

Scientific Revolution

In spite of the efforts of Bacon, Cusa, and a few others, scholastic devotion to Aristotle and other ancient authorities still dominated science up to the late sixteenth century. Even Nicolaus Copernicus (1473-1543), who shook Europe by proposing that the earth orbits the sun, quoted heavily from the works of Ptolemy. Also Vesalius, who published original work in anatomy, still used the faulty physiology of Galen. The true scientific revolution, which replaced authoritarianism with empiricism, began with the careers of Galileo and Francis Bacon.

It was Galileo Galilei (1564-1642) who dethroned Aristotle and initiated the explosion of empirical science. The son of a famous composer, Galileo was only a university student when he began performing experiments disproving the dogma of Aristotle. Galileo developed the mechanics of inertia, force, and gravity. The famous incident of Galileo dropping balls from the Leaning Tower of Pisa resulted in his dismissal from the faculty of the University of Pisa after complaints from Scholastic professors. Moving to Padua, Galileo built telescopes, newly invented, and used them to prove that Copernicus was right. When Church authorities ordered him to keep quiet, Galileo defiantly published his work. In his trial before the Inquisition, Galileo argued that when plain facts seem to contradict the Bible, we should conclude that we are not reading the Bible correctly. But he was forced to recant. By humiliating the most famous scientist in Europe, the Church lost its credibility as an intellectual power.

Francis Bacon (1561-1626), an English statesman, developed the philosophy of empiricism, and promoted scientific knowledge as the way for humans to achieve prosperity through power over nature. Bacon sought to sweep away the false claims to knowledge of medieval philosophers, and teach people to disregard the prejudices of education while examining the actual facts. Bacon's reputation grew after his death. Voltaire and others listed him as one of the chief instigators of the Enlightenment.

Within a century, empiricism triumphed over scholasticism. Galileo published his final masterpiece on astronomy in 1632. William Gilbert had already summarized observations on electricity and magnetism in 1600, and William Harvey described blood circulation in 1628. Robert Boyle founded modern chemistry in the 1660's. But the greatest transformation in people's understanding of the Universe occurred in astronomy, when Isaac Newton (1642-1727), building on Galileo's observations and the mathematics of Johannes

Kepler, showed that natural laws could explain all the motions of the planets.
Newton published his Principia in 1687.