

were subject, the ways rulers influenced medicine, and how royal practitioners shaped and reacted to changing political fortunes.

I. Bernard Cohen & George E. Smith, eds. *The Cambridge Companion to Newton*. Cambridge: Cambridge University Press, 2002. xiv + 514pp. £15.95 paper/£ 45.00 hard. Review BY ALESSANDRO GIOSTRA, ACCADEMIA GEORGICA, TREIA.

“The goal of this volume is to provide an introduction to Newton’s work, enabling readers to gain more rapid access to it and to become better judges of how well subsequent philosophers have dealt with it” (4). These words, which are part of the introduction by the editors, clearly express their main preoccupation in issuing this work. This collection of essays, included in the Cambridge Companions to Philosophy, was released through the contribution given by some specialists of Newtonian thought, who lay stress on the main aspects of the activity of “*the giant of science in the seventeenth and eighteenth century*” (1).

The editors introduce this volume by pointing out the contribution given by Newton to philosophy, even if he cannot be deemed a philosopher in the common meaning of this word. His own vision, which opposed Descartes’s mechanical philosophy, does not contain any philosophical arrangement. Newtonian ontology, however, arises from the distinctive feature of his scientific research; “hence it too was part of the split between science and philosophy” (2). Besides a “Brief Biographical Sketch” (9-14), the editors treat the role played by the scientist from Woolsthorpe in the advancement of learning, referring to the contents of the single works by the contributors. The analysis of each aspect of Newton’s thought allows grasping a sort of methodological unity belonging to the wide range of disciplines he dealt with.

The philosophical theory of absolute space-time is the one which most made Newton a milestone in the history of philosophy. That vision underwent its final crisis during the nineteenth cen-

ture and was replaced by the achievement of Relativity at the beginning of the twentieth century. Robert Disalle's contribution remarks the change, occurring in the past decades, of the opinions on Relativity and its relationship with the Newtonian conception of space and time. According to his viewpoint, both Einstein's and Newton's theories establish a space-time absolutism linked with physical phenomena; in other terms, "they are assumptions implicit in the laws of physics" (34).

The character of Newton, as a scientist, is especially connected with his *Synthesis* of Kepler's astronomy and Galilei's studies on motion, which was able to join terrestrial and celestial physics; thus, that *Synthesis* positively defeated the traditional cosmos and brought to an end the revision of Aristotelian natural philosophy, which had started in the late Middle Ages. William Harper shows the great value of the achievement of universal gravitation for the following astronomical enquiry, as it "illustrates a general methodology in which phenomena constrain theory to approximation established by measuring parameters" (175). A further view on Newton's law of gravitation was given by Curtis Wilson: gravitational theory, which consisted in an acceptance and correction of Kepler's three laws of planetary motion at the same time, left some unresolved questions which were investigated in the period following Newton's death and solved at the end of the eighteenth century. Newtonian *Synthesis*, a fundamental progress in the history of science, was announced in the *Philosophiae Naturalis Principia Mathematica* [*The Mathematical Principles of Natural Philosophy*], the second edition of which, issued in 1713, contains the famous statement "Hypotheses non fingo" [I do not feign Hypotheses] (139); it soon became an emblem of Newton's experimental philosophy. The *Principia* can be considered to be the final step of those theories and discoveries which had led to the twilight of the Aristotelian world view. The analysis of "The Methodology of the *Principia*" (138-173), carried out by George E. Smith, argues that only through the solution of the open questions in Newton's work by later scientists, "the new approach to theory construction that

the book was intended to illustrate [...] became a permanent part of the science of physics" (167).

In this volume a careful attention was also paid to the disciplines Newton devoted himself to, not falling within the physical and mathematical subjects. Alchemical and theological studies were particularly considered, that is, those matters the editors deem to be part of "The Other Newton" (23). Newton's interest in alchemy is well known, even if "It may seem surprising to present Isaac Newton, the founder of modern mathematical natural science, as a serious student of alchemy" (370). This difficult impact in accepting his alchemical activity is due to the general negative opinion that the early modern scientific community had for alchemists and their link with occult disciplines. Newton's vision, as Karin Figala shows, is the belief in the presence of a single matter for all natural things, which changes into different kinds of bodies and forms a hierarchical structure. Figala's analysis lays stress on the influences exerted by such authors as Michael Maier on Newton's alchemical writings, especially on the idea of a hierarchy among planets. The importance given by students, especially in the past decades, to Newton's theological investigations is due to the methodological uniformity between physical and theological arrangements in his thought. Maurizio Mamiani points out Newton's interpretation of *Apocalypse*, to interpret the biblical language the English scientist used the same method which had been employed in the *Principia*; it reflects the existence of a single truth which is present in microcosm and macrocosm, revealing a physical world not provided with an inherent necessity.

The last two works in this volume concern the dispute between Newton and Leibniz, that is, probably the most famous conflict within the history of philosophy. Indeed, as Rupert Halls remarks, "it was a sad chronology that brought two such inventive mathematicians as Newton and Leibniz to live in the same age; never were temperaments and intellectual characters more at odds" (431). The most controversial point of that hard debate consisted in the divergent approach to calculus, which led Newton to excogitate the kinematical method of fluxions; it was the result

of his conception of calculus as a “collection of interrelated methods for solving problems, not a radically new, superior approach to mathematics” (21). Leibniz’s view, on the contrary, was founded upon a greater employment of symbolization. This dispute, also involving the priority of the discovery of this method, generated a larger detachment between two different mathematical schools, which can generally be identified as the English and continental ones, following Newtonian and Leibnizian arrangement respectively. Within the topics belonging to this discussion, Domenico Bertoloni Meli focuses the contents of the Leibniz-Clarke correspondence. Newton’s and Leibniz’s different cosmological visions came at odds in that exchange of letters. A clear instance of their opposite viewpoints can be shown in the role God plays in the universe: Leibniz, whose conception trusted in the belief in a Clockwork Universe, rejected Newton’s idea of a God who “had to intervene from time to time in the mechanisms of the universe in order to repair it, as if God lacked foreknowledge to arrange them perfectly from the beginning” (461). On the other side, Clark charged Leibniz’s model of the universe as a preordained universal harmony, for it led to materialism and gave no space to the intervention of God, as a person, in natural processes. The source of this Newtonian conception can be found in the Medieval voluntarism which supported, against Aristotelian pantheism, the total power exerted by God on nature.

The whole contents of this collection of essays make it a complete survey on Newton’s thought, as it also covers those aspects which have often been disregarded by historians of science. Thus it can be considered a useful work for all those students who are going to probe into the questions belonging to Newton’s contribution to the advancement of philosophical learning. A full understanding of this volume, however, requires readers to be already familiar with the basic topics concerning the history of science and, particularly, the Scientific Revolution. This publication, as an outcome of the co-operation made by important researchers in this area of investigation, succeeds in giving the right tribute to one among the most fascinating and complex characters in the

history of thought: namely, the scientist who “had deduced with unprecedented precision most of the known phenomena of optics and all the known phenomena of celestial and terrestrial mechanics” (T. Kuhn, *The Copernican Revolution: Planetary Astronomy in the Development of the Western World*, [1957] 260).

Claire Jowitt and Diane Watt, eds. *The Arts of 17th-Century Science: Representations of the Natural World in European and North American Culture*. Aldershot, U.K.: Ashgate. 284 pp. \$84.95. Review by KAROL K. WEAVER, PURDUE UNIVERSITY.

The Arts of 17th-Century Science: Representations of the Natural World in European and North American Culture is a collection of essays that considers how scientific and literary sources of the early modern period overlapped and influenced each other. Editors Claire Jowitt and Diane Watt skillfully separated the volume into four major topics, did a fine job selecting essays that explored these subjects, and placed essays in such a way that they supported one another and the major ideas of a particular section. Despite the tendency of some of the authors to employ jargon-laden language, the collection as a whole succeeds in its goals to contextualize both art and science in particular historical periods, and to demonstrate the interaction between these two disciplines that are normally defined in opposition to each other.

Jowitt and Watt divided the text into four themes: philosophy, religion, gender, and colonialism. Each of these sections considers the natural world as represented by many different types of discourses, including religious, philosophical, scientific, and literary documents. “Part III: Gender, Sexuality and Scientific Thought” is especially strong due to the quality essays chosen for this section. For example, Bettina Mathes’ fine contribution, “From Nymph to Nymphomania: ‘Linear Perspectives’ on Female Sexuality,” contemplates sources that range from medical texts to Renaissance artwork in order to show how the “introduction of the term *nymphomania* does