

## Lecture 4: Scientific and Technical Knowledge in Antiquity

### Key Facts:

- **Alexandria Museion:** Founded in the 3rd century BC under Ptolemy Philadelphus, included the extensive Library of Alexandria with over 500,000 papyrus scrolls.
- **Eratosthenes:** Applied a coordinate system to the Earth's surface and calculated the Earth's circumference with remarkable accuracy.
- **Aristarchus:** Proposed the first known heliocentric system where Earth and other planets orbit the Sun.
- **Apollonius and Ptolemy:** Developed the theory of epicycles and compiled the *Almagest*, a significant astronomical manual.
- **Technological Innovations:** Included the Eupalinus tunnel, water lifting devices like the Archimedean screw, and the Antikythera mechanism, an early mechanical computer.
- **Military Technologies:** Ctesibius's machines, water organ, and superweapons of Archimedes.
- **Reasons for No Industrial Revolution:** Lack of natural resources, widespread slave labor, and non-capitalist economy.

### Trends:

- Emphasis on empirical observation and mathematical principles.
- Significant advancements in astronomy, engineering, and military technology.
- Development of infrastructure and mechanical devices for practical and military applications.

## Lecture 5: Scientific and Technical Knowledge in the Middle Ages in Asia and America

### Key Facts:

- **Mesoamerican Civilizations:** Developed advanced agricultural techniques, an elaborate medical pharmacopeia, and the quipu for recording information.
- **Chinese Achievements:** Decimal place-value number system, extensive astronomical records, accurate maps, the Grand Canal, and porcelain.
- **Gunpowder and Printing:** Invention of gunpowder in the 9th century and movable type printing around 1040 revolutionized warfare and communication.
- **Byzantine Science:** John Philopon introduced the concept of "impetus," which influenced later scientific thought.
- **Islamic Science:** Major contributions in various fields including medicine, mathematics, and astronomy, with significant translations of Greek works.

### Trends:

- Technological and scientific advancements were often tied to practical needs such as agriculture, warfare, and navigation.
- Cross-cultural exchanges, particularly through translation efforts, played a crucial role in the spread of knowledge.

## Lecture 6: Scientific and Technical Knowledge in Medieval Europe

### Key Facts:

- **Medieval Periodization:** Early Middle Ages (5-9th centuries), High Middle Ages (10-13th centuries), Late Middle Ages (14-15th centuries).
- **Key Dates:** 476 AD (fall of Western Roman Empire), 1054 AD (division of Catholic and Orthodox churches), 1492 AD (Columbus's discovery of America).
- **Technological Innovations:** Heavy plow, horse collar, three-field rotation system, and water and windmills.
- **First Universities:** Salerno Medical School (9th century), Bologna (1088 AD), Paris (by 1200 AD), Oxford (by 1220 AD).
- **Scientific Method:** Emphasis on experience and observation, as seen in the works of Roger Bacon and Jean Buridan.

### Trends:

- Revival and growth of learning institutions.
- Technological innovations leading to increased agricultural productivity and demographic growth.
- Development of experimental methods and empirical research.

## Lecture 7: Scientific and Technical Knowledge in Early Modern Time (16-17th Century)

### Key Facts:

- **Scientific Revolution:** Marked by figures like Galileo Galilei, Copernicus, and advancements in anatomy and chemistry.
- **Renaissance Humanism:** Renewed interest in antiquity, rejection of scholasticism, and belief in human potential.
- **Printing Revolution:** Gutenberg's invention of the printing press in the late 1430s greatly increased the dissemination of information.
- **Reformation:** Initiated by Martin Luther in 1517, leading to significant religious and cultural shifts.
- **First Scientific Societies:** The Academy of the Mysteries of Nature (1560) and the Royal Society of London (1662).

### Trends:

- Increased emphasis on observation, experimentation, and empirical evidence.
- Integration of scientific inquiry with broader cultural movements like the Renaissance and Reformation.
- Formation of scientific communities and institutions fostering collaborative research and knowledge dissemination.