th December 2023 by Saurabh Pandey

Reindeer Behaviour

- Researchers have discovered that the more time reindeer spend ruminating, the less time they spend in non-rapid eye movement (non-REM) sleep.
- EEG recordings revealed that reindeer's brainwaves during rumination resemble the brain waves present during non REM sleep, and these brainwave patterns suggest that the reindeer are more "rested" after ruminating.



- Light/dark cycles are absent in the Arctic during winter and summer, and previous studies showed that Arctic dwelling reindeer don't display circadian behavioural rhythms during these seasons, though they tend to be more active during the daytime during the spring and autumn equinox, when light/dark cycles are present.
- They found that reindeer slept approximately the same amount during winter, summer, and autumn,

despite the fact that they were much more active during the summer.

- This is in contrast to other species that change the amount they sleep in response to environmental conditions.
- One possible strategy is the opportunity for rest during rumination the rechewing of partially digested food, which is an important component of digestion for reindeer and other ruminants.
- The Hindu

AEROGEL



- Inspired by the structure of polar bear fur, researchers present a knittable aerogel fibre with exceptional thermal and mechanical properties.
- The fibers are washable, dyeable, durable, and well-suited to be used in advanced textiles.

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- This allowed the researchers to test them in a sweater that demonstrated impressive thermal insulation, among other features.
- Aerogels are an ideal material for thermal insulation.
- Encapsulated aerogel fibre has excellent thermal insulation while also being mechanically robust.

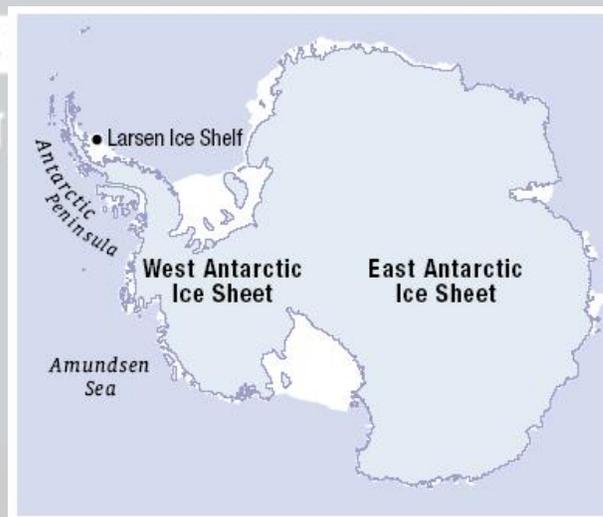
Aerogel

- Aerogels are among the lightest solid materials known to man.
- They are created by combining a polymer with a solvent to form a gel, and then removing the liquid from the gel and replacing it with air.
- Aerogels are extremely porous and very low in density.
- They are solid to the touch. This translucent material is considered one of the finest insulation materials available.
- Although aerogels were first invented in the 1930s, NASA's Glenn Research Center in Cleveland has invented groundbreaking methods of creating new types of aerogels that could change the way we think about insulation.



The Hindu

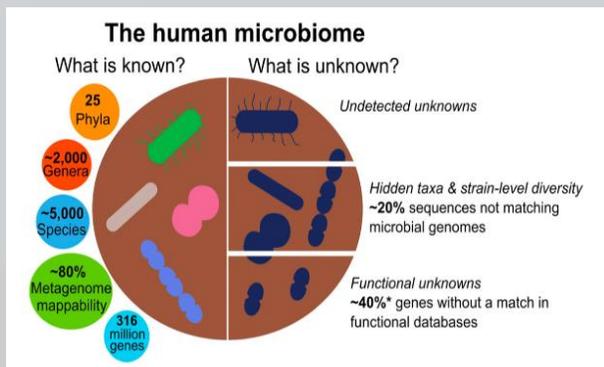
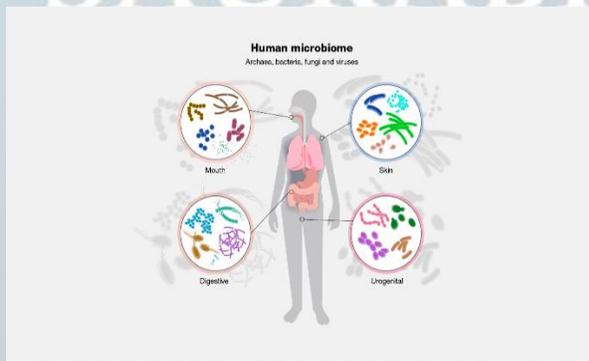
West Antarctic Ice Sheet



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- Genetic analyses of an Antarctic octopus show that the West Antarctic Ice Sheet (WAIS) collapsed during the Last Interglacial about 1,29,000 to 1,16,000 years ago when temperatures were only about 1-degree C warmer than pre industrial levels.
- The findings suggest that WAIS collapse and resultant sea level rise could be caused by even the minimal temperature rises. Total WAIS collapse would have devastating global ramifications it could raise the global sea level by roughly 3 to 5 meters.
- The Hindu

Microbiome



What is a microbiome?

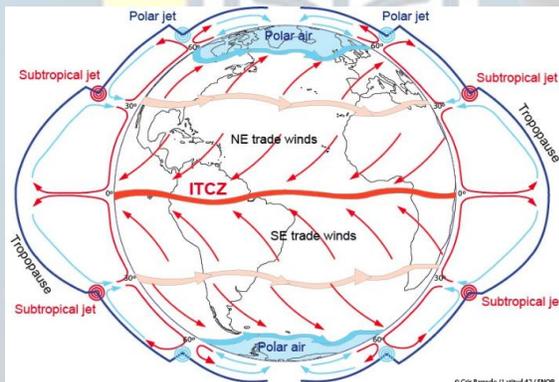
- A genome is the entire set of DNA instructions found in a cell.
- In humans, the genome consists of 23 pairs of chromosomes located in a cell's nucleus. A biome refers to the species that are present in a location.
- In our case, the ocular microbiome refers to the bacteria, fungi and viruses that are present in the eye.
- The microbes in a healthy ocular microbiome act like a barrier, preventing invasion by harmful pathogens.
- The ocular microbiome is also significantly different in the conjunctiva (the thin, clear membrane that protects the eye) and the cornea (the outermost clear layer that helps in focusing and refraction of the eye) of patients with infectious diseases such as fungal keratitis when compared to healthy eye microbiomes
- The prevailing levels of air pollution, due to very high amounts of dust all over the country, have made many people suffer from 'pink eye' (conjunctivitis), itching and swelling of the eye, and blurry vision (when the lens is affected), or sensitivity to bright light.

The Hindu

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India Meteorological Department (IMD)

- The 2023 northeast monsoon was in an active phase during this episode, characterised by the presence of an east-west trough (or ITCZ).
- The unprecedented heavy rainfall on December 18 was associated with an easterly wave with an embedded cyclonic circulation that moved from the southwestern Bay of Bengal across southern Tamil Nadu and Kerala into the southeastern Arabian Sea between December 16 and December 19.



- There was a large scale, intense convergence of winds with the influx of abundant moisture into the region.
- Most of the recent rains fell in the early morning hours of December 18, supported by the climatological diurnal pattern over the region.
- The north south running hills along the Tamil Nadu Kerala border are also

likely to have contributed to the dynamics of the heavy rains.

- The India Meteorological Department (IMD) had predicted extreme rainfall (more than 20 cm of rainfall in 24 hours) for December 18 about 48 hours in advance and issued a red level warning.
- But rainfall of more than 50 cm was not expected at all. Compared to a tropical cyclone, this weather system was weaker.
- A review of the available numerical weather prediction (NWP) model forecasts showed that no model could predict the intensity of this heavy rainfall event.
- For the prediction of extremes, a probabilistic approach is generally used extensively to calculate the probability of such extreme events occurring in each region.
- These probabilistic forecasts can be generated using an ensemble approach, where we generate a larger number of forecasts (3040 forecasts) with perturbed initial conditions.
- The Indian Institute of Tropical Meteorology (IITM) in Pune has developed such a prediction system for making probabilistic forecasts.

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- This ensemble forecasting system was able to suggest the high probability of occurrence of extreme rainfall events in southern Tamil Nadu almost three days in advance.
- Probabilistic forecasts provide more lead time, which can be used for better preparation.
- End users should be trained to use probabilistic methods for proper mitigation of such extreme events
- More research is required for a better understanding of the physical processes of these extreme events.
- Public awareness and education also play a crucial role in building resilience.
- Communities should be educated about the risks associated with extreme precipitation events and receive information on how to prepare and respond effectively.

Multifaceted approach

- In the face of increasing extreme rainfall events, we must take a multifaceted and proactive approach to mitigate the impact and strengthen the resilience of our communities.
- To meet the challenge of climate change, a comprehensive strategy that includes robust early warning systems, sustainable urban planning, ecosystem conservation, global climate action and community engagement is essential to effectively mitigate the impacts of increasing extreme precipitation events.
- The robust early warning system is very vital, but it is only one component of this comprehensive strategy.

- The Hindu

India-Maldives (hydrology)

- The Maldives Cabinet decided against renewing a Memorandum of Understanding (MoU) with India for cooperation in hydrography.
- The agreement, which was signed in 2019, is due to expire in 2024

What is hydrography?

- It is the science of studying oceans, seas, and other water bodies, by compiling and analyzing data, maps, and charts.
- Branching off from applied sciences, it looks at measuring and describing the physical attributes of water bodies and predicting how they might change over time.

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- While it is said to be undertaken primarily for safety of navigation, it also supports other activities, such as economic development, security and defence, scientific research, and environmental protection.
- Hydrographical measurements include tidal, current and wave information. Maldives is a member of the Colombo Security Conclave, an initiative aimed at enhancing Indian Ocean maritime security, that includes India, Sri Lanka, and Mauritius.
- However, earlier this month, the Maldives skipped the latest round of the Conclave's NSA level meet held in Mauritius.
- Notably, it coincided with Maldivian Vice-President Hussain Mohamed Latheef's visit to China, to attend the China Indian Ocean Region Forum on Development Cooperation, where he said the Maldives was "eager to explore novel avenues of collaboration and cooperation with China"
- The MEA's response to the termination of the Maldives's joint hydrographic initiative with India, pointed to New Delhi's belief that its neighbours should tap the "benefits" of India's expertise.
- **The Hindu**

Concern telecom bill

- Contentious clauses is the requirement that all users have to be identified through the use of "verifiable biometric based identification as may be prescribed" by telecommunication service providers.
- Further, it requires that no user shall furnish any false particulars or suppress material information. This could impede whistleblowers as well as journalists who operate under anonymity.
- If users fail to comply, they will be charged a hefty penalty from ₹25,000 to ₹1,00,000 for some provisions.
- Most of the contentious provisions are contained in Chapter IV, which grants emergency powers to the Central government in the interest of public safety and national security.
- Section 19 (f) empowers the Central government to notify "standards and conformity assessment measures" in respect of encryption and data processing in telecommunication, which has raised eyebrows given that most internet communication is increasingly being pushed towards encryption to evade national state surveillance programmes.

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- The government's interest in breaking up encryption of WhatsApp and Signal has to be seen in the backdrop of a controversy over Israeli company NSO Group's Pegasus spyware targeting 300 mobile phone numbers for illegal surveillance.
- It also allows the Central or a State government during a public emergency, including disaster management, and in the interest of public safety to take "temporary possession of any telecommunication service or network".
- It can take over control and management of such services or networks.

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