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Philip Beeley, Yelda Nasifoglu, & Benjamin Wardhaugh (eds), *Reading Mathematics in Early Modern Europe: Studies in the Production, Collection, and Use of Mathematical Books*, New York & London, Routledge, 2021, xvi + 332 pp., £96.00 (hardback), ISBN 9780367609252

Reading, perhaps the defining activity of the long history of organised scholarship, can be vexingly hard to pin down. Most of the time, I can barely make sense of my own peculiar and variable engagements with printed words; it is a wonder that I manage from time to time to coax students into better readings of their own. There is something about the unstable interiority, the situated materiality, the sociotechnical and cognitive contingency of reading that makes it virtually impossible to comprehend with precision. We can hardly begin to explain the reading we may encounter firsthand, nevermind reading from centuries past.

I am grateful to the eleven audacious authors who contributed to this stimulating volume for trying nevertheless. Aspiring to describe the characteristic and distinctive features of mathematical reading in early modern Europe, with a focus on England and particularly Oxford, they deliver in the end a nuanced and inviting portrait of the many things mathematical books and ideas about mathematical books did for those who made and used them. Reading is of course central to this world of books, but reading as such is necessarily somewhat marginal in the volume's analyses. Rather, as the subtitle suggests, there is much to be learned from approaching books obliquely, following how they were made, discussed, amassed, amended, promoted, imagined, and otherwise featured in intersecting communities of mathematical scholars, practitioners, publishers, and more.

The various forms and scales of communities that form around books prove to be the key to their historical significance. This is in part about the ideas and information books store and convey, but it proves to be at least as much about how books nucleate social and institutional demands and relationships, how they furnish occasions to attest and contest and reflect. A communal perspective takes the authors to many other kinds of texts and interactions, in forms as varied as letters, catalogues, ledgers, specimen prints, and scrap notes.

The community of authors represented in this book came from the Reading Euclid project funded at Oxford from 2016-2018 by the UK Arts and Humanities Research Council, led by Benjamin Wardhaugh with co-editors Philip Beeley as co-investigator and Yelda Nasifoglu as research associate. Early modern editions and interrogations of Euclid's *Elements,* here, give a through-line for traversing a much wider world of mathematical scholarship and practice. The editors and authors have produced a thematically and analytically coherent volume, with chapters that enrich each other while also holding up well individually. The project's Oxford context comes across strongly in the sources and subjects at the volume's centre, with Henry Savile of Oxford's eponymous geometry and astronomy professorships drawing special attention. Chronologically, the volume's periodization is largely bookended by the epoch-making print editions of Euclid's *Elements* from the turn of the sixteenth and eighteenth centuries. The volume is richly illustrated with quotations and images, exhibiting a panoply of rare and remarkable material derived from the Reading Euclid project and from contributors' own respective undertakings.

A sharp and effective introductory chapter by the editors had me enthusiastically reenacting many of the practices of annotation discussed later in the book. There follows a series of chapters that establish contestation and correction as specifically mathematical modes of book-work. With fruitfully varied approaches and sources, Vincenzo De Risi, Robert Goulding, Yelda Nasifoglu, and Renée Raphael chronicle attempts to rationalize and resolve the implications and limitations of diagrams and related reasoning in geometric texts.

Mordechai Feingold's survey of the curricular values and roles of mathematics (and mathematical books) in English universities frames a middle section with chapters by Richard Oosterhoff, William Poole, and Philip Beeley in which collections of books and manuscripts anchor accounts of the multifarious social and intellectual stakes of mathematics at and around Oxford. Likewise, Benjamin Wardhaugh's illuminating survey of mathematical textbook annotations frames striking analyses by Boris Jardine and Kevin Tracey of annotations in specific books. There is no conclusion to venture what must inevitably be premature summations of an avowedly exploratory project.

In the early modern contexts studied, as now, there does appear to be something distinctive about mathematical reading, and accordingly about how books and associated texts figure in the communities and contexts where mathematical knowledge is pursued. Unsurprising elements examined to great effect here include the role of axiomatics and diagrammatic representation, expectations of symbolic precision and rigour, and practices of calculation and explanation. Each manifests in the composition of published texts, commentaries and discussions in various settings, and annotations both routine and exceptional. There is less on how text-oriented mathematics related to mathematics in other modalities; the few mentions in this volume suggest both how important and how elusive such interactions may be to the wider history at stake. Wardhaugh's chapter most directly confronts the limitations of text-oriented studies that must necessarily overemphasize the unrepresentative survivals of particular kinds of texts to the exclusion of other facets of lived historical experience, a predicament hardly unique to histories of mathematics. Old books have always been fickle windows on the past.

The authors introduce mathematical details and historiography judiciously. Historians of mathematics will appreciate the contexts and analytic specificity for their field, while historians who come to the book from other perspectives and traditions will find an accessible induction into how and why the mathematical dimensions of this history really matter.

The authors also thoroughly engage the substantial literatures on early modern mathematical practice and practitioners (a somewhat distinct subject, historiographically and substantively, from the history of theoretical mathematics), book and publishing history, and the history of universities and scholarship (including the specific literature on Oxford). The chapters and the volume as a whole make insightful potential contributions to other areas without such detailed reckoning with their scholarly contexts. The idea of reading as a performance, for example, recurs fruitfully while remaining under-theorised. Scholars interested in personas and subjectivity, as well as affect and emotion ('aggression' was a surprising watchword!), will likewise find much of interest.

The editors' introduction stresses the volume's historiographical implications for understanding the practices and institutions of early modern mathematics and their ramifications for wider histories of reading, including in mathematics. For historians of mathematics, however, there is a greater and more radical historiographical potential lurking between the lines. One of the defining debates of the last half century has concerned what it means to rewrite ancient mathematical texts, and how to do so while respecting the sometimes-competing prerogatives of mathematical and historical understanding. With its capacious historical reframing of the problem of rewriting mathematics as a

matter of early modern scholarly practice, this volume offers both a contextualization and a critique of what have been divisive historiographical debates about transmission and interpretation. Reading and understanding, of mathematics and of history, can be seen as cognate imponderables, alike susceptible to bookish historicization.

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