The above-mentioned mathematical summary alternates between following the text very closely, e.g., faithfully rendering arabisms such as “a circle, of the circles in the sphere”, and making liberal use of modern algebraic and geometric symbolism (not all of it to the reviewer’s taste). It sometimes conflates distinctions found in the Arabic vocabulary between, e.g., ‘produce’, ‘draw’ and ‘join’ (a straight line) into, simply, ‘draw’. The reviewer also notes that halfway down p. 401 “And total arcs $HZ = ZT$, $\therefore$ remaining arcs $ZL = KZ$” should be “And total lines $HZ = ZT$, $\therefore$ remaining lines $ZL = KZ$”; halfway down p. 403 “$\therefore$ AL = LB” should be “and AL = LB”; and in the first line of the summary of Proposition III.2 on p. 398 the words “from it” might better have been “by it”. Finally, throughout the summary it would be more in accordance with standard geometrical vocabulary to refer to the two areas created when a line cuts a circle as ‘segments’ rather than ‘sections’.

These are minor matters, however, and in any edition of a large work that combines historical complexities with what are often intricate mathematical arguments, one is bound to find such slips, or things that another editor might have done differently. Noting such things is in no way intended to diminish the achievement of the editors or the thanks the scholarly community owes them for this fine work.

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LEN BERGGREN

THE EARLY HISTORY OF THE TELESCOPE


My biggest mistake in 2008, the prequel to the International Year of Astronomy, was failing to attend the Middleburg conference on the origins of the telescope. Judging from this well-integrated volume of sixteen conference papers, it was a superbly informative conclave, and one that has set the question and agenda for the early history of the telescope.

There is a fascinating puzzle here. Spectacle lenses had been around for a few centuries, so if all that was required was for someone to pick up a convex and a concave spectacle lens, and *voila!* … the telescope should have been invented a dozen times. So why did it appear so abruptly in Middleburg in 1608, and then propagate like wildfire so that within a year it was being sold all over Europe? As this volume makes clear, the question is not the invention of the telescope, but the origins of the telescope.

The historian of astronomy Huib Zuidervaart opens the volume with an in-depth report on the various claimants for the invention of the telescope and the way their claims have risen and fallen over the centuries. The Middleburg optician Hans Lipperhey, who in 1608 applied for a patent for the invention (the first documented claim), emerges with the best credentials, but that does not answer the central question well
framed in the introduction to the volume and summarized above.

A key to the puzzle emerges in the fourth chapter, by Rolf Willach, an optical engineer and independent scholar who has long quietly tested early lenses and who here summarizes his American Philosophical Society Transaction of 2008. Spectacle lenses can work with some satisfaction with only a very narrow central zone with the appropriate focal length, but that is not good enough for a telescope. Making a telescope required better lens-making techniques, and/or diaphragming off the lousy outer zones. The secret of both Lipperhey’s early success as well as Galileo’s was in the diaphragm that blocked off the poor perimeter areas.

Other chapters in this volume provide rich details about the role of Middleburg in the early 1600s as it occupied a central commercial position in the young Dutch republic, about William Bourne’s hypothetical invention of a mirror telescope, and about lens-making in the early seventeenth century. Mario Biagioli argues that Galileo either saw a telescope or had a close description of one before he made his own. A. Mark Smith demonstrates that modern lens theory owes little to Ibn al-Haytham and much to Kepler. Marvin Bolt and Michael Korey present a list of pre-1650 telescopes, expanding the 2001 census by Willach. They describe and show pictures of 20 instruments, and mention several additional candidates. The search goes on!

This admirable volume concludes with an extensive bibliography. It is a “must have” edition for any serious history of astronomy library.

Harvard-Smithsonian Center for Astrophysics

OWEN GINGERICH

ABRAHAM IBN EZRA ON ELECTIONS


This is the third volume in the series of Ibn Ezra’s astrological treatises, composed in the twelfth century (a review of the first two volumes appeared in this journal, xluii (2011), 120–1). Once again we are given a critical edition of the Hebrew texts, together with a reliable English translation and valuable notes: the Book of elections (3 versions), the Book of interrogations (3 versions), and the Book of the luminaries. The astrological system of elections concerns finding the best time for beginning some activity; interrogations concern responses by an astrologer to questions related to daily life; and the Book of the luminaries concerns astrological doctrines related to critical days in the course of a disease. In all cases Ibn Ezra depended on Arabic sources, which are identified by the editor. The appendices include a list of the manuscripts consulted, a concordance of topics discussed in the various treatises, a list of authorities and sources mentioned in the three versions of the Book of elections and