debate, and thereby contributed to placing the individual believer's exercise of free judgement at the centre of religion in modern Bosnia-Herzegovina.

In summary, this is a very heterogeneous, thought-provoking collection of articles presenting the best of current French studies on the Turkic world, augmented by numerous photos, English summaries and an index, and with only a dozen or so typographical errors. Both the editors and Brill are to be commended for making this fine work available to a wider research audience. winter.stefan@uqam.ca.

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Mathematics in India. By Kim Plofker. pp. xi, 357. Princeton and Oxford, Princeton University Press, 2009.
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Mathematics in India traces the overall course of Indian mathematical science as a coherent intellectual tradition extending from antiquity to the early colonial period. Plofker has produced a classic work that should be owned and read by any scholar interested in the history of science in South Asia. It is at the same time a path-breaking contribution to the understanding of the history of mathematics.

Plofker arranges her book in nine chapters and two appendices, and the book is accurately referenced throughout to a wide range of the latest and best research literature.

Pre-modern Indian literature on mathematics was written almost entirely in the Sanskrit language, and India's mathematicians used the language in special ways, inventing their own codes, abbreviations, and modes of expression that go beyond mere stylistic variation. Furthermore, all surviving Indian mathematical works have reached the modern period through complex processes of manuscript transmission, and many works have still not been edited or printed and therefore still have to be read in manuscript. It is extremely helpful, then, that Plofker devotes Appendix A to a survey of the basic features of Sanskrit language and literature with reference to mathematics, and a brief account of the manuscript tradition. The second Appendix is a helpful prosopographical glossary of forty-two major mathematical authors, referencing Pingree's *CESS,* the entries in the *Dictionary of Scientific Biography*, and other key sources.

Plofker does not set out her historiographical orientation in any one place, but her theoretical stance as a historian becomes clear at many points. She remains close to the sources, excavating their contents and relationships, and remains resolutely evidence-based. She argues that the commonly-propounded theory that Indian mathematics (and other sciences) experienced a period of decline and stagnation in the second millennium is exaggerated or even wholly inaccurate (p. 290). She notes that, structurally-speaking, the historical evolution of mathematical thought in India had more in common with early Europe than has been previously credited, that is to say, a few classic works were repeatedly referenced throughout the tradition, but this did not prevent innovation and the proliferation of new works and the development of "many interesting paths of discovery and controversy" (p. 295). She begins her book with a survey of previous scholarship, deprecating old-fashioned "grand narrative" approaches and drawing attention to the diversity and importance of research publications of recent decades. Most important, she notes that the history of science in India has long been co-opted for political purposes, starting with British-era polemics against indigenous sciences and continuing into the present-day politicised debates about history, religion and culture in Indian society that commonly posit a deep

past of scientific and technical achievement (p. 2). Plofker's treatment of this sensitive matter is brief but effective, as is her later discussion of encounters with Islamic mathematics in the Indian subcontinent (¶8.2) that offers a powerful corrective to the "foreign deluge" theory of scientific decline. Following in the footsteps of her teacher (and mine), David Pingree, Plofker sees India as never having been historically isolated, and as having "constantly exchanged goods and ideas with its neighbors" (p. 9).

In a short but important passage (p. 12), Plofker argues (following Staal and others) that the Sanskrit intellectual tradition differed from the Greek and its Islamic and European successors in a fundamental way, by understanding the universal or ideal structures lying behind manifest creation not primarily as mathematical entities, but as linguistic ones. For Sanskrit philosophers and logicians, therefore, ideas about the nature of reality are appropriately interrogated through grammatical and linguistic interpretation rather than through mathematics. This placed the tradition of mathematical sciences of India in a quite different relationship to other intellectual disciplines than was the case in early Europe.

Plofker's sensitive and wide-ranging chapter on mathematical thought in Vedic India incidentally addresses the vexed question of astrochronology, noting that the Achilles' heel of the subject is, "its requirement of an unambiguous identification of an accurately observed event" (p. 32). She notes that none of the texts of the Vedic corpus meet these criteria, and runs through some of the better-known astrochronological arguments with great fairness and patience, showing that ultimately they invariably depend on assumptions from outside the Vedic texts themselves.

Nor is Plofker afraid to address some of the other controversial issues that have created heat amongst historians of Indian mathematics. She writes clearly about the touchy subject of Vedic India and ancient Mesopotamia, showing that the evidence is far less obvious or convincing than Pingree would have had us believe (¶2.5). She also addresses (¶7.5) the argument that has been made that some aspects of Keralan mathematics from the late fourteenth century might have reached Europe via the Jesuits, and then influenced or even initiated the European development of calculus. Plofker notes that the idea is intriguing but still lacks the evidence necessary to raise it beyond speculation. She also discusses the vexed "mystery of Indian observational astronomy" (¶4.6) in a lucid and thoughtful section that gives close attention to the work of the late Roger Billard as well as to the "transmission hypothesis" that the fundamentals of the *siddhānta* system were derived from Hellenistic sources. Plofker's nuanced conclusion is that arguments for both positions have merit and value but that neither is conclusive at the present state of the field.

At the start of her chapter on mathematical traces in the Early Classical period, Plofker is briefly misled by outdated scholarship on the date of the *Arthaśāstra*, but this does not lead to serious error. Her subsequent remarks address the history of place-value notation, the emergence of Greco-Indian astrology and the early Classical Sanskrit astronomy and trigonometry reported in Varāhamihira's *Pañcasiddhāntikā*, Puranic cosmology and mathematics in non-mathematical literatures, including Jaina and Buddhist texts. Turning to astronomical computation in the later first millennium, Plofker offers a helpful glossary of technical terms before launching a survey of Siddhānta literature. This is the heartland of the astronomical *jyotiṣa* literature, and Plofker's account is necessarily technical, but nevertheless readable as a descriptive narrative. Geometrical diagrams complement the algebraic expressions, greatly clarifying the issues.

Moving from spherical astronomy to mathematics, Chapter Five surveys the arithmetical concepts and techniques from Āryabhaṭa to Mahāvīra, with a detailed excursus on the mathematics of the Bakhshali manuscript. In Chapter Six, Plofker examines the more standardised forms of mathematics that emerged in the twelfth century with Bhāskara II, and that finally established what might be called the canonical mathematics of pre-modern India. This chapter begins with an interesting and helpful survey of prosopographical sources and terminology, including remarks on the sociology of Sanskrit culture and science in Southeast Asia and the Himalayan region (¶6.1.4). At the end of this section (¶6.4), Plofker stands back and offers several pages of valuable reflections on Indian mathematical

writing and thought viewed as a whole. She discusses the relationship of mathematical thinking to other forms of Sanskrit learning, orality, exposition, the role of commentaries, and the concepts of proof, truth and validity in Indian mathematics, where contemporary understandings have evolved considerably in the light of the much wider range of works available for study today than in the past.

Chapter Seven is devoted to the unique work of Mādhava of Saṅgamagrāma in the fourteenth century and his brilliant students and successors in the Keralan School of mathematics. This exposition is followed by a discussion of the famous transmission of Indian numbers to the West through Bishop Severus Sebokht in 662 CE, and the engagement of Islam with Indian mathematical ideas in the Middle-East and later in India itself.

The book closes with a slightly miscellaneous chapter on continuity and change in the modern period, that is nevertheless full of fascinating observations and exposition about topics from early modern prosopography to Leonhard Euler's attempts to clarify aspects of Indian mathematics and the controversies between Puranic and astronomical world-views. Plofker ends with a list of major questions about Indian mathematics that remain unanswered, each of which would be material for several PhD theses. "Imagine not being able to answer such questions in the case of, say, Hellenistic or Islamic or early modern Latin mathematics", Plofker laments.

The book is beautifully typeset (TeX), and it is a relief to read a book with footnotes actually at the foot of the page. The bibliographical cross-referencing system is idiosyncratic for a book in the humanities, but quickly becomes familiar. The Sanskrit is throughout accurate and typos are almost completely absent.

This book will revolutionise the secondary accounts of Indian mathematics written by generalist historians of science in future textbooks. With support, it can also act as the foundation for university courses. It illuminates and coordinates a great deal of fresh material as well as information previously buried in specialist publications, tying everything together in a coherent historical narrative. While specialists will enjoy the mathematical examples that punctuate the book, it is not necessary to be good at maths to get a great deal of historical insight from this book into India's intellectual tradition of mathematics. Plofker's accessible narrative style means that this is also the book about mathematics in India for the rest of us.

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Song Blue and White Porcelain on the Silk Road. By Adam T. Kessler. pp. 587. Leiden, Brill, 2012.
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Adam Kessler's book on blue-and-white porcelain of the pre-Ming (1368–1644) period is a serious and provocative work. It is clearly a study with many years of research behind it, and it is a study that all scholars of Chinese porcelain, and some in the Chinese art field, especially art that has come to our attention through excavation sites, will have to reckon with. It is a book with a bold thesis that is argued through a long and detailed text and copious notes.

The thesis is invoked by the title and clearly stated in the first paragraphs of the introduction: imperial blue-and-white porcelain, long associated with the Yuan dynasty and specifically the kiln site at Jingdezhen, may date to the pre-Yuan period. In north China this could be the Jin dynasty