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JÖ¼rgen Renn, ed. *Galileo in Context.* Cambridge: Cambridge University Press, 2001. 431 pp. $25.99 (paper), ISBN 978-0-521-00103-8.

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From Engineers to Artists: Finding Contexts for Early Modern Science

Historians of Italy might rightly expect to find the articles in *Galileo in Context*, edited by Jürgen Renn, relevant to their work. After all, the volume grew out of a 1996 conference on new approaches to Galileo, by way of a 2000 double issue of *Science in Context.* However, the collection is more concerned with contextualizing early modern science generally than Galileo specifically. The volume, writes Renn, aims to "challenge the notion of context" (p. 2) in order to come to "an *historical epistemology* of early modern science" (p. 6). As is often the case in collections, the authors provide a mixed bag of articles that do not necessarily form a coherent whole, but several essays provide useful insights into the history of science in early modern Italy.

The volume is split into three sections: the contexts of engineers, artists, and "traditional power structures" (including the Church, patronage, and Galileo's colleagues). In "Galileo Engineer: Art and Modern Science," Wolfgang Lefèvre connects Galileo's mechanics with the work of artisans and engineers by noting, for instance, Galileo's use of pendula just when such devices found increased practical use in machines and clocks. Lefèvre concludes that the Scientific Revolution, as manifested in the new dynamics, was "the work of men who must be thought of no less as engineers than as scientists" (p. 24). However, while he successfully challenges historians' imposition of a sharp divide between early modern scientists and engineers, Lefèvre does not provide an alternative. He could have strengthened his point by replacing the anachronistic scientist-engineer dichotomy with categories that the historical actors themselves would have recognized.

Horst Bredekamp uses an art-historical analysis of Galileo's scientific and non-scientific drawings to argue, in "Gazing Hands and Blind Spots: Galileo as Draftsman," that Galileo's artistic training helped him make and publicize new discoveries, as when he could "see" texture on the moon where others only "saw" light and dark. Bredekamp provides a useful, though not entirely novel, argument. However, some of his details are less convincing, such as his claim that the placement of six lunar images together on one page of the *Sidereus Nuncius* manuscript was "clearly a reference to the Medici" coat of arms (p. 170).

Sara Booth and Albert Van Helden also explore the connections between art and science with the most tightly argued article in the volume, "The Virgin and the Telescope: The Moons of Cigoli and Galileo." They address Lodovico Cigoli's fresco in S. Maria Maggiore in Rome, which seems to feature the Virgin Mary standing on an imperfect, *Nuncius*-style moon. As contemporary images of the Immaculate Conception or the Assumption traditionally depicted a perfect, immaculate moon to symbolize Mary's purity, historians have puzzled over Cigoli's apparently unpunished artistic/astronomical heterodoxy in a time of close attention to such matters. The authors draw on natural philosophy, art history, and exegetical traditions to argue convincingly that the fresco is in fact a perfectly orthodox illustration of a different subject, the triumph of the Woman of the Apocalypse over evil–represented by the cratered, imperfect moon recently described by Galileo.

Rivka Feldhay, in "Recent Narratives on Galileo and the Church: Or The Three Dogmas of the Counter-Reformation," counters a perceived tendency among "neo-conflictualist" historians (Richard Blackwell, Annibale Fantoli, and Ernan McMullin, among others) to exaggerate three Counter-Reformation trends–"typical authoritarian attitudes," "literal reading of the scripture," and "mild skeptical positions in astronomy"–as, respectively, "totalitarianism," "fundamentalism," and "instrumentalism" (p. 224). Feldhay historicizes and hence moderates the interpretation of these trends in order to demonstrate that the conflict between Galileo and the Catholic authorities was not inevitable, but rather a result of complex, particular circumstances and actors.

In "Replication or Monopoly? The Economies of In-

vention and Discovery in Galileo's Observations of 1610," Mario Biagioli highlights a tension in Galileo's work between revealing astronomical discoveries but concealing the means to reproduce them, suggesting persuasively that Galileo's balancing act must be understood in the context of the various "economies" of credit and compensation in which he worked. Thus, when he offered his telescope to political figures but not to his fellow astronomers, Galileo exhibited behavior typical of contemporary patron-seeking inventors. Biagioli provides an interesting account, which could have been valuably extended to include Galileo's tenure as philosopher to the Grand Duke. Biagioli's identification of Galileo's dedication of the Medicean Stars as an unusual "hybrid" is less compelling, as he perhaps overemphasizes the irregularity of the gift. The Medicean Stars could be seen as a variation of public art or monuments: such artifacts were similarly connected to the patron and yet visible to the public.

The two other articles in the volume are less specifically useful to historians of Italy. Paolo Galluzzi's "Gassendi and *l'Affaire Galilée* of the Laws of Motion" illustrates how early modern (French) intellectuals came to hold or change their natural philosophical positions under pressure from their colleagues. Jürgen Renn, Peter Damerow, Simone Rieger, and Domenico Giulini problematize the very notion of scientific discovery in "Hunting the White Elephant: When and How did Galileo Discover the Law of the Fall?" an essay of almost 250 pages (including related materials in the volume's appendix) which appears strangely out of step with the remainder of the book. A detailed evaluation of the authors' claims would be unsuitable here, other than to note that they may have been more successful by either writing a standalone monograph or by excising large sections of the paper to make it a better fit with its companions.

Unfortunately, disappointing production standards mar the volume, including numerous proofing errors, occasional garbled translations (e.g., p. 155), and several poorly reproduced images. Especially deplorable is the heavily pixilated, black-and-white image of the Cigoli fresco that accompanies the Booth and Van Helden article. Oddly, virtually the same image, though without the distortions, appears in the Bredekamp essay. Lengthy, untranslated quotations limit the potential audience of some of the articles.

Although historians of Italy are not the primary intended audience for this volume, it contains a number of interesting insights into the context in which Galileo lived, learned and worked, if the reader works to separate the wheat from the chaff.

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