MR2290701 (2007k:01008) 01A45

Gontier, Thierry (F-LYON3Q)

Mathématiques et science universelle chez Bacon et chez Descartes. (French. English, French summary) [[**Mathematics and universal science in Bacon and Descartes**]]

Rev. Hist. Sci. **59** (2006), *no.* 2, 285–312. *ISBN* 2200-92108-X

Francis Bacon (1561–1626) is known today primarily for his advocacy of the method of induction in scientific investigation and for his belief in the power of technology and science to improve society. Although he was not particularly engaged with mathematics, he had definite views about this subject. Bacon believed strongly that qualitative physics was fundamental and that mathematics was subordinate to physics. He was very concerned by what he saw happening in contemporary astronomy. Copernican astronomy provided a mathematical account of celestial motions but was based on a dangerous set of fictions. He thought it was necessary to establish astronomy at its rightful place within physics and to develop astronomy from an understanding of the true nature of the world. For Bacon this nature consisted of a motionless Earth at the center of the universe, a fundamental physical truth that must inform all work in astronomy. Bacon's own theory involved a cosmology derived from a Paracelsian conception of matter and the adoption of outmoded and empirically worthless astronomical conceptions.

Until the 1960s historians of science were very critical of Bacon's conception of mathematics and its place within the framework of human knowledge. His point of view seemed to contradict the modern picture of the Scientific Revolution as an event marked by the application of sophisticated mathematics to physical investigation. However, in the last several decades scholars have attempted to provide a detailed and historically sympathetic account of Bacon's scientific philosophy, including the role of mathematics in his system of thought.

The article under review is a contribution to this unfolding body of scholarship. The author looks at Bacon by examining his relationship to Aristotle and to Bacon's contemporary René Descartes. Aristotle held that mathematics and physics were distinct subjects, a fact that derived from their different subject matter. Physics concerned itself with corruptible objects and phenomena, whereas mathematics was concerned with what is eternal and unchanging. For Aristotle, there was no such thing as a universal mathematical method for the simple reason that there was no universal method at all: each domain of knowledge had its own principles and modes of reasoning. Bacon, by contrast, did believe in a universal method and in the unity of science, and maintained that mathematics played a valuable if always subsidiary role within natural philosophy. A belief in a universal method was also fundamental to Descartes' philosophy, although for Descartes physical reality was intrinsically mathematical and the study of mathematics formed the core of any investigation in natural philosophy. Despite their differences both Bacon and Descartes believed in the existence of a common method applicable to all branches of knowledge, a belief directly contrary to the tenets of Aristotle's philosophy. Both men also emphasized the active operational element in scientific discovery and invention and regarded mathematics, understood as an art, as the embodiment of such agency. *Craig G. Fraser*