

**S&T in Ancient India  
&  
Why India missed the scientific revolution**

# **S&T during Indus Valley Civilization (3300-1700)**

- **Hand-built pottery**
- **Drainage, sewerage, irrigation, canals**
- **Sophisticated tooling**
- **Toys for children**
- **Metal wares - needles, mirrors, pots, etc**
- **Metal war tools**



# S&T during Vedic Period

- Dams and bridges - geometry for construction
- Metallurgy - Iron Pillar of Delhi - Damascus steel
- Sugar refining
- Cotton cloth gin and carding
- Ideas of atomism
- Advanced mathematics
  - Dealing with large numbers
  - Decimal systems
  - Dealing with zero
  - Algebra and stuff
- Medicinal works - Ayurvedic texts - alleged surgery, etc



# Post Vedic period + Mughal period

- Aryabhatta (476 AD- 500CE), Bhramagupta (598 CE - 668 CE)
- Kerala school of mathematics (1340 - 1425)
- Jehangir (1569 -1627) - interests in sciences, botany, aviary, zoo, arts and painting
- Raja Sawai Jai Singh (1688-1743)



# Colonial India (1757-1900)

- *Secular education* through missionary schools
- Education patronage mostly for colonial requirements
- Establishment of universities - 1857



# Outcomes - famous scientists

- JC Bose (1858-1937) - plant sciences, radio research
- Prafulla Chandra Ray (1861-1944) - chemical scientist
- Satyendra Nath Bose (1894-1974) - physics - Bose-Einstein statistics
- Meghnad Saha (1893-1956) - physicist
- P. C. Mahalanobis (1893 - 1972) - Indian Statistical Institute
- C. V. Raman (1888 - 1970) - 1930 Nobel prize for physics
- Subrahmanyan Chandrasekhar, Homi Bhabha, Srinivasa Ramanujan, Vikram Sarabhai, Har Gobind Khorana, Harish Chandra, Abdus Salam



# S&T gap from IVC-Vedic times to Colonial period?

- Idealist and speculative philosophies
- Disinterested in material world - lack of technological interests
- Lack of dissent - compliant commons
- Stratification of society on caste = isolation of knowledge
- Weakness on sound observations, data keeping
- Isolated by choice (no foreign travel)
- Inadequate patronage
- Oral - literary transition?
- Lack of mass literacy?
- Inherent 'OK' to live with contradictions - Philosophical



# Abu Rehan Al-Beruni (973-1048 AD)

“Folly is an illness for which there is no medicine, and the Hindus believe that there is no country but theirs, no nation like theirs, no king like theirs, no religion like theirs, no science like theirs. They are haughty, foolishly vain, self-conceited, and stolid. They are by nature niggardly in communicating that which they know, and they take the greatest possible care to withhold it from men of another caste among their own people, still much more, of course, from any foreigner. According to their belief, there is no other country on earth but theirs, no other race but theirs, and no created beings besides them have any knowledge or science whatsoever. Their haughtiness is such that, if you tell them of any science or scholar in Khura-sa-n and Persia, they will think you to be both an ignoramus and liar. If they traveled and mixed with other nations, they would soon change their mind, for their ancestors were not as narrow-minded as the present generation is. One of their scholars, Varahamihira, in a passage where he calls on the people to honour the Brahmans, says: “The Greeks, though impure, must be honoured, since they were trained in science, and therein excelled others. What, then, are we to say of a Bra-hman, if he combines with his purity the height of science?” In former times, the Hindus used to acknowledge that the progress of science due to the Greeks is much more important than that which is due to themselves.”





# S&T gap mystery - a model hypothesis to test

## Intellectual development =

- 1) Patronage
- 2) Scholarly community
- 3) Cross-fertilization of ideas
- 4) Chances of a genius appearing on the scene



# Model - expected outcome

