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Book Reviews

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Niccolò Guicciardini, ed., *Anachronisms in the History of Mathematics: Essays on the Historical Interpretation of Mathematical Texts*. Cambridge: Cambridge University Press, 2021. 392 pp. ISBN: 9781108834964.

Anachronisms in the History of Mathematics is a collection of essays that stems from a workshop convened by Niccolò Guicciardini at the California Institute of Technology in 2018.

If the concept of anachronism is pivotal to any historical reconstruction, it holds a particularly complex position in the history of mathematics. On the one hand, an essentialist interpretation would stress the stability—some would go as far as to claim its permanence and universality—of mathematics. To a similar interpretation, the history of mathematics is the history of a cumulative development, the unfolding of a coherent body of knowledge which is universal and, therefore, independent from its 'context'. On the other hand, a close reading of historical primary sources can show that, also in the case of mathematical knowledge, stability has been achieved amongst a high degree of diversity. It is not necessary to look very far in time or space to find similar examples. While most 'Western-educated' readers will find a remarkable sense of 'kinship' while skimming through a modern edition of Euclid's *Elements*, that comforting feeling will rapidly disappear when confronting, for example, medieval European vernacular algebra written in rhetorical style (i.e. word by word, without symbols). To every reader who has ventured in a similar exploration, it is hardly possible to escape the impression that, also in the case of mathematics, the past can show a high degree of 'foreignness'. This tension between mathematical stability and historical diversity is analysed throughout the contributions of the book, providing a rich series of case studies.

In his *Introduction*, Niccolò Guicciardini sets the scene for the entire volume by asking: should historians of mathematics attempt to 'translate' past mathematical texts into modern mathematical language and evaluate their arguments according to modern standards, or should they stress the 'foreign-

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ness' of such texts, and understand them as instances of an unbridgeable past? Analysing a number of cases related to the history of Chinese mathematics, Karine Chemla argues that, perhaps counter-intuitively, contemporary scientific breakthroughs can help in reading past mathematical texts in less anachronistic ways. Kim Plofker argues that the study of pre-modern Indian mathematics is subject as much to the risk of anachronism as it is to the risk of 'anachorism'. This she defines as the use of concepts developed in a distant space (rather than time) as interpretive tools to approach the history of Indian mathematics. Jacqueline Feke discusses a common anachronistic assumption that in European antiquity mathematics and philosophy were separate fields of research. Using examples from the history of Chinese mathematics, Martina Schneider argues that "deliberate" or "controlled" anachronistic readings can be helpful to the historian to provide "historiographically sensitive" mathematical reconstructions. Robert Goulding analyses the reasons that led Petrus Ramus to an anachronistic reconstruction of ancient mathematics, and how this affected his understanding of Euclid's *Elements*. Niccolò Guicciardini argues that the differential equations by Leibniz and the Leibnizian school have a deceptive familiarity to the modern eye, as they conceal mathematical tasks and criteria that are different from contemporary ones. Craig Fraser, Andrew Schroter, Jemma Lorenat, and Jeremy Gray offer similar perspectives by discussing the cases of Euler's early work on calculus, early 19th-century projective geometry, and the historiography on projective geometry by Roberto Bonola. Finally, Joseph Dauben asks whether anachronism is inevitable in the history of mathematics.

As can be seen from this quick overview, the book gathers a diverse range of scholars who cover a wide-ranging set of periods and of topics. Given the wide scope of the subjects covered in the book, it is likely that most readers will not have the competences to gauge the historiographical novelty of each of these contributions. Unfortunately, the text is not particularly easy to navigate, as the book does not provide a unified bibliography (each chapter is followed by its own references) and the final *Index* does not include all the authors quoted in the internal chapters. Together with its wide-ranging subjects, the book offers a thorough and nuanced reflection on several understandings of anachronism in the history of mathematics, justifying the plural—anachronism*s*—of the book's title. Examples of these are Chemla's conception of 'textual anachronism', Pfolker's category of 'anachorism', Feke's analysis of the distinction between practitioners and research practices, Schneider's "deliberate" or "controlled" anachronistic readings, Guicciardini's "deceptive familiarity" of early modern algebra, Goulding's, Fraser's, Lorenat's, and Gray's discussion of past (and present) historical inaccuracies, and Dauben's concept

of "commensurable" and "incommensurable" anachronisms. Each chapter contributes to the discussion by providing a distinct methodological angle on the problem of anachronism.

The main contribution of the book lies in this rich meta-historical reflection. Apart from contributing to their specific historiographies, the essays of this book provide an important contribution to the methodology of the history of mathematics. As a consequence, the book has an appeal for any historian of mathematics, regardless of their period of specialisation. The most significant contribution of the book lies, in fact, in providing detailed analyses of a crucial problem for the practitioner of the history of mathematics. The volume explicitly seeks to "reflect on the 'uses and abuses' of anachronism in the historical study of the mathematical sciences" (p. 2). The discussion brings to the fore the Janus-faced nature of anachronism in the history of mathematics, as anachronisms can be as misleading as they can be enlightening when writing the history of this body of knowledge. The book does not offer clear-cut solutions, but rather a series of nuanced arguments and of possible angles through which historians of mathematics are invited to think about anachronism in their scholarly activity. In other words, the book provides a methodological masterclass that provides historians of mathematics with a deeper awareness of the possible dangers and rewards of stressing both the remoteness and the familiarity of their primary sources.

Finally, the book seems to open promising directions for further research. For example, if it is true, following Henk Bos, that reconstructing mathematicians' own "tasks and criteria of quality control" can provide an effective methodology to achieve a deep reading of historical mathematical texts, this can be an open door for collaborations between the history of mathematics and socio-economic history. If these self-imposed tasks and criteria provide an effective perspective from which the historian of mathematics can approach their sources, a collaboration with the socio-economic historian might lead to a deeper appreciation of the entanglement of such 'self-impositions' with the broad 'contexts' in which mathematical texts were written. *Anachronisms in the History of Mathematics* provides a rich series of contributions which will be of interest both to the specialist and to any scholar interested in the analysis of past mathematical sources.

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