

The Seventeenth-Century Scientific Revolution
Mathematics and Rhetoric in the Service of the Counter-Intuitive

I. Three Ages of Explanation

- A. Ancient Greece—observation, logic, and common sense
- B. Age of Authority
 - 1. Medieval Christendom (reintroduction of logic)
 - 2. Renaissance
- C. Scientific Revolution (hypothesis formation and testing)
 - 1. experimentation
 - 2. measurement
 - 3. mathematical reasoning

II. Study of Motion

- A. Mykołaj Kopernik (Nicholaus Copernicus) (1473–1543)
 - 1. Studied at universities of Kraków, Bologna, and Padua
 - 2. *On the Revolution of the Heavenly Spheres*—1543
- B. Niccolo (Tartaglia = Stammerer) Fontana (1543–1607)
- C. Giovanni Benedetti (1530–1590)
- D. Tycho Brahe (1546–1601) (Uraniborg)
- E. Johannes Kepler (1571–1630)—Three Laws of Planetary Motion
 - 1. Planets move in elliptical orbits
 - 2. Line joining sun to planet sweeps out equal areas in equal times
 - 3. Time planet takes to orbit sun varies proportionately with distance
- F. Galileo Galilei (1564–1642)
 - 1. Law of Inertia
 - 2. *Dialogue on the Two Chief Systems of the World*—1632
 - 3. Conflict between Old and New, between Authority and Reason
 - a. Giordano Bruno (1548–1600)
 - b. Domenico Scandella “Menocchio”
- G. Isaac Newton (1642–1727)
 - 1. *Principia mathematica*—1687
 - 2. Unified Field Theory

III. Theories of Thought

- A. Deductive method—René Descartes (1596–1650)
- B. Inductive Method—Francis Bacon (1561–1626)

IV. Influence on the Enlightenment

- A. Fontenelle (popularized the views of Descartes)
- B. Voltaire (popularized the views of Newton)