Review
Reviewed Work(s):
La naissance de la mécanique analytique: La science du mouvement au tournant des XVIIe et XVIIIe siècles
by Michel Blay
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tive impact will occasion much debate. Walter Charleton, a major conduit of Gassendi's thought, presents an obvious example; but Charleton's turn toward a "contingent epistemology" needs to be understood in the context of his turn away from a mystical, Helmontian, antirational, inspirationist anthropology. By 1652, Charleton's *Darknes of Atheism* associated such an anthropology with recent excesses of the radical sects. His turn toward the contingent, limited, "carnal" mediations of human ways of knowing may then signify the emergence of a socioreligious narrative of man's creaturely status and abilities—in oppositon to radical narratives of fallen man's regeneration as the new Adam through divine inspiration—rather than the influence of a neo-Epicurean narrative of the social nature of language and representation packaged with Gassendi's epistemology and atomism. Boyle's early interest in Gassendi is intriguing; but here the chronology presents obvious difficulties (pp. 160–165).

The question of the precise nature of cultural narratives authorizing neoclassical "literate culture" raises a still more general concern. Kroll's implication seems to be that neo-Epicurean narratives fostered a "highly sophisticated defense of the rhetorical or symbolic nature of human culture as a whole" (p. 186) that entailed full embrace of the contingencies of language and representation as necessary to human knowledge and, hence, as dictating a new probabilistic mentality. Kroll finds this mentality literally everywhere. While not denying the importance of probabilism, I believe that Kroll's account risks overstating the case and eliding the resistance (even within the same individual) to the ubiquity of rhetoric and the insuperability of contingent, human language.

Indeed, it may be more profitable to attach the argument not to neo-Epicureanism as such but, rather, to its reception within shifting religious and cultural narratives situating postlapsarian human culture with respect to its lost Adamic heritage. Such a strategy would, I think, go a long way toward repairing certain troubling lapses in Kroll's evidence. Thus, for example, Kroll's analysis of the "Webster-Ward debate of 1654" (pp. 194–201) hinges upon the assumption (attributed to Seth Ward) "that to invite a comparative reading of cultural alternatives must necessitate a contingent, probable view of history" (p. 196). But the force of such an assumption would not be obvious to all seventeenth-century readers. Indeed, early modern comparativist strategies often sprang from syncretistic impulses that read the diversity of cultural forms (including human languages) within the grid of a biblically inspired master narrative that sought, beneath the babble of external forms, a divinely authored originative unity. Such quests did, of course, become increasingly nostalgic as reworked narratives of the Adamic fall, the babylonic confusion of tongues, and the Pentecost opened room for a new view of diversity as rooted in sociohistorical contingency. But comparativist strategies, as such, did not *necessitate* "contingent, probable" views; indeed, nostalgia for the lost unity of the divine, Adamic Word continued to rear its head, if only as an eschatological desire.

Kroll's reading of "literate culture" stresses the contingent and probable, but pays less attention to countercurrents. Recent studies like Hugh Ormsby-Lennon's on Rosicrucian linguistics and Allison Coudert's on theories of natural language are not mentioned. Surprisingly, Kroll nowhere analyzes Boyle's complex *Considerations Touching the Style of the Holy Scriptures*, a key text for understanding relations among science, contingent human knowledge, human languages, and the Word of God in Restoration culture, as Robert Markley's recent essay has shown. While Kroll does touch upon biblical narratives in his excellent discussion of Jean Le Clerc, Le Clerc's efforts cannot illumine the earlier formation of Restoration culture.

Despite such concerns, Kroll's important and impressive book offers an interpretation of Restoration culture that historians of science must in the future assimilate and come to terms with.

JAMES J. BONO

■ Eighteenth Century

Michel Blay. *La naissance de la mécanique analytique: La science du mouvement au tournant des XVIIe et XVIIIe siècles.* Preface by **Jacques Merleau-Ponty.** (Bibliothèque d'Histoire des Sciences.) 414 pp., figs., apps., bibl., index. Paris: Presses Universitaires de France, 1992. (Published in cooperation with the Centre National des Lettres.) Fr 315 (paper).

Between 1695 and 1715 the French priest and mathematician Pierre Varignon wrote a series

of original memoirs in which he adapted techniques from the recently founded Leibnizian calculus to the solution of problems in mechanics, in particular ones that had appeared in the first two books of Isaac Newton's *Principia mathematica* (1687). His work was a major contribution to analytical dynamics, the investigation by algorithmic, symbolic methods of the science of moving bodies. Michel Blay's book, the most detailed study to date of this scientist's work, is divided in three parts. In the first he considers the invention of the calculus by G. W. Leibniz and its introduction into France. The solution of two problems of interest during the period, the brachystochrone and curve of constant pressure, is also described. The second part begins with a look at Leibniz's dynamics and is mainly devoted to a study of four memoirs from the Paris Academy in which Varignon introduced the basic definitions, techniques, and concepts of his mathematical dynamics. There is also a chapter on the mathematical philosophy of Bernard de Fontenelle, a prominent early advocate of the new analysis. The last part is devoted to two topics: a detailed examination of Varignon's treatment of several propositions, from the second book of the *Principia*, involving the motion of bodies in a resisting medium; and his solution to Evangelista Torricelli's problem in fluid mechanics.

Blay's account follows the original closely and succeeds very well, by means of commentary and notes, in conveying the technical character of Varignon's dynamics. In addition to providing a well-documented introduction to his science, the book will be a valuable source for the further study of his work and its relation to that of his contemporaries and successors.

On page 161 Blay writes: "the figure, essential for the development and organization of geometrical-infinitesimal thought, becomes progressively with Varignon a simple diagram. That is, the figure loses its traditional intellectual value in order to take on a value that is entirely secondary and illustrative." While there is no question of the importance of Varignon's contribution, Blay overstates here the extent to which he achieved a fully analytical mechanics. It was only rather slowly and with some difficulty that analytical methods were assimilated into the subject; despite Varignon's pioneering efforts, it was not until the 1740s and 1750s, in the work of A. C. Clairaut, Leonhard Euler, and Jean d'Alembert, that a systematic theory became established. There were several reasons for this, only one of which can be mentioned here. There was a fundamental dual aspect to the employment of geometrical conceptions and modes of representation during the earlier period (1670–1740). The use of diagrams and figures was natural because the objects under study—the trajectories of moving particles, the paths of least descent, the shapes of bent laminae, and so on—were themselves curves. In addition, geometrical techniques were employed in a logical abstract sense to represent relations among the variable quantities that appeared in problems. In the absence of a formal function concept, researchers used graphical methods extensively to represent and to analyze relationships among such variables. This graphical mode of representation, adopted by Varignon himself throughout his writings in calculus and mechanics, constituted an essential mathematical feature of physical theories of the period.

CRAIG FRASER

Rienk H. Vermij. *Secularisering en natuurwetenschap in de zeventiende en achttiende eeuw: Bernard Nieuwentijt.* (Nieuwe Nederlandse Bijdragen tot de Geschiedenis der Geneeskunde en der Natuurwetenschappen, 38.) 173 pp., figs., bibl., index. Amsterdam/Atlanta, Ga.: Rodopi, 1991. Dfl 49.50, $24.75 (paper).

Newtonianism spread with remarkable rapidity among European Protestant elites of the early eighteenth century. The leaders of the movement to replace Descartes's science with that of Newton have been known for some time: Samuel Clarke, Richard Bentley, George Cheyne, William Derham, J. Desaguliers, W. 's Gravesande, and P. van Musschenbroek. To their ranks this competent, even lively, monograph by Rienk Vermij adds Bernard Nieuwentijt—lesser known, but famed in his day. He was a Leiden-educated doctor, a writer of mathematical textbooks, an experimenter of no particular originality, a physico-theologian, and, most important, a regent in his native town of Purmerend, not far from Amsterdam. This study of Nieuwentijt seeks consciously to imitate the social reading of Newtonianism offered by myself and others, and to ask questions that may explain why the Dutch were so prominent in the move-