

Notes and Sources

Two hitherto unknown Arabic Euclid manuscripts

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Available online 16 October 2014

Abstract

I describe essential features of two Arabic manuscripts (Tehran, Majlis Shūrā 15480 and 2060), each containing the Ishāq–Thābit version of the *Elements*. Internal characteristics help to situate them within existing families of Arabic primary transmission manuscripts. These two manuscripts add further details to the existing historical narrative of the Arabic Euclidean transmission. I also describe basic features of an anonymous Arabic summary/commentary on the *Elements* found in ms. 2060.

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Résumé

Cette étude décrit deux manuscrits arabes (15480 et 2060) dans le bibliothèque Majlis Shūrā de Téhéran. Chaque manuscrit contient la version arabe des *Eléments* attribuée à Thābit. Nous nous proposons de situer ces manuscrits dans la tradition euclidienne en arabe. Nous discutons ensuite un commentaire anonyme en arabe sur les *Eléments* qui se trouve dans le manuscrit 2060.

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MSC: 01A30; 01A90

Keywords: Euclid's *Elements*; al-Ḥajjāj; Ishāq ibn Ḥunayn; Thābit ibn Qurra

1. Ms 15480/1 — its physical characteristics

The Arabic codex now numbered 15480 is among those digitized and posted online by the Majlis Shūrā Library in Tehran.¹ The manuscript occupies the first 135 folios of the current codex. The manuscript is now incomplete — it includes only books I–IX. It opens with the last words of Euclid's definition 16. There must at one time have been some additional material preceding this Euclidean treatise, however, because the manuscript now begins with a folio numbered 10. A more modern foliation, perhaps made at the time

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¹ The manuscript may be read online or downloaded as a PDF file from the library website: http://dlib.ical.ir/faces/search/bibliographic/biblioFullView.aspx?_afPfm=b8tskqe7r (accessed 16 June 2013).

of the current binding, numbers every fifth folio beginning from the current opening of the manuscript.² Beginning with original folio 40, we find the *abjad* (alphanumeric) equivalent of the folio number written in the upper margin of the facing page. Two folios 56 and 49 (original numbering) have been interchanged in the modern rebinding process.

The colophon to book IX occurs at the end of folio 143 (original numbering) or folio 134 (new foliation). It is followed by a date, written in another hand, in black ink (in contrast to the red ink used for the colophon) — 1078 of the Hijra, which corresponds to 1667 in the Gregorian calendar. The colophon itself concludes with the statement: ‘It (referring to the entire treatise) is 277 propositions in nine books.’ Such a summary statement is unusual in the Arabic primary transmission documents and might be taken to signify that this represents the end of the treatise — suggesting that no more had been copied. This hypothesis is incorrect, however. We find an identical statement in the colophon to book IX in two additional manuscripts — Chester Beatty ms. arab. 3035 (folio 61b) and Tehran, Majlis Shūrā 200 (folio 117a). Whether the original treatise actually continued beyond this point is unknown. This summary statement is significant, however, because it provides us with an essential clue necessary to situate ms 15480/1 in relation to other surviving manuscript copies — it is very closely related to both Majlis Shūrā 200 and Chester Beatty arab. 3035.

The manuscript has been copied with seventeen lines per page using a neat *naskhī* script in which most diacritic points are clearly indicated. It has been copied in two colors, black ink for the words of the text and red ink used for the independent letters that represent labels of geometric points. These letter labels are usually written in independent form — unlike the majority of Arabic manuscripts where they are typically joined together when possible — and they are written without an overline. Important words in the text, such as the stereotypical terms that introduce each section of the demonstration are also written in red as well as the incipit and explicit formulae that introduce and conclude each book of the treatise. The large *abjad* (alphanumeric) label that introduces each proposition is written in black ink, outlined in red — except the label is only in red (and in smaller script) after proposition VIII, 20. Within the blocks of definitions, each is separated from the other by a small red symbol reminiscent of a Maltese or Coptic cross. This extensive use of red must have required the copyist to change pens very frequently throughout the copying process yet there appear to be only few instances in which the copyist erred by forgetting to change pens, suggesting that the copying was done with care, perhaps for presentation to a high-ranking patron.

The diagrams are drawn with black ink, and the labels for geometric points are inserted in red ink. These labels are often placed directly on the point to which they refer. And if a single letter is used to label a line segment (as in book V or in books VII–IX) that letter is usually placed on or immediately beside the midpoint of the line segment. Throughout the manuscript, but especially in books VII–IX, there are numerical values inserted into some diagrams. These numbers were apparently intended to help the reader by providing a concrete example of the abstract numerical relations being discussed in the Euclidean text.³ The values inserted into the diagrams of Majlis Shūrā 15480/1 are, in every case, identical to the values found in Chester Beatty arab. 3035 and in Majlis Shūrā 200, again suggesting a very close relationship among these three manuscripts.

Although the script itself is clear, some might even describe it as elegant, the diagrams typically appear to be rather crudely constructed. Many diagrams appear to be only freehand sketches, and even those that appear to have been constructed using straight edge and compass seem somewhat clumsy in the sense that the base lines are often not parallel to the lines of text. As is often the case in Arabic Euclidean manuscripts, the diagrams are placed at or near the end of the proposition. Sometimes they are placed

² In discussing characteristics of the manuscript, I shall use the original folio numbers rather than the new foliation.

³ The presence of numerals within diagrams is not unusual — such numerical examples appear in both primary and secondary Euclidean literature throughout the medieval period and they are found across linguistic boundaries, appearing to pass from Byzantine Greek into Arabic and later into Latin and Hebrew. Studies so far have not shown any large-scale patterns that would indicate that specific examples were widely transmitted [De Young, 2005, 2012a].

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