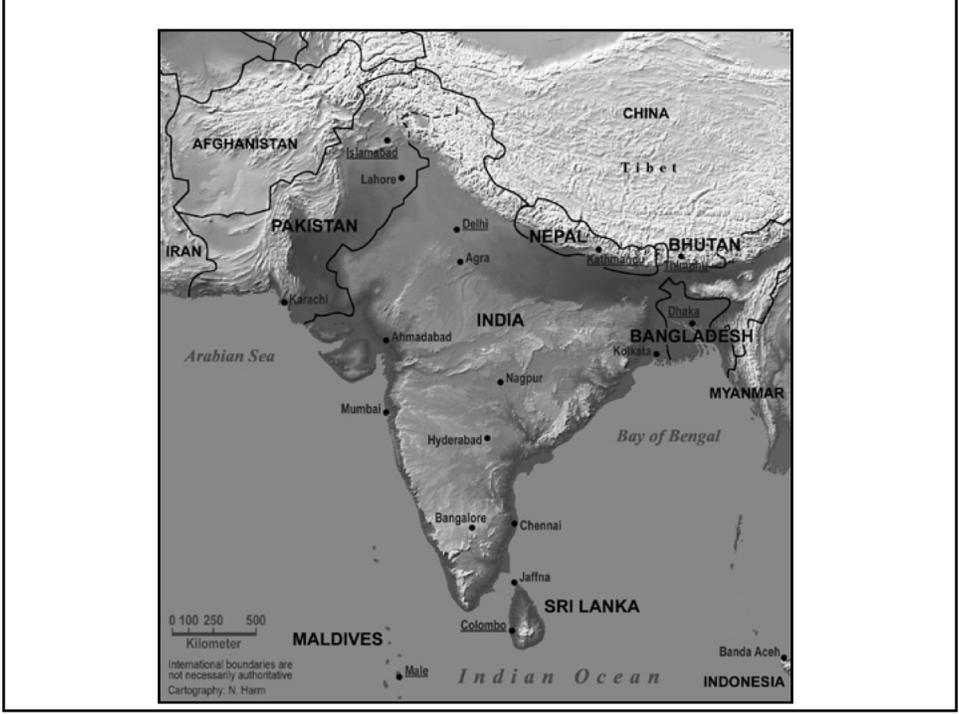


# Science, Technology, and Ancient India



### Periodization of South Asian History

- Early
  - from 8<sup>th</sup> century BCE to 8<sup>th</sup> century CE
  - early civilizations (Maurya, Gupta)
- Medieval
  - from 8<sup>th</sup> century CE to 16<sup>th</sup> century
  - fragmentation
- Early Modern
  - from 16<sup>th</sup> to 19<sup>th</sup> century
  - Mughals, British
- Modern
  - from 19<sup>th</sup> century to now
  - British, independence

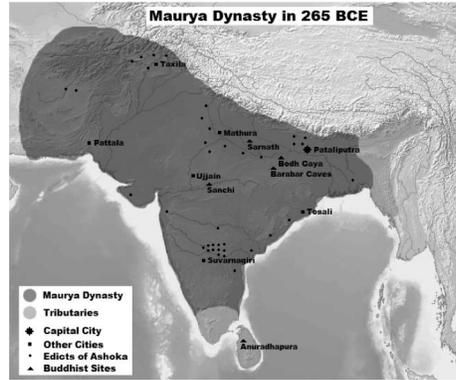
### Early Settlements in South Asia

- first continuous settlements formed in 8<sup>th</sup> century BCE
- first signs of organized and developed civilization:
  - Harappa (in Indus Valley)
  - marked by distinctive pottery and metal tools



## New Emergent Civilizations

- Mauryas (321 – 181 BCE)
- Guptas (320 – 520 CE)
- Mauryas
  - hydraulic civilization
    - complex bureaucracy
    - many public works
    - urban infrastructure
  - greatest Mauryan rule was: Ashoka the Great
    - ruled 60+ years
    - embraced Buddhism



- In general, there was no tradition in the study of ‘natural science’ in ancient India
- why?
- Because ancient “Indian religions militated against the direct study of nature” (p. 141)

**Basic features of Early 'Civilizations' in Ancient India**

- heterogeneous, no single essence
- constant transmission and exchange with rest of Asia
  - China/East Asia  $\leftrightarrow$  India  $\leftrightarrow$  Middle East & Near East
- general features
  - developed bureaucracy
  - political centralization
  - developed bureaucracy
  - social stratification
  - urban civilization
  - irrigation agriculture
  - monumental architecture
  - higher learning directed towards utility

- Earliest 'science' in India was astronomy
  - for purposes of maintaining calendar and connecting Earthly events with movement of planets and locations of stars
    - astrology
  - maintained domination of Brahmins
  - ancillary strand of mathematics

### Guptas (4<sup>th</sup> to 6<sup>th</sup> CE)

- after Ashoka, Buddhism was marginalized
- under the Guptas, Brahmanic cultural supremacy returned
- often called “Golden Age” of classical India
- under Samudragupta
- extensive inventions, discoveries, cultural creations



### Scientific Accomplishments of Guptas

- astronomy expanded although still remained a practical activity
  - uses in personal lives, agriculture, etc.
    - read p. 146
  - from 4<sup>th</sup> to 7<sup>th</sup> centuries, production of textbooks on astronomy (*siddhanta* or ‘solutions’)
  - Aryabhata I (476-) argued that Earth rotates around its own axis
  - Aryabhata also engaged in mathematical work
    - use of decimal system, possible first use of “zero”
    - calculated value of pi to four decimal places
- Other ‘sciences’ that flourished
  - medical theory
    - training schools, etc.
  - alchemy