

Quasicrystal

- Scientists have reported finding only the third natural source of quasicrystals, a material once deemed impossible and whose unusual properties scientists are still unravelling.
- In a crystal, the atoms are arranged in a pattern that periodically repeats itself.
- A quasicrystal atom are arranged in a pattern that repeats itself at irregular intervals. Quasicrystals were discovered in the lab in 1982.
- In the late 1990s, scientists began looking for quasicrystals in nature.
- After a decade-long quest, Luca Bindi, Paul Steinhardt, and others reported finding the first natural quasicrystal in 2009 as microscopic grains in a piece of the Khatyrka meteorite in the Koryak mountains of Russia.
- This meteorite was involved in several collisions in space over millions of years, heating and pressurizing it to a great degree and creating the quasicrystals.
- Reported finding a quasicrystal in the remains of the first nuclear weapon test, conducted on July 16, 1945, in New Mexico.

THE HINDU

Collapse of Hittite Empire

- A major drought that occurred in central Anatolia between around 1198 BC and 1196 BC may have had a key role in the collapse of the Hittite Empire (Nature).
- The findings suggest that extreme climate change can push populations beyond their limits.
- Researchers created a high-resolution dryness record using stable isotope records and measurements from tree rings of juniper trees in central Anatolia.
- They identified an unusually severe dry period around 1198 BC and 1196 BC causing severe drought.

THE HINDU

Loss of wetland

- The world lost about 20% of its natural wetlands between 1700 and 2020, says a new study (Nature).
- Researchers reconstructed the timing and spatial distribution of wetland loss due to human intervention by combining 3,320 international and regional records of wetland drainage and land conversion from 154 countries.
- They estimate that 3.4 million square km of inland wetlands have been lost since 1700 a net loss of 21% of global wetlands.

Millets for a healthier future

- Half of all calories consumed by humans come from maize, rice, and wheat.
- We depend on 13 crops for 80% of our nutritional needs. Their inventories will dwindle as climate change leads to erratic rainfall and weather extremes.
- There is a need for growing hardier species to help secure our needs, which is why millets are gaining significance.
- Millets are grown in warm regions with poor soil and yield large crops of small seeds which are used to make flour.
- Some examples of millets are pearl millet or bajra, sorghum or jowar, and finger millet or ragi.
- The minor millets are foxtail millet or thenai, little millet or samai, and barnyard millet or sanwa, which is used in bread and biscuits.
- Millets have been staple foods for people in Asia and Africa for over 10,000 years.
- They are climate- resilient, need little water, and grow well in warmer, drier environments.
- India produces around 12 million metric tonnes of millets annual.
- The Food and Agricultural Organization (FAO/UNO) has declared the year 2023 as the international year of millets.
- In keeping with this, India's Agriculture Ministry has lined up a series of millet- centric plans and activities on the use of millets, particularly in Andhra Pradesh, Madhya Pradesh, and Bihar.
- It also plans "eat right melas" in Punjab, Kerala and Tamil Nadu.

THE HINDU

H5N1

- Avian influenza, or bird flu, is a highly contagious viral infection that primarily affects birds.
- Infrequently, the virus can infect mammals from birds, a phenomenon called spillover, and rarely can spread between mammals.
- There are several different subtypes of avian influenza viruses, ranging from low pathogenic to highly pathogenic types.
- H5N1 is a highly pathogenic subtype of avian influenza that causes severe disease and death in birds.
- This subtype has caused a number of human infections through close contact with infected birds or

contaminated environments, and is often fatal.

- The H5N1 subtype has the potential to spill over to other mammals such as minks, ferrets, seals, and domestic cats when the animals come in contact with infected birds or their feces or consume carcasses of infected birds and further serve as reservoirs.
- It is also possible that over time, the virus could evolve to adapt to new hosts, leading to a further outbreak
- A new strain of H5N1, named 2.3.4.4b, emerged in 2020 and rapidly spread across Asia, Africa, and Europe and subsequently to North and South America by 2021 and 2022, respectively.
- Many mammals were also infected in these outbreaks, including human infections.
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What can be done?

- Preventing H5N1 spillovers and outbreaks requires a combination of

measures including vaccination of poultry, safe disposal of dead birds, quarantine and culling of affected animals, wearing personal protective equipment when handling birds, and improved surveillance and monitoring of H5N1 in birds and other animals.

- Human vaccines against H5N1 avian influenza have been designed to protect against the most severe forms of the disease.
- However, the highly mutable nature of the H5N1 virus could potentially decrease vaccine efficacy over time.
- Therefore, molecular surveillance of H5N1 and its subtypes is essential in understanding and responding to outbreaks.
- Genome sequencing can be employed to monitor the emergence of new subtypes, and keep a close watch on mutations and virulence factors that may increase the ability to infect humans.

THE HINDU

Border infrastructure

- “Focused on the rapid development of infrastructure along Northern Borders with China for obvious strategic reasons”.
- This was a reference to successive skirmishes with the Chinese People’s

Liberation Army in Chumar in 2014, Doklam in 2017, and the ongoing standoff along the entire LAC since April 2020 when the Chinese army amassed troops along the border, which resulted in the Galwan clashes, the first such violent incident in 45 years

- An official document released, highlighted a multi-pronged approach to improving connectivity to the LAC through roads, bridges, and tunnels, improving cross border connectivity to neighboring countries via highways, bridges, inland waterways, railroads, electricity lines, and fuel pipelines,
- Modernizing and constructing integrated check posts (ICPs) at all the border crossings to smooth trade, and funding and constructing infrastructure projects in neighboring countries.
- dozens of projects in the neighborhood that have been planned, financed or constructed some involve major outlays like the railway links to Nepal and Bangladesh, the Mahakali motorable bridge and the Maitri Setu between Tripura and Bangladesh, the Kaladan Multimodal Transit Transport Project (KMTTP) which includes a 158 km waterway, the Sittwe port project and road to Mizoram.

- It also speaks of “South Asia’s first cross border petroleum products pipeline” between Motihari in India and Amlekhgunj in Nepal, another High-Speed Diesel pipeline with Bangladesh that will reduce petrol prices and road congestion, and a Bhutanese dry port in Pasakha bordering West Bengal being developed under an Indian government grant.

THE HINDU
