Renaissance and Reformation
Renaissance et Réforme

Raphael, Renée. Reading Galileo: Scribal Technologies and the Two New Sciences

W. R. Laird

Volume 41, Number 3, Summer 2018

URI: https://id.erudit.org/iderudit/1085721ar
DOI: https://doi.org/10.33137/rr.v41i3.31647

See table of contents

Publisher(s)

Iter Press

ISSN

0034-429X (print)
2293-7374 (digital)

Explore this journal

Cite this review

Laird, W. (2018). Review of [Raphael, Renée. Reading Galileo: Scribal Technologies and the Two New Sciences]. *Renaissance and Reformation / Renaissance et Réforme*, *41*(3), 263–266. https://doi.org/10.33137/rr.v41i3.31647

all other books, must be read as one for which prayer and the Holy Spirit are required in order to apprehend the literal interpretation, leading its readers to a confession of the word as the Word.

The Bible has come under the attack of the Enlightened modernity: it is read like any other text and subjected to scrutiny under the historical-critical method derived from sciences and philosophy. On the one hand, Provan is keenly cognizant of the modern and post-modern critical methods, their promise and problems; on the other hand, he places much value on the church's pre-critical appropriation of the Bible. He underscores the Protestant hermeneutics of the sixteenth century, and the need for the present generation to be in continuity with them. In so doing he has succeeded in repositioning the Bible as the beginning, middle, and end of Christian faith and practice.

DENNIS NGIEN
Tyndale University College & Seminary

Raphael, Renée.
***Reading Galileo: Scribal Technologies and the* Two New Sciences.**
Baltimore: Johns Hopkins University Press, 2017. Pp. xi, 265. ISBN 978-1-4214-2177-3 (hardcover) $54.95.

The *Discourses on Two New Sciences* was Galileo's last and most important scientific work. In it, among other things, he laid the foundations of two entirely new mathematical sciences. The first was the new science of the strength of materials, which he founded on the principles of mechanics and on the power of the supposed interparticulate void. The second—and the more important for the history of science—was the new mathematical science of motion, the culmination for him of fifty years of study and careful experiments. Here he laid out in axiomatic form the mathematical principles of uniform and accelerated motions, notably that in the natural fall of heavy bodies speed increases as time and that distances in successive equal times are as the series of odd numbers. The ultimate legacy of his work was the ouster of the bookish methods of scholastic natural philosophy and the rise of mathematical and experimental science.

In *Reading Galileo*, Renée Raphael wishes to debunk this "grand narrative." According to her, historians of science from Antonio Favaro onwards have sustained this narrative by relying only on what Raphael calls Galileo's "ideal" readers (always within quotation marks), those who read the *Two New Sciences* both as manifesto for the overthrow of scholastic, Aristotelian natural philosophy and as an example of how to use mathematics and experiment in the study of nature. Instead, she wants "to force […] a clash between a darling of the traditional narrative and the approaches and methods of revisionist historians of science" (193–94), viz., historians of reading and the book, such as Elizabeth Eisenstein, Lisa Jardine, and Ann Blair. Her purpose, then, is to show that there were other, presumably real, readers of *Two New Sciences*, who brought to it more traditional methods and intentions, and who read it within the traditional bookish context of the previous century, the "scribal technologies" of her subtitle.

According to Raphael, a reader's methods and purpose are revealed in marginalia and annotations. Following the examples of Owen Gingerich in his study of annotated copies of Copernicus and Robert Westman in his of Galileo's *Dialogue*, she has examined the few extant copies of the *Two New Sciences* that contain annotations. Their annotators include some who otherwise rank among her "ideal" readers: Giovanni Battista Baliani (if she is correct in identifying an annotated copy as his), Vincenzo Viviani, and Marin Mersenne. Pseudo-Baliani (as she calls the first) displays some of the characteristics of the "ideal" reader—including a concern for the truth of Galileo's conclusions—but prefers authorities to experiment, treats the mathematics for its own sake, translates Galileo into scholastic terminology, and invokes causes where Galileo explicitly abjured them. Likewise, Viviani, Galileo's last student and vigorous promoter, departs in his annotations from the "ideal" reader in applying sixteenth-century textual methods of annotator and editor—adding topical headings, cross-references, citations of sources, and alternative proofs—rather than doing experiments himself. Even Mersenne deviated from the "ideal" reader by annotating two copies of the *Two New Sciences* entirely from a letter written to him by Descartes in answer to a request for opinions on the work, following the common practice of using annotations to organize various opinions on a text rather than record his own.

Beyond these, Raphael has examined two annotated copies of *Two New Sciences* in the Savile Collection at Oxford, one with annotations by Seth

Ward and the other with copies of Ward's annotations by Christopher Wren. Although Ward and Wren were mathematical and scientific adepts—both served as Savilian professor of astronomy at Oxford and both were active in the new Royal Society—in their annotations they reveal themselves to be far from "ideal" readers. Ward's suggest that he was concerned more with collecting observations and experiments from books than with reproducing Galileo's experiments for himself. And he treated Galileo's mathematical proofs mainly as mathematical exercises for algebraic practice. He also followed sixteenth-century bookish practices by pointing out standard philosophical topics, citing other authors, and the like. His annotations served as a teaching text for Wren, who dutifully copied them all out in his own copy of the book. Neither seems to have taken up in their annotations Galileo's new mathematical and experimental methods.

Raphael has supplemented these few annotated copies of *Two New Sciences* with the lecture notes of Galileo's successors at the University of Pisa and of Jesuits teaching at the Collegio Romano. Instead of a deep rift at Pisa between the followers of Galileo and their Aristotelian enemies, Raphael sees only a generational division exaggerated by rhetoric. The younger professors, despite their occasional use of new authorities, including Galileo, Gassendi, Descartes, and Torricelli, still relied on traditional scholastic and humanist reading practices. Like the hide-bound Aristotelians they ridiculed, they themselves still adhered to traditional authorities in their public teaching for the sake of civic and religious peace, reserving novelties for private study.

Among professors of philosophy at the Collegio Romano, Raphael could find only a few who drew even slightly on the *Two New Sciences*. Six mentioned Galileo's measurement of the heaviness of air (a perennially fruitless point of controversy in natural philosophy and a very minor point for Galileo), and only four mentioned the measurement of accelerated motion, three of whom cited Galileo's rule. But in their discussions of it, all three asserted incorrectly that speed (rather than distance) followed the odd numbers, although they all applied the rule correctly in their examples. Thus, Galileo's greatest discovery and the foundational axiom of his new science of motion—that the speed of accelerated motion is proportional to time, and not to distance—was lost on them. Raphael tries to excuse them by suggesting that they understood speed as average speed rather than Galileo's instantaneous speed, but this won't do. Average speed is also proportional to time, and not to the odd numbers. If

the common source of the other two was Niccolò Cabeo, as Raphael suggests, this just shows how they were betrayed by their traditional bookish method of teaching what they had been taught without understanding it.

Fortunately for the course of science, Galileo's legacy did not lie with readers such as these. Instead, it lay with the "ideal" readers, who sought to confirm and extend his work with mathematical demonstrations and experiments—Baliani, Torricelli, Mersenne, Gassendi, Riccioli, Fabri, Huygens, and Newton. Their contributions have been studied by a host of historians of science, from Antonio Favaro, Alexandre Koyré, and Stillman Drake, to Paolo Galluzzi, Domenico Bertoloni Meli, Dan Garber, and Carla Rita Palmerino, most of whose works are listed in Raphael's bibliography. Historians of reading and the book may find it interesting—though not surprising—that a few seventeenth-century readers of the *Two New Sciences* brought to this extraordinary book traditional scholastic and humanist methods and habits of reading. But those few hardly warrant a revision of the established account of Galileo's legacy.

W.R. LAIRD
Carleton University

Saiber, Arielle.
Measured Words: Computation and Writing in Renaissance Italy.
Toronto: University of Toronto Press, 2017. Pp. 280. ISBN 978-0-8020-3950-7 (hardcover) $65.

There are moments during which we as historians, literary scholars, or students of gender or media studies tend to get distracted in our readings of primary texts. One of these moments is when our authors start to talk about mathematics and geometry. In that case, we often—and too quickly indeed—tend to leave the inhospitable territory of these pages to the further investigation of specialists in the history of mathematics. Not so Arielle Saiber, for after her *Giordano Bruno and the Geometry of Language* (2005) she has now published another fascinating book on Italian Renaissance mathematics.

In four chapters that may also be read independently, *Measured Words* examines Leon Battista Alberti's *De componendis cifris* (1466), Luca Paccioli's *Degno alphabeto anticho* (1509), Niccolò Tartaglia's *Quando chel cubo*