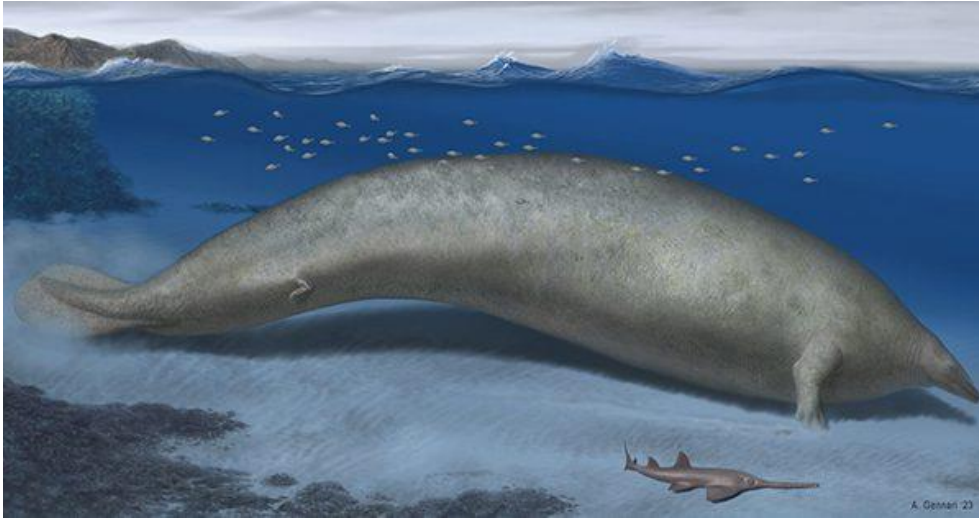


1. *Perucetus colossus*: Historical discovery of the heaviest animal



Context

- *Perucetus colossus*, a **prehistoric whale species that lived more than 38 million years ago, has emerged as a new contender for the title of the heaviest animal ever to have existed.**
- Recent findings based on a newly-described fossil in **Peru** suggest that it might have outweighed even the massive blue whale, known as the largest animal on Earth

Details

- It is also known as the giant Peruvian sperm whale.

Taxonomy and Discovery

- ***Perucetus colossus* belongs to the family Kogiidae**, a group of toothed whales that includes modern-day pygmy and dwarf sperm whales.
- The first fossil evidence of *Perucetus colossus* **was discovered in Peru, South America, hence the name "Perucetus."**

Physical Characteristics

- **Size:** *Perucetus colossus* was one of the largest prehistoric whales known, **reaching lengths of up to 60 feet (18 meters).**
- **Skull and Jaw:** The species possessed a massive skull and a formidable jaw equipped with sharp teeth, suggesting it was a powerful predator.



- **Limbs:** Perucetus colossus exhibited vestigial hind limbs, a characteristic shared with other ancient whales, indicating a partial adaptation to land.

Paleoenvironment

- **Geological Era:** Perucetus colossus lived during the late Miocene epoch, approximately 10-12 million years ago.
- **Habitat:** It inhabited the ancient oceans surrounding the South American continent.
- **Paleoecology:** Fossil evidence suggests that Perucetus colossus was likely a **deep-diving predator**, preying on large marine creatures in its ecosystem.

Behavior and Feeding Habits

- **Predatory Nature:** Perucetus colossus was a formidable predator, possibly preying on a variety of marine organisms, including fish, cephalopods, and other smaller marine mammals.
- **Feeding Strategies:** The presence of sharp teeth in its massive jaws indicates that it may have employed a biting and gripping feeding strategy, akin to modern sperm whales.

Size and Weight

- **Blue Whales:** Blue whales are renowned for their immense size, measuring up to 29.9 meters in length and **weighing around 180,000 kilograms**. They are the largest animals living today.
- **Perucetus colossus:** Although it might not have been as long as a blue whale, Perucetus colossus could have exceeded its weight. Scientists estimate its weight to be between 85 and a staggering 340 tonnes.

Fossil Discovery

- **Location:** The fossil remains of Perucetus colossus were found in Peru, South America.
- **Bones Discovered:** The discovery consisted of 13 vertebrae, 4 ribs, and a portion of the pelvis of this ancient whale species.

Pachyosteosclerosis

- **Unusual Bone Characteristics:** The bones of *Perucetus colossus* displayed an unusually large volume and extreme density, which is termed pachyosteosclerosis.
- **Comparison to Living Whales:** This characteristic is absent in modern-day whales, dolphins, and porpoises. Instead, it is found in sirenians, a marine mammal group that includes sea cows.

Diving Abilities

- **Lung Capacity:** Whales that dive deep into the ocean can empty their lungs completely to facilitate deep dives.
- **Probable Shallow Diver:** *Perucetus colossus* likely inhabited shallow coastal areas and might have dived with air in its lungs.
- **Heavy Bones for Staying Near Seafloor:** The unusually dense bones of *Perucetus colossus* could have aided it in staying close to the seafloor despite having air-filled lungs.

Possible Lifestyle

- **Similarity to Sirenians:** Due to its giant size and lifestyle, *Perucetus colossus* might have resembled sirenians, marine mammals that include sea cows.
- **Steller's Sea Cow:** Researchers suggest that the appearance and lifestyle of *Perucetus colossus* might have been reminiscent of Steller's sea cow, a species discovered in 1741 and later driven to extinction by human activities.

2. Einstein Cross

Context

- Astronomers have made a stunning discovery of a rare astronomical phenomenon known as the "Einstein cross," where **light from a distant galaxy is split and magnified by a foreground elliptical galaxy.**
- This remarkable event was **first predicted by Albert Einstein in 1915 as a consequence of his theory of general relativity.**
- In this fascinating cosmic display, a **background galaxy, likely a quasar, located about 11 billion light-years away, has its light warped and quadruplicated by**

a massive elliptical galaxy situated approximately 6 billion light-years from Earth.

Details

Introduction

- The Einstein Cross, also **known as Q2237+0305**, is a fascinating astronomical phenomenon.
- The Einstein Cross was discovered in 1985 by a team of astronomers led by Dennis Walsh.
- It is located in the constellation Pegasus and has a redshift of $z \approx 1.7$, making it one of the most distant known quasars.
- The phenomenon was **named the "Einstein Cross" due to the cross-like pattern created by the four bright images of the quasar around the lensing galaxy.**

The Gravitational Lensing Effect

- Einstein's theory of general relativity explains **how massive objects can warp the fabric of space-time.**
- Gravity, as described by Einstein, is not a force but rather a result of space-time curvature caused by matter and energy.
- When light passes through highly curved regions of space-time, such as those near massive galaxies, it bends and forms a halo.

Time Delay and Microlensing

- As light from the quasar traverse different paths around the lensing galaxy, each image arrives at Earth with a slight time delay relative to the others.
- This time delay allows astronomers to measure the size and mass distribution of the lensing galaxy, aiding in studying dark matter and galaxy evolution.
- Microlensing, caused by individual stars within the lensing galaxy, can further enhance or distort the brightness of the images over time, providing valuable information about the lens's structure.

The Einstein Cross Arrangement

- In the case of the newly discovered Einstein cross, the observer (Earth), the lensing galaxy (foreground elliptical), and the background quasar have aligned in a way that perfectly duplicates the quasar's light.
- This alignment results in four smudges of blue light arranged around the orange of the foreground galaxy, forming a beautiful Einstein ring.

Insights from Einstein Rings

- Astronomers have identified hundreds of Einstein rings, not only for their stunning visual appeal but also for their scientific significance.
- **These rings magnify and bend the light they receive, allowing astronomers to reconstruct the original, pre-bent light forms and observe distant galaxies in greater detail.**

Cosmic Scale and Gauging Mass

- **The extent to which light bends depends on the gravitational field's strength of the object causing the bending.**
- Einstein rings serve as a **cosmic scale for gauging the masses of galaxies and black holes.**
- The study of distant light warping around these rings enables scientists to observe objects that may otherwise remain hidden, such as black holes and distant exoplanets.

3. 22nd LAW COMMISSION



The Government has recently extended the term of the 22nd Law Commission upto 31st August 2024.



Details

- The Law Commission of India is a **statutory body** that was established to **conduct legal research and make recommendations for the reform of the law in India.** It has played a vital role in the development of the Indian legal system, by suggesting amendments to existing laws, drafting new legislation, and reviewing the implementation of laws.

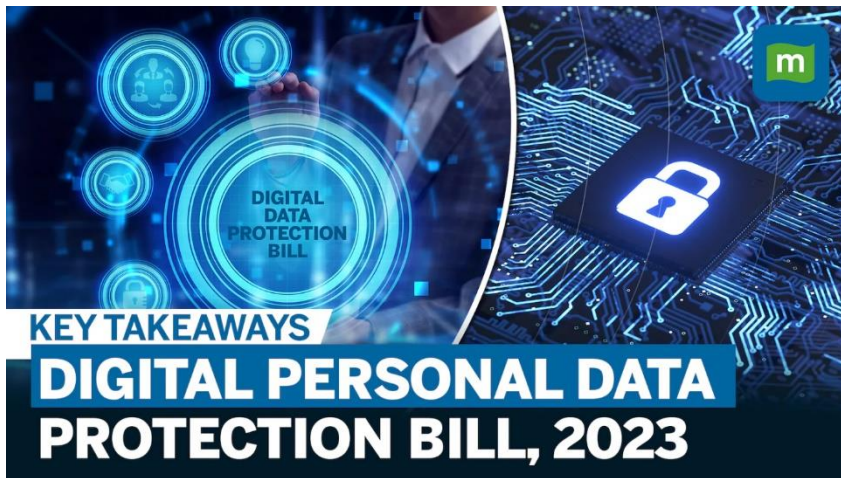
Composition of the 22nd Law Commission of India

- A **full-time Chairperson, who is usually a retired judge of the Supreme Court or a High Court.**
- Four full-time Members (including Member-Secretary), who are experts in law, administration, or social sciences.
- Secretary, Department of Legal Affairs as ex officio Member, who represents the Ministry of Law and Justice.
- Secretary, Legislative Department as ex officio Member, who is responsible for drafting and vetting of bills and ordinances.
- **Not more than five part-time Members,** who are eminent persons from various fields such as academia, civil society, or media.

The functions of the 22nd Law Commission of India are to:

- Identify laws that are obsolete, redundant, or inconsistent with the Constitution or other laws and suggest their repeal or amendment.
- Examine existing laws and propose measures to simplify them and remove ambiguities or anomalies.
- Study the socio-economic conditions and public opinion and suggest reforms to make laws more responsive and effective.
- Research emerging areas of law such as cyber law, environmental law, human rights law, etc. and recommend suitable legislation or amendments.
- Review the implementation and impact of laws and suggest measures to improve their enforcement and compliance.
- Advise the Government on any legal matter referred to it by the President or a Minister.

4. DATA PROTECTION BILL 2023



Context: The Government has tabled the Digital Personal Data Protection Bill, 2023, in the Parliament, which aims to regulate the collection, processing, storage, and transfer of personal data of individuals by various entities. The Bill is based on the recommendations of the Justice B N Srikrishna Committee, which was set up in 2017 to draft a comprehensive data protection framework for India.

Details

- The Bill **defines personal data as any data that can identify an individual, such as name, address, phone number, email, biometric data, etc.** It also categorises some personal data as sensitive personal data, which includes financial data, health data, sexual orientation, religious or political beliefs, etc.
- The Bill requires entities that **collect and process personal data** to obtain consent from the individuals and follow certain principles of data protection, such as purpose limitation, data minimisation, accuracy, storage limitation, etc.
- The Bill also **establishes a Data Protection Authority (DPA)** to oversee and enforce the provisions of the Bill and impose penalties for violations.

The Bill has been welcomed by some experts and stakeholders as a positive step towards ensuring the privacy and security of personal data in India. However, it has also faced criticism from various quarters for its shortcomings and loopholes.

Some of the main issues raised by the critics are:

Government Exemptions and Data Access

- Critics are concerned that the **bill grants the government wide-ranging exemptions from data protection obligations.** The government's ability to access personal data without consent for reasons such as national security, public order, sovereignty, and integrity of India raises privacy and civil liberty concerns. The power to mandate entities to provide anonymized or non-personal data for policy-making or research purposes might also lead to **potential misuse of data.**

Cross-Border Data Transfer

- The bill's provisions for **the cross-border transfer of personal data have been criticized for lacking clear criteria and mechanisms for approval or agreement.** Requiring one copy of personal data to be stored in India may pose challenges for global entities, leading to operational complexities and increased costs. The absence of well-defined guidelines for transferring data outside India raises uncertainties about data flows and compliance.

Individual Rights and Remedies

- While the bill grants individuals certain rights over their data, critics argue that **these rights are subject to exceptions and limitations that could undermine their effectiveness.** For example, the right to erasure is not absolute and can be denied under specific circumstances. The bill's provisions also do not offer a robust mechanism for individuals to seek compensation or redressal for harm caused by data breaches or misuse.

Addressing Emerging Digital Age Challenges

- Critics have pointed out that the **bill may not adequately address the challenges posed by emerging technologies and practices in the digital age.** Aspects like artificial intelligence, big data analytics, social media platforms, and online profiling may require specialized considerations to ensure adequate protection of personal data. Incorporating principles like privacy by design and default from the beginning stages of system and process development is seen as crucial to safeguard privacy.

What other data protection models have been adopted elsewhere?



EU's General Data Protection Regulation (GDPR)

- The GDPR is considered a gold standard for data protection, emphasizing user consent, transparency, and robust enforcement mechanisms. It empowers individuals with control over their data and holds businesses accountable for data breaches.
- While the **Indian bill draws inspiration from the GDPR**, it has been criticized for providing more exemptions for the government and lacking the same level of accountability for public authorities.

U.S. Data Protection Model

- The U.S. approach focuses on protecting individual liberties from government intrusion. It allows data collection as long as individuals are informed, but critics argue that it lacks comprehensive privacy principles.
- Unlike the Indian bill, the U.S. lacks a unified data protection framework and mainly relies on sector-specific regulations. This can result in fragmented and inconsistent protection.

China's Data Protection Laws

- China's recent data protection laws, such as the Personal Information Protection Law (PIPL) and Data Security Law (DSL), grant individuals certain rights over their data and impose penalties for mishandling data.
- **Similar to the Indian bill, China's laws have been criticized for giving the government extensive powers to regulate data and companies.** The Indian bill's provision for government control and exemptions has raised concerns about its alignment with China's approach.

These are some of the examples of data protection models that have been adopted or proposed by different countries and regions. However, there is no one-size-fits-all solution for data protection, as each model reflects the specific context, culture, values, and objectives of its jurisdiction. Therefore, it is important to evaluate the merits and drawbacks of each model and learn from the best practices and experiences of others while also considering the unique needs and challenges of one's own country or region.

5. TRACHOMA



Context: Iraq has now joined the **league of 17 other countries** that have eliminated trachoma, a neglected tropical disease and the world's leading infectious cause of blindness, the World Health Organization (WHO) announced recently.

More about the news

- Iraq is now one of the 17 other countries that have eliminated trachoma.
- The country is **also the 50th to be acknowledged by the United Nations health agency** for eliminating at least one neglected tropical disease globally.

About Trachoma

- Trachoma is the **world's leading infectious cause of blindness** and is one of the conditions known as neglected tropical diseases.
- Trachoma is a bacterial infection caused by *Chlamydia trachomatis*. They can be easily treated.

The advanced form of trachoma

- Over time, it causes the eyelashes to be pushed **inward into the eye**. So with every blink, they brush against the eyeball.
- This advanced form of trachoma is called trichiasis. Over time, if it's not treated, trichiasis can lead to blindness.

Causes and transmission

- The disease thrives where there are water shortages, poor sanitation and infestations of flies, which are considered physical vectors of the disease.

Prevalence

- The disease is still known to be endemic in six countries of the WHO's Eastern Mediterranean Region.



- However, there has been substantial progress in the number of people in the region requiring antibiotic treatment for **trachoma elimination purposes**, which has fallen from 39 million in 2013 to 6.9 million in April 2023.

Strategy of Iraq

- Iraq established its **national trachoma programme in 2012** to coordinate the final domestic push against the disease.
- A **trachoma surveillance system** was developed to detect and manage cases within secondary and tertiary eye care facilities, as well as through school pre-enrolment and school eye screening programmes conducted in collaboration with the Ministry of Education.

SAFE strategy

To eliminate trachoma as a public health problem, **the WHO recommends the SAFE strategy**, a comprehensive approach to reduce transmission of the causative organism, clear existing infections and deal with their effects.

The SAFE strategy includes:

- Surgery to treat the blinding stage (trachomatous trichiasis);
- Antibiotics to clear the infection, particularly the antibiotic azithromycin;
- Facial cleanliness and Environmental improvement, particularly improving access to water and sanitation.

Countries that have eliminated Trachoma

- The 17 other countries that have eliminated trachoma are Benin, Cambodia, China, Gambia, Ghana, Islamic Republic of Iran, Lao People's Democratic Republic, Malawi, Mali, Mexico, Morocco, Myanmar, Nepal, Oman, Saudi Arabia, Togo and Vanuatu.

What are Neglected Tropical Diseases (NTDs)

- Neglected tropical diseases (NTDs) are a **diverse group of tropical infections which are common in low-income populations** in developing regions of Africa, Asia, and the Americas. They are caused by a variety of pathogens such as viruses, bacteria, protozoa and parasitic worms (helminths).

Why are they called 'neglected'?



- They are 'neglected' because they are almost absent from the global health agenda. Even today, when the focus is on Universal Health Coverage, NTDs have very limited resources and are almost ignored by global funding agencies.

Where are NTDs most prevalent?

- NTDs flourish mainly in rural areas, **conflict zones and hard-to reach-regions**. They thrive in areas where access to clean water and sanitation is scarce – worsened by climate change.
- Furthermore, NTDs tend to affect regions without quality healthcare, leaving poor populations vulnerable to these debilitating diseases and newly emerging threats.

How can we tackle NTDs?

- Addressing NTDs **requires cross-sectoral approaches** that span from bringing medicines to the 'end of the road' thus making "universal health coverage" (UHC) a reality, to relieving the associated mental health burden, to tackling fundamental human rights issues.
- Vector control, veterinary public health and WASH are key complements to interventions targeting humans.

Conclusion

- WHO's road map for **2021-2030 sets out ambitious targets for tackling many of these diseases in an integrated manner**. The road map targets are aligned with those of the Sustainable Development Goals. Ensuring that essential services reach all who need them is at the heart of efforts to respond to NTDs.