

Review of

***The Oxford Handbook of The History of Mathematics*, edited by Eleanor Robson & Jacqueline Stedall. Oxford: Oxford University Press, 2009. Pp. vii+918. Index of names and subjects. Hc. £ 90.**

The editors claim in the “Introduction” to “hope that this book will not be what you expect” (p. 1). The reviewer’s task being to make the reader aware of what should be expected, let it none the less be said straightaway that the book is very good but definitely no handbook. Indeed, as the editors adequately explain next, it is

not a textbook, an encyclopedia, or a manual. If you are looking for a comprehensive account of the history of mathematics, divided in the usual way into periods and cultures, you will not find it here. Even a book of this size is too small for that, and in any case it is not what we want to offer. Instead, this book explores the history of mathematics under a series of themes which raise new questions about what mathematics has been and what it has meant to practise it. The book is not descriptive or didactic but investigative, comprising a variety of innovative and imaginative approaches to history.

It thus contains 36 paradigmatic examples of questions and approaches that *can* be applied to the topic – with one exception (on which below) good or very good. They are ordered (but after they were received by the editors) in nine groups with four in each, these nine groups being themselves grouped three by three; a complete list will give an adequate impression of the scope of the book, first of all but not only of its geographical and temporal reach:

I Geographies and Cultures

1 Global

- 1.1 “What was mathematics in the ancient world? Greek and Chinese perspectives” – G. E. R. Lloyd.
- 1.2 “Mathematics and authority: a case study in Old and New World accounting” – Gary Urton.
- 1.3 “Heavenly learning, statecraft, and scholarship: the Jesuits and their mathematics in China” – Catherine Jami.
- 1.4 “The internationalization of mathematics in a world of nations, 1800–1960” – Karen Hunger Parshall.

2 Regional

- 2.1 “The two cultures of mathematics in ancient Greece” – Markus Asper.
- 2.2 “Tracing mathematical networks in seventeenth-century England” – Jacqueline Stedall.
- 2.3 “Mathematics and mathematics education in traditional Vietnam” –

Alexei Volkov.

2.4 “A Balkan trilogy: mathematics in the Balkans before World War I” – Snezana Lawrence.

3 Local

3.1 “Mathematics education in an Old Babylonian scribal school” – Eleanor Robson.

3.2 “The archaeology of mathematics in an ancient Greek city” – David Gilman Romano.

3.3 “Engineering the Neapolitan state” – Massimo Mazzotti.

3.4 “Observatory mathematics in the nineteenth century” – David Aubin.

II *People and Practices*

4 Lives

4.1 “Patronage of the mathematical sciences in Islamic societies” – Sonja Brentjes.

4.2 “John Aubrey and the ‘Lives of our English mathematical writers’” – Kate Bennett.

4.3 “Introducing mathematics, building an empire: Russia under Peter I” – Irina Gouzevitch and Dmitri Gouzevitch.

4.4 “Human computers in eighteenth- and nineteenth-century Britain” – Mary Croarken.

5 Practices

5.1 “Mixing, building, and feeding: mathematics and technology in ancient Egypt” – Corinna Rossi.

5.2 “*Siyāq*: numerical notation and numeracy in the Persianate world” – Brian Spooner and William L. Hanaway.

5.3 “Learning arithmetic: textbooks and their users in England 1500–1900” – John Denniss.

5.4 “Algorithms and automation: the production of mathematics and textiles” – Carrie Brezine.

6 Presentation

6.1 “The cognitive and cultural foundations of numbers” – Stephen Chrisomalis.

6.2 “Sanskrit mathematical verse” – Kim Plofker.

6.3 “Antiquity, nobility, and utility: picturing the Early Modern mathematical sciences” – Volker R. Remmert.

6.4 “Writing the ultimate mathematical textbook: Nicolas Bourbaki’s *Elements de mathematique*” – Leo Corry.

3. *Interactions and Interpretations*

7 Intellectual

7.1 “People and numbers in early imperial China” – Christopher Cullen.

- 7.2 “Mathematics in fourteenth-century theology” – Mark Thakkar.
- 7.3 “Mathematics, music, and experiment in late seventeenth-century England” – Benjamin Wardhaugh.
- 7.4 “Modernism in mathematics” – Jeremy Gray.
- 8 Mathematical
 - 8.1 “The transmission of the *Elements* to the Latin West: three case studies” – Sabine Rommevaux.
 - 8.2 “‘Gigantic implements of war’: images of Newton as a mathematician” – Niccolo Guicciardini.
 - 8.3 “From cascades to calculus: Rolle’s theorem” – June Barrow-Green.
 - 8.4 “Abstraction and application: new contexts, new interpretations in twentieth-century mathematics” – Tinne Hoff Kjeldsen.
- 9 Historical
 - 9.1 “Traditions and myths in the historiography of Egyptian mathematics” – Annette Imhausen.
 - 9.2 “Reading ancient Greek mathematics” – Ken Saito.
 - 9.3 “Number, shape, and the nature of space: thinking through Islamic art” – Carol Bier.
 - 9.4 “The historiography and history of mathematics in the Third Reich” – Reinhard Siegmund-Schultze.

The understanding of mathematics is very broad; almost anthropological, it encompasses the whole range of mathematical practices within a society or a professional group. The topics dealt with thus reach from Inca and late medieval Italian book-keeping (1.2) – ancient Greek and Roman surveying and geometric planning of a race-course in Corinth (3.2) – the algorithms of weaving patterns in the Andes (5.4) – and the teaching of basic arithmetic (2.3, 3.1 and 5.3) to the mathematics of astronomical observatories and computation (3.4 and 4.4) – to Newton’s and others’ understanding of what was really important in his infinitesimal work (8.2) – the problems inherent in the concept of mathematical “modernism” (7.4) – the Bourbaki project (6.4) – and the links of the theories of convex sets and non-linear programming with individual and institutional aims of workers (8.4).

Approaches are varied, as a natural consequence of the editors giving “authors a broad remit to select topics and approaches from their own area of expertise, as long as they went beyond straight ‘what-happened-when’ historical accounts” (p. 1). Fortunately (after all, the *sine qua non* of historiography is knowledge of what-happened-when), the actual chapters contain all the often unfamiliar factual information needed to support the argument and to undermine myths, and they are happily free of free-wheeling proclamations of principle;

they are indeed good paradigmatic examples, convincing by the quality of their reasoning.¹ For example, many of us may (in these or other words) know the description of Czar Peter the Great behaving like “a savage visiting a supermarket who, fascinated by the riches on display, shovels everything into his basket without knowing whether he needs it or not” when important Western European science (p. 354, citing W. Berelowitch, in ch. 4.3); this is shown by Irina and Dmitri Gouzévitch to be totally false, in a paper which combines a large amount of well-digested biographical information (about Peter, but also about the Western European mathematicians that were hired for his project) with information about the preceding state of mathematical knowledge in Russia, about Russian metrology and orthography old and new, about the difficulty of creating a lay publishing institution and about the character of the books translated (a character that changes during the development of the project and in sympathy with the changing military challenges) – etc.

On other topics the reader may be even less prepared. How many of us, for example, even among those with some familiarity with the mathematics of the Islamic world, know much about the *siyaq* number notation, developed from the Sasanian administrative numerical shorthand and used for administrative and accounting purposes from the Ottoman empire to India (and even further), from ‘Abbasid times until the twentieth century? After reading the chapter we not only know about the script, its history and historical context; we also got material to reflect upon concerning the conditions of numeracy – conditions that are much more intricate than we believe, accustomed as we are to its being exclusively carried by the decimal place-value system.

Dependent rather on the choice of authors than on the task given to them is the possibility to deal with the same historical situation from several different points of view – a perfect illustration of how different equally legitimate questions may be asked, and even of how different equally legitimate delimitations of “mathematics” are possible. Classical Antiquity is thus dealt with in four chapters. In 1.1, Geoffrey Lloyd looks at the understanding of what mathematics meant within Greek elite culture (comparing to Han and slightly later China). This necessarily restricts his discussion to the kinds of mathematics whose presentation makes up the bulk of Thomas Heath’s *History of Greek Mathematics* [1921] – of extreme importance for later Islamic and European mathematics, but

¹ Explicit methodological reflections are certainly not absent, and sometimes extensive and profound (e.g., 7.4 and 9.4); but when present they are well integrated with the subject-matter.

socially a fringe phenomenon in its times.² Markus Asper (2.1) takes up the existence of “several coexisting and partly overlapping fields of mathematical practices”, and discusses the socially much more important (though culturally subliminal) practical traditions with their probable roots in the Near East (those which Netz [2002] refers to with the pun “counter culture”). David Gilman Romano (3.2) analyses the archaeological remains of one of the practical traditions, namely the surveying of land and the geometrical planning of a race course in Corinth. Ken Saito (9.2), finally, returns to the mathematics “of theorems”, but in particular to the problem of textual criticism of the manuscript tradition, emphasizing how both the material possibilities (the difficulty of travelling between manuscripts before the railway, the opportunity to travel between or to send manuscripts after their construction, the new opportunities for comparison offered by microfilming, etc.) and the questions asked by different epochs affect what is seen in the texts.

Other multiple coverages concern Pharaonic Egypt (5.1, 9.1) and China (1.1, 7.1 and, at some distance, 1.3), similarly offering complementary perspectives. A couple of a different kind is offered by chapters 9.1 and 9.3 – respectively Annette Imhausen’s analysis of how a number of unfounded myths have developed (e.g. from Moritz Cantor’s suggestion of what *might* have been the case until the repetition of the same as a fact), and Carol Bier’s *production* of such myths (going the whole way from suggestion to factual assertion). Bier’s aim is to connect the culture of geometric patterns (which in fact distinguishes the Islamic world from other cultures) directly to some particular spirituality. Alone among contributors to the volume, she claims that the questions *she* wants to raise to the material are the only good questions to ask.³ The creation of the

² Multiplying generously the total evidence by three, Reviel Netz [1999: 291] estimates that on the average at most one mathematician (active in this kind of mathematics) was born per year in the Greek, Hellenistic and Roman world during the millennium under discussion.

Lloyd is well aware that there were other kinds of mathematical practice – see, e.g., [Lloyd 1992: 570f].

³ “However, the questions I think we should be asking are not about decoration and ornament, but about surfaces and the plane, about units and repeats, and about circles and the nature of two-dimensional space” (p. 833). Further on in the same paragraph, it is suggested that the apparently non-representational patterns might be “representational in the deepest meaning of the word: a visual metaphor of relationships, of existence, of the cosmos, an expression of realities beyond that which can be merely seen”. If anything, this sounds Platonic or Neoplatonic rather than broadly Islamic – but no evidence for the suggestion

myth can be seen on p. 834:

“According to this line of thinking [the author’s own speculation, unsupported by any source evidence except contemporaneity of decorative patterns and theoretical mathematics dealing with wholly different topics], at some point between the eighth and the eleventh century, Islamic ornament and its formal expression became connected to abstract ideas articulated in contemporary philosophy, mathematics, and religion.

Misleading use of evidence also abounds in the following pages.⁴

Fortunately, this unconvincing piece is the exception that puts the rest of the book in relief.

Until not very long ago, the history of mathematics was relatively untouched by what happened in the history of science at large; obviously, this is no longer the case, the present volume presents perspectives as broad and as broad-minded as what can be found in the best history of other sciences. There is strong interest in contexts of many kinds, and in actors’ aims (including their social aims); but the reduction of everything to image or career strategy (in the style of “Boyle being busy fashioning himself as a gentleman natural philosopher” – the new brand of externalism) is as absent as the “internalist” conviction that external conditions (like the social role of a mathematician or the very existence of a category “mathematics”) are perennial and therefore separable from the development of knowledge.

All the way through, the exposition is transparent. Problems and concepts are well explained, and only a minimum of background knowledge is presupposed. Not only historians of mathematics but anybody interested in the history of mathematics and in possession of academic training will enjoy and profit from reading the book.

Unfortunately, a final critical point needs to be made, imputable neither to the editors nor to the authors but to Oxford University Press. The technical quality of the book might be acceptable for a crime novel bought in the airport

is offered.

⁴ One example must suffice. A Qur’anic passage (59:21, God speaking to Muhamad)

Had we sent down this Qur’an on a mountain, verily thou would have seen it humble itself and cleave asunder for fear of God. Such are the similitudes that we propound to men that they reflect.

is inscribed on the 11th-c. tomb towers of Kharraqan. Bier “feels tempted to” see the demonstrative pronoun “such” (*tilka*), clearly referring to the preceding “similitude” (*mathal*, meaning “likeness, metaphor, simile”), as pointing instead to “the actual patterns depicted on the monuments”.

and meant to be discarded at arrival, but for a volume supposed to be read and consulted repeatedly it is a scandal. The reviewer's copy broke twice during the single reading and each time had to be glued together anew; the pages turned out to be neither sewn nor glued to some kind of linen. Libraries can only be advised to buy the paperback edition (according to a brief inspection of one specimen of better quality) and have it bound themselves. Others interested in possessing it should definitely buy the paperback, at one third of the price of the hardback edition.

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