



2 April, 2024

125 years of Kodaikanal Solar Observatory

Context: The Kodaikanal Observatory, nestled in Southern India's Palani hills, marked its 125th anniversary in 2024. Established in 1899 as a Solar Physics Observatory, it later absorbed activities from the Madras Observatory.

➤ Establishment of Observatories:

- The British East India Company established the Madras Observatory in 1792, the first of its kind in the region.
- It recorded astronomical observations from 1812-1825, including those of the Sun, Moon, stars, and planets.

➤ Early Observations and Visitors:

- Astronomy in India initially focused on special events like eclipses and planetary transits, attracting foreign astronomers.
- Some of these visitors settled in India, laying the foundation for observatory-based astronomy.

➤ Scientific Contributions:

- Spectroscopic observations during the 1868 solar eclipse led to the discovery of helium.
- The Madras Observatory attempted celestial and solar photography during the 1871 solar eclipse.

➤ Impact of Observations:

- Observations contributed to understanding phenomena like the Great Drought of 1875 and associated global famines.
- Solar activity was found to influence rainfall patterns in India.

➤ Purpose of Solar Study:

- Studying the Sun is crucial due to its impact on Earth's atmosphere and space weather.
- Solar storms and flares can affect satellite operations, power grids, and navigation systems.

➤ Establishment of Kodaikanal Solar Observatory (KoSO):

- Proposed to study solar changes and their correlation with Indian meteorology.
- Located in Kodaikanal after surveys of various hill stations in Tamil Nadu.
- Established in 1895 under the Government of India's sanction.

➤ Integration and Expansion:

- KoSO absorbed the Madras Observatory in 1899 and commenced systematic observations in 1901.
- Expanded its research areas to include cosmic rays, radio astronomy, and more after World War II.

➤ Current Status:

- KoSO, now under the Indian Institute of Astrophysics, Bengaluru since 1971, boasts a vast digital repository of solar images.

- It houses advanced instruments for high-resolution solar imaging and continues to contribute to solar research.



➤ Evershed Effect

- The Evershed effect, named after astronomer John Evershed, signifies radial gas flow across sunspot penumbrae.
- Gas flow varies in speed, peaking at the penumbra's center and reducing to zero at its outer edge.
- Evershed discovered this in 1909 at the Kodaikanal Solar Observatory, noticing Doppler shifts in sunspot spectral lines.
- Ultraviolet spectral analysis confirms systematic red-shift across temperatures below 105 K.
- Observed velocity suggests a constant downflow, challenging coronal stability observations.

13 East-flowing Rivers have No Water

Context: Currently, more than 13 east-flowing rivers between Mahanadi and Pennar have dried up, as per recent data from the Central Water Commission (CWC).

➤ Rivers Facing Drought:

- Thirteen east-flowing rivers, including Rushikulya, Bahuda, Vamsadhara, Nagavali, Sarada, Varaha, Tandava, Eluru, Gundlakamma, Tammileru, Musi, Paleru, and Munneru, have dried up.
- These rivers flow through Andhra Pradesh, Telangana, and Odisha, covering an area of 86,643 square kilometers.
- The basin, heavily reliant on agriculture (covering 60% of the area), faces alarming water scarcity even before peak summer.

➤ Urban Centers and Basin Storage:

- Urban centers in the basin include Visakhapatnam, Vizianagaram, East Godavari, West Godavari, Srikakulam, and Kakinada.
- Storage in the basin has continuously declined this year, reaching zero on March 21, as reported by the Central Water Commission (CWC).

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2 April, 2024

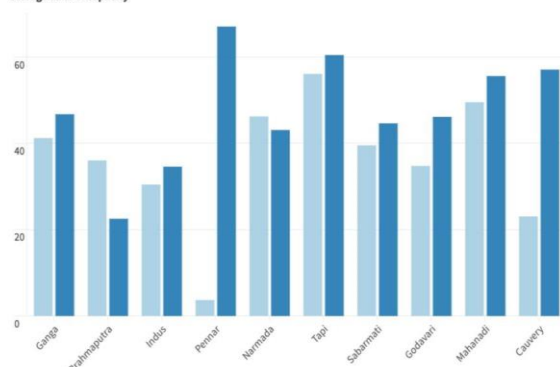
- Last year, storage during the same period was 32.28% of the basin's capacity.

➤ Rainfall Deficiency and Socio-Economic Impact:

- Andhra Pradesh and Telangana have experienced significant rainfall deficits (65% and 67% respectively) since March 1, according to the India Meteorological Data (IMD).
- Water scarcity affects socio-economic conditions, livelihoods, and agricultural activities, highlighting the dependence on river water.

■ This year's storage ■ Last year's storage

Storage as % of capacity



➤ National Water Storage Scenario:

- Most river basins record less than 40% of live storage capacity, with 12 out of 20 basins reporting lower storage than last year.
- Major basins like Cauvery, Pennar, and east-flowing rivers between Pennar and Kanniyakumari exhibit deficient water storage.
- The Ganga basin records less than half (41.2%) of its total capacity, posing concerns for 286,000 villages located within its boundaries, where agriculture covers 65.57% of the basin area.

➤ Drought Conditions and Reservoir Storage:

- India's major reservoirs show a live storage capacity drop to 36% of their total capacity.
- At least six reservoirs have no water storage, while 86 reservoirs have storage at 40% or below, mostly in southern states, Maharashtra, and Gujarat, according to CWC's bulletin released on March 28.

Havana syndrome

Context: The Kremlin rejected a media investigation linking a Russian military intelligence unit to the 'Havana syndrome' affecting US diplomats worldwide.

➤ What is Havana Syndrome?

- Refers to a set of mental health symptoms experienced by US intelligence and embassy officials.
- Symptoms include hearing sounds without external noise, nausea, vertigo, headaches, memory loss, and balance issues.
- Traces back to Cuba in late 2016, after the US opened its embassy in Havana.

➤ Investigation Findings

- Links symptoms to a Russian military intelligence unit, 29155, using "directed energy" weapons.

- Unit accused of foreign assassination, subversion, and sabotage.
- Evidence places unit members at the scenes of suspected attacks on US government personnel abroad.

➤ Where Has Havana Syndrome Been Reported?

- Reported in various countries since the Cuban incident, including China, Uzbekistan, and within the US.
- Over 130 incidents reported globally, including in Russia, Poland, Georgia, Taiwan, and Austria.
- Notable incidents include a delay in US Vice-President Kamala Harris's trip to Vietnam and a case in India in 2021.

➤ Causes of Havana Syndrome

- Initially suspected as a "sonic attack" by Cuba but later linked to high-powered microwaves.
- Microwaves may damage or interfere with the nervous system, causing symptoms.
- Suspected use of a "microwave weapon" emitting high-powered microwaves.

➤ Havana Syndrome in India

- Only one reported occurrence in India as of July 2023.
- Indian security sources unaware of possessing such technology.
- Unlikely for the government to admit to possessing such technology due to the sensitive nature of intelligence work

What is Havana syndrome?

The medical mystery named for the Cuban city where U.S. diplomats first experienced sudden, debilitating symptoms in 2016 has been re-reported by Americans serving in several other countries.

Acute symptoms (often occurring suddenly) may include:

Chronic symptoms (can last weeks, months or longer) may include:

Loud sounds (sometimes described as chirping, clicking or screeching) and pain in one or both ears; many felt the sensations came from a particular direction or were felt when in a specific location

Tinnitus, hearing loss

Intense pressure or vibration inside the head

Difficulty with memory or concentration

Visual disturbances

Nausea

Unsteady gait, loss of balance, vertigo/dizziness

Headache

Impaired concentration, memory loss

Insomnia

Depression

Impaired balance

No definitive cause has been found, but scientific studies have noted many of the acute symptoms are consistent with exposure to directed radio frequency (RF) energy. One theory posits the use of RF energy by a U.S. adversary as a weapon or a tool of espionage.

Source: National Academy of Sciences

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2 April, 2024

NEWS IN BETWEEN THE LINES

International Criminal Court



Recently, a group of universities have written a joint note urging the International Criminal Court (ICC) to step in to intervene of the profound link between environmental degradation and human suffering.

About International Criminal Court:

- The International Criminal Court (ICC) is a **permanent international tribunal** that **investigates, prosecutes and tries individuals accused of committing serious crimes**.
- Its mandate includes genocide, war crimes, crimes against humanity and the crime of aggression.
- It was established by the **1998 Rome Statute** and **became effective in 2002** when the Statute came into force.
- It has four main organs: **Presidency, Judicial Divisions, Office of the Prosecutor and Registry**.
- The Presidency conducts external relations, coordinates judicial matters and oversees the Registry's administrative work.
- The Judicial Divisions have **18 judges** elected by the Assembly of States Parties and serving a **9-year term**.
- The organization has two working languages, which are **English and French**.
- Its headquarter is in the Hague, **Netherlands**.

Central Water Commission



Recently, an analysis of data released by the Central Water Commission (CWC) has revealed that at least 13 east-flowing rivers between Mahanadi and Pennar currently have no water.

About Central Water Commission:

- The Central Water Commission (CWC) is a **government body** that is responsible for the sustainable development and management of India's water resources.
- It was **established in 1945 on the advice of Dr. B.R. Ambedkar**.
- It is responsible for the development, conservation and management of water resources throughout India, this includes river basin management, flood control, irrigation and hydropower generation.
- It is divided into three wings: **River Management Wing (RM), Design and Research Wing (D&R), and Water Planning and Projects Wing (WP&P)**.
- Each wing is placed under the charge of a full-time Member with the status of Ex-Officio Additional Secretary to the Government of India.
- It is headed by a **Chairman who is also the Ex-Officio Secretary** to the Government of India.
- Its headquarter in **New Delhi**.

National Mineral Development Corporation



Recently, the National Mineral Development Corporation (NMDC) reported a record 45.1 million tonne production and 44.48 MT sales in the fiscal year ending on March 31.

About National Mineral Development Corporation:

- The National Mineral Development Corporation (NMDC), **India's largest iron ore producer** is a **Navratna** public sector enterprise **under the Ministry of Steel of the Government of India**.
- It was established in **1958** to explore and exploit mineral resources in India.
- It explores a range of minerals, including iron ore, copper, rock phosphate, lime stone, dolomite, gypsum, bentonite, magnesite, diamond, tin, tungsten, graphite and beach sands.
- It owns and operates highly mechanized iron ore mines in **Chhattisgarh and Karnataka**.
- In 2023, NMDC entered the gold sector by undertaking gold mining at the **Mount Celia** project in Western Australia.

Mumbai International Film Festival



Recently, the organizers of the 18th Mumbai International Film Festival announced an extension of the submission deadline for the Doc Film Bazaar until April 10.

About Mumbai International Film Festival:

- Mumbai International Film Festival (MIFF) is **organized by the Ministry of Information and Broadcasting, Government of India**.
- It is held biennially, typically **every two years**.
- It serves as a **platform for showcasing documentary, short film and animation content**, promoting talent in filmmaking, production and distribution.
- It attracts participation from filmmakers, artists and industry professionals from around the world.
- It is recognized as one of the **prominent film festivals in Asia**.
- The festival facilitates cultural exchange by showcasing diverse perspectives and narratives through documentary films from different regions and cultures.

Face to Face Centres



2 April, 2024

Dornier 228 Aircraft



Recently, the Hindustan Aeronautics Limited has delivered two Dornier 228 planes/aircrafts to the Guyana Defence Force.

About the Dornier 228 Aircraft:

- The Dornier 228 is a **twin-engine turboprop aircraft** that can perform multiple maritime missions.
- It's lightweight, has a wide range of operating speeds and is **fuel efficient**.
- It has a **wingspan of 55 ft 8 in**, is **54 ft 4 in long** and has a **height of 15 ft 11 in**.
- The aircraft is **designed for quick role-changing**, with capabilities for **maritime petrol, surveillance, marine pollution contingency, search and rescue** and medical evacuation.
- Hindustan Aeronautics Limited (HAL) bought a production license for the Dornier 228 in **1983** and set up a manufacturing unit in **Kanpur**.

Ozone



Recently, an international team of scientists, including from India, has discovered strong evidence indicating the presence of ozone on Jupiter's moon Callisto.

About Ozone (O₃):

- In the Earth's atmosphere, the ozone layer is **found in the lower part of the stratosphere**, approximately **15-35 kilometers** above the ground.
- Ozone, **composed of three oxygen atoms**, serves as a shield against harmful ultraviolet (UV) radiation from the sun, particularly **UV-B and UV-C radiation**.
- It absorbs UV radiation, preventing it from reaching the Earth's surface, thereby **protecting living organisms from DNA damage, mutations and health risks such as skin cancer and cataracts**.
- Human activities, such as the release of ozone-depleting substances like **chlorofluorocarbons (CFCs)**, can lead to ozone depletion, **resulting in ozone holes** and increased UV radiation levels, posing risks to human health and ecosystems.
- International agreements like the **Montreal Protocol** (The protocol was signed in **1987** and came into force in **1989**) have been established to regulate the production and use of ozone-depleting substances.

Place in News

Gambia

The Gambia's ban on female genital mutilation (FGM) since 2015 is currently under threat due to proposed changes before parliament, which could potentially legalize medicalized FGM and allow it for consenting adults.

Gambia (Capital: Banjul)

Location: The Gambia is a small **West African country**, situated on the Atlantic coast.

Boundaries: Gambia shares its borders with **Senegal** (East, North and South) and the **Atlantic Ocean** (West).

Physical Features:

- The Gambia is dominated by one major river, which shares the country's name, the **Gambia River**.
- The Gambia has a **tropical savannah climate**.
- The Gambia possesses limited mineral resources, including **phosphate, silica sand** and clay.



POINTS TO PONDER

- What state is Cumbum Valley located in? – **Tamil Nadu**
- At which place did the Indian Air Force conduct the Gagan Shakti 2024 exercise? – **Pokhran**
- Which institution hosted the International Chess Federation (FIDE) rated chess tournament? – **IIT Madras**
- What recent project is referred to as 'Stargate'? – **AI Supercomputer**
- Who received the 'International Culture Award 2024'? – **Meena Charanda**

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DELHI MUKHERJEE NAGAR: 9205274741, 42 | **LAXMI NAGAR** : 9205212500, 9205962002 | **RAJENDRA NAGAR**: 9205274743 | **UTTAR PRADESH PRAYAGRAJ**: 0532-2260189, 8853467068 | **LUCKNOW** (ALIGANJ): 0522-4025825, 9506256789 | **LUCKNOW** (GOMTI NAGAR): 7234000501, 7234000502 | **GREATER NOIDA**: 9205336037, 38 | **KANPUR**: 7887003962, 7897003962 | **GORAKHPUR**: 7080847474, 9161947474 | **ODISHA BHUBANESWAR**: 9818244644/7656949029



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