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Berggren, J. L. (3-SFR)★ **Episodes in the mathematics of medieval Islam.***Springer-Verlag, New York, 1986. xiv+197 pp. \$23.00. ISBN 0-387-96318-9*

The book is, in spite of the author's more modest claims, an introductory survey of main developments in those disciplines which were particularly important in Medieval Islamic mathematics: Arithmetic (especially "Hindu reckoning", including the handling of fractions and the extraction of roots), geometrical constructions (with emphasis on conic sections, verging constructions and constructions with a fixed compass opening), algebra, trigonometry (including the computational techniques in use) and spherics. All chapters include a discussion of "the Islamic dimension", i.e., the application of mathematics to some problem of Islamic jurisprudence or custom, a set of exercises, and select, partially annotated bibliography. The presentation is mainly made through report of key works and paraphrase or quotation of central passages; the fullness thus achieved in restricted space can be illustrated by the subjects covered in only 28 pages on algebra: Presentation of the problem of unknown quantities and of the Greek and Indian background (including essential details from *Elements II*); al-Khwārizmī's basic ideas and his algorithm and proof for the case $x^2 + 21 = 10x$; Thābit's Euclidean demonstrations; Abū Kāmil's advances, e.g., in the treatment of combined expressions, and a sketch of a refined combination of the principle of "false position" with normal algebra; al-Karajī's beginnings of an arithmetization of algebra and al-Samaw'al's full treatment of polynomials; and 'Umar al-Khayyāmī's classification of all equations of degree 1, 2 and 3, with a paraphrase of his solution and discussion of the case $x^3 + mx = n$; an example from al-Khwārizmī's algebra of inheritance; and a set of exercises.

In cases where modern symbolism is used in paraphrases the style of the original argument is always explained, and anachronisms are nowhere to be found. Broad historical descriptions are avoided, but enough background in biographical information is always given to put things into context. No knowledge of mathematics (or of the history of mathematics) beyond normal high-school level is presupposed, and everything required beyond that (be it Apollonian theory of conics or the definitions of celestial circles) is explained carefully and clearly. Scattered throughout the work are a number of lucid remarks on the character of Islamic mathematics or of mathematical work in general. The book will hence not only be an excellent textbook for the teaching of the history of mathematics but also for the liberal art aspect of mathematics teaching in general.

Reviewed by *Jens Høyrup*

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