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# CHRONICLES OF THE CENTURIES

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## BLUEPRINTS OF TIME

Tracing the making of science, technology, engineering,  
architecture, and mathematics in South-Asia.

2 0 2 4

# SCIENCE & HISTORY



In today's world, advanced tools and knowledge position human life as an integral part of the ongoing evolutionary processes on our planet. The history of science, technology, engineering, art, and mathematics can be best understood as an important element of this unfolding human saga. Innovations in STEAM subjects (Science, Technology, Engineering, Arts, and Mathematics) have brought us to a pivotal moment in history, offering the potential for universal well-being and sustainability, while also warning of the grave risks associated with reckless resource depletion and the looming specter of mass destruction through warfare.

The nexus between history and science grows stronger with every advancement in science and technology. Our 20th century understanding of the structure of matter, of atoms and radioactivity, provided historians with the powerful tool of radiometric dating including radio carbon dating. Equipment for radiometric dating is today available in many institutes and laboratories such as the Physical Research Laboratory at Ahmadabad.

The new tools of Genomics and DNA analysis provided yet another powerful tool for analysis of human protohistory including tracing human migrations. Such tools are available in institutes of molecular biology such as the Centre for Cellular and Molecular Biology at Hyderabad.

As we reflect on these insights, may the wisdom gained from our understanding of the past and the challenges of the present guide us in the new year and beyond, helping us navigate the opportunities and obstacles of our ever-evolving human journey.

"Freedom is the recognition of necessity; science is the cognition of necessity. Finally, as the search for causes and their effects, science is cumulative; science is the history of science."

Science and Freedom  
D D Kosambi

This calendar sheds light on the foundation of science, emphasizing the meticulous gathering of evidence and the deliberate elimination of false or fabricated information, all rooted in evidence-based reasoning. These enduring principles, deeply rooted in South Asia's history, are not only a testament to our intellectual heritage but also hold immense relevance today, benefiting humanity by providing a reliable framework for understanding the world, making informed decisions, and fostering innovation.



Do not believe in anything simply because you have heard it.

Do not believe in anything simply because it is spoken and rumored by many.

Do not believe in anything simply because it is found written in your religious books.

Do not believe in anything merely on the authority of your teachers and elders.

Do not believe in traditions because they have been handed down for many generations.

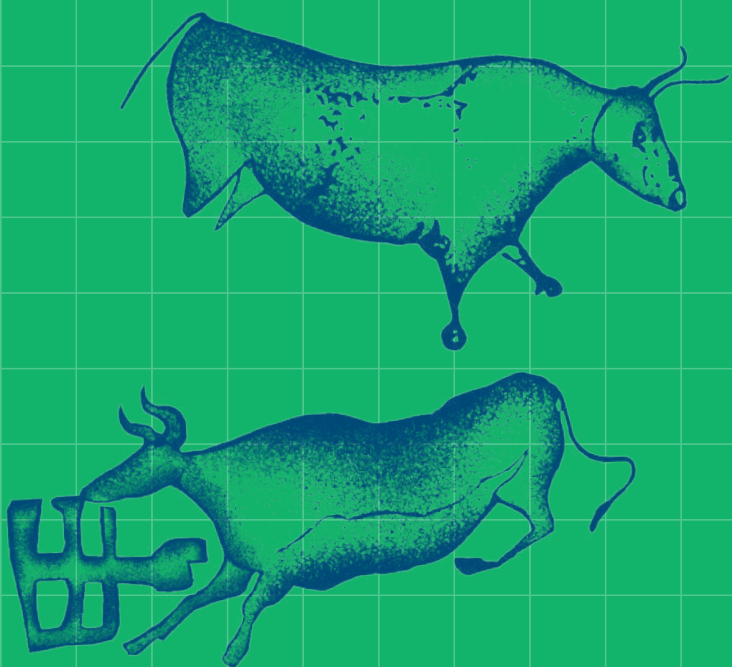
But after observation and analysis, when you find that anything agrees with reason and is conducive to the good and benefit of one and all, then accept it and live up to it.

Gautama Buddha



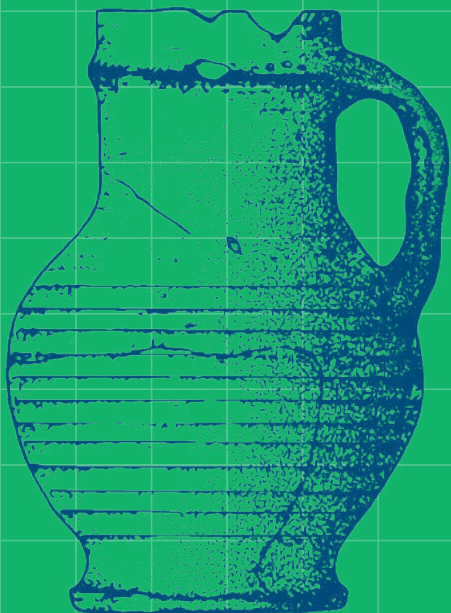
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watch the  
Bharat ki Chaap  
episode 1





CAVE PAINTNGS

The prehistoric cave paintings at Bhimbetka in Madhya Pradesh give us a glimpse of the past. They depict the hunting of animals, the use of weapons like spears, bows, and arrows, as well as early representations of symbols.

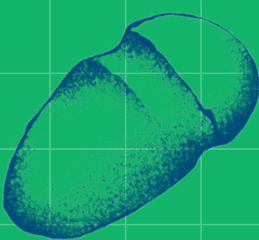


PIONEERING FOOD STORAGE

At Burzahom, evidence of stone tools and baked pots used for food storage has been discovered. This represents a significant technological advancement for humankind and provides durable, compelling historical evidence of social evolution.

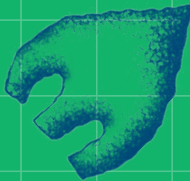
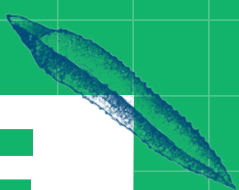


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PRIMITIVE TOOLS

The evolution of stone artifacts, from hand tools to megaliths, is a record of the growing technological capability and understanding of materials by early humans.



THE  
STONE  
AGE

TILL 3500 BCE



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AGRICULTURAL TRANSITION

Agriculture became possible with the discovery that seeds could replicate. This breakthrough, likely made by women, ranks as one of the most important technological innovations in human history. It freed humanity from the limitations of parasitical survival, enabled the creation of surpluses through human labor, and facilitated settled habitation.

KEY SITES

- 1 Burzahom
- 2 Bhimbetka
- 3 Wai



JAN

2024

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29	30	31				

HOLIDAYS

26 Republic Day

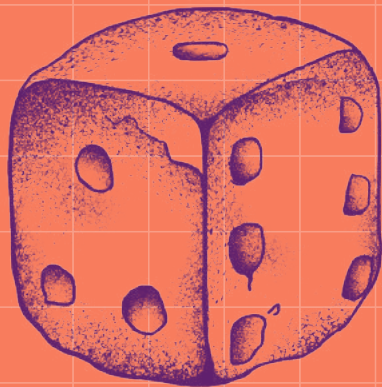
SEE THE SKIES

- New Moon Day
- Full Moon Day

CELEBRATING SCIENTIFIC MINDSETS

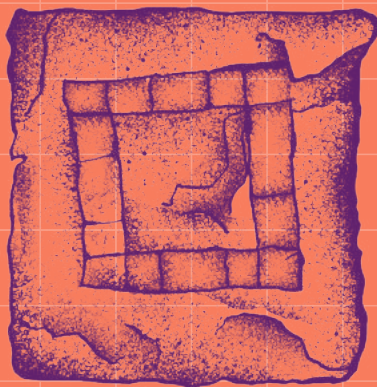
- 1 Satyendranath Bose (B)
- 3 Savitribai Phule (B)
- 9 Har Gobind Khorana (B)
- 23 Subhash Chandra Bose (B)
- 29 Md. Abdus Salam (B)





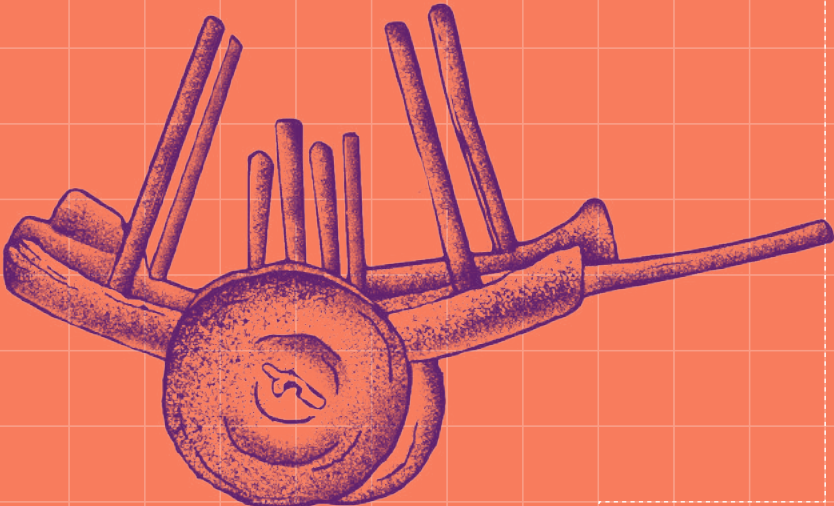
TOOLS OF TRADE & OF GAMING

Games, dice, and standardized weights and measures are evidence that trading, leisure, and mathematics had become integral parts of citizens' lives.



AGRICULTURE & TRANSPORTATION

The fertile soil of the river vallies, along with the perpetual availability of water, ensured a significant surplus of food. Food grain was transported using wheeled bullock carts, though advanced spoked wheels had not been developed at that time.



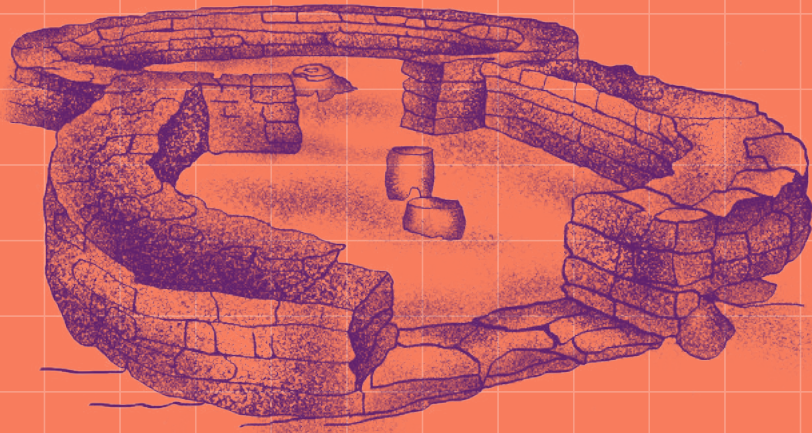
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THE RIVER VALLEY CIVILIZATIONS

3500 BCE TO 2000 BCE

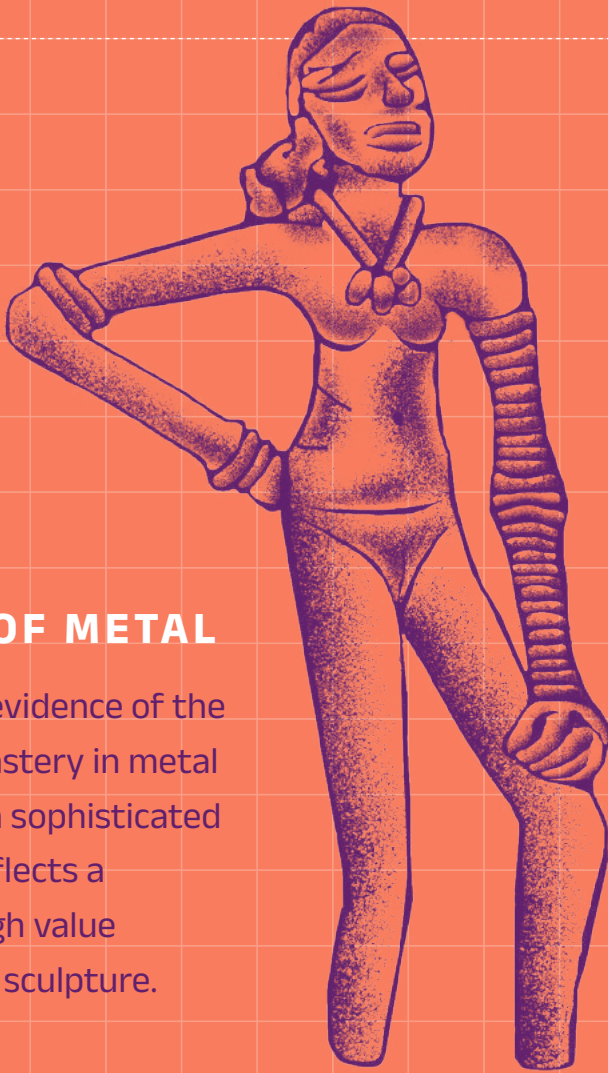
LARGE STORAGE FACILITIES

Productive agriculture, yielding ample surplus grain, facilitated trade and supported urban populations. Cities equipped with granaries, well-structured water storage, and efficient drainage systems were constructed, stretching from Mohenjo-daro in the North to Lothal and Dholavira in the West, and extending to Keeladi in the Southern region of the subcontinent.



UNDERSTANDING OF METAL

The dancing girl stands as evidence of the Bronze Age civilization's mastery in metal casting, achieved through a sophisticated lost-wax process. It also reflects a civilization that placed a high value on art, ornamentation, and sculpture.



Scan this to watch the Bharat ki Chhāp episode 3

KEY SITES

- 1 Harappa
- 2 Dholavira
- 3 Keeladi



FEB

2024

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19	20	<u>21</u>	22	23	24 <sup>●</sup>	25 <sup>●</sup>
26	27	<u>28</u>	29			

SPECIAL DAYS

- 11 AIPSN Foundation Day
- 17 Astronomy Day
- 28 National Science Day

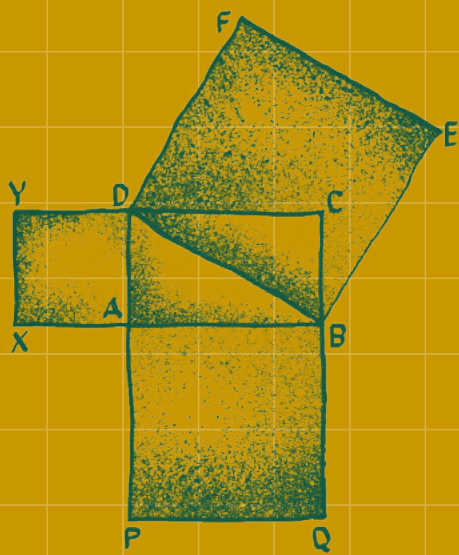
SEE THE SKIES

- New Moon Day
- Full Moon Day

CELEBRATING SCIENTIFIC MINDSETS

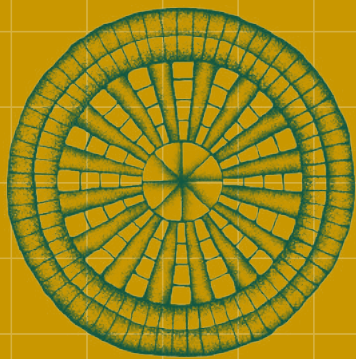
- 12 Charles Robert Darwin (Darwin Day)
- 21 Shanti Swarup Bhatnagar (B)





THE RECTANGLE THEOREM

The Sulbasutras of Baudhayana are believed to have been composed around 600 BCE. They contain a geometric theorem that states: "The area of the square on the diagonal of a rectangle is equal to the sum of the areas of the squares on its sides." This theorem probably predates the work of Pythagoras and is an early example of geometric knowledge.

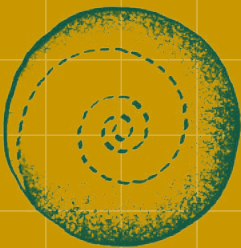
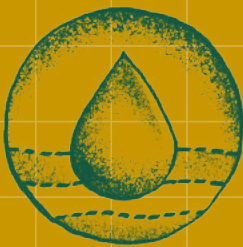


MATH IN CONSTRUCTION

The Sulbasutras describe the precise construction of fire altars in various shapes using standardized bricks, including one in the shape of a wheel, complete with spokes.

AGRICULTURE WITH IRON TOOLS

The use of iron tools enabled the clearing of forests and the leveling of land. Ploughing with the help of animal power significantly increased food productivity, leading to population growth and expansion.



THE BRONZE & IRON AGE

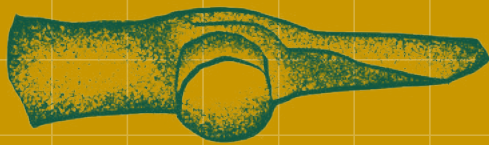
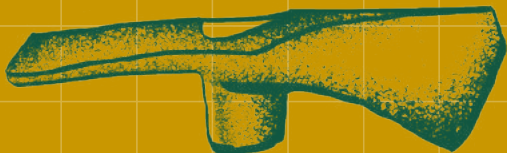
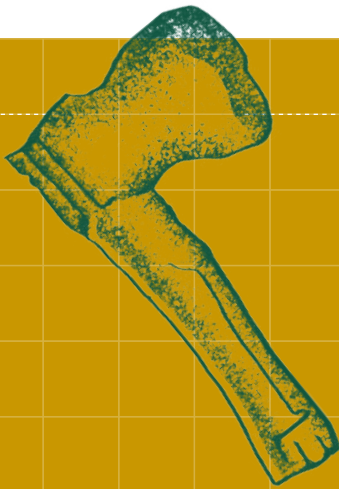
2000 BCE TO 600 BCE



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EARLY RATIONALIST & MATERIALIST LITERATURE

Tolkāppiyam, one of the most ancient extant Tamil grammar texts, declared that "nilam, tī, nīr, vaḷi, vicumpōṭu aintum kalanta mayakkam ulakam," which translates to "the world is composed of land, fire, water, gas/atmosphere, and space." Materialist philosophy, with similar concepts, was also articulated by Kanad, as well as in the Samkhya and Vaisheshika philosophical schools.



IRON SMELTING

The invention of iron smelting technology enabled the manual forging of iron tools, such as axes, which played a crucial role in clearing forests. This transition from food gathering to food cultivation became prevalent across most of the subcontinent.



Scan this to watch the Bharat Ki Chhap episode 4

KEY SITES

- 1 Kaushambi
- 2 Gangetic Basin
- 3 Bastar



MAR

2024

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18	19	20	21	22	23	24
25 <sup>•</sup>	26	27	28	29	30	31

SPECIAL DAYS

22 World Water Day

SEE THE SKIES

○ New Moon Day

● Full Moon Day

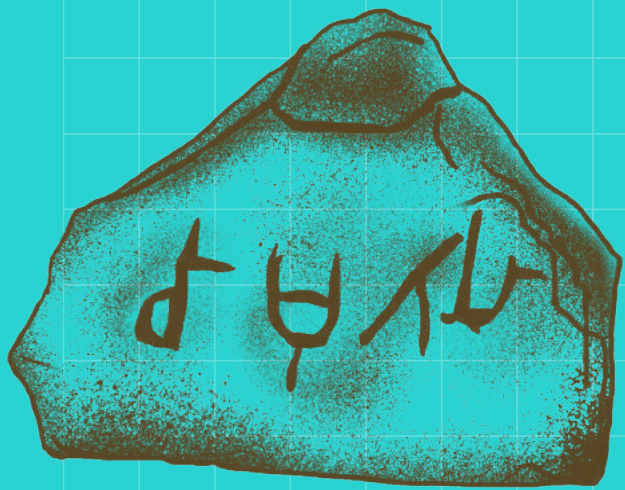
CELEBRATING SCIENTIFIC MINDSETS

14 Albert Einstein (B)

23 Martyrdom of Bhagat Singh

31 Anandibai Joshi (B)





THE BAKSHALI MANUSCRIPT

The Bakshali manuscript, discovered in 1881, is the oldest extant mathematics manuscript from the Indian subcontinent. However, its carbon dating is disputed. In this manuscript, zero is represented as a dot within a place value system.

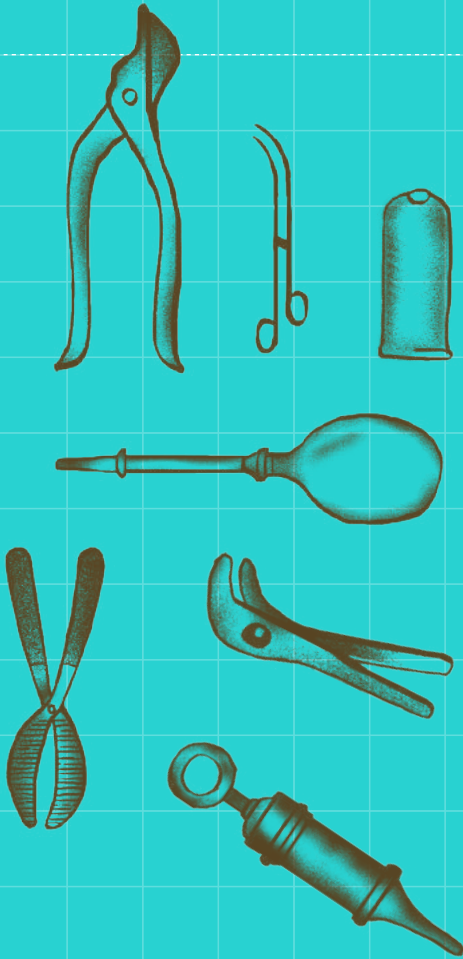


PHILOSOPHICAL BLOOM

The era of Buddha witnessed significant philosophical growth. Alongside Buddhism and Jainism, philosophical schools like Samkhya, Nyaya, Vaisheshika, and Charvaka each formulated their unique systems of ethics, logic, rational discourse, and concepts of reality.

SUSHRUTA SAMHITA

"The various parts or members of the body, including the skin, cannot be accurately described by someone who is not well-versed in anatomy. Therefore, anyone wishing to acquire a comprehensive understanding of anatomy should prepare a deceased body, carefully dissect it, and examine its various parts."



THE AGE OF CODIFICATION

500 BCE TO 300 CE



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BRAHMI-TAMIZHI SCRIPT

While the Harappan script is ancient, it remains undeciphered. The Brahmi and Tamizhi scripts, on the other hand, were the first scripts to be deciphered and have served as the ancestors of many of the contemporary scripts found in the Indian subcontinent.



Scan this to watch the Bharat ki Chhâp episode 5

KEY SITES

- 1 Bakshali
- 2 Sarnath
- 3 Thanjavur



APR

2024

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<u>22</u>	23 <sup>•</sup>	24	25	26	27	28
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SPECIAL DAYS

- 7 World Health Day
- 22 Earth Day

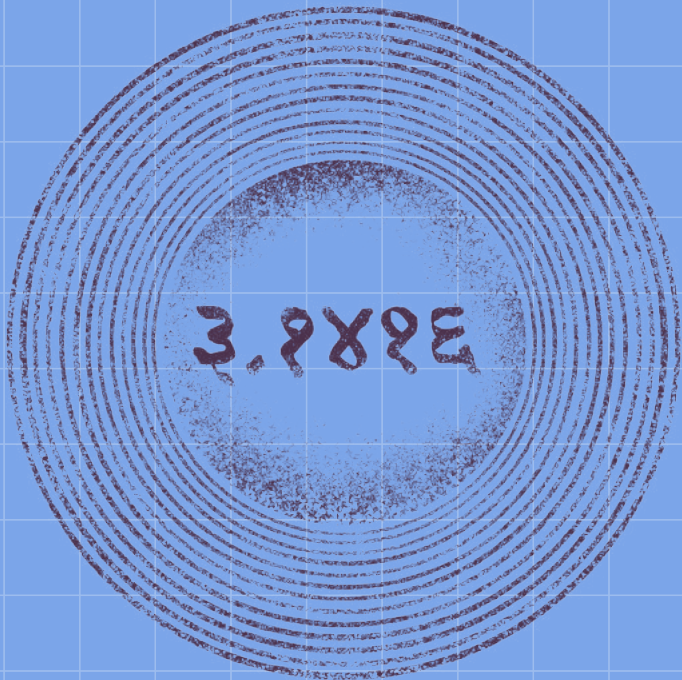
SEE THE SKIES

- New Moon Day
- Full Moon Day

CELEBRATING SCIENTIFIC MINDSETS

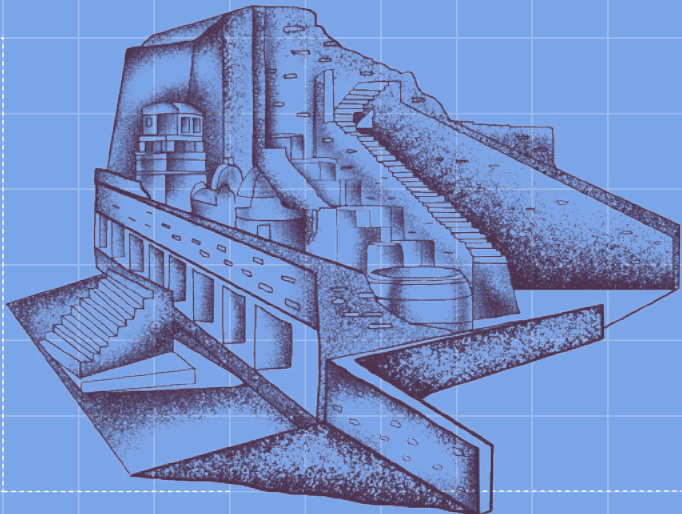
- 10 Abraham T Kovoov (B)
- 11 Jyotiba Phule (B)
- 14 BR Ambedkar (B)
- 15 Leonardo da Vinci (B)
- 20 Chandita Mukherjee (B)





### ARYABHATA

Aryabhata's approximation of pi as 3.1416 was indeed one of the most accurate in his part of the world. However, around the same time in China, Zu Chongzhi achieved even greater accuracy in the calculation of pi.



### NALANDA AND VIKRAMSHILA

The universities of Nalanda and Vikramshila were renowned worldwide. These institutions produced thousands of scholars over the course of centuries. They offered education in a wide range of subjects, including philosophy, mathematics, medicine, alchemy and astronomy.

# MATHEMATICS ASTRONOMY & THE UNIVERSITY

300 CE TO 700 CE

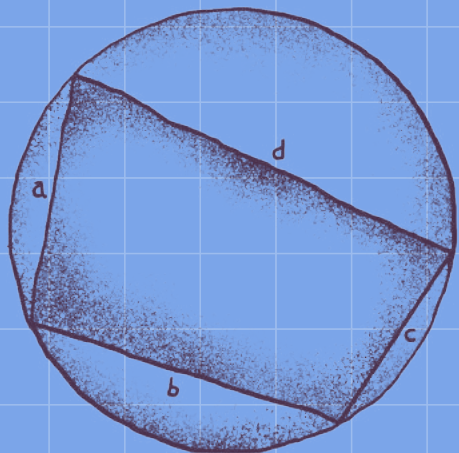


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### DEVELOPMENT OF SCRIPTS AND THEIR REGIONAL SPREAD

Various scripts in the subcontinent share common origins and have evolved over time.



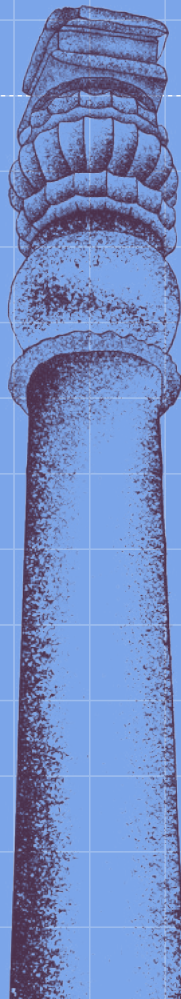
### BRAHMAGUPTA'S FORMULA

Even to this day, Brahmagupta's geometrical formula for the area of a cyclic quadrilateral, expressed in terms of its sides, continues to inspire wonder.

$$(\text{Area})^2 = (s-a)(s-b)(s-c)(s-d)$$
$$s = \frac{a+b+c+d}{2}$$

### IRON PILLAR OF CHANDRAGUPTA MAURYA

The iron pillar in Delhi, which remains free of rust to this day, stands as a remarkable testament to the mastery of knowledge in smelting iron alloys for specialized purposes.



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watch the  
Bharat ki Chhāp  
episode 6

### KEY SITES

- 1 Nalanda
- 2 Sanchi
- 3 Shringverpur
- 4 Bhinmal



## MAY

2024

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27	28	29	30	31		

### HOLIDAYS

- 1 International Labour Day

### SPECIAL DAYS

- 22 International Biodiversity Day

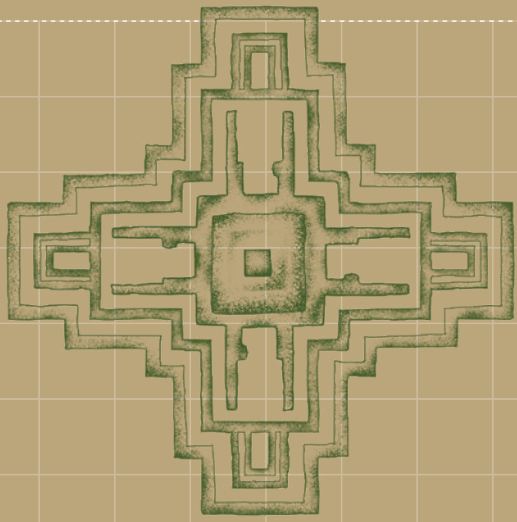
### SEE THE SKIES

- New Moon Day
- Full Moon Day

### CELEBRATING SCIENTIFIC MINDSETS

- 7 Rabindranath Tagore (B)
- 10 J D Bernal (B)
- 13 Ronald Ross (B)
- 15 Pierre Curie (B)
- 17 Edward Jenner (B)
- 18 Karl Marx (B)
- 22 Rammohan Ray (B)



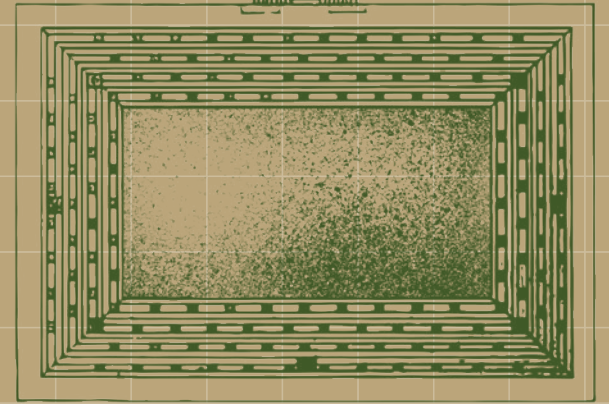


## MODHERA SURYA MANDIR

The Modhera Surya Mandir is located on the Tropic of Cancer, where, during the summer solstice, the Sun is directly overhead at noon. Interestingly, the architectural plans of Modhera in Gujarat and the Buddhist temple university at Somapura in Bangladesh exhibit many similarities.



Scan for  
augmented  
reality

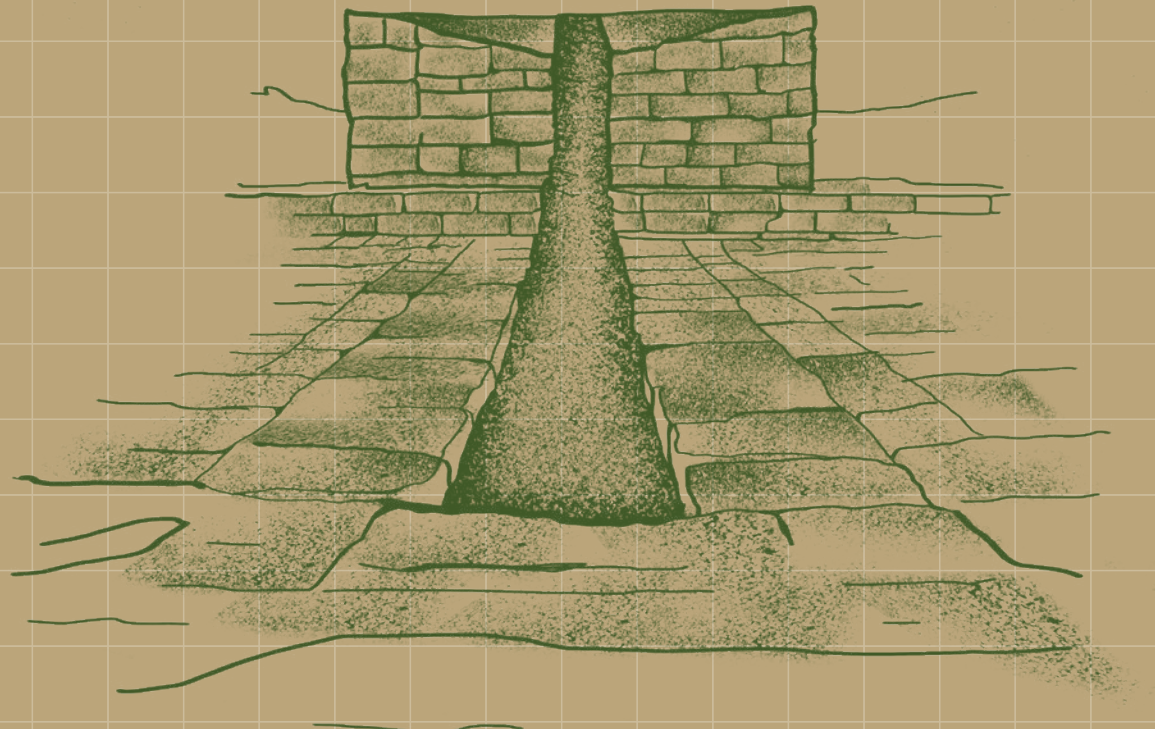


# TEMPLE ARCHITECTURE

700 CE TO 1300 CE

## EVOLUTION OF LANGUAGES

During this time, there was a continuous evolution and development of the regional languages and scripts of the subcontinent, which shared common origins.



## MARAGEH OBSERVATORY

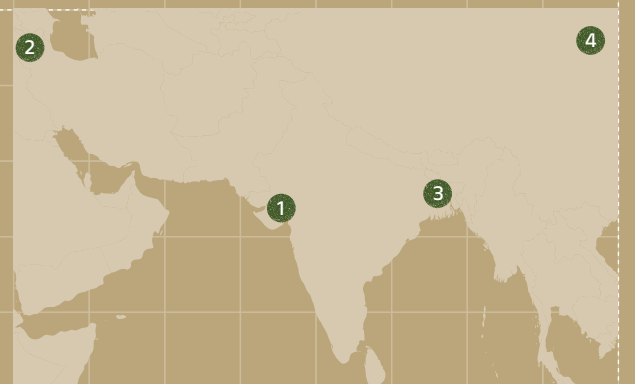
The Maragheh Observatory, located in the Eastern Azerbaijan province of Iran, served as a pan-Asian center for astronomy and mathematics. It inspired the Samarkand Observatory of Ulugh Beg, which in turn influenced the construction of the Jantar Mantars in India and the Chinese observatory at Gaocheng.



Scan this to  
watch the  
Bharat ki Chhāp  
episode 7

## HISTORICAL SITES

- 1 Modhera
- 2 Maragheh
- 3 Somapura
- 4 Gaocheng



JUN

2024

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17	<u>18</u>	19	20	21	22 <sup>•</sup>	23
24	25	26	27	28	29	<u>30</u>

### SPECIAL DAYS

- 5 World Environment Day

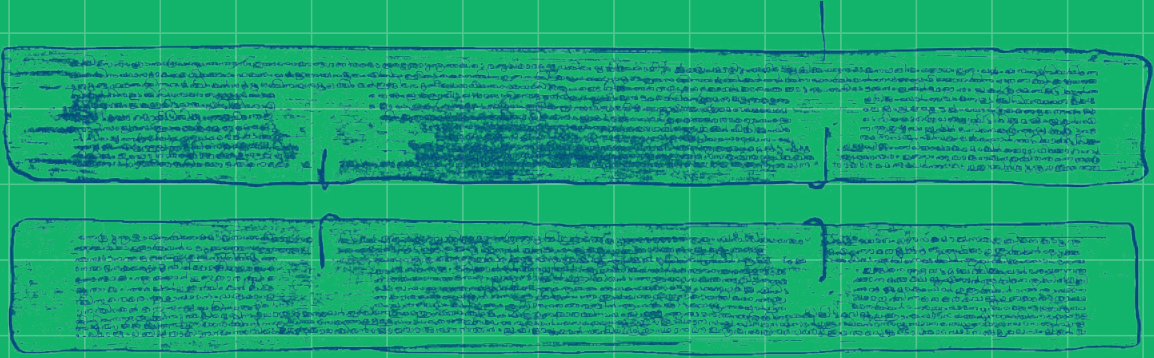
### SEE THE SKIES

- New Moon Day  
● Full Moon Day

### CELEBRATING SCIENTIFIC MINDSETS

- 18 Kamala Sohoni (B)  
30 C N R Rao (B)



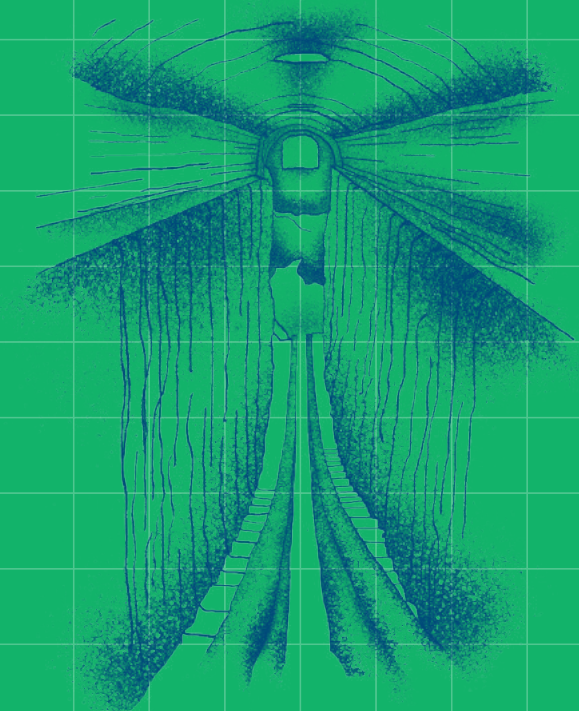


MATHEMATICAL DEMOCRATIZATION

Jyeshtadeva's mathematical treatise, 'Yuktibhasha,' was written in Malayalam rather than in Sanskrit, signifying the democratization of advanced education.

ASTRONOMICAL ARCHITECTURE

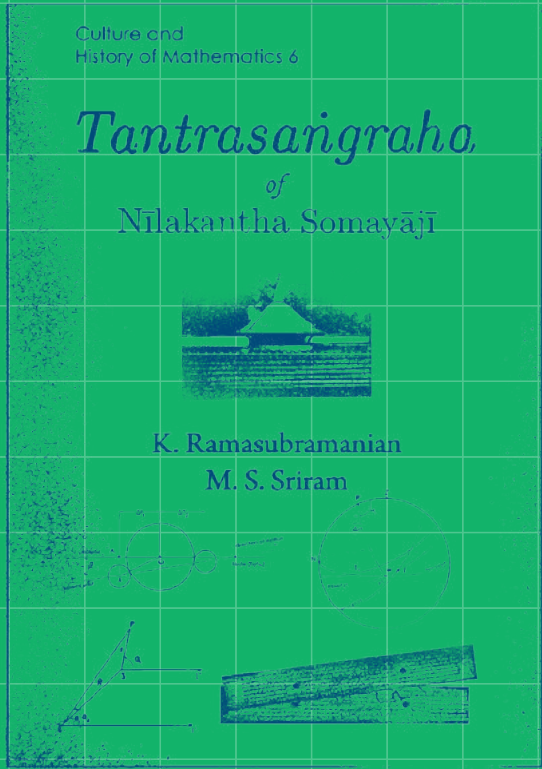
The meridian instrument at the Ulugh Beg Observatory in Samarkand served as a precursor to the astronomical architectural designs found at the Jantar Mantars in Delhi, Jaipur, and Ujjain.



Scan for augmented reality

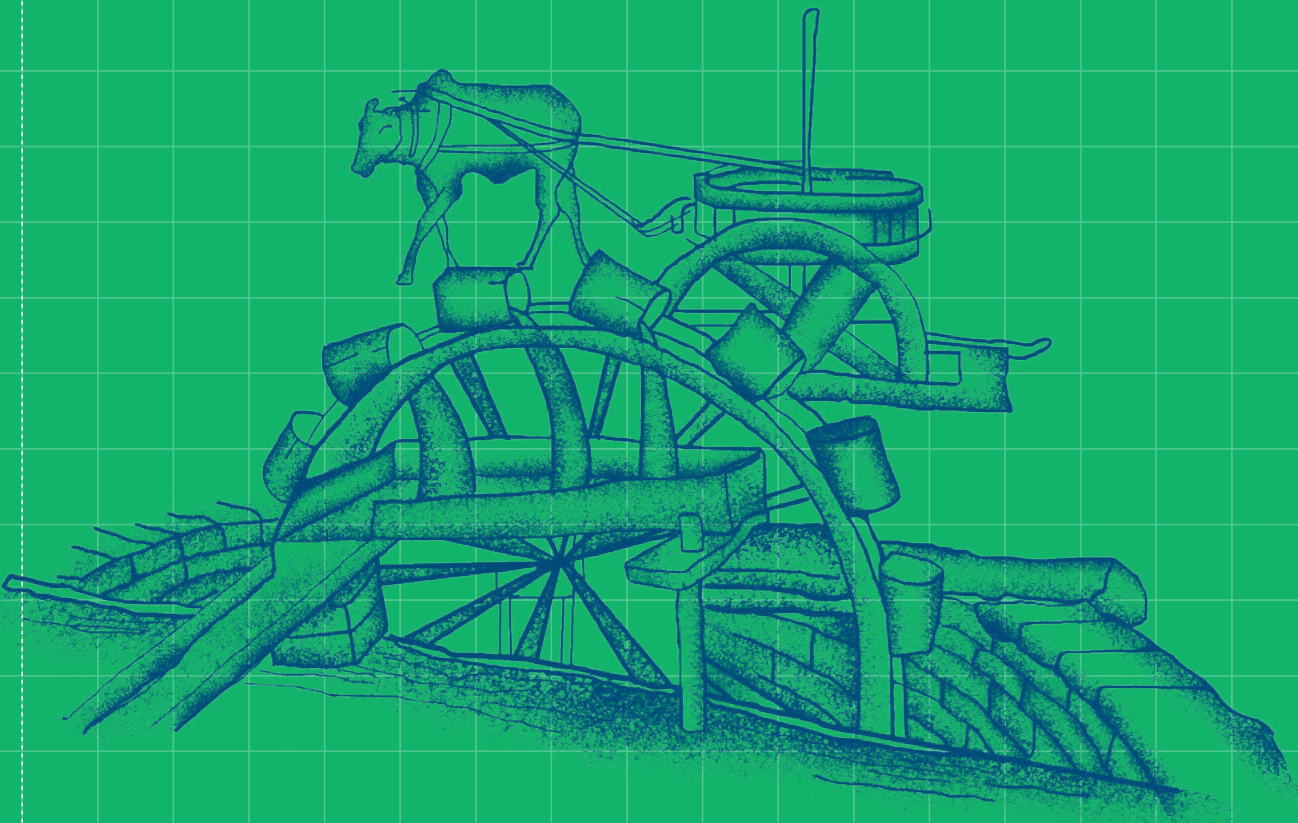
SYNTHESIS & GROWTH

1300 CE TO 1600 CE



GERM OF THE HELIOCENTRIC THEORY

Tantrasangraha, authored by Nilakantha Somayaji of the Kerala School of astronomy, had a profound influence on Arab and European mathematics and astronomy. It contained the seeds of the heliocentric theory of planetary motions.



PERSIAN WHEEL

The introduction of the Persian wheel improved our understanding of the transmission of applied force through the use of belts and gears.



Scan this to watch the Bharat ki Chhāp episode 8

KEY SITES

- 1 Kerala
- 2 Samarkhand
- 3 Andhra Coast



JUL

2024

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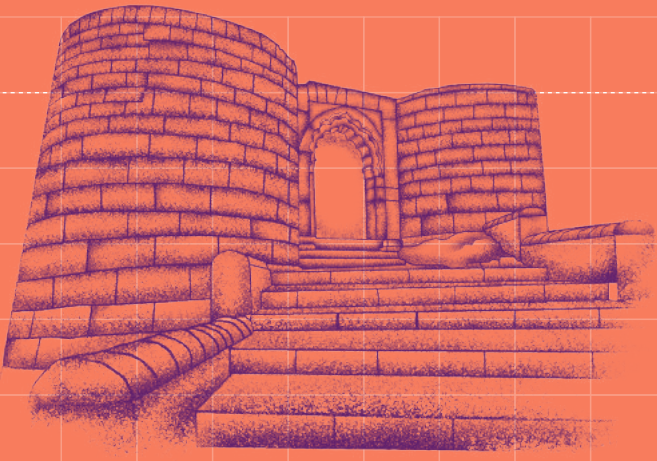
SEE THE SKIES

- New Moon Day
- Full Moon Day

CELEBRATING SCIENTIFIC MINDSETS

- 6 D S Kothari (B)
- 18 Kadambini Ganguly (B)
- 31 D D Kosambi (B)





CREATIVE ARCHITECTURAL DESIGN

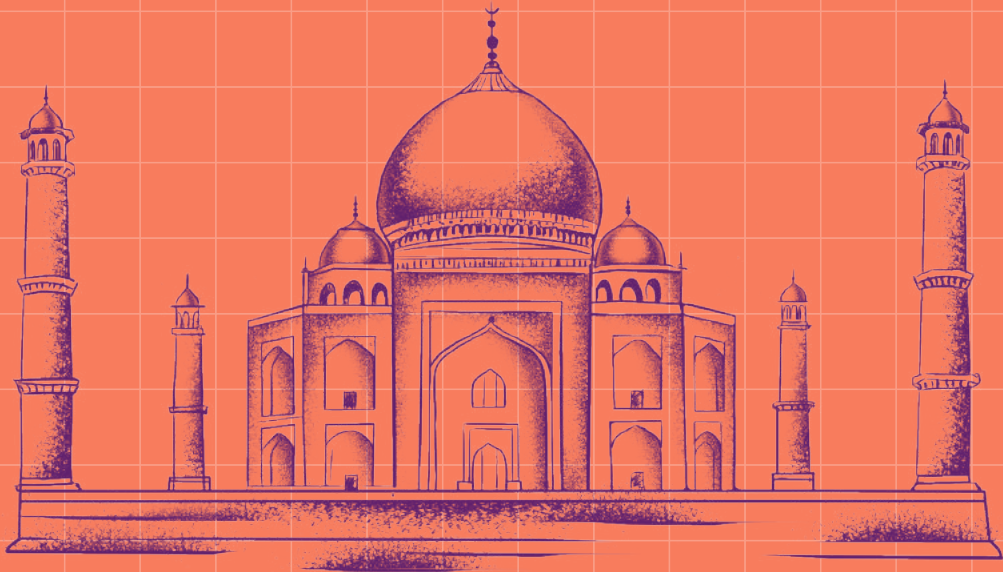
Shivaji Maharaj's forts were constructed by ingeniously blending stone architecture with the natural landscape and mountain peaks of the Sahyadri range.

Scan for  
augmented  
reality



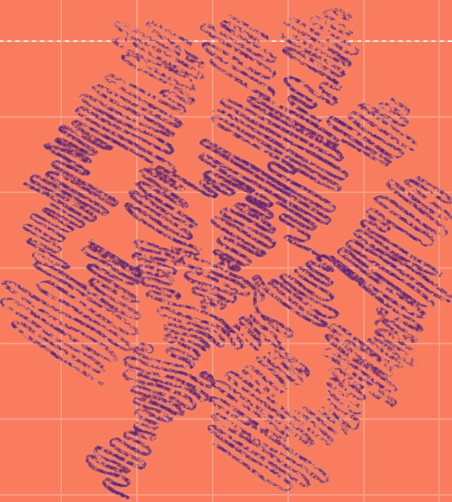
TAJ MAHAL

The exquisite beauty of the Taj Mahal stems from meticulous measurements, precise masonry craftsmanship, and the application of advanced geometrical design principles.



EXQUISITE  
ARCHITECTURE  
& HANDICRAFTS

1600 CE TO 1750 CE

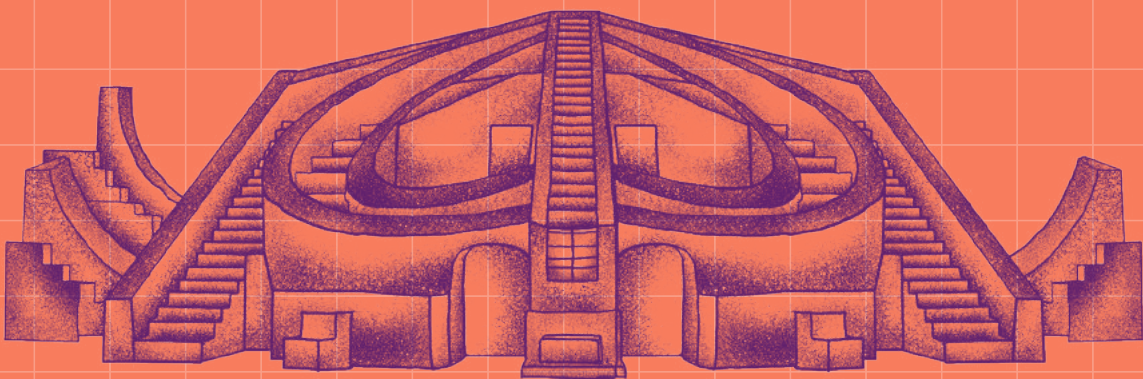


PREMIUM HANDLOOM

The best machine-made cotton fabrics from England couldn't match the exceptional quality of handwoven muslin produced by weavers in Dhaka. The British colonialists though imposed harsh administrative measures that hindered the production of Bengal's handwoven muslin.

PINNACLE OF  
ASTRONOMICAL STRUCTURES

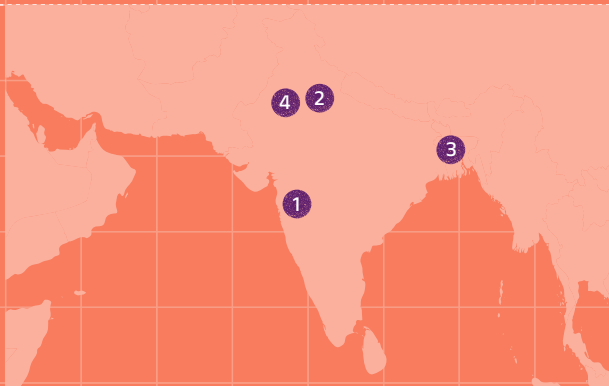
The Jantar Mantars, constructed by Raja Jai Singh II in Jaipur, Ujjain, and Delhi, represent the height of pre-telescope astronomical architecture designed for naked-eye observations. These instruments were developed by building upon the architecture of the Ulugh Beg observatory.



Scan this to  
watch the  
Bharat ki Chhâp  
episode 9

KEY SITES

- 1 Raigadh
- 2 Agra
- 3 Dhaka
- 4 Jaipur



AUG

2024

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<u>12</u>	13	14	<u>15</u>	16	17	18
19 <sup>●</sup>	<u>20</u>	21	22	<u>23</u>	<u>24</u>	25
26	27	28	29	<u>30</u>	31	

HOLIDAYS

- 15 Independence Day

SPECIAL DAYS

- 6 Hiroshima Day
- 9 Nagasaki Day
- 20 National Scientific Temper Day

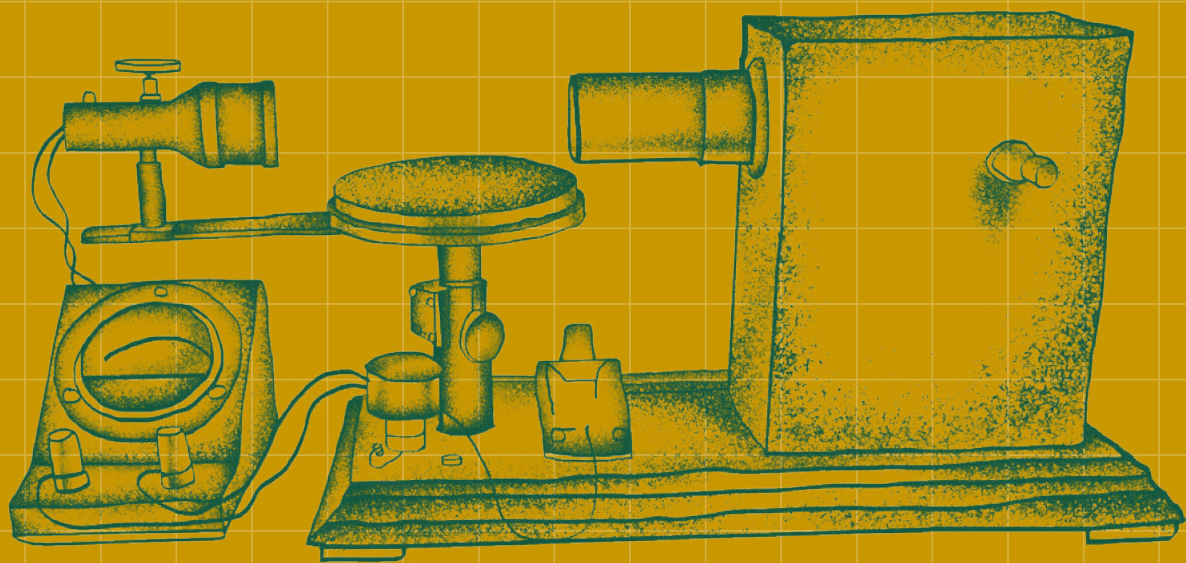
SEE THE SKIES

- New Moon Day
- Full Moon Day

CELEBRATING SCIENTIFIC MINDSETS

- 2 Prafulla Chandra Ray (B)
- 7 M S Swaminathan (B)
- 10 Irfan Habib (B)
- 12 Vikram Sarabhai (B)
- 23 Anna Mani (B)
- 30 Ernest Rutherford (B)



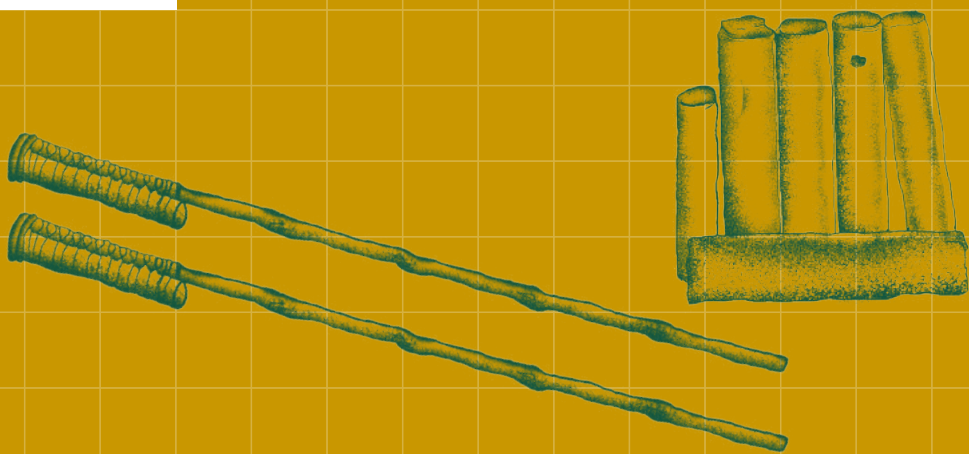


### ELECTROMAGNETIC WAVE EXPERIMENTS

J.C. Bose conducted experiments on producing, transmitting, detecting, and receiving electromagnetic microwaves with a wavelength of 5 millimeters, all from a single room laboratory measuring 6m×6m. These experiments, conducted in 1895, represented world-class frontline research for their time.

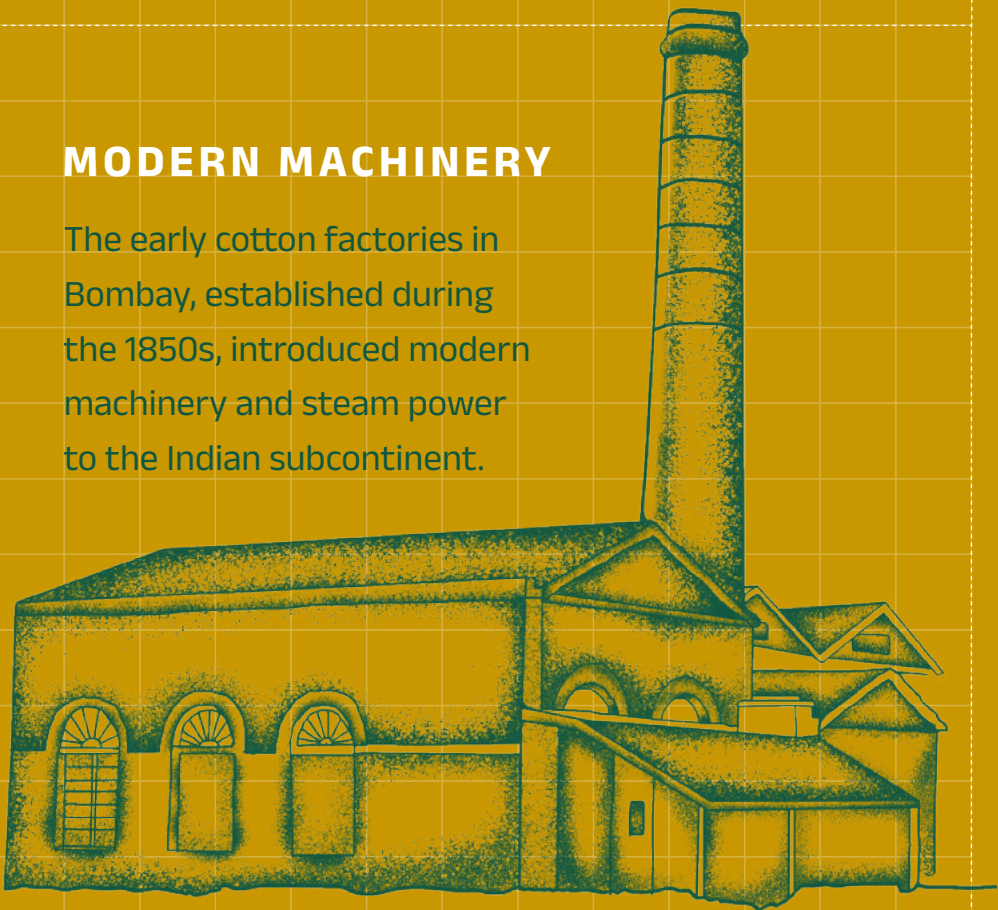
### ROCKETS

Tipu Sultan developed iron-cased rockets and used them as artillery against the technologically superior East India Company forces. After Tipu's defeat, these rockets were taken to London and studied by Congreve for potential use in the Napoleonic Wars.

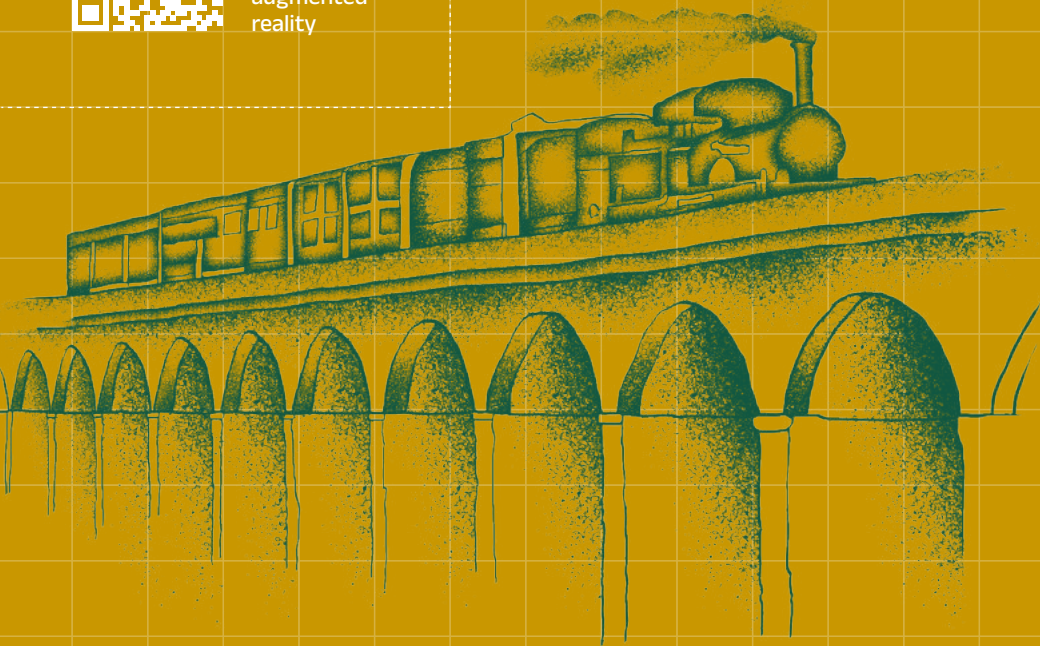


### MODERN MACHINERY

The early cotton factories in Bombay, established during the 1850s, introduced modern machinery and steam power to the Indian subcontinent.



Scan for augmented reality



### RAILWAY INFRASTRUCTURE

The construction of railways, coupled with the establishment of railway engineering workshops, rapidly spread modern machine manufacturing techniques throughout the entire subcontinent.



Scan this to watch the Bharat ki Chhap episode 10

### KEY SITES

- 1 Mysore
- 2 Mumbai
- 3 Kolkata
- 4 Kharagpur



SEP

2024

M	T	W	T	F	S	S
30						<u>1</u>
2 <sup>o</sup>	3	4	5	<u>6</u>	7	8
9	<u>10</u>	11	12	13	14	<u>15</u>
16	17	18 <sup>•</sup>	19	20	21	<u>22</u>
<u>23</u>	24	25	<u>26</u>	27	28	29

#### SPECIAL DAYS

- 1 World Peace Day

#### SEE THE SKIES

- New Moon Day
- Full Moon Day

#### CELEBRATING SCIENTIFIC MINDSETS

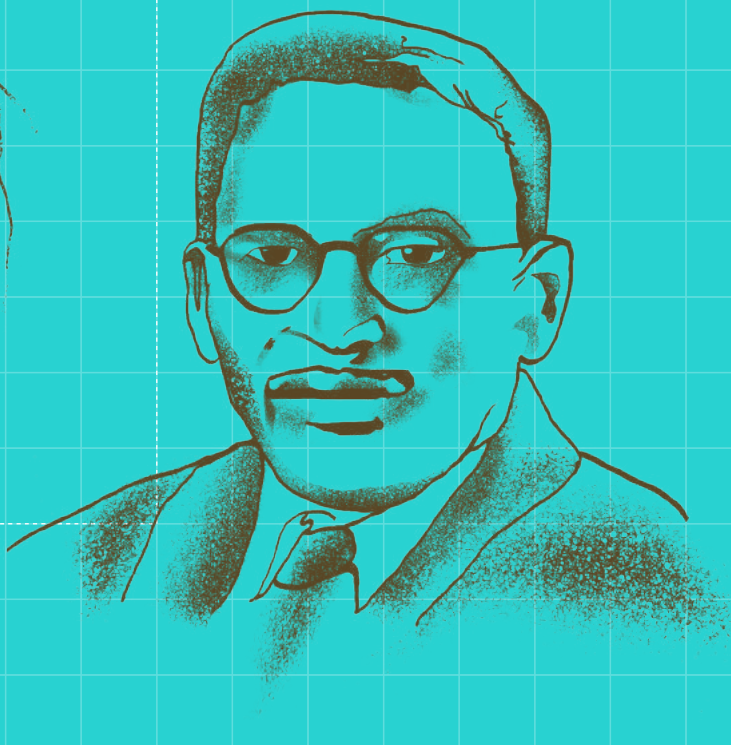
- 6 John Dalton (B)
- 10 Joseph Needham (B)
- 15 M Visvesvaraya (B)
- 22 Michael Faraday (B)
- 23 Asima Chatterjee (B)
- 26 Iswar Chandra Vidyasagar (B)





TECHNOLOGICAL AUTONOMY

Prafulla Chandra Ray inspired brilliant students such as M.N. Saha and S.N. Bose, instilling a strong connection between science and the freedom struggle. Additionally, he established Bengal Chemicals, which exemplified technological self-reliance.



NATION-BUILDING VISION

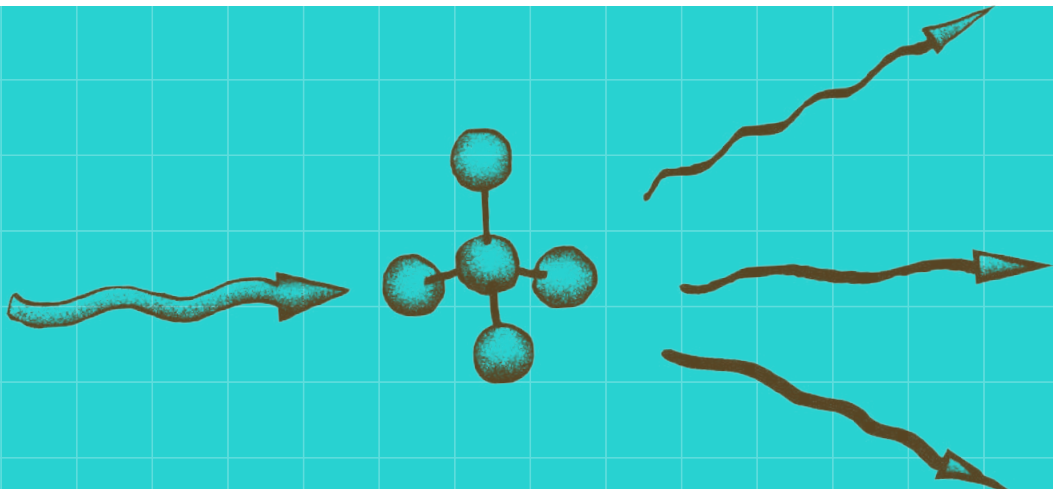
Leaders in India's national freedom struggle, including Jawaharlal Nehru and Subhash Chandra Bose, were firmly convinced that the nation could attain self-reliance through technology. They worked closely with scientists like M.N. Saha to formulate a science and technology policy aimed at promoting self-sufficiency for a newly independent India.

THE FREEDOM STRUGGLE

1900 CE TO 1950

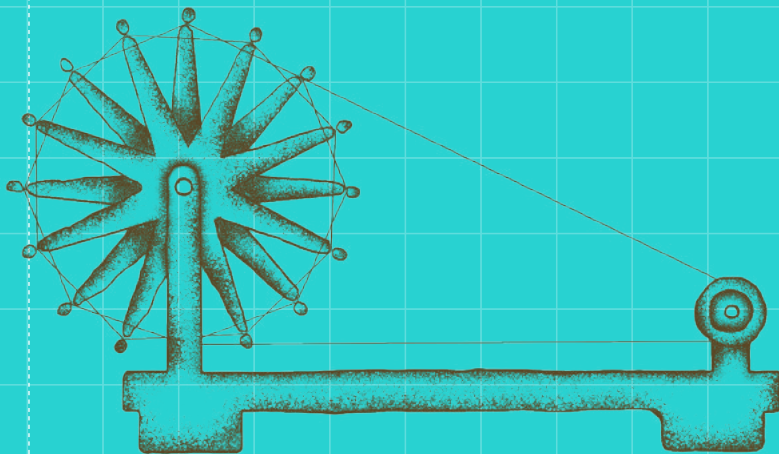


Scan for augmented reality



NOBEL PRIZE IN PHYSICS

The straightforward yet ingenious experiments conducted by C.V. Raman and K.S. Krishnan using self-constructed equipment at the Indian Association for the Cultivation of Science showcased how light can change color when scattered by molecules. In recognition of these groundbreaking contributions, C.V. Raman was awarded the Nobel Prize in Physics in 1930.



ALTERNATE APPROACH TO DEVELOPMENT

Gandhiji promoted an alternative concept of development that revolved around rural cottage industries, using hand tools like the charkha, with the goal of offering sustainable and productive employment to millions of people.



Scan this to watch the Bharat ki Chhāp episode 11

KEY SITES

- 1 Kolkata
- 2 Mumbai
- 3 Udaipur
- 4 Wardha



OCT

2024

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HOLIDAYS

- 2 Gandhi Jayanti

SEE THE SKIES

- New Moon Day
- Full Moon Day

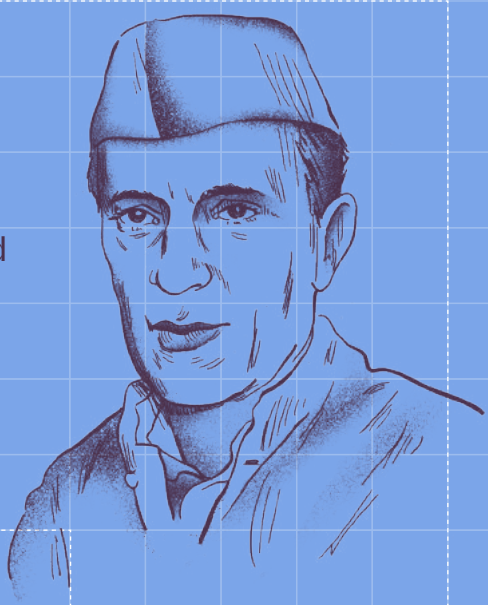
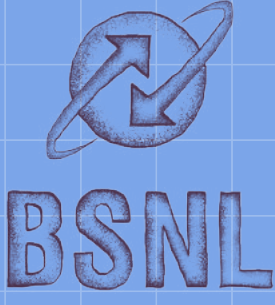
CELEBRATING SCIENTIFIC MINDSETS

- 6 Meghnad Saha (B)
- 7 Niels Bohr (B)
- 8 G N Ramachandran (B)
- 11 Harish-Chandra (B)
- 19 S Chandrasekhar (B)
- 30 Homi Jehangir Bhabha (B)



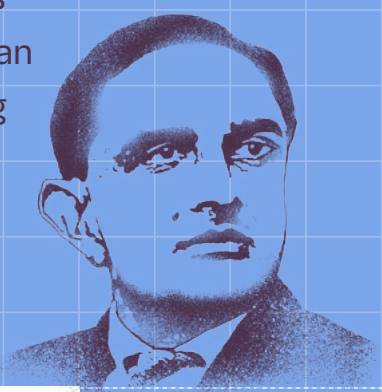
FOUNDATION OF INDUSTRIAL DEVELOPMENT

The immediate task for newly independent India was to build a modern industrial foundation in various sectors, including energy, oil, coal, electricity, telecommunications, machine tools, railways, food storage, fertilizer, basic chemicals and more. These achievements were realized during the initial five-year plans, under the leadership of Jawaharlal Nehru.



TECHNOLOGICAL ADVANCEMENTS

Visionary scientist-administrators Vikram Sarabhai and Satish Dhawan played pivotal roles in establishing and developing comprehensive technology for space research, satellite telecommunications, and defense in India.



MODERN SCIENCE IN FREE INDIA

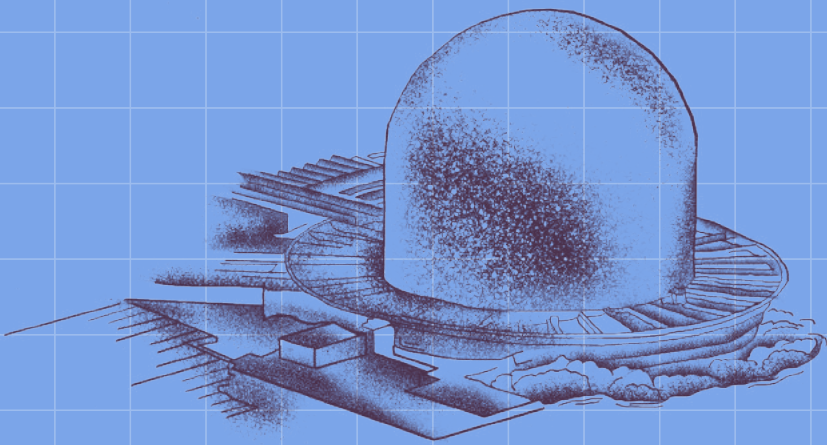
POST 1947



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SCIENCE OF HISTORY

The pioneering research and writings of historians such as Romila Thapar, Irfan Habib, and R.S. Sharma have demonstrated how the field of history can be subject to scientific investigation, shedding light on the rich history of the subcontinent.

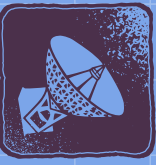


INFRASTRUCTURE OF ATOMIC ENERGY

Homi Bhabha was an outstanding physicist and administrator. Under his leadership a comprehensive self reliant infrastructure for atomic energy was established.

ACCESSIBLE DRUG THERAPY

The leadership of entrepreneurs like K.A. Hamied of CIPLA played a crucial role in challenging the intellectual property monopolies held by Western transnational corporations. Their efforts made it possible to provide affordable modern drug therapy for HIV-AIDS.



Scan this to watch the Bharat ki Chhāp episode 12

KEY SITES

- 1 Mumbai
- 2 Delhi
- 3 Bengaluru
- 4 Kolkata



NOV

2024

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SEE THE SKIES

- New Moon Day
- Full Moon Day

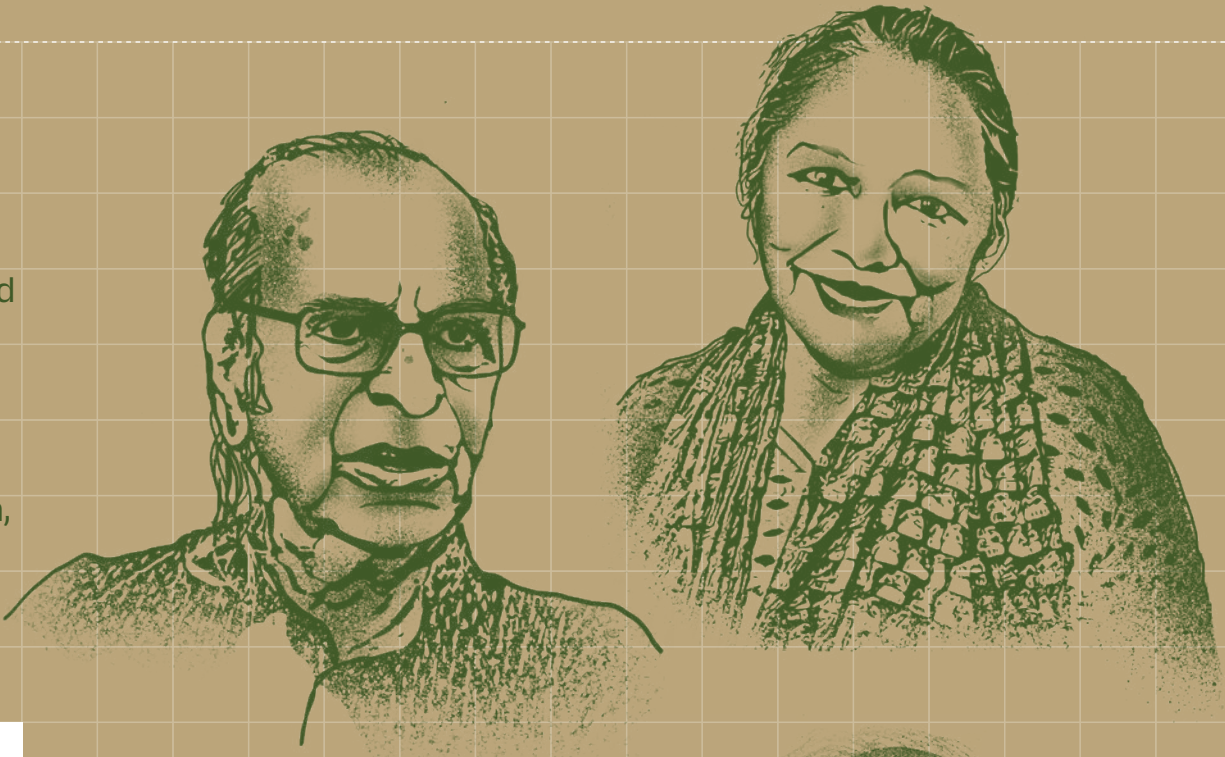
CELEBRATING SCIENTIFIC MINDSETS

- 4 Janaki Ammal (B)
- 5 J B S Haldane (B)
- 7 Marie Curie / C V Raman (B)
- 12 Salim Ali (B)
- 14 Jawaharlal Nehru / Birbal Sahani (B)
- 19 Debiprasad Chattopadhyay (B)
- 20 Edwin Hubble (B)
- 30 J C Bose / Romila Thapar (B)



AWARD WINNING STEM SERIALS

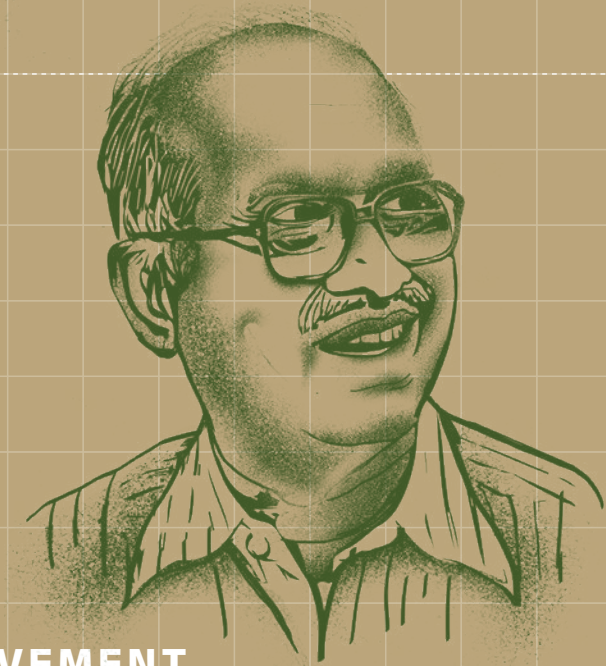
With the support of the National Council of Science and Technology Communication, and later Vigyan Prasar, renowned scientists like Prof. Yashpal created TV serials with the goal of improving public comprehension of science, such as "The Turning Point." A new generation of skilled filmmakers, including Chandita Mukherjee and Seema Murlidhara, produced STEM serials like "Bharat ki Chhāp" and "Khudbudh," which gained international acclaim.



TODAY  
GOING  
FORWARD

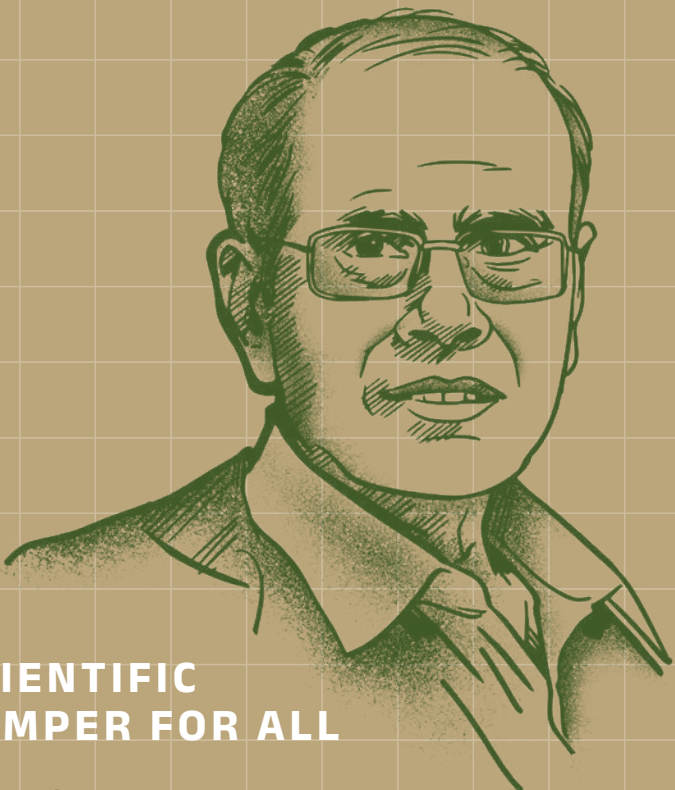


Scan for  
augmented  
reality



PEOPLES' SCIENCE MOVEMENT

To tackle the problems caused for humanity by the unscientific, irrational and indiscriminate application of modern technology the contemporary development paradigm itself has to be subjected to scientific scrutiny and audit. The concept of a people's science movement to reexamine development models was pioneered by Kerala Sastra Sahitya Parishad led by visionary scientists like M.P. Parameshwaran.

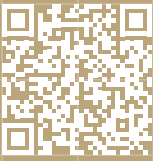
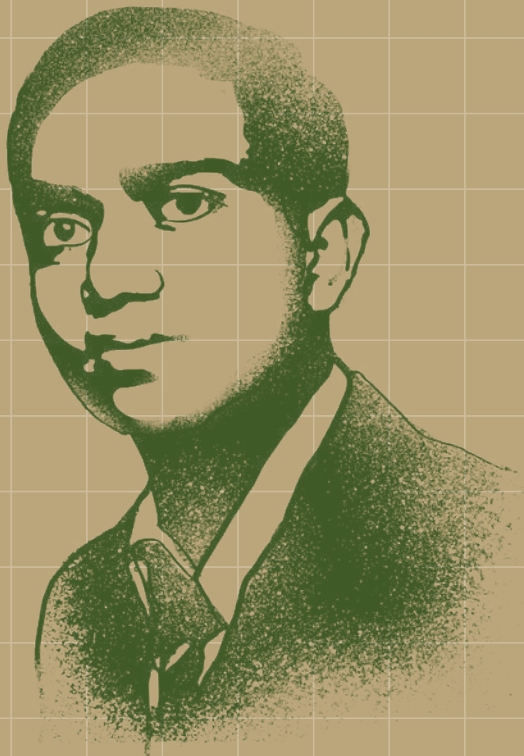


SCIENTIFIC  
TEMPER FOR ALL

Scientific temper involves tackling present-day social issues through the critical application of the scientific method. This concept was championed by Nehru, articulated by scientist-administrators like molecular biologist P.M. Bhargava, and promoted among the public by social reformers like Dr. Narendra Dabholkar. August 20th, the day of Dr. Dabholkar's martyrdom, is observed as National Scientific Temper Day.

CONTINUED  
MATHEMATICAL  
ADVANCEMENT

Mathematician V.K. Patodi was indeed one of the most brilliant students mentored by the legendary M.S. Narasimhan at TIFR. He made a remarkable breakthrough at a young age, uncovering a profound connection between geometry and mathematical analysis. Sadly, he passed away at the age of 31.



Scan this to  
watch the  
Bharat ki Chhāp  
episode 13

KEY SITES

- 1 Kerala
- 2 Mumbai
- 3 Madhya Pradesh
- 4 Hyderabad



DEC

2024

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16	17	18	19	20	21	<u>22</u>
23	24	<u>25</u>	26	<u>27</u>	28	29

SPECIAL DAYS

- 3 Bhopal Day
- 22 National Math Day

SEE THE SKIES

- New Moon Day
- Full Moon Day

CELEBRATING SCIENTIFIC MINDSETS

- 4 K S Krishnan (B)
- 15 Irawati Karve (B)
- 22 S Ramanujan (B)
- 25 Isaac Newton (B)
- 27 Louis Pasteur / Johannes Kepler (B)





## ANTHROPOCENE: GLOBAL WARMING

Global warming and climate change are the new reality. The survival of future generations mandates purposefully moving towards a carbon-neutral or carbon-reducing mode of existence everywhere.

This will require well-considered techno-economic-ecologic decisions and global lifestyle changes based on scientific calculation. The universalization of scientific temper will be imperative for the democratic implementation of these challenging decisions.

# CHALLENGES GOING FORWARD



## PANDEMICS

Capitalist globalization and industrial pig and poultry farming have contributed to the conditions that can lead to outbreaks of diseases such as swine flu, bird flu, and global corona virus influenza pandemics. The recent COVID-19 pandemic has underscored the shortcomings and failures of commercialized market-based healthcare systems, shedding light on serious concerns regarding national and state systems for collecting and disclosing COVID mortality data. Achieving health for all will necessitate the development and implementation of alternative scientific and socially-oriented healthcare infrastructure.



## DEMOCRACY vs CORPORATE CONTROL IN EDUCATION

The National Education Policy 2020 deviates from the mandate of the Right to Education Act, which recognizes good quality education as a citizen's right and the responsibility of the state. Despite the proven limitations of online instruction, many governments promote corporate edtech to the detriment of actual learning, which thrives on physical teacher-student and peer interaction.



## RENEWABLE ENERGY vs COAL AND NUCLEAR

The international nuclear reactor lobby advocates for new nuclear reactors through the IAEA, despite the disasters at Chernobyl and Fukushima. The issue of disposing of nuclear waste materials with half-lives ranging from thousands to hundreds of years, necessitating stringent security systems, remains unresolved. Fast breeder reactors, which come with multiple hazards, are being promoted under catchword titles like 'small modular reactors' without undergoing techno-economic-ecologic evaluation in the public domain.



## BASIC NEEDS FOR ALL FOOD, HEALTH, EDUCATION, HOUSING, ENERGY.

The technical knowledge and means to fulfill basic needs for everyone have been accessible for over two centuries. However, despite some growth in GDP during the seventy-six years of India's independence, the nation's average statistics demonstrate that we are still far from achieving this objective. For instance, our Global Hunger Index in 2022 ranks at 111 out of 125 countries. The national average for maternal mortality is approximately 95 per one lakh births, while in Kerala, it is significantly lower at 19.



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English copies of the book can be printed on demand

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