Matematica e immaginazione nel Rinascimento. Annarita Angelini. Storie della Scienza. Milan: Editrice Bibliografica, 2017. 200 pp. €18.50.

"Arimmetica antica. 4°": that's not all he wrote, but it sums up what the notary assessing the library of the late Galileo Galilei had to say about a particular book. We do not know, and are unlikely to learn, whether this volume was in Italian or Latin, where and when it was published, whether it featured the word "arithmetic" or "arithmetically" in its title, what it claimed to offer its audience, and how it differentiated itself from similar works in a crowded market. We are, and will likely remain, ignorant of how it came into Galileo's possession, and what, if any, use he made of it; nor can we be sure of the borders this *arimmetica* shared with geometry, astronomy, and music. Beyond the notary's gesture to the quarto format, and the hypothesis that *antica* refers not to the subject matter but to a blackletter—rather than roman—font, we have no means of determining the work in question here.

We are on much more solid ground in Annarita Angelini's *Matematica e immaginazione nel Rinascimento*, which gives voice to the ongoing dialogue of figurative arts and mathematical developments in Europe between the early fifteenth and late seventeenth centuries. Philosophical conjectures about what it is the mind knows, how these concepts relate to the extremes of pristine divine knowledge and misleading sensory data, and, above all, the flexibility, autonomy, and generative capacity of such notions, serve as connective tissue between figurative and mathematical arts. Angelini also offers close, economical, and persuasive readings of fourteen colored images—a fresco, various sketches, oil paintings, prints, and a tapestry—that shape and nuance an often-abstract argument. The arc of the narrative leaves the discourse of mimesis, naturalism, and a pellucid geometry for a series of penumbral constructs—the shadow cone of Leonardo da Vinci, Nicholas of Cusa's uncanny and mobile icon, the "embodied non-body" described by Francesco Patrizi, quantities neither positive nor negative envisioned by Girolamo Cardano—and shows the sibling likenesses subtending these and other concepts. This approach allows for, but does not depend upon, some traffic between images and texts normally sequestered within particular disciplines.

As Angelini argues in her discussion of Jan van Eyck's *Arnolfini Portrait*, even efforts that privilege the stabilizing conventions of Euclidean geometry and perspectival construction can disclose in their details a shadowy, coextensive realm, a space intuited rather than fully understood, much less articulated or exploited. Such strategies are useful in a narrative anticipating, at multiple junctures, features of Gérard Desargues's projective geometry and a range of philosophical insights offered by Gottfried Wilhelm Leibniz. Her emphasis on liminal rather than central and institutionalized aspects of mathematics also allows Angelini to explain unexpected interdisciplinary exchanges, and to posit both self-censure and an increasing interest in the intellectual autonomy and creativity of artists and scientists alike. On this reading, a certain impatience with the strictures and seemingly empty formalism of geometry, best but not uniquely

https://doi.org/10.1017/rqx.2019.412 Published online by Cambridge University Press

expressed in Dürer's celebrated print, correlates neatly with the link between that science and melancholia; the sometime effort of philosophers to distill a universal mathesis from the narrower confines of a single discipline is a related development.

One occasionally wishes for more context than this intriguing study provides. A sketch of a typical early modern mathematical education, for instance, would offer some measure of the conceptual distance of these less conventional approaches. More emphasis might be placed on the very different media of the images examined in this work. The many quarrels within the world of Euclidean geometry—the fidelity of various editions and translations of the *Elements* to its author's imagined intentions, the nature of proof, the availability and relevance of a method, the role of diagrams, the changing definitions of ratio and proportionality, the legitimacy of conceptual outliers such as curvilinear angles and superposition, among others—might be examined in tandem with the objections being raised just beyond that realm. Other desiderata would include larger, clearer images, more attention to the impact of European notions, however distorted, of mathematical notions and artistic practices beyond the continent, and some examination of the other scholarly areas that, like mathematics, were claiming to offer a metalanguage as they jockeyed for position as the master discipline.

Eileen Reeves, *Princeton University*
doi:10.1017/rqx.2019.412

Penser les mathématiques au XVI^e siècle. Shin Higashi.
Histoire et philosophie des sciences 17. Paris: Classiques Garnier, 2018. 490 pp. €49.

In this book, Shin Higashi investigates possible sixteenth-century roots of the seventeenth-century rise of the modern mathematical sciences. It is a virtue that Higashi sticks closely to presenting sixteenth-century work in its own right, rather than seeing everything from the perspective of the new science, such as that of Galileo, but this means that the narrative lacks much sense of tension or development over time. Only at the end does the author underline the great distance between the views on mathematics of late Renaissance commentators on Aristotle and the views of Galileo or Descartes. Almost all possible connections to medieval views of mathematics in the fourteenth or fifteenth centuries—which do exist—are also left unexplored. In one case, John Buridan is mentioned as a person who defended a view on the scientific status of mathematical demonstrations similar to that of Piccolomini. The echo of the fourteenth-century nominalists, or *moderni*, in the view of the Coimbra Jesuits that mathematical entities are fictive or imaginary is entirely missed. Thomas Aquinas gets more attention because of the resurgence by the sixteenth century of the so-called *antiqui*, especially the Thomists.