

Pseudo-Māshā'allāh
On the Astrolabe

A Critical Edition of the Latin Text
with English Translation
by

Ron B. Thomson

Version 1.7

Toronto, Canada
2022

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PART I: INTRODUCTION

PART II: *COMPOSITIO*
CRITICAL EDITION WITH ENGLISH TRANSLATION

PART III: THE LISTS OF FIXED STARS
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CRITICAL EDITION WITH ENGLISH TRANSLATION

IT IS SAID that the inventor [of the astrolabe] was Ptolemy, the author of the *Almegisti*, who was led to that discovery in the following manner: as he was taking a ride with an armillary sphere in his hand, he let it fall, and the animal on which he was riding trod upon it and broke (or flattened) it, so that it received the shape of an astrolabe. ...¹

In memory of Paul Kunitzsch
14 July 1930 - 7 May 2020

¹ This delightful but mythical anecdote is recounted by Ibn Khallikān (1211-1282), in his *Wafayāt al-A'yān* [Biographical Dictionary]. See *Ibn Khallikan's Biographical Dictionary*, trans. William MacGuckin Slane, vol. 3 (Paris: The Oriental Translation Fund of Great Britain and Ireland, 1868 [corrected reprint]), p. 584.

PREFACE

This edition was begun because of the deficiencies in the edition printed by Gunther in 1929.¹ While preparing my thesis on the mathematics of astrolabes,² I became aware of these deficiencies when I tried to make sense of the edition of *Compositio*, chapters 16 to 18. I did a quick collation of the printed version with several manuscripts in the Bibliothèque nationale de France in Paris, and discovered that the edition printed by Gunther, based on only a few English manuscripts, was faulty both in words and phrases omitted from the text and in words and phrases added to it.

While I have worked on this project for over 25 years, I simply did not have the time to make any real progress until the last few years. I began by collecting references to manuscripts of the text and ended up with a list of approximately 200 different manuscripts which possibly contained either the “Construction” chapters or the “Uses” chapters or both. I also began, with a few small grants, to collect microfilms of these manuscripts in order to do transcriptions, or to eliminate them as false or ghost references. The current list – manuscripts containing the text, lost manuscripts, erroneous or ghost references, and rejected manuscripts – can be found below (with their sigla) in section D and addenda. These lists will be updated as copies of the yet-to-be-examined manuscripts have been obtained.

The collection of this manuscript information has led me into one interesting side-track, the identification of the current whereabouts of the more than 600 manuscripts which were part of the private collection of Prince Baldessarre Boncompagni (1821-1894). When Boncompagni died in 1894, his entire library was sold by his heirs at auction in Rome in 1898 and thereby dispersed. This library contained four copies of Pseudo-Māshā'allāh's text,³ hence my search. While Menso Folkerts (who began to systematically search for these missing manuscripts) and I have identified nearly 300 manuscripts from the collection,⁴ we have yet to find the four useful for this edition.

I also became aware in the 1980s that the late Prof. Michael Masi of Loyola University in Chicago (Department of English) was interested in preparing an edition of the text. I offered at the time to co-operate with him in the preparing of a complete edition, but his interest was to prepare a text that might have been the exemplar for Chaucer's English text, “On the Astrolabe.” Prof. Masi completed his edition but it was not published before he died. His heirs have generously sent me

¹ See below, Addendum 3. Printed Editions of Pseudo-Māshā'allāh, *On the Astrolabe* for the bibliographic entry and a critique of the edition.

² “Thirteenth-Century Mathematical Astronomy: *De plana spere Iordani*,” D.Phil. thesis, University of Oxford, Faculty of Modern History, 1975; republished as *Jordanus de Nemore and the Mathematics of Astrolabes: De plana spere*, Studies and Texts 39 (Toronto: Pontifical Institute of Mediaeval Studies, 1978).

³ Boncompagni, ms. 51 (*olim* 326); ms. 104 (*olim* 279); ms. 128 (*olim* 40); ms. 357 (*olim* 328).

⁴ See “Boncompagni Manuscripts: Present Shelfmarks,” Beta Version 1.9 (June 2016), website of the Warburg Institute, London. First presented in September 2009. [Latest version now on-line at ShareOK, University of Oklahoma.]

his typescript and related files, which helped me identify more copies of the text and to eliminate others which he had personally examined. I have not used his text while preparing this critical edition, but I have compared my final text with his in order to benefit from any insights he might have had. For this I am thankful, and have noted points in the text where his contribution has been invaluable.⁵

By publishing the text on line, I am attempting to make what would otherwise be an expensive book much more readily available to users. As such, while retaining copyright, I am allowing users to download a print a personal copy of either part or all of the text and translation. What I am not allowing is the printing of the text for resale, or for its incorporation into other works. I expect when finished to deposit a limited number of printed copies in various major research libraries so that they will be available over time, even if the internet system fails. I also expect to offer through a print-on-demand house the opportunity for users to purchase a printed copy.

Finally, I am producing this work in four parts. First the introduction which lists the manuscripts and other relevant information for the critical edition. Second, there is the critical edition consisting of the Latin text, the apparatus criticus, and a “facing” English translation. Third, there is the Latin text alone, without the apparatus, but retaining the critical edition’s line numbers which will allow readers access to a more compact text, while still allowing them to cite passages by capitulum and line. Finally, there is the English translation alone, for those who simply wish a convenient version of the English text. I hope this will make the whole project more convenient, while still retaining its academic foundation.

Throughout the publication process, I will always welcome comments and criticisms which might be incorporated into a later version.

Ron B. Thomson, D.Phil.
Toronto, August, 2012

PREFACE, VERSION 1.1

I have now been able to add Chapters 7 to 16 to this publication. There have been no real changes to the Latin, nor have the earlier line numbers shifted. More material has been added to the apparatus of the earlier material, and the English translation and the diagrams have been tweaked a bit. The division into pages may have changed in places, but by referring to the text by Capitulum and line, no changes need to be made to any citations either in the past or in the future.

As well I have added an appendix to gather together all the information about various stars cited or listed in the text, in the apparatus, and in the diagrams; this appendix will serve as an index to the stars and their citations (and variants) in the text.

⁵ Because he was interested in a base text for Chaucer, he ended up editing the treatise as found in Oxford, Bodleian Library, ms. Selden Supra 78, ff. 51^r-70^r (early 14th century), my ms Oτ, with comparisons to 6 other manuscripts for each of the two main sections of the treatise (construction and use).

Toronto, September 2014

PREFACE, VERSION 1.2

I have now been able to add Chapters 17 to 22 to this publication, which completes the “composition” section of the text (other than the list of stars to be engraved on the rete – which is the next editing phase). There have been no changes to the Latin, nor have the earlier line numbers shifted. More material has been added to the apparatus of the earlier material, and the English translation and the diagrams have been tweaked a bit. The division into pages may have changed in places, but by referring to the text by *Capitulum* and line, no changes need to be made to any citations either in the past or in the future.

I have been fortunate to receive a research grant from the Cogito Foundation in Wallerau, Switzerland, which will allow me to purchase copies of all the manuscripts of the text which I do not already have. This more or less guarantees that I can finish the project, including the editing of the “*Practica*” section.

Toronto, September 2015

PREFACE, VERSION 1.3

This version includes the Lists of Fixed Stars which usually accompany the text of the *Compositio*. As well, I have collated a number of other copies of the text, from manuscripts of which I did not have copies earlier, or newly found manuscripts of the text. I should thank all those who regularly contribute information about these manuscripts.

The new collations have meant some shifting in pagination, but not in line numbers. The Latin itself has not been changed, and reference should continue to be by *Capitulum* and line. The appendix concerning the stars found in the text has been shifted to become an appendix to the Lists of Fixed Stars, keeping all this material together.

I have renumbered the parts, so that the critical edition will now consist of three parts – the *Compositio*, the Lists of Fixed Stars, and the *Practica*. If kept as one part as originally planned, that section would be too long and unwieldy. But these are merely matters of form and not of content.

I have updated the introduction as much as possible, given the stage of the project. It will not assume its final form until the *Practica* has been edited, and precise information about the manuscripts has been fully gleaned.

Toronto, November 2016.

PREFACE, VERSION 1.7

With this version I have completed the critical *edition* of the three parts of the text (construction, star lists, use), as well as completing the introduction with all relevant information.

For those interested, a printed and bound version of the complete text (in 2 volumes) is available from Volumes Publishing. See the title-page verso for details.

Toronto, July 2022

PART I
INTRODUCTION

PART I: INTRODUCTION

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A. The Author

The text edited here was studied in detail by Dr. Paul Kunitzsch (Munich) in a very significant article published in 1981.¹ He not only found that the text was an agglomeration from a variety of sources (especially the part on the construction of an astrolabe) but also shed serious doubt on the authorship of the text (and its parts). As a result of his studies, we have come to refer to the author as “Pseudo-Māshā’allāh” (although it is highly unlikely that there was one author for all of the parts).

As can be seen from the incipit and explicit of both the *Compositio* and the *Practica*, the manuscripts assign the text to a “Messehalle” (with a wide variety of spellings):²

Macelama	Messa	Messehalath
Macellama	Messahalach	Messehale
Mechale	Messahale	Messehalla
Mensehale	Messahalla	Messehalla3
Mesaalat	Messahallach	Messehallach
Mesahalam	Messahallah	Messehallat
Mesahallach	Messahalle	Messehallath
Mesalach	Messahath	Messehallaz
Mesalahat	Messalahat	Messehallaz/
Mesallae	Messallae	Messehalle
Mesalle	Messallat	Messehallhach
Mesehalle	Messcallath	Messehhalath
Mese ^{le}	Messeh ^a ...	Mesthale
Meshalle	Messehalat	Methalle

As Kunitzsch argued, these ascriptions cannot be trusted and tell us nothing. After his detailed study he concludes:

that nothing of the popularized treatise on the composition and use of the astrolabe generally ascribed to Messahalla can be traced back to this author. Part i, *De compositione*, is a western Latin compilation, perhaps from the middle or second half of the 13th century A.D., consisting of four or five distinct sections of different origin, none of which bears a recognizable relation to Messahalla. ... Part ii, *De*

¹ “On the authenticity of the treatise on the composition and use of the astrolabe ascribed to Messahalla,” *Archives Internationales d’Histoire des Sciences*, 31 (1981), 42-62; reprinted in *The Arabs and the Stars*, Northampton: Variorum, 1989.

² Plus one to John of Sacro Bosco. Note, the -e endings on some of the variants is simply the genitive form of a nominative -a ending.

operatione, has proved to be a purely western compilation and fabrication made on the basis of Johannes Hispalensis' Latin translation of the Arabic treatise on the use of the astrolabe by the Spanish-Muslim astronomer Ibn aṣ-Ṣaffār, one of Maslama's [i.e., Maslama al-Mağrīṭī] disciples. Thus, not only does each of the two parts show its internal elements of compilation, but even the two parts as a whole are of different origin. The question cannot yet be answered whether the composition of the whole was the work of one man, or whether the two parts were conceived independently and merely put together later by readers or scribes.³

Further to this discussion, I myself am inclined to consider the prologue to the *Practica* to be possibly of a different origin from the rest of the *Practica*. In twelve manuscripts it is missing, the text beginning only with capitulum 1; in one manuscript it is found alone (ms Bε₁). The content of the prologue, listing the parts of the astrolabe, while possible useful, is totally different in nature from the set of 47 capitula which follows.

There is also the question of the interpolation of certain capitula into the set traditionally ascribed to Pseudo-Māshā'allāh, especially Cap. 11 and 12 of the *Practica*. Many manuscripts do not contain these two capitula, skipping from Cap. 10 to Cap. 13. As well Millàs Vallicrosa argued in 1932 that these, as well as other parts, must have been introduced later into whatever the original text or texts was or were. However, given our present understanding that the entire treatise appears to be a compilation of earlier and disparate parts, arguments which depend on the "integrity" (or not) of an original Islamic text no longer are convincing.⁴

B. Sections of the Text

As Kunitzsch argued, the text as we now know it is actually an agglomeration, with distinct changes and styles. His divisions are these (with my division of the *Practica*):

Compositio or Construction: prologue,
Compositio or Construction: chapters 1 to 6;
Compositio or Construction: chapters 7 to 16;

³ Kunitzsch, "Authenticity," p. 56. For some more recent speculation on the source or sources of this text, see Julio Samsó, *On Both Sides of the Straits of Gibraltar. Studies in the History of Medieval Astronomy in the Iberian Peninsula and the Maghrib*, Handbook of Oriental Studies, Section One: the Near and Middle East, 144 (Leiden: Brill, 2020), p. 431, and also p. 432.

⁴ J. Millàs Vallicrosa, "La introducción del cuadrante con cursor en Europa," *Isis* 17 (1932), 218-258, especially pp. 254-258. See also Nan L. Hahn, *Medieval Mensuration: Quadrans Vetus and Geometrie Due Sunt Partes Principales ...*, Transactions of the American Philosophical Society vol. 72 part 8 (Philadelphia: American Philosophical Society, 1982), pp. xxiv-xxvi.

Compositio or Construction: chapters 17 to 22;

Compositio or Construction: lists of fixed stars;

Practica or Use: prologue (2 versions)

Practica or Use: chapters 1 to 47

(some of the later chapters treat astrological issues and surveying questions and may have been added later to the corpus)

I am following these divisions in my edition,⁵ and list for each manuscript what material it contains (section E). In the end I hope this gives us a better idea of how the text was assembled over time.

Furthermore, especially in the *Practica* section, I have followed the traditional ordering of capitula and their numbering, even though in some instances (e.g., Cap. 6) some mss divide a capitulum into two, and in other mss some capitula are run together as one (e.g., Cap. 11 and 12, 21 and 22). I hope in this way that past and future references to the various parts will be consistent and therefore easier to navigate.

The manuscripts give a variety of titles for the *Practica* section of the Pseudo-Māshā'allāh text. Where a title or incipit is given, "Practica astrolabii" is by far the most common. The second most common is "De usu/utilitatibus astrolabii" or some variant of this (sometimes with "operatione" added). Also a few have "Canones astrolabii" or "Canones de usu et operatione astrolabii". A very few have "Lectura astrolabii", "Liber de operatione astrolabii", "Opus astrolabii" or "Tractatus utilitates astrolabii"

The same variety appears at the end of the text of which the most common by far is "Explicit practica astrolabii". (The second most common ending is simply "Explicit" or "Explicit astrolabium" or some variant, usually in manuscripts which include both the *Compositio* and the *Practica* in sequence and where the explicit concludes the combined text. In these instances the text is sometimes ascribed to Māshā'allāh.)

Other titles in the explicit are variations of "Capitula de utilitate astrolabii", "Canones (de usu et utilitatiubs/de utilitatibus et operationibus) astrolabii", "De operatione astrolabii" "Liber (de operatione) astrolabii", "Opus astrolabii", "Tractatus astrolabii", and "Utilitates astrolabii".

Note: There is a parallel version of the *Practica* ascribed to Ibn al-Ṣaffār, translated by Johannes Hispalensis.¹ This was edited and published by José Millás Vallicrosa.²

⁵ For continuity of scholarship I have retained the numbering of the capitula as established by Gunther for his Latin text. Note that Gunther divides his capitulum 39 of the *Practica* into two English chapters (39 and 40) and from thereafter the English chapters are numbered one higher than the Latin capitula. Skeat does not number the capitulum of the *Practica* in his 1872 edition.

¹ See the table of various versions in Kunitzsch, "Authenticity," p. 52.

² José M.^a Millás Vallicrosa, *Las traducciones orientales en los manuscritos de la Biblioteca Catedral de Toledo* (Madrid, 1942), pp. 261-284.

C. Summary of Contents

Composition/Construction

Prologue: general comments on astrolabes.

[Section I]

Chapter 1: the making of the mother, rim and plates.

Chapter 2: the engraving of the back of the astrolabe: the circle of signs of the zodiac (and the division into signs and degrees), the calendar circle (and the division into months and days).

Chapter 3: the engraving of the shadow square on the back of the astrolabe.

Chapter 4: the construction of the alidade (on the back of the astrolabe) for sighting the sun and other planets and stars.

Chapter 5: the marking of the (unequal) hour divisions along the alidade.

Chapter 5 bis: the making of the novella for the front of the astrolabe.

Chapter 6: the making of the central pin and wedge (or “horse”) to hold the astrolabe together.

[Section II]

Chapter 7: to draw the circle through the beginning of Capricorn, of Cancer, and of Aries and Libra, starting with any one of the three.

Chapter 8: to draw the circle of signs or zodiac.

Chapter 9: to divide the zodiac into its signs.

Chapter 10: to plot the position of a star given its co-ordinates.

Chapter 11: to construct the rete.

Chapter 12: to draw the horizon at a given latitude.

Chapter 13: to draw the almucantars at a given latitude.

Chapter 14: to draw the azimuths at a given latitude using arcs.

Chapter 15: to draw the azimuths at a given latitude using the zenith.

Chapter 16: to draw the unequal/natural hour lines.

[Section III]

Chapter 17: the projection of the surface of a sphere onto a plane.

Chapter 18: the projection onto a plane of any circle on a sphere parallel to the ecliptic.

Chapter 19: another method for drawing the azimuths.

Chapter 20: a second alternative method for drawing the azimuths.

Chapter 21: to draw the twilight (or daybreak) line.

Chapter 22: to place stars in the rete using distances measured from the ecliptic.

[Lists of Fixed Stars]

- Star List 1
- Star List 1-A
- Star List 2
- Star List 3-A
- Star List 3-B

[Practica: Operation or Use of the Astrolabe]

- Prologue: the parts of an astrolabe
- Chapter 1: to find the position of the sun along the ecliptic
- Chapter 2: to measure the elevation of the sun or of a star above the horizon
- Chapter 3: to find the time in unequal hours
- Chapter 4: to find the end of evening twilight and the beginning of morning twilight
- Chapter 5: to find the arc of the day and the arc of the night
- Chapter 6: to find the length of an unequal (daylight) hour (and the number of equal hours in a day)
- Chapter 7: to find how much of an [unequal] hour has passed
- Chapter 8: to find how many equal hours have passed
- Chapter 9: to convert unequal hours into equal hours
- Chapter 10: to find the altitude of the sun at mid-day
- Chapter 11: to find the time of day using the alidade
- Chapter 12: to find the time of day using the hour-lines
- Chapter 13: preliminary material concerning points on the ecliptic
- Chapter 14: to find the position of the sun along the ecliptic
- Chapter 15: to find which days are equal to each other
- Chapter 16: to find the degree of the ecliptic which crosses the meridian at the same time as a particular star
- Chapter 17: to find the azimuth of the sun at any time
- Chapter 18: to find the points on the horizon where the sun rises and sets
- Chapter 19: to find the four cardinal directions using an astrolabe
- Chapter 20: to find the declination of any point along the ecliptic
- Chapter 21: to find the latitude of some position on earth, or the altitude of the pole at that point
- Chapter 22: a different way to find the latitude of some position on earth
- Chapter 23: to find for which latitude a plate has been engraved
- Chapter 24: to find the time at a latitude for which you do not have a plate
- Chapter 25: to ascertain the position of the sun along the ecliptic
- Chapter 26: to find the distance in longitude between two regions
- Chapter 27: to calculate the distance in Roman miles between two places
- Chapter 28: to project the beginning and end of a sign on the equatorial circle

- Chapter 29. to measure the rising (or setting) of a sign, etc. vis-a-vis the horizon
 Chapter 30. to identify a star on the rete which is otherwise unknown
 Chapter 31. to identify a star not engraved on the rete
 Chapter 32. to determine which degree in which sign the moon (or a planet) is
 Chapter 33. to find the position of the moon on any day
 Chapter 34. a “more accurate” way of find the positions of the planets
 Chapter 35. to ascertain if a planet is above, on, or below the ecliptic
 Chapter 36. to ascertain if a planet is moving in retrograde or forward motion
 Chapter 37. to find the equation of the 12 houses by an astrolabe
 Chapter 38. to do the same, but differently
 Chapter 39. to plot the aspects of planets
 Chapter 40. to calculate the ascendent over one or more years
 Chapter 41. to calculate the equal hours equivalent to the unequal hours as found in the previous chapter
 Chapter 42. the shadow square on the astrolabe; and the shadow of an altitude
 Chapter 43. to find the altitude of something using the points along the shadow square
 Chapter 44. to find a shadow at noon using the altitude
 Chapter 45. to find the height of an accessible object
 Chapter 46. to find the height of an inaccessible object
 Chapter 47. to measure a distance across a plane

D. The Manuscripts

The following is a list of the 200 manuscripts containing Pseudo-Māshā'allāh, *On the Astrolabe*, as confirmed to date. Given are: library, fonds (if any) and shelf-mark, the folios of the sections of the text found in the manuscript, the date (if known), and siglum.

Because of the large number of manuscripts, each siglum is a combination of a roman capital letter and a Greek lower-case letter. The initial capital letter generally refers to the home city of the library, except in a few cases where there are simply too many manuscripts; in this case Q carries on with manuscripts in cities beginning with P and X continues on with manuscripts in cities beginning with V. (Spellings of the cities tend to be the local spelling, e. g., Wien rather than Vienna.) I have added a key to the sigla at the end of the introduction (p. 93).

While the place where the text in a manuscript starts or stops is noted in this list, for a full analysis of the order of the various capitula, and of missing capitula, see below, “E. The Manuscripts of Each Section.”

While certain variants suggest ways of grouping manuscripts, and certain manuscripts are so close that one was certainly copied from another, I have not attempted to develop a stemma of any sort. However, I do note that a subgroup (subgroup A) of the *Practica* mss follows a different ordering of the capitula (and omits the same capitula as well) although the text does not vary

significantly from what is presented here. Usually (but not always) this set omits Cap. 13, 23, 30, 31, 34, 35 and two of the astrological capitula, 38 and 39. (Sometimes, however, a missing capitulum has been copied into the margins.) As well Cap. 42-44 are found between Cap. 27 and 28, while Cap. 33 is found in the later gap between Cap. 41 and 45.¹

A second group of copies of the *Practica* also exists, which has a slightly different or rewritten prologue. This version, which I have named “Proemium B” is included in my text as an appendix to the regular proemium. Proemium B begins “Scribitur primo posteriorem. In omni scientia ...”.²

The addenda to this introduction list:

- Lost Manuscripts and Erroneous, Non-Functioning, and Ghost References
- Spurious References: Other Astrolabe Texts

Assisi, Biblioteca del Sacro Convento,³ Fondo Antico Communale, ms. 174

ff. 105^{rb}-111^{va}: *Compositio*, Proemium – Cap. 18

ff. 112^{r-v}: Star List 1

ff. 113^{r-v}: Star List 2

ff. 113^r: *Practica*, Cap. 46 line 2 to end.

14th cent.⁴

Aα

Bamberg, Staatsbibliothek., ms. Class. 84

ff. 121^{ra}-125^{rb}: *Practica*, Proemium – Cap. 40(?)⁵

ff. 125^{rb}-132^{vb}: “De compositione quadrantis”

14th cent.⁶

¹ The manuscripts are: Bζ Bη Bι Bκ Cδ Cζ₁ Cζ₂ Dγ Eγ Eμ Eο Eρ Gα Kε Kι Λλ Mα Mγ Mλ Mμ Mτ Oη Oσ Oφ Qε Qζ Qη Qμ Pζ Pι Pφ Rα Sβ Sθ Sι Sλ Vα Vγ Vν Vρ Vυ Vφ.

² Lynn Thorndike and Pearl Kibre, *A Catalogue of Incipits of Mediaeval Scientific Writings in Latin*, revised ed. (Cambridge, Mass: Mediaeval Academy of America, 1963), item 1414-3. (References to Thorndike and Kibre cite column number and the number of the item in that column.)

Mss with Proemium B are: Mμ Nζ Pκ Pχ Tβ Vη Vμ Vo Wζ.

³ *Olim*: Biblioteca del Convento di S. Francesco

⁴ G. Mazzatinti and L. Alessandri in G. Mazzatinti, *Inventari dei Manoscritti della Biblioteche d'Italia*, 4 (1894), p. 51.

⁵ In ms Bβ, Cap. 39 contains a different but parallel text, and Cap. 40 is so corrupt, and the folio so damaged, that it could not be collated (ff. 124^{va}-125^{rb}).

⁶ Friedrich Leitschuh, *Katalog der Handschriften der Königlichen Bibliothek zu Bamberg* (Bamburg, 1895; rpt. Wiesbaden, 1966), vol. 1, part 2, p. 90.

Bβ

Basel, Öffentliche Bibliothek der Universität Basel, ms. F-III-25

ff. 26^v-34^v: *Compositio*, Proemium – Cap. 16

ff. 35^r-40^r, 41^r: *Practica* (subgroup A)⁷

13th/14th cent.⁸

Bζ

Berlin, Staatsbibliothek zu Berlin - Preussischer Kulturbesitz,⁹ ms. lat. fol. 192¹⁰

ff. 29^{ra}-29^{rb}: *Compositio*, Cap. 20 line 7 – Cap. 22

29^{rb}-32^{rb} *Practica*

15th cent.¹¹

Bδ

Berlin, Staatsbibliothek zu Berlin - Preussischer Kulturbesitz, ms. lat. fol. 246

ff. 32^r-37^{ra}: *Compositio*

– inserted leaves 35^{bis} and 35^{ter} are not part of this treatise¹²

ff. 37^{ra}-38^{vb}: *Practica*

f. 59^r: *Practica*, Proemium only (second copy)

15th cent.¹³

Bε

Bε₁ [f. 59^r]

⁷ Proemium: 41^{r-v}; Cap. 1–47: 35^r-40^r

⁸ Martin Steinmann, *Die Handschriften der Universitätsbibliothek Basel. Register zu den Abteilungen CI-CVI, D-F ...* (Basel: Verlag der Universitätsbibliothek Basel, 1998), p. 36. Barnabas B. Hughes, *Medieval Mathematical Latin Writings in the University Library, Basel. A Provisional Catalog* (Privately printed, 1972), p. 28 says 14th-15th century.

⁹ *Olim*: Deutsche Staatsbibliothek; Staatsbibliothek Preussischer Kulturbesitz.; Königliche Bibliothek.

¹⁰ Also known as ms. 963 (catalogue entry number).

¹¹ Valentin Rose, *Die Handschriften-verzeichnisse der Königlichen Bibliothek zu Berlin, 13: Verzeichnis der Lateinischen Handschriften*, vol. 2, part 3 (Berlin 1905), pp. 1199-1200; entry 963.

¹² Michael Masi writes that Ernst Zinner in his notes (in Berlin) on this manuscript says that these interleaves are from Sacrobosco.

¹³ Michael Masi noted that the typed catalogue in the Berlin Library dates the manuscript to the 15th century (1443-1458 – scribe's dates).

Berlin, Staatsbibliothek zu Berlin - Preussischer Kulturbesitz, ms. lat. fol. 610¹⁴

ff. 63^r-75^v: *Compositio*

– ff. 72^v -73^r: blank [for the lists of fixed stars?]

75^v-82^r: *Practica*

13-14th cent. (1276-1277)¹⁵

Bγ

Bernkastel-Kues, St. Nikolaus-Hospitals, Bibliothek, ms. 209

f. 77^{va}: Star List 2 [13 stars only and not collated]¹⁶

Bernkastel-Kues, St. Nikolaus-Hospitals, Bibliothek, ms. 212

ff. 118^{ra}-122^{ra}: *Compositio*, Proemium – Cap. 16

– ff. 122^r-123^v: “Opus armillarum”

124^{ra}-126^{vb}: *Practica* (subgroup A)

15th cent.¹⁷

Bη

Bologna, Biblioteca Universitaria, ms. 132 (154)

ff. 98^r-111^v: *Compositio*, Cap. 2 line 28 – Cap. 22

ff. 96 and 97 are missing.¹⁸

112^r: Star List 1

112^v: Star list 2

113^r-119^v: *Practica*

14th cent.¹⁹

Bθ

Brno, Moravská zemská knihovna v Brně (*olim* Státní vědecká knihovna; *olim* Univerzitní knihovna), ms A 64

ff. 406^v-411^r: *Practica* (subgroup A)

¹⁴ *Olim*: Phillips 254 (inside front cover).

¹⁵ Explicit on fol. 250^{vb}.

¹⁶ See Paul Kunitzsch, *Typen von Sternverzeichnissen in astronomischen Handschriften des zehnten bis vierzehnten Jahrhunderts* (Wiesbaden: Harrassowitz, 1966), pp. 47-48

¹⁷ Francis S. Benjamin, jr., and G. J. Toomer, *Campanus of Novara and Medieval Planetary Theory. Theorica planetarum* (Madison: University of Wisconsin Press, 1971), p. 88.

¹⁸ Benjamin and Toomer, p. 109.

¹⁹ Benjamin and Toomer, p. 108.

ff. 411^r-420^r: *Compositio*
 ca. AD 1477²⁰
 Bκ

Brugge, Openbare Bibliotheek Biekorf, ms. 522
 ff. 60^{ra}-68^{rb}: *Compositio*, Proemium – Cap. 16
 f. 68r: Star List 3-B
 ff. 68^{va}-74^{rb}: *Practica* (subgroup A)
 14th cent.²¹
 Bι

Brugge, Openbare Bibliotheek Biekorf, ms. 523
 ff. 79^r-85^v: *Compositio*, Proemium – Cap. 16
 – varies greatly from base text in places
 13th cent.²²
 Bα

Cambridge, Gonville and Caius College Library, ms. 174/95
 pp. 24^a-47^b: *Compositio*
 pp. 39-40: Star List 1
 p. 40: Star List 2
 pp. 47^b-53^b: *Practica*
 14th/15th cent.²³
 Cι

Cambridge, St John's College Library, ms. 155 (*olim* F.18),
 ff. 50^r-55^v: *Practica*, Cap. 1 – Cap. 33 line 6 (“... Semper pro quolibet uno”)
 15th cent.²⁴
 Cα

Cambridge, St John's College Library, ms. 162 (*olim* F.25)

²⁰ Online information: www.manuscriptorium.com.

²¹ A. De Poorter, *Catalogue des manuscrits de la bibliothèque publique de la ville de Bruges*, Catalogue général des manuscrits des bibliothèques de Belgique 2 (Gembloux and Paris, 1934), p. 610.

²² De Poorter, p. 615.

²³ Montague Rhodes James, *A Descriptive Catalogue of the Manuscripts in the Library of Gonville and Caius College* (Cambridge, University Press, 1907), I: 196.

²⁴ Montague Rhodes James, *A Descriptive Catalogue of the Manuscripts in the Library of St John's College* (Cambridge, 1913), p. 186.

ff. 50^r-54^r: *Compositio*, Proemium – Cap. 16
 ff. 55^r- : a text on planimetrics; Jordanus de Nemore, *De plana spera*
 ff. 61^v-69^v: Maslama ibn Aḥmad al-Majrīṭī, astrolabe text (inc.: “Primum horum armilla per
 quam suspenditur ...”)²⁵
 13th/14th cent.²⁶
 Cβ

Cambridge, Trinity College Library, ms. 567 (R.2.86)

ff. 26^r-32^r: *Practica*
 15th cent.²⁷
 Cγ

Cambridge, University Library, ms. Hh.6.8 (catalogue 1684)

ff. 185^r-190^v (also pp. 208-219): *Compositio*, Proemium – Cap. 16
 ff. 191^r-192^v (also pp. 220-223): other astrolabe material
 ff. 193^r-196^v (also pp. 224-231): *Practica* (subgroup A)
 ff. 197^r-198^v (also pp. 232-235): other astrolabe material
 f. 199^r (also p. 236): Star List 3-A
 13th cent., end²⁸
 Cδ

Cambridge, University Library, ms. Ii.1.13 (catalogue 1705)

ff. 84^v-92^r (olim 75^v-83^v): *Compositio*
 ff. 90^v-91^r (olim. 81^v-82^r): Star List 1
 f. 91^r (olim. 82^r): Star List 2
 ff. 92^r-94^v (olim. 83^r-85^v): *Practica*
 14th cent.²⁹
 Cε

²⁵ Lynn Thorndike and Pearl Kibre, *A Catalogue of Incipits of Mediaeval Scientific Writings in Latin*, revised ed. (Cambridge, Mass: Mediaeval Academy of America, 1963) item 1118-10. (References to Thordike and Kibre cite column number and the number of the item in that column.)

²⁶ James, *St John's College*, p. 192.

²⁷ Montague Rhodes James, *The Western Manuscripts in the Library of Trinity College, Cambridge. A Descriptive Catalogue* (Cambridge, 1901), 2: 43.

²⁸ *A Catalogue of the Manuscripts Preserved in the Library of the University of Cambridge*, vol. 3 (1858), p. 302.

²⁹ *A Catalogue of the Manuscripts*, 3: 321.

Cambridge, University Library, ms. Ii.3.3 (catalogue 1767)

ff. 61^r-73^v: *Compositio*

f. 70^v: Star List 1

f. 71^r: Star List 2

ff. 74^r-79^r: *Practica*

[used in the edition published by Gunther]

AD 1276³⁰

Cη

Cambridge, University Library, ms. Kk.1.1 (catalogue 1935)

ff. 105^{vb}-109^{va}: *Compositio*, Proemium – Cap. 16

ff. 112^{ra}-117^{vb}: a set of *Practica* in 40 chapters, Joannes Hispalensis version
13th cent.³¹

Cθ

Cambridge, University Library, ms. Additional 6860

ff. 66^v-70^v: *Compositio*, Cap. 1 line 18 – Cap. 16

ff. 70^v-71^r: Star List 1-A

ff. 71^v-76^r: *Practica* (Cζ or Cζ₁) (subgroup A)

ff. 76^r-77^v: *Practica*, second version (Cζ₂), Cap. 28 – Cap. 47 (subgroup A
early 14th cent.³²

Cζ

Darmstadt, Universitäts- und Landesbibliothek, ms. 1227

117^r-120^v: *Compositio*, Proemium – Cap. 3 line 7 (“... et divides spacia”)

³⁰ *A Catalogue of the Manuscripts*, 3: 404.

³¹ *A Catalogue of the Manuscripts*, 3: 547.

³² Thorndike and Kibre, item 893-7 (re Honorius of Autun, *Imago mundi*). Before 1936 this manuscript was part of the Gurney collection (see W. D. Macray, “The Manuscripts of the Late John Henry Gurney, Esq. of Keswick Hall, Norfolk” in Royal Commission on Historical Manuscripts, *The Manuscripts of the Duke of Beaufort, K.G., the Earl of Donoughmore, and others*, 12th report, appendix, part 9 [London, 1891], pp. 121-2 [item IV]). It has been identified as from the Abbey of Bury St. Edmunds, both from its abbey shelf-mark (A.229) and the donation citation on fol. 1r – ex dono fratris Thome de Strouteby. M. R. James, “Bury St. Edmunds Manuscripts,” *English Historical Review* 41 (1926), p. 253, item 28 dates this to the 13th century. He also dates another manuscript donated by Strouteby to the abbey as 13th century (Montague Rhodes James, *A Descriptive Catalogue of the Manuscripts in the Library of Pembroke College, Cambridge* [Cambridge, University Press, 1905], p. 45, ms. 46). See now Jayne Ringrose, *Summary Catalogue of the Additional Medieval Manuscripts in Cambridge University Library Acquired Before 1940* (Woodbridge/Rochester, NY: Boydell Press, 2009), p. 275.

14th cent., first quarter³³

Dβ

Darmstadt, Universitäts- und Landesbibliothek, ms. 2661

ff. 146^r-161^r: *Compositio* (complete except for Cap. 17)

f. 156^v: Star List 3-B

f. 157^r: Star List 2

ff. 161^r-168^r: *Practica* (subgroup A)

12th-13th cent.³⁴

Dγ

Douai, Bibliothèque Municipale, ms. 715

ff. 9^r-14^r: *Practica*.

AD 1338³⁵

Dδ

Dublin, Trinity College Library, ms 403 (D.2.29/502)

ff. 57^r-70^r: *Compositio*

ff. 70^v-71^r: Star List 1

f. 71^v: Star List 2

ff. 72^r-78^r: *Practica*, Proemium – Cap. 43

15th cent., 2nd half³⁶

Dη

Edinburgh, Royal Observatory, Crawford Library, ms 3.12

ff. 4^{ra}-8^{va}: *Compositio*

ff. 8^{va}-10^{nb}: *Practica*

14th cent., beginning³⁷

Eα

³³ Information from digital on-line copy; citation link: <http://tudigit.ulb.tu-darmstadt.de/show/Hs-1227>.

³⁴ Ernst Zinner, *Verzeichnis der astronomischen Handschriften des deutschen Kulturgebietes* (Munich: C.H. Beck, 1925), entry 7022; Nan L. Hahn, *Medieval Mensuration: "Quadrans Vetus" and "Geometrie Due Sunt Partes Principales ..."*, *Transactions* 72 part 8 (Philadelphia: American Philosophical Society, 1982), p. 3.

³⁵ *Catalogue général des manuscrits des bibliothèques publiques des départements* (Paris, 1878), 6: 428.

³⁶ Marvin L. Colker, *Trinity College Library Dublin. Descriptive Catalogue of the Mediaeval and Renaissance Latin Manuscripts* (Aldershot: Scholar's Press, 1991), 1: 826.

³⁷ N. R. Ker, *Medieval Manuscripts in British Libraries* (Oxford, 1977), 2: 563.

Edinburgh, Royal Observatory, Crawford Library, ms 5.14

ff. 8^{ra}-8^{vb}: *Practica* (subgroup A)

– ff. 7^{ra}-7^{vb}: Canons on astrolabe construction, not Pseudo-Māshā'allāh

13th cent., 2nd half³⁸

Eγ

Eger, Főgyházmegyei Könyvtár, ms U² VI 1

ff. 79^{ra}-92^{ra}: *Compositio*

ff. 92^{ra}-97^{vb}: *Practica*

15th cent.³⁹

Eβ

Einsiedeln, Stiftsbibliothek, ms 29 (878)

pp. 103-128: *Compositio*

p. 121: SL 3-B

pp. 121-122: SL 1-A

pp. 122-123: SL 2

pp. 128-136: *Practica*

14th cent.⁴⁰

Eδ

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha,⁴¹ ms Amplon. F^o 38

f. 2^v: Star List 3-A

mid-13th cent.⁴²

Eε

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. F^o 376

ff. 82^{va}-91^v: *Compositio*

ff. 89^v: Star List 3-B⁴³

³⁸ Ker, 2: 580.

³⁹ Paul Oskar Kristeller, *Iter Italicum*, vol. 4 (London/Leiden, 1989), p. 302.

⁴⁰ Gabriel Meier, *Catalogus codicum manu scriptorum qui in Bibliotheca Monasterii Einsidlensis O.S.B. servantur* (Einsiedeln, 1899), 1: 20-22. There are a variety of handwritings in this manuscript, some of which are quite early. The dating would apply to this section only.

⁴¹ *Olim*: Wissenschaftliche Allgemeinbibliothek.

⁴² Wilhelm Schum, *Beschreibendes Verzeichnis der Amplonianischen Handschriften-Sammlung zu Erfurt* (Berlin, 1887), p. 31.

⁴³ Kunitzsch (*Typen*, pp. 47, 53, and 70) gives the wrong folios, i.e., 89^r-89^v instead of 89^v-90^r.

ff. 89^v-90^{ra}: Star List 1-A

f. 90^{rb}: Star List 2

ff. 92^{ra}-95^{va}: *Practica*

14th cent.⁴⁴

Eζ

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. F^o 394

ff. 60^{ra}-64^{vb}: *Compositio*

ff. 64^{vb}-67^{rb}: *Practica*

14th cent.⁴⁵

Eη

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. Q^o 349

ff. 163^r-171^v: *Practica* (missing Cap. 47)⁴⁶

14th cent.⁴⁷

Eκ

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. Q^o 351

ff. 34^{ra}-36^{vb}: *Practica*

14th cent.⁴⁸

Eλ

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. Q^o 355

ff. 49^r-56^v: *Compositio*, Proemium – Cap. 16

f. 56^v: Star List 3-B

ff. 57^r-62^r: *Practica* (subgroup A) (missing capitula copied into margins)

14th cent.⁴⁹

Eμ

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. Q^o 363

ff. 94^{ra}-95^{vb}: *Compositio*, Proemium – Cap. 16

⁴⁴ Schum, p. 262.

⁴⁵ Schum, pp. 276-277.

⁴⁶ Schum's catalogue (p. 586) indicates that in 1887 the manuscript ended with fol. 172 on which was Cap. 47 of the *Practica*. This folio is now lost.

⁴⁷ Schum, pp. 583-587.

⁴⁸ Schum, pp. 587-590.

⁴⁹ Schum, pp. 594-597.

ff. 95^{vb}-97^{ra}: *Practica* of Ibn al-Ṣaffār, translated by Johannes Hispalensis, cap. 14-cap. 40⁵⁰
13th-14th cent.⁵¹

Ev

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. Q^o 367
f. 99^v: Star List 1
end of the 13, beginning of the 14th cent.⁵²

Eπ

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. Q^o 369
ff. 184^{va}-188^{ra}: *Compositio*, Proemium – Cap. 16
ff. 188^{ra}-190^{vb}: *Practica* (subgroup A)
f. 190^{vb} (later hand): repeat of *Compositio*, Proemium.

f. 203^{va}: Star List 1-A

f. 204^r: Star List 1

AD 1325⁵³

Eo

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. Q^o 382
ff. 18^{va}-20^{vb}: *Practica* (subgroup A)

AD 1322⁵⁴

Eq

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. Q^o 385
ff. 147^r-151^r: *Practica*

14th cent.⁵⁵

Eσ

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms Amplon. Q^o 386
ff. 130^r-140^v, 142^v-145^r: *Compositio*

f. 141^{r-v}: Star List 1

⁵⁰ Published in José M.^a Millás Vallicrosa, *Las traducciones orientales en los manuscritos de la Biblioteca Catedral de Toledo* (Madrid, 1942), pp. 261-284.

⁵¹ Schum, pp. 607-609.

⁵² Schum, pp. 614.

⁵³ Schum, pp. 617-621.

⁵⁴ Schum, pp. 640-641.

⁵⁵ Schum, pp. 641-644.

f. 142^r: Star List 2
 ff. 145^v-150^v: *Practica*
 14th cent.⁵⁶
 Eτ

Erlangen, Friedrich-Alexander-Universität Erlangen-Nürnberg, Universitätsbibliothek, ms. 665
 (*olim* Irmischer catalogue no. 877; *olim* Altdorf Universitätsbibliothek, ms. II [Am.] 13)
 ff. 9^{ra}-22^{ra}: *Compositio*
 ff. 22^{ra}-26^{va}: *Practica* (missing Cap. 47)
 f. 19^r: extraneous material⁵⁷
 15th cent.⁵⁸
 Ev

El Escorial, Real Biblioteca del Monasterio de San Lorenzo, ms. O.II.10
 ff. 69^r-71^v: *Compositio*: Proemium – Cap. 5 line 37 (“... Cumque reversa fuerit umbra”); rest
 of text probably lost during [re]binding rather than being left unfinished
 14th cent.⁵⁹
 Eφ

Firenze, Biblioteca Medicea Laurenziana, ms. Plut. XVIII sin. cod. 3
 ff. 68^v-82^{ra}: *Compositio*
 ff. 82^{ra}-90^{ra}: *Practica*
 14th cent.⁶⁰
 Fζ

Firenze, Biblioteca Nazionale Centrale, ms. II.III.24
 ff. 189^{ra}-195^{ra}: *Compositio*
 195^{ra}-198^{rb}: *Practica*
 14th cent.⁶¹
 Fα

⁵⁶ Schum, pp. 645-647.

⁵⁷ The star list on f. 28^r is Kunitzsch (*Typen*), Typ IX.

⁵⁸ Hans Fischer, *Katalog der Handschriften der Universitätsbibliothek Erlangen*, Neubearbeiten, 2: *Die Lateinischen Papierhandschriften der Universitätsbibliothek Erlangen* (Erlangen, 1936), p. 407.

⁵⁹ Guillermo Antolín, *Catálogo de los Códices Latinos de la Real Biblioteca del Escorial* (Madrid, 1913), 3: 209.

⁶⁰ Hahn, p. 197.

⁶¹ Hahn, p. 197.

Firenze, Biblioteca Nazionale Centrale, ms. Conventi Soppressi J.II.10 (*olim* San Marco 200)

ff. 197^r-209^r (*olim* 189^r-201^r): *Compositio*

ff. 210^r-216^f (*olim* 202^r-208^r): *Practica* [different hand]

13th cent., end⁶²

Fβ

Firenze, Biblioteca Riccardiana, ms. 689 (*olim* L.II.29)

ff. 41^r: different proemium

ff. 41^r-46^v: *Practica*, Cap. 1–47

f. 46^v–: a different astrolabe construction text (inc.: “Accipe tabulam de quacumque ...”)⁶³
16th cent.⁶⁴

Fγ

Firenze, Biblioteca Riccardiana, ms. 868 (*olim* L.II.1)

ff. 34^{ra}-35^{vb} (*olim* 31^r-32^v): *Practica*, beginning Cap. 16 line 3 (“qui ceciderit super eandem ...”)
15th cent.⁶⁵

Fε

Firenze, Biblioteca Riccardiana, ms. 885

ff. 104^r-107^r: *Compositio*, Proemium – Cap. 7 line 14 (“... sitque omnis quarta circuli”).
14th cent.⁶⁶

Fδ

Göttingen, Niedersächsische Staats- und Universitätsbibliothek, ms. Theol. 124

ff. 143^v-145^{rb}: a different astrolabe construction text, inc.: “Accipe rotulas ...”

ff. 145^{rb}-145^{vb}: *Compositio*, Cap. 14, 15, 20

ff. 145^{vb}, 146^{rb}-147^{vb}, 143^{rb}: *Practica* (subgroup A)

ff. 145^{vb}-146^{rb}: other astrolabe material

14th cent.⁶⁷

Gα

⁶² Axel Anthon Björnbo, “Die mathematischen S. Marcohandschriften in Florenz,” *Bibliotheca Mathematica*, 3rd ser., 12 (1911-12), 194.

⁶³ Thorndike and Kibre, item 25-31.

⁶⁴ Kristeller, *Iter Italicum*, 1: 197.

⁶⁵ Kristeller, *Iter Italicum*, 1: 180.

⁶⁶ Benjamin and Toomer, p. 90.

⁶⁷ *Verzeichnis der Handschriften im Preussischen Staate*, 1: Hannover, pt. 2: Göttingen (Berlin, 1893), vol. 2, p. 364.

Karlsruhe, Badische Landesbibliothek, ms. EM [= Ettenheim-Münster] 32

ff. 111^r-117^v: *Practica*

ff. 106^r-111^r contains a different astrolabe text, inc. “Pro confectione astrolabii accipe tabulam”⁶⁸

15th cent. end⁶⁹

Kα

Kraków, Biblioteka Jagiellońska, ms 551 (*olim* DD.III.62)

ff. 30^{vb}-32^{ra}: *Practica*, 1-27, Proemium⁷⁰

ff. 32^{ra}-34^{va}: *Practica* (not Pseudo-Māshā'allāh)

ff. 56^{ra}-57^{rb}: *Canones* (not Pseudo-Māshā'allāh)

AD 1388 (fol. 30^{vb})⁷¹

Kγ

Kraków, Biblioteka Jagiellońska, ms 601 (*olim* DD.IV.5)

ff. 57^v-60^v: *Practica*

ca. 1474⁷²

Kδ

Kraków, Biblioteka Jagiellońska, ms 715 (*olim* DD.III.11)

ff. 28^v-31^r (*olim* pp. 56-64): *Practica* (subgroup A)

ff. 31^r (*olim* p. 64): unknown astrolabe chapter

ff. 31^v-34^r (*olim* pp. 65-70): Another astrolabe text, inc.: “Astrolabium ita construitur. Recipe tabulas de auricalco ...”⁷³

ca. AD 0-1370⁷⁴

Kε

⁶⁸ Thorndike and Kibre, item 1130-17.

⁶⁹ Karl Preisendanz, *Die Handschriften der Badischen Landesbibliothek in Karlsruhe*, 9: *Die Handschriften des Klosters Ettenheim-Münster*, 2nd ed. (Wiesbaden: Harrassowitz, 1973), pp. 16, 100-101.

⁷⁰ In ms Kγ the Proemium (fol. 32^{ra}) follows Cap. 1-27. At the end of Cap. 27 a later hand has added the title of Cap. 28.

⁷¹ *Catalogus Codicum Manuscriptorum Medii Aevi Latinorum qui in Bibliotheca Jagellonica Cracoviae Asservantur*, vol. 3 (Wratislav, etc.: Ossolinianum, 1984), p. 333.

⁷² *Catalogus ... Jagellonica*, vol. 4 (1988), p. 176.

⁷³ Thorndike and Kibre, item 155-8.

⁷⁴ *Catalogus ... Jagellonica*, vol. 5 (1993), p. 154.

Kraków, Biblioteka Jagiellońska, ms 1915 (*olim* BB.XXV.2)

ff. 53^v-57^v (*olim* pp. 106-114): *Practica* (heavily glossed in the margins)

15th cent.⁷⁵

Kθ

Kraków, Biblioteka Jagiellońska, ms 1970 (*olim* BB.XXIII.13)

ff. 1^r-6^v (*olim* pp. 1-12): *Practica*, Cap. 5 line 6 (“|quantitas diei et noctis ...”) – Cap. 47
(subgroup A)

ff. 6^v-7^r (*olim* pp. 12-13): unknown astrolabe item

ff. 7^r-12^v (*olim* pp. 13-24): another astrolabe text, inc.: “Astrolabium ita construitur. Recipe
tabulas de auricalco ...”⁷⁶

14th cent.⁷⁷

Kι

Leyden, Bibliotheek der Rijksuniversiteit, ms. Scaligerani 64

f. 120v: Star List 3-A

[does not contain the Pseudo-Māshāʿallāh text]

14th cent.⁷⁸

Lα

London, British Library, ms. Arundel 268

ff. 49^{ra}-56^{va}: *Compositio* (missing a folio between 50^v and 51^r, i.e., Cap. 5 line 12 – Cap. 7 line
59)

ff. 57^{va}-61^{rb}: *Practica*

13th/14th cent.⁷⁹

Lβ

London, British Library, ms. Egerton 844 (*olim* Cambridge, Trinity College, ms. 1216 / O.3.44)

ff. 58^{ra}-71^{ra}: *Compositio*

ff. 71^{ra}-77^{rb}: *Practica*

⁷⁵ Notice with microfilm.

⁷⁶ Thorndike and Kibre, item 155-8.

⁷⁷ Notice with microfilm.

⁷⁸ *Bibliotheca Universitatis Leidensis. Codices manuscripti: 2. Codices Scaligerani*, ed. P. C. Molhuysen (Leidin, 1910), p. 25

⁷⁹ *Catalogue of Manuscripts in the British Museum. New Series 1, part 1. The Arundel Manuscripts* (London, 1834), pp. 79-80.

14th cent.⁸⁰

Lγ

London, British Library, ms. Egerton 2622

ff. 169^v-173^v: *Practica*, Proemium to Cap. 21 line 1 (“... vel latitudine regionis!”)

15th cent.⁸¹

Lδ

London, British Library, ms. Harley 3647

ff. 63^{ra}-75^{rb}: *Compositio*

f. 72^v: Star List 1

f. 73^r: Star List 2

ff. 75^{va}-81^{ra}: *Practica*

13th cent.⁸²

Lε

London, British Library, ms. Royal 12.C.ix

f. 30^v: Star List 1-A

ff. 38^{ra}-41^{rb}: *Practica* (subgroup A)

ff. 41^{va}-49^v: *Compositio* (missing Cap. 17 and 19)

early 14th cent.⁸³

Lζ

London, British Library, ms. Royal 12.C.xvii,

ff. 95^{ra}-110^{ra}: *Compositio*

110^{ra}-118^{rb}: *Practica*

beginning of 14th cent.⁸⁴

Lη

London, British Library, ms. Sloane 513

ff. 15^v-16^r: a completely different proemium: “R[egula] ad discernenda membra astrolabii”

ff. 16^r-19^v: *Practica*, Cap. 1-19, 42-47

⁸⁰ James, *The Western Manuscripts in the Library of Trinity College, Cambridge*. 3: 226.

⁸¹ *Catalogue of Additions to the Manuscripts in the British Museum in the years MDCCCLXXXII – MDCCCLXXXVII* (London, 1889), pp. 349-350.

⁸² *A Catalogue of the Harleian Manuscripts in the British Museum* (London, 1808), 3: 48.

⁸³ George F. Warner and Julius P. Gilson, *British Museum. Catalogue of Western Manuscripts in the Old Royal and King's Collections* (London, 1921), 2: 25-26.

⁸⁴ Warner and Gilson, 2: 31-32.

15th cent.⁸⁵

L_t

London, Middle Temple, ms. 75 (*olim* Anc. 5)

ff. 132^v: *Compositio*, Proemium lines 1-4

ff. 132^v-133^r and 136^r-140^r: *Practica*, Proemium to Cap. 28 line 4 (“... donec finis signi cadat super”)

14th/15th cent. (ca. 1390).⁸⁶

L_κ

London, Wellcome Library, ms. 19

ff. 104^{va}-107^{va} (*olim* 94^{va}-97^{va})⁸⁷: *Practica* (subgroup A)

AD 1332⁸⁸

L_λ

Lüneburg, Ratsbücherei, ms. Misc. D.2^o.11

ff. 69^{va}-73^{va}: *Practica*

15th cent.⁸⁹

L_μ

Madrid, Biblioteca Nacional, ms. 10009 (*olim* Toledo, Biblioteca Capitular, ms. 98-20)

ff. 20^{rb}-23^{ra}: *Practica* (subgroup A)

ff. 17^{rb}-20^{rb}: a different astrolabe text, possibly translated by Johannes Hispanus.⁹⁰

13th cent.⁹¹

M_α

⁸⁵ Edward J. L. Scott, *Index to the Sloane Manuscripts in the British Museum* (London, 1904), p. 26

⁸⁶ Ker, 1 (1969): 158-162

⁸⁷ There are three sets of numbering on each folio: an old numbering (“*olim*”) in the top right corner, cancelled; a new numbering in the top right corner (caused by the insertion of 10 folios early in the manuscript); and a repeat of the old numbering (not cancelled) at the bottom centre.

⁸⁸ Fol. 107^{va}. S. A. J. Moorat, *Catalogue of Western Manuscripts on Medicine and Science in the Wellcome Historical Medical Library* (London, 1962), 1: 13-14.

⁸⁹ Martin Wierschin, *Handschriften der Ratsbücherei Lüneburg. [1] Miscellanea und Historica* (Wiesbaden: Harrassowitz, 1969), pp. 21-27.

⁹⁰ Published in José M.^a Millás Vallicrosa, *Las traducciones orientales en los manuscritos de la Biblioteca Catedral de Toledo* (Madrid, 1942), pp. 313-321.

⁹¹ Millás Vallicrosa, *Traducciones*, pp. 166-180.

Manchester, University of Manchester, John Rylands Library, ms. 67⁹²

ff. 218^r-226^v: *Compositio*

ff. 226^v-231^r: *Practica*

AD 1474⁹³

Mδ

Mantova, Biblioteca Comunale Teresiana, ms. 125 (*olim* A IV 31)

ff. 13^{rb}-17^{vb}: *Compositio* (f. 16 missing; gap from Cap. 9 line 20 to Cap. 13 line 4)

ff. 18^{ra}-21^{va}: *Practica* (subgroup A)

15th cent.⁹⁴

Mγ

Melk, Benediktinerstift, ms. 601 (*olim* 51; *olim* B 16)

f. 17^v: *Compositio*, Cap. 22

ff. 9^r-17^r: Another astrolabe construction, inc.: “Cum ascensiones signorum vel cuiuslibet signi vel”⁹⁵

ff. 18^r-26^v: Astrolabe, *Practica*, possibly by Christinus de Prachatitz, Robert of Chester or Prodocimo de Beldomandi.

beginning of 15th cent.⁹⁶

Mζ

Milano, Biblioteca Pinacoteca Accademia Ambrosiana, ms. H.75.Sup.

ff. 34^{ra}-46^{va}: *Compositio*

ff. 43^v-44^r: Star List 1

f. 44^r: Star List 2

ff. 46^{va}-51^{vb}: *Practica*

AD 1284⁹⁷

Mη

⁹² Note: Manuscripts 66 and 67 form a pair, foliated continuously but bound in 2 volumes. M. R. James, *A Descriptive Catalogue of Latin Manuscripts in the John Rylands Library, Manchester* (Manchester, 1921), pp. 128-129.

⁹³ *Ibid.*

⁹⁴ Kristeller, *Iter Italicum*, 1: 272.

⁹⁵ Thorndike and Kibre, item 284-5.

⁹⁶ See Christine Glassner, *Inventar der Handschriften des Benediktinerstiftes Melk, Part 1, Von den Anfängen bis ca. 1400. Katalogband*, Österreichische Akademie der Wissenschaften, Philosophisch-historische Klasse, Denkschriften 285 (Wien: Österreichische Akademie der Wissenschaften, 2000), pp. 270-275.

⁹⁷ *Inventario Ceruti dei manoscritti della Bibliotheca Ambrosiana*, 3 (Trezzano sul Naviglio, 1977), p. 466.

Milano, Biblioteca Pinacoteca Accademia Ambrosiana, ms. H.109.Sup.

ff. 1^r-7^r: *Compositio*, Proemium – Cap. 16

f. 17^v: Star List 1-A – “Hec tabula apud⁹⁸ tractatum astrolabii Messahale”

15th cent.⁹⁹

Mθ

Milano, Biblioteca Pinacoteca Accademia Ambrosiana, ms. M.28.Sup.

ff. 92^v-97^r: *Practica*

14th cent.¹⁰⁰

Mι

Milano, Biblioteca Pinacoteca Accademia Ambrosiana, ms. R.47.Sup.

ff. 126^r-132^v: *Compositio*, Proemium – Cap. 16

ff. 112^r-117^v: *Practica*;¹⁰¹ long marginal gloss continues onto f. 118^r

f. 119^v: Star List 3-B

13th cent.¹⁰²

Mκ

Montpellier, Bibliothèque Interuniversitaire, Section Médecine (*olim* Bibliothèque de la Faculté de Médecine), ms. H 323

ff. 74^r-90^r: *Compositio*

f. 87^v: Star List 3-B

f. 88^v: Star List 2

ff. 90^v-98^v: *Practica* (subgroup A)

13th/14th cent.¹⁰³

Mλ

⁹⁸ Ms: aput

⁹⁹ *Inventario Ceruti*, 3: 652.

¹⁰⁰ *Inventario Ceruti*, 4 (1978): 92

¹⁰¹ The text carries a large number of long glosses. For the first 5 or 6 capitula these are worked into the text itself, and are sometimes transcribed in the apparatus criticus; others are simply noted. Later in the text the glosses are in the margins and are not transcribed.

¹⁰² *Inventario Ceruti*, 4: 648.

¹⁰³ *Catalogue général des manuscrits des bibliothèques publiques des départements*, 1 (Paris, 1849), p. 418.

München, Bayerische Staatsbibliothek, Clm 353

ff. 41^{ra}-49^{ra}, 54^{ra-rb}: *Compositio*¹⁰⁴

ff. 49^{ra}-52^{vb}: *Practica*

f. 53r: Star List 1-A,¹⁰⁵ Star List 3-B

13th cent.¹⁰⁶

Mv

München, Bayerische Staatsbibliothek, Clm 372

ff. 227^r-235^v: *Practica*, Proemium B, Cap. 1-47

15th cent.¹⁰⁷

Mμ

München, Bayerische Staatsbibliothek, Clm 572

ff. 1^r-19^r: *Compositio*

ff. 19r-27v: *Practica*

f. 28r: Star List 1

AD 1432¹⁰⁸

Mo

München, Bayerische Staatsbibliothek, Clm 588¹⁰⁹

ff. 137^{va}-141^{rb}: *Practica*

[ff. 137^{ra-va}: another astrolabe text, inc. "Quamvis artis astronomice iudicardi..."]¹¹⁰

¹⁰⁴ In ms Mv, *Compositio* Cap. 22 is found on f. 54^r, after the *Practica*.

¹⁰⁵ Seven stars only.

¹⁰⁶ Carolus Helm, et al., *Catalogus Codicum Latinorum Bibliothecae Regiae Monacensis*, 2nd ed., vol. 1, part 1 (Munich 1892), p. 93.

¹⁰⁷ Carolus Helm, et al., *Catalogus Codicum*, 2nd ed., vol. 1, part 1 (1892), pp. 98-99.

¹⁰⁸ Fol. 27v: "Explicit astrolabium 1432, 7 die maii". And see Carolus Helm, et al., *Catalogus Codicum*, 2nd ed., vol. 1, part 1 (1892), p. 157.

¹⁰⁹ The folios in ms Mπ are irregularly numbered. They are numbered regularly from 1 to the end, although there is an unnumbered folio between 29 and 30. However, there is a second set of numbers beginning on fol. 30 ("1") which runs through to fol. 66 ("37"); then fol 67 has "39" running through to fol. 122 ("94") where the second set of numbers stop.

As well there are two unnumbered folios between 158 and 159; two folios 196; and another unnumbered folio between 239 and 240.

¹¹⁰ Thorndike and Kibre, item 1163-6.

14th cent.¹¹¹

Mπ

München, Bayerische Staatsbibliothek, Clm 10661

ff. 159^r-161^r (*olim* ff. 83^r-85^r): *Compositio*, Cap. 17-22

15th/16th cent.¹¹²

Mρ

München, Bayerische Staatsbibliothek, Clm 10662

ff. 154^r-157^r: *Compositio*, Cap. 17-18¹¹³

AD 1436¹¹⁴

Mσ

München, Bayerische Staatsbibliothek, Clm 10664

ff. 16^v-26^v: *Practica* (subgroup A)

15th cent.¹¹⁵

Mτ

München, Bayerische Staatsbibliothek, Clm 14583

ff. 410^r-418^r: *Compositio*

ff. 418^r-425^r: *Practica*

AD 1445; AD 1450¹¹⁶

Mυ

München, Bayerische Staatsbibliothek, Clm 14684

ff. 82^v-92^r: *Compositio*

ff. 92^r-98^r: *Practica*

14th cent.¹¹⁷

Mφ

¹¹¹ Carolus Helm, et al., *Catalogus Codicum*, 2nd ed., vol. 1, part 1 (1892), p. 159.

¹¹² Carolus Helm, et al., *Catalogus Codicum*, vol. 2, part 1 (1874), p. 155.

¹¹³ Ms Mσ contains two versions of Cap. 18.

¹¹⁴ Carolus Helm, et al., *Catalogus Codicum*, vol. 2, part 1 (1874), p. 155.

¹¹⁵ Carolus Helm, et al., *Catalogus Codicum*, vol. 2, part 1 (1874), p. 156.

¹¹⁶ AD 1445: fol. 410^r; AD 1450: fol. 425^r. And see Carolus Helm, et al., *Catalogus Codicum*, vol. 2, part 2 (1876), p. 198.

¹¹⁷ Carolus Helm, et al., *Catalogus Codicum*, vol. 2, part 2 (1876), p. 217.

München, Bayerische Staatsbibliothek, Clm 19689

f. 66^r (*olim* 60^r): *Compositio*, Cap. 17

Fols. 38^r-65^v (*olim* 2^r-29^v): Johannes de Gmunden, astrolabe text.¹¹⁸

Fols. 67^r- (*olim* 31^r-): Andreas Stiborius Boius, *Canones astrolabii*
16th cent.¹¹⁹

Mχ

München, Bayerische Staatsbibliothek, Clm 19690

ff. 108^r-109^r: *Compositio*, Cap. 17-18

16th cent.¹²⁰

Mψ

Napoli, Biblioteca Nazionale “Vittorio Emanuele III”, ms. VIII-C-36

ff. 29^{ra}-33^{va}: *Compositio*

ff. 33^{va}-36^{rb}: *Practica*

ca. AD 1445¹²¹

Nα

Napoli, Biblioteca Nazionale “Vittorio Emanuele III”, ms. VIII-C-42

ff. 1^r-9^r: *Compositio*

ff. 9^r-12^v: *Practica*

ca. AD 1440¹²²

Nδ

Napoli, Biblioteca Nazionale “Vittorio Emanuele III”, ms. VIII-C-46

ff. 43^{ra}-54^{ra}: *Compositio*

f. 47^v: Star List 1

f. 48^r: Star List 2

ff. 54^{ra}-58^{rb}: *Practica*

ca. AD 1364¹²³

Nε

¹¹⁸ Thorndike and Kibre, entry 1294-2.

¹¹⁹ Carolus Helm, et al., *Catalogus Codicum*, vol. 2, part 3 (1878), p. 269.

¹²⁰ Carolus Helm, et al., *Catalogus Codicum*, vol. 2, part 3 (1878), p. 269.

¹²¹ François Fossier, *La Bibliothèque Farnèse. Étude des manuscrits latins et en langue vernaculaire*, Le Palais Farnèse III, 2 (Rome: École Française de Rome, 1982), pp. 359-360.

¹²² Fol. 49^r. Fossier, *Bibliothèque Farnèse*, p. 362.

¹²³ Fol. 1^r. Fossier, *Bibliothèque Farnèse*, pp. 364-365.

Napoli, Biblioteca Nazionale “Vittorio Emanuele III”, ms. VIII-G-86

ff. 120^r-126^r: *Practica*

AD 1481¹²⁴

Nγ

New Haven, Yale University, Cushing/Whitney Medical Library – Medical Historical Library, ms.

25 (*olim* Salzburg, Stiftsbibliothek Sankt Peter, Incunabula 800¹²⁵)

ff. 108^r-109^r: A different composition text, missing its beginning.

ff. 109^r-114^v: *Practica*, Proemium B, Cap. 1-47

15th cent.¹²⁶

Nζ

Ottobeuren, Bibliothek der Benediktinerabtei, ms. O. 86 (*olim* II 319 / F 319)

ff. 143^v-149^v: *Practica*

ff. 149^v-150^v: other astrolabe material

15th cent. (ca. 1466)¹²⁷

Oβ

Oxford, Bodleian Library, ms. Ashmole 340

ff. 29^r-38^r: *Practica*

late 15th cent.¹²⁸

Oγ

Oxford, Bodleian Library, ms. Ashmole 1522

ff. 80^{ra}-95^{ra}: *Compositio*

ff. 95^{ra}-101^{vb}: *Practica*

¹²⁴ Cesare Cenci, *Manoscritti Francescani della Biblioteca Nazionale di Napoli* (Grottaferrata: Collegii S. Bonaventurae ad Clara Aquas, 1971), 2: 862.

¹²⁵ Folios 1-131 contain manuscript material and folios 132+ contain printed material, hence its classification as an incunabula.

¹²⁶ Fol. 61^v: AD 1433. See C. U. Faye and W. H. Bond, *Supplement to the Census of Medieval and Renaissance Manuscripts in the United States and Canada* (New York: Bibliographic Society of America, 1962), pp. 58-59, no. 25: “ca. 1450.”

¹²⁷ Hermann Hauke, *Die mittelalterlichen Handschriften in der Abtei Ottobeuren* (Wiesbaden, 1974), pp. 84-86.

¹²⁸ William Henry Black, *A Descriptive, Analytical, and Critical Catalogue of the Manuscripts Bequeathed unto the University of Oxford by Elias Ashmole ...* (Oxford, 1845), col. 233.

14th cent., first half¹²⁹

Oζ

Oxford, Bodleian Library, ms. Ashmole 1796

ff. 40^v-48^v: *Compositio*, Proemium – Cap. 16

ff. 48^v-55^v: *Practica* (subgroup A)

end of 14th cent./beginning of 15th cent.¹³⁰

Oη

Oxford, Bodleian Library, ms. Bodley 430

ff. 42^r-45^v: *Compositio*, Proemium – Cap. 16

ff. 45^v-47^r: additional astrolabe material not yet identified.¹³¹

13th cent.¹³²

Oα

Oxford, Bodleian Library, ms. Bod. 464

ff. 134^r-139^v: *Practica*

ca. AD 1318¹³³

Oι

Oxford, Bodleian Library, ms. Canon. Misc. 61

f. 1^r: Star List 3-B

ff. 1^v-8^v: *Compositio*, Proemium – Cap. 16

15th cent.¹³⁴

Oκ

Oxford, Bodleian Library, ms. Digby 28

ff. 212^v-215^v: *Compositio*, Proemium – Cap. 7 line 9 (“... et ista erunt diametra”) [ms ends]

¹²⁹ Black, col. 1425.

¹³⁰ Black, col. 1505.

¹³¹ This manuscript contains a large number of marginal glosses and insertions. Only when the material forms part of the normal text is it transcribed. The additional (and unique?) glosses have not been noted.

¹³² Falconer Madan, et al., *A Summary Catalogue of Western Manuscripts in the Bodleian Library at Oxford* (Oxford, 1922), vol. 2, part 1, p. 325.

¹³³ Madan, et al., *Summary Catalogue*, vol. 2, part 1, p. 375.

¹³⁴ Henry Coxe, *Catalogi Codicum Manuscriptorum Bibliothecae Bodleianae. Part 3: Codices ... Canonicianos* (Oxford, 1854), col. 473.

beginning of the 14th cent.¹³⁵

Oμ

Oxford, Bodleian Library, ms. Digby 38

ff. 73^r-76^v: *Practica*, Proemium to Cap. 38, also Cap. 42-Cap. 44

[remaining folios with this text now lost]

14th cent.¹³⁶

Oν

Oxford, Bodleian Library, ms. Digby 207

ff. 16^r-22^r: *Compositio*

ff. 22^r-24^v: *Practica*

beginning of the 14th cent.¹³⁷

Oξ

Oxford, Bodleian Library, ms. Digby 215

ff. 44^{va}-46^{ra}: *Compositio*, Proemium – Cap. 7 line 14 (“... sitque omnis quarta circuli”).

15th cent.¹³⁸

Oο

Oxford, Bodleian Library, ms. Savile 16

ff. 49^r-50^v: *Compositio*, Proemium – Cap. 10 line 6 (“... abscindant se super E, et”)

13th cent.¹³⁹

Oπ

Oxford, Bodleian Library, ms. Savile 17

ff. 11^v-21^v: *Practica*

f. 11^{r-v}: chapter list

15th cent., first half¹⁴⁰

Oρ

¹³⁵ William Macray, *Catalogi Codicum Manuscriptorum Bibliothecae Bodleianae. Part 9: Codices ... Kenelm Digby* (Oxford, 1883), col. 23.

¹³⁶ Macray, *Catalogi Codicum Part 9: Digby*, col. 34.

¹³⁷ Macray, *Catalogi Codicum Part 9: Digby*, col. 224.

¹³⁸ Macray, *Catalogi Codicum Part 9: Digby*, col. 228.

¹³⁹ Madan, et al., *Summary Catalogue* (Oxford, 1937), vol. 2, part 2, p. 1103.

¹⁴⁰ Madan, et al., *Summary Catalogue*, vol. 2, part 2, p. 1104.

Oxford, Bodleian Library, ms. Savile 21

ff. 104^r-109^v: *Compositio*, Proemium – Cap. 16

ff. 109^v-111^r: other astrolabe material

ff. 111^r-115^r: *Practica* (subgroup A)

ff. 116^v-117^r: astrolabe diagrams

13th cent.¹⁴¹

Oσ

Oxford, Bodleian Library, ms. Selden Supra 78

ff. 51^r-63^v: *Compositio*

ff. 64^r-70^r: *Practica*

early 14th cent.¹⁴²

Oτ

Oxford, Bodleian Library, ms. Tanner 192

ff. 76^{va}-88^{vb} (*olim* pp. 156^a-180^b): *Compositio*

ff. 88^{vb}-95^{vb} (*olim* pp. 180^b-194^b): *Practica*

14th cent.¹⁴³

Oυ

Oxford, Magdalene College, ms. 182

ff. 103^{ra}-104^{vb} (*olim* ff. 48^{ra}-49^{vb}: *Compositio*, Cap. 13 line 10 (“iunges H cum M ...”) – Cap. 16;
Cap. 20-21

ff. 105^{ra}-109^{rb} (*olim* 50^{ra}-54^{rb}): *Practica* (subgroup A); Cap. 33 repeated

15th cent.¹⁴⁴

Oφ

Oxford, Merton College, ms. 259

ff. 90^v-91^v: *Practica*, Proemium – Cap. 21 line 5 (“... que duo sunt semper equales”)

ff. 89^v-90^v, 91^v-94^r: other astrolabe material¹⁴⁵:

¹⁴¹ Madan, et al., *Summary Catalogue*, vol. 2, part 2, p. 1106.

¹⁴² Madan, et al., *Summary Catalogue*, vol. 2, part 1, p. 645.

¹⁴³ Alfred Hackman, *Catalogi Codicum Manuscriptorum Bibliothecae Bodleianae. Part 9: Codices ... Thomae Tanneri* (Oxford, 1860), col. 630.

¹⁴⁴ Henry Coxe, *Catalogus Codicum MSS qui in Collegiis Aulisque Oxoniensibus hodie adservantur* (Oxford, 1852), 2: “Collegii B. Mariae Magdalенаe,” p. 82; see also draft catalogue for more details.

¹⁴⁵ Ff. 89^v-90^v contains Johannes Hispalensis, *De constructione astrolabii*, inc. “Astrologie speculationis exercitium habere volentibus” (Thorndike and Kibre, item 156-4/9). Similarly for ff. 91^v-94^r. See R.M.

ca. AD 1200¹⁴⁶

Oχ

Oxford, St. John's College, ms. 188

ff. 97^{ra}-101^v(?): Unidentified *Practica* (but not Pseudo-Māshā'allāh)

f. 98^v: Star List 3-B

13th cent.¹⁴⁷

Oψ

Paris, Bibliothèque nationale de France, ms. fr. 12481

ff. 78^v-82^v: *Practica*

14th cent.¹⁴⁸

Pβ

Paris, Bibliothèque nationale de France, ms. lat. 7194

ff. 46^{ra}-57^{va}: *Compositio*

ff. 57^{va}-62^{va}: *Practica*

14th cent.¹⁴⁹

Pγ

Paris, Bibliothèque nationale de France, ms. lat. 7195

ff. 44^{ra}-54^{rb}: *Compositio*

f. 54^{r-v}: Star List 1

f. 55^r: Star List 2

ff. 55^{va}-61^{ra}: *Practica*

14th cent.¹⁵⁰

Pδ

Paris, Bibliothèque nationale de France, ms. lat. 7196

ff. 35^{va}-35^{vb}: *Practica*: Proemium to Cap. 3 line 3 ("... ex parte orientis si altitudo sit a l'" [end

Thomson, *A Descriptive Catalogue of the Medieval Manuscripts of Merton College, Oxford* (Woodbridge: Brewer, 2009), p. 200.

¹⁴⁶ R.M. Thomson, *A Descriptive Catalogue*, p. 199.

¹⁴⁷ Coxe, *Catalogus ... Collegiis*, 2: "Collegii S. Johannis Baptistae," p. 63.

¹⁴⁸ Henri Dumont and C. Couderc, *Bibliothèque Nationale. Catalogue général des manuscrits français. Ancien supplément français II, Nos. 9561-13090 du fonds français* (Paris, 1896), p. 544.

¹⁴⁹ Hahn, p. 197.

¹⁵⁰ Hahn, p. 197.

of folio / end of ms])

14th cent.¹⁵¹

Pε

Paris, Bibliothèque nationale de France, ms. lat. 7198

ff. 8^{ra}-10^{va}: *Practica* (subgroup A)

late 13th cent.¹⁵²

Pζ

Paris, Bibliothèque nationale de France, ms. lat. 7280

ff. 73^r-78^{ra}: *Compositio*

ff. 78^{ra}-81^{rb}: *Practica*

ff. 81^v-82^r: Star List 1

f. 82^r: Star List 2

14-15th cent.¹⁵³

Pθ

Paris, Bibliothèque nationale de France, ms. lat. 7292

ff. 296^{vb}-300^{va}: *Practica* (subgroup A)

15th cent.¹⁵⁴

Pι

Paris, Bibliothèque nationale de France, ms. lat. 7294

ff. 30^r-30^v, 4^r-7^v: *Practica*, Proemium B, Cap. 1-47

15th cent.¹⁵⁵

Pκ

Paris, Bibliothèque nationale de France, ms. lat. 7295A

ff. 49^r-62^r: *Compositio*

¹⁵¹ Lynn Thorndike, "Notes on some Astronomical, Astrological and Mathematical Manuscripts of the Bibliothèque Nationale, Paris," *Journal of the Warburg and Courtauld Institutes* 20 (1957), p. 112.

¹⁵² Fritz S. Pedersen, *The Toledan Tables*, *Historisk-filosofiske Skrifter* 24:3 (Copenhagen: Kongelige Danske Videnskabernes Selskab, 2002), part 3, p. 795.

¹⁵³ Benjamin and Toomer, pp. 117-119.

¹⁵⁴ Charles Samaran and Robert Marichal, *Catalogue des manuscrits en écriture latine portant des indications de date, de lieu ou de copiste* (Paris, 1962), 2: 514.

¹⁵⁵ Hahn, p. 198.

15th cent.¹⁵⁶

Pλ

Paris, Bibliothèque nationale de France, ms. lat. 7298

ff. 61^{va}-70^{vb}: *Compositio*

ff. 70^{vb}-75^{va}: *Practica*

14th cent.¹⁵⁷

Pμ

Paris, Bibliothèque nationale de France, ms. lat. 7336

ff. 301^r-320^{ra}: *Compositio*

320^{rb}-326^{v158}: *Practica*

15th cent.¹⁵⁹

Pν

Paris, Bibliothèque nationale de France, ms. lat. 7378A

ff. 86^{ra}-89^v: *Practica*

14th cent.¹⁶⁰

Pξ

Paris, Bibliothèque nationale de France, ms. lat. 7413(1)

ff. 1^r-13^r: *Compositio*

f. 10^{va}: Star List 3-B

ff. 10^{vb}-11^r: Star List 1-A

f. 11^r: Star List 2

ff. 13^v-18^v: *Practica*

late 13th cent.¹⁶¹

Pο

¹⁵⁶ Benjamin and Toomer, pp. 83-85.

¹⁵⁷ Benjamin and Toomer, pp. 86-89.

¹⁵⁸ Fol. 326^v is also numbered “327”, and what would normally be 327 is numbered “328”. After this, the folio numbering is normal.

¹⁵⁹ Hahn, p. 198.

¹⁶⁰ Petrus Peregrinus de Maricourt, *Opera*, ed. Loris Sturlese and Ron B. Thomson (Pisa: Scuola Normale Superiore, 1995), p. 26.

¹⁶¹ Léopold Delisle, *Catalogue des manuscrits des fonds Libri et Barrois* (Paris, 1888), p. 223.

Paris, Bibliothèque nationale de France, ms. lat. 7413(2)

f. 75^{vb}: *Compositio*, Proemium lines 1 to 16 (“...in septimo climate”)

found in last column on last folio verso of ms; crossed out by several vertical lines

f. 36^r: unidentified star list

f. 36^v: Star Lists 3-A and 3-B (conflated)

13th cent.¹⁶²

Pπ

Paris, Bibliothèque nationale de France, ms. lat. 7414¹⁶³

ff. 9^r/1^r-35^v/27^v: *Compositio*

ff. 36^r/28^r-[48^v]/40^v: *Practica*

AD 1512¹⁶⁴

PQ

Paris, Bibliothèque nationale de France, ms. lat. 7416¹⁶⁵

ff. 1^r-7^v: *Practica*

ca. AD 1460¹⁶⁶

Pσ

Paris, Bibliothèque nationale de France, ms. lat. 7416B

ff. 75^{va}-79^{ra}: *Practica*

ff. 79^{ra}-86^{rb}: *Compositio*

f. 86^{ra}: Star List 3-B

f. 86^{rb}: Star List 2

13th-14th cent.¹⁶⁷

Pτ

¹⁶² Delisle, *Catalogue ... Barrois*, p. 225.

¹⁶³ The folios in ms PQ are irregularly numbered. The manuscript begins with “1”, “2”, “3”, etc. but on fol. 9r, a second number system of “1”, “2”, “3”, etc. begins. The first system ends at fol. 39 (where only “3” appears), which is also fol. 31 of the second system; the second system then continues through to the end of the manuscript.

¹⁶⁴ Fol. 40^v.

¹⁶⁵ Sometimes designated “7416(1)” or “7416A”.

¹⁶⁶ Emmanuel Poulle, *Les Instruments de la théorie des planètes selon Ptolémée: Équatoires et horlogerie planétaire du XIIIe au XVIIe siècle* (Geneva: Droz / Paris: Champion, 1980), 2: 812-813.

¹⁶⁷ Benjamin and Toomer, p. 16 n. 58.

Paris, Bibliothèque nationale de France, ms. lat. 7421

ff. 62^r-79^v (*olim* 61^r-78^v): *Compositio*

ff. 79^v-80^r (*olim* 78^v-79^r): Star List 1

ff. 80^v (*olim* 79^v): Star List 2

ff. 81^r-89^v (*olim* 80^r-88^v): *Practica*

14th cent.¹⁶⁸

Pυ

Paris, Bibliothèque nationale de France, ms. lat. 10266

ff. 126^r-138^r: *Compositio*, Proemium – Cap. 16

ff. 139^r-147^r: *Practica* (subgroup A)

f. 29^{r-v}: a version of the introduction to the *Practica* with a different set of uses

15th cent.¹⁶⁹

Pφ

Paris, Bibliothèque nationale de France, ms. lat. 16649

ff. 171^r-175^v: a different astrolabe text, inc.: “Astrolabium ita componitur seu constitur.
Accipe tabulas de auricalco ...”¹⁷⁰

ff. 181^v-189^v: *Practica*, Proemium B, Cap. 1-47

16th cent.¹⁷¹

Pχ

Paris, Bibliothèque nationale de France, ms. lat. 16652

ff. 2^r-6^r: *Compositio*, Cap. 4 line 28 (“certissime, ac propter hoc sit aliquem ...”) – Cap. 16
[the first folio of the text seems to be missing]

13th cent.¹⁷²

Pψ

Paris, Bibliothèque nationale de France, ms. n.a.l. 595

ff. 27^r-39^r: *Practica*, Proemium;¹⁷³ Cap. 9 – Cap. 47

¹⁶⁸ Benjamin and Toomer, p. 16 n. 58.

¹⁶⁹ Léopold Delisle, *Inventaire des manuscrits latins conservés à la Bibliothèque nationale sous les numéros 8823-18613* (Paris, 1863-1871), part 1, p. 67.

¹⁷⁰ This version is not in Thorndike and Kibre; see column 155.

¹⁷¹ Delisle, *Inventaire ... 8823-18613*, part 4, p. 72.

¹⁷² Delisle, *Inventaire ... 8823-18613*, part 4, p. 72.

¹⁷³ There are at least 2 of the original folios missing between f. 27 and f. 28.

14-15th cent.¹⁷⁴

P ω

Paris, Bibliothèque nationale de France, ms. n.a.l. 693

ff. 9^r-13^v: *Compositio*, Proemium – Cap. 16

f. 13^v: Star List 3-B

ff. 13^v-14^r: *Practica*, Cap. 3 and Cap. 37

ff. 14^r-15^r: some other unidentified astrolabe material

13-14th cent.¹⁷⁵

Q α

Paris, Bibliothèque nationale de France, ms. n.a.l. 1893

ff. 48^{va}-60^{rb}: *Compositio*

ff. 57^v-58^v: Star List 1

ff. 60^{va}-65^{rb}: *Practica*

14th cent.¹⁷⁶

Q β

Paris, Bibliothèque Sainte-Geneviève, ms. 1043

ff. 65^{ra}-76^{rb}: *Compositio*

ff. 76^{rb}-80^{rb}: *Practica*

13th cent.¹⁷⁷

P α

Paris, Bibliothèque de la Sorbonne, ms. 595

ff. 68^{ra}-82^{ra}: *Compositio*

ff. 82^{ra}-88^{ra}: *Practica*

14th cent.¹⁷⁸

Q γ

Parma, Biblioteca Palatina, ms. 984 (*olim* HH.III.17)

ff. 115^r-130^v: *Compositio*

¹⁷⁴ Henri Omont, "Nouvelles acquisitions des manuscrits de la Bibliothèque nationale pendant les années 1894-1895," *Bibliothèque de l'École des Chartes*, 57 (1896), p. 171.

¹⁷⁵ Lynn Thorndike, "Notes on Some Astronomical, Astrological, and Mathematical Manuscripts of the Bibliothèque Nationale, Paris," *Journal of the Warburg and Courtauld Institutes*, 20 (1957), pp. 160-161

¹⁷⁶ Hahn, p. 197.

¹⁷⁷ Hahn, p. 196.

¹⁷⁸ Hahn, p. 198.

f. 125^v: Star List 1
 f. 126^r: Star List 2
 ff. 126^v-130^v: *Practica* (missing Cap. 46 and 47)
 15th cent.¹⁷⁹
 Qð

Pommersfelden, Gräflich Schönbornsche Schlossbibliothek ms. 66 (2640)
 ff. 106^r-108^r: John of Seville, *De constructione astrolabii*, inc.: “Astrologice speculationis exercitium habere volentibus ...”¹⁸⁰
 ff. 109^{rb}-113^{va}: *Practica* (subgroup A)
 14th cent.¹⁸¹
 Qε

Praha, Knihovna Metropolitní Kapituli,¹⁸² ms. L.29¹⁸³
 ff. 63^{vb}-65^{vb}: *Practica* (subgroup A)
 AD 1374-76¹⁸⁴
 Qζ

Praha, Národní knihovna České Republiky, ms. V.G.18¹⁸⁵
 ff. 6^r-11^r: *Practica* (subgroup A)
 ff. 1^r-6^r: Astrolabe treatise, inc.: “Astrolabium sic construitur. Accipe ...”¹⁸⁶
 end of 14th cent.¹⁸⁷
 Qη

¹⁷⁹ Benjamin and Toomer, pp.81-83.

¹⁸⁰ Thorndike and Kibre, entry 156-9.

¹⁸¹ Dated “N.L.XI” in the explicit on f. 113v. Also dated “1306,” f. 84v, bottom margin; see Charles Burnett, “Latin Alphanumeric Notation and Annotation in Italian in the Twelfth Century: Ms London, British Library, Harley 5402,” in *Sic Itur ad Astra. Festschrift für den Arabisten Paul Kunitzsch zum 70. Geburtstag*, ed. Menso Folkerts and Richard Lorsch (Wiesbaden: Harrassowitz, 2000), p. 82.

¹⁸² Now housed in the Prague Castle Archives.

¹⁸³ Catalogue entry 1272.

¹⁸⁴ Ant. Podlaha, *Soupis Rukopisů Knihovny Metropolitní Kapitoly Pražské* (Prague, 1922), 2: 217.

¹⁸⁵ *Olim* Y.III.4 no. 56; catalogue entry 970.

¹⁸⁶ Thorndike and Kibre, entry 155-7.

¹⁸⁷ Josef Truhlář, *Catalogus codicum manu scriptorum Latinorum ...* (Prague, 1906), 1: 404.

Praha, Národní knihovna České republiky, ms. X.A.23¹⁸⁸

ff. 63^r-68^r: *Practica*

f. 62^v: List of chapter rubrics.

end of 14th cent.¹⁸⁹

Qθ

Praha, Národní knihovna České republiky, ms. XIII.F.24¹⁹⁰

ff. 90^{ra}-91^{va}: *Practica*, Proemium – Cap. 22 line 3 (“... ut dictum est prius!”)

ff. 82^{ra}-90/a^{va}: Astrolabe treatise by John of Sacrobosco, inc.: “Astrolabium speculationibus exercitium ...”¹⁹¹

14th cent.¹⁹²

Qι

Princeton, Princeton University Library, ms. Garrett 99

ff. 180^r-192^r: *Compositio*

ff. 192^r-198^r: *Practica*

late 13th cent.¹⁹³

Qλ

Private Collection¹⁹⁴

¹⁸⁸ *Olim* Y.II.3 n. 23; catalogue entry 1826.

¹⁸⁹ Truhlář, 2: 40.

¹⁹⁰ Catalogue entry 2362.

¹⁹¹ Thorndike and Kibre, entry 155-9a (from the later addenda). There are two folios 90 in the manuscript: fol. 90/a followed by fol. 90.

¹⁹² Truhlář, 2: 255.

¹⁹³ Typescript catalogue. Note on f. 162r dated AD 1297.

¹⁹⁴ *Olim* Napoli, Biblioteca Statale Oratoriana del Monumento Nazionale dei Girolamini, ms CF.1.20 (formerly ms Pil. XXIV no. VII [sometimes 24-7], also known as Mandarinini 31 (or XXXI) from the 1897 catalogue; the use of roman numerals has led to a number of careless citations, e.g., “24-6” and “Mand. 21”). See Enrico Mandarinini, *I Codici Manoscritti della Biblioteca Oratoriana di Napoli* (Naples/Rome, 1897), pp. 53-54. Sold at auction by Christie’s (London), 16 November 1977 and purchased by Nico Israel (Amsterdam); sold by Israel in 1979 (Catalogue 21) and purchased by H. P. Kraus (New York); sold by Kraus. See H. P. Kraus, *Science. Manuscripts Autographs Documents*, Catalogue 155 (New York, 1980), item 11, pp. 11-12.

ff. 132^r-147^r:¹⁹⁵ *Compositio*
 f. 143^{r-v}: Star List 3-B
 f. 144^v: Star List 2
 ff. 147^r- 152^v: *Practica*
 ff. 153^r-157^v: diagrams
 late 13th cent.
 Qμ

Ravenna, Biblioteca Classense, ms. 269

ff. 1^{ra}-16^v: *Compositio*, Proemium – Cap. 16; Cap. 19 – Cap. 22
 f. 12^v: Star List 3-B
 f. 13^r: Star List 2
 ff. 17^{ra}-24^{va}: *Practica* (subgroup A)
 14th cent.¹⁹⁶
 Rα

Roma, Biblioteca Vallicelliana, ms. D 40

ff. 88^{ra}-98^{rb}: *Compositio*
 ff. 98^{va}-104^{vb}: *Practica*
 AD 1351-1400¹⁹⁷
 Rδ

Roma, Biblioteca Vallicelliana, ms. F 37

ff. 74^r-77^r: *Practica*, Proemium – Cap. 31 line 6 (“... stellam inter”)¹⁹⁸
 15th cent., second half¹⁹⁹
 Rγ

Roma, Osservatorio Astronomico di Roma, Biblioteca, ms. III C.14,

ff. 160^{ra}-167^{vb}: *Compositio*

¹⁹⁵ Ms Qμ has been renumbered in the bottom corner of each folio. These numbers are each one greater than the numbers cited here, reflecting a blank folio at the beginning.

¹⁹⁶ Mazzatinti, *Inventari*, vol. 4, pp. 202-203

¹⁹⁷ Dated AD 1464 on fol. 108vb. See also Kristeller, *Iter Italicum*, 2:132.

¹⁹⁸ The bottom half of folio 74 has been torn out, except for a small wedge which was restored in 1974 as fol. 73bis. Missing are the sections Proem. line 18 to Cap. 2 line 3 and Cap. 3 line 15 to Cap. 6 line 1. However some partial lines from the missing sections can be found on the wedge (recto and verso) but because so little survives, they have not been collated.

¹⁹⁹ Dated AD 1483 on fol. 152v.

ff. 168^{ra}-171^{vb}: *Practica*
 fourteenth century, second half²⁰⁰
 Rε

Rovigo, Biblioteca dell'Accademia dei Concordi, ms. Silvestriano 88 (*olim* Fondo Concordi, ms. 13;
olim 6,4)²⁰¹

ff. 70^r-79^v: *Compositio*, Proemium – Cap. 13 line 19 (“... pervenias ad punctum”)
 15th cent., last quarter²⁰²
 Rβ

Saint-Omer, Bibliothèque municipale, ms. 374

ff. 137^v-139^v: *Practica*, Proemium – Cap. 23²⁰³
 15th cent.²⁰⁴
 Sα

Salamanca, Universidad de Salamanca, Biblioteca, ms. 2353

ff. 4^{vb}-6^{vb}: *Practica* (subgroup A)
 ff. 6^{vb}-12^{ra}: *Compositio*, Proemium – Cap. 16; Cap. 19 – Cap. 22
 f. 10^{va}: Star List 3-B
 f. 10^{vb}: Star List 2
 fol. 12^{ra}: Another astrolabe text, inc. “Astrolabium ita construitur. Accipe rotulas ...”²⁰⁵
 14th cent.²⁰⁶
 Sβ

²⁰⁰ “Estimated date” – Manus on-line catalogue [2021].

²⁰¹ An extra “6” (i.e., 6,4,6) was added to this shelfmark, current between 1865 and 1893. The manuscript was also indexed on a card numbered “13” and it was sometimes erroneously referred to as “Concordi 13”. In the late 1920s or the early 1930s the current shelfmark came into use.

²⁰² Nicoletta Giovè Marchioli and Leonardo Granata, *I manoscritti medievali delle province di Belluno e Rovigo* (Venice: Regione del Veneto; Tavarnuzze, Impruneta: SISMEL Edizioni del Galluzzo, 2010), p. 71.

²⁰³ This ms is written in a flowery hand which is difficult to read. It also varies constantly from the base text. But an attempt has to been made to collate it where possible.

²⁰⁴ *Catalogue général des manuscrits des bibliothèques publiques des départements* (Paris, 1861), 3: 182.

²⁰⁵ Thorndike and Kibre, entry 155-8.

²⁰⁶ Guy Beaujouan, *Manuscrits scientifiques médiévaux de l'université de Salamanque et de ses “colegios mayores”* (Bordeaux, 1962), p. 148; *Catálogo de Manuscritos de la Biblioteca Uniuersitaria de Salamanca* (Salamanca: Ediciones Universidad de Salamanca, 2002), 2: 733.

Salamanca, Universidad de Salamanca, Biblioteca, ms. 2621

f. 10^{ra}: variant on Star List 1 (not collated)²⁰⁷

f. 10^{rb}: Star List of Jean Fusoris²⁰⁸

f. 115^v: Star List – Kunitzsch, Typ IX²⁰⁹

f. 116^r: Star List 2

15th cent.²¹⁰

Sγ

Salamanca, Universidad de Salamanca, Biblioteca General, ms. 2662

ff. 67^{ra}-78^{vb}: *Compositio*

ff. 78^{vb}-84^{vb}: *Practica*

14th cent., end²¹¹

Sδ

San Marino, Henry E. Huntington Library, ms. 39465 (*olim* Roma, Library of Prince Baldassarre

Boncompagni, ms. 357 (*olim* 328))²¹²

ff. 20^r-30^r: *Practica*

15th cent.²¹³

Not collated²¹⁴

Sankt Gallen, Kantonsbibliothek Vadiana, ms. 412

ff. 93v-95r: Star List 1

f. 95v: Star List of Jean Fusoris²¹⁵

²⁰⁷ Kunitzsch, *Typen*, p. 54: VIIIg.

²⁰⁸ *Ibid.*, p. 5 note 8.

²⁰⁹ *Ibid.*, p. 59: IXg.

²¹⁰ Beaujouan, *Salamanque*, p. 173; *Catálogo ... Salamanca*, 2: 979.

²¹¹ Beaujouan, *Salamanque*, p. 178; *Catálogo ... Salamanca*, 2: 1055.

²¹² Enrico Narducci, *Catalogo di Manoscritti ora posseduti da D. Baldassarre Boncompagni*, 2nd ed. (Rome, 1892), pp. 211-213.

²¹³ C. W. Dutschke, *Guide to Medieval and Renaissance Manuscripts in the Huntington Library* (San Marino, 1989), 2: 717; and the library's on-line catalogue.

²¹⁴ The whereabouts of this ms was discovered too late to allow collation with the *Practica* text.

²¹⁵ Kunitzsch, *Typen*, p. 5 note 8.

15th cent.²¹⁶

Sε

Sankt-Peterburg, Rossijskaja Nacionalnaja Biblioteka, ms. Lat O.v.IX n°. 2

ff. 6^v-18^r: *Compositio*, Proemium – Cap. 16

ff. 18^r-25^r: *Practica*, Proem. – Cap. 37 line 5 (“...est initium [tertie] domus”), Cap. 42-44

(subgroup A)

13th cent.²¹⁷

Sλ

Schlägl/Aigen-im-Mühlkreis, Bibliothek des Praemonstratenserstiftes, ms. Plagens [824] 236²¹⁸

ff. 158^r-172^r: *Practica*

ca. AD 1466²¹⁹

Sη

Sevilla, Biblioteca Capitular y Colombina, ms 7-6-2 (*olim* BB-50-15)

ff. 121^r-131^r: *Compositio*

ff. 131^v-140^v: *Practica* (subgroup A)

13th-14th cent.²²⁰

Sθ

Sevilla, Biblioteca Capitular y Colombina, ms 7-7-2 (*olim* Z-137-40)

ff. 43^{ra}-49^{rb}: *Compositio*, Proemium – Cap 16

ff. 49^{rb}-51^{rb}: other astrolabe material

ff. 51^{rb}-55^{rb}: *Practica* (subgroup A)

14th-15th cent.²²¹

Sι

²¹⁶ *Ibid.*, p. 53: VIIIi.

²¹⁷ Olga Bleskina, *Catalogus codicum manuscriptorum latinorum, qui in Bibliotheca Publica Petropolitana asservantur ...* (St. Petersburg, 2011), pp. 177-178. The catalogue divides the text up into 10 different works; these are actually different chapters of the *Compositio*.

²¹⁸ Catalogue entry: 126.

²¹⁹ Godefroidus Vielhaber and Gerlacus Indra, *Catalogus codicum Plagensium (Cpl.) manuscriptorum* (Linz, 1918), p. 224.

²²⁰ José Francisco Sáez Guillén et al., *Catálogo de manuscritos de la Biblioteca Colombina de Sevilla* (Seville: Cabildo de la S.M. y P.I. Catedral de Sevilla, Institución Colombina, 2002), 1: 628.

²²¹ *Ibid.*, 1: 680.

Stams, Stiftsbibliothek, ms. 13

ff. 78^{ra}-93^{ra}: *Compositio*

ff. 93^{ra}-101^{rb}: *Practica*

15th cent.²²²

Sk

Toruń, Uniwersytetu Mikołaja Kopernica, Biblioteka Główna, ms. 74 (*olim* Königsberg, Staats- und Universitätsbibliothek, ms. Folio 1735)

ff. 200^{ra}-204^{vb}: *Practica*, Proemium B, Cap. 1-47

15th cent.²²³

Tβ

Trier, Stadtbibliothek, ms. 1074/1271 (8°)

ff. 49^r-70^{vr} (*olim* 50^r-71^r): *Compositio*

f. 65^r (*olim* 66^r): Star List 1

f. 65^v (*olim* 66^v): Star List 2

ff. 70^v-81^v (*olim* 71^v-82^v): *Practica*

15th cent.²²⁴

Tδ

Uppsala, Universitetsbibliotek, ms. C 653

ff. 61^r-64^v: *Compositio*, Proemium – Cap. 9 line 3 (“... cuius rei exemplar”)

ff. 214^{ra}-227^r: a different astrolabe text, inc. “Inquirentibus compositionem astrolabii modumque compositionis ...”²²⁵

14th cent. (1388)²²⁶

Uα

Vatican, Biblioteca Apostolica Vaticana, ms. Barb. lat. 156

ff. 198^r-206^r: *Compositio*, Proemium – Cap 16

²²² *A Checklist of Manuscripts from Stams Zisterzienser Stift ...* (Collegeville, MN: Monastic Manuscript Microfilm, St. John’s University, circa 1974), p. 3

²²³ Zinner, *Verzeichnis*, entry 7059.

²²⁴ Adolf Becker, *Beschreibendes Verzeichnis der Handschriften der Stadtbibliothek zu Trier, 7: Die deutschen Handschriften* (Trier, 1911), p. 141.

²²⁵ Not in Thorndike and Kibre.

²²⁶ Margarete Andersson-Schmitt, et al., *Mittelalterliche Handschriften der Universitätsbibliothek Uppsala. Katalog über die C-Sammlung* (Stockholm, 1993), 6: 214. On fol. 64^v, where our text ends, there is a “colophon” which reads “Pomponius Valerius scribus 1568” – but this is in a much later hand.

ff. 206^r-208^v: some other astrolabe material

ff. 208^v-214^r: *Practica* (subgroup A)

15th cent.²²⁷

Vα

Vatican, Biblioteca Apostolica Vaticana, ms. Barb. lat. 276

ff. 40^r-51^v: *Compositio*, Proemium – Cap. 7; fols. 91^r-109^r: Cap. 8 – 22

ff. 57^r-71^v: *Practica*

ff. 51^r-56^v: a different astrolabe text, inc.: “Astrologice speculationis exercitium habere volentibus ...”²²⁸

AD 1473²²⁹

Vβ

Vatican, Biblioteca Apostolica Vaticana, ms. Barb. lat. 303

ff. 79^{vb}-81^{rb}: *Practica* (subgroup A)

13th cent. (?)²³⁰

Vγ

Vatican, Biblioteca Apostolica Vaticana, ms. Borg. 312

ff. 15^{ra}-18^{ra}: *Compositio*, Proemium – Cap. 16

14th cent.²³¹

Vε

Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1373

ff. 11^v-18^r: *Practica*, Proemium B, Cap. 1-47

ff. 6^v-11^v: another astrolabe text

15th cent. (first quarter)²³²

Vη

²²⁷ Theodore Silverstein, *Medieval Latin Scientific Writings in the Barbarini Collection: a Provisional Catalogue* (Chicago: University of Chicago Press, 1957), p. 34.

²²⁸ Thorndike and Kibre, entry 156-4/9.

²²⁹ Silverstein, p. 76; fol. 71^v = “1473”. See the note at *Compositio*, Cap. 7 line 9(app. crit.) for information on the scribe.

²³⁰ Silverstein, p. 86

²³¹ Anneliese Maier, *Codices Burghesiani Bibliothecae Vaticanae* (Vatican City, 1952), p. 354.

²³² Ludwig Schuba, *Die Quadriviums-Handschriften der Codices Palatini Latini in der Vatikanischen Bibliothek* (Wiesbaden: Reichert, 1992), p. 82.

Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1376

ff. 331^v-334^v: astrolabe diagrams

ff. 335^r-339^{va}: *Compositio*

ff. 339^{vb}-342^{vb}: *Practica*

AD 1447²³³

V_ι

Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1381

f. 136^v: an incomplete and unidentified star list

ff. 137^r-146^v: *Compositio*, Proemium – Cap. 16

f. 147^r: Star List 3-B

14th cent., end²³⁴

V_κ

Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1391

ff. 195^v-198^v: *Compositio*, Cap. 17 and Cap. 18

ca. AD 1500²³⁵

V_θ

Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1414

ff. 179^{va}-183^{va}: *Practica* (subgroup A)

ff. 183^{va}-189^{vb}: *Compositio*, Proemium – Cap. 16

13-14th cent.²³⁶

V_ν

Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1416

ff. 214^r-221^v: *Practica*, Cap. 1– Cap. 46 line 12 (“... subtractione continentium facta.”)

15th cent. (2nd third)²³⁷

V_ξ

Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1435

ff. 260^{rb}-262^{rb} (*olim* 246^{rb}-248^{rb}): A different astrolabe text, inc.: “Astrolabium ita con-struitur.

²³³ Fol. 342^{vb}. See Schuba, p. 94.

²³⁴ Schuba, p. 115.

²³⁵ Schuba, p. 153.

²³⁶ Lynn Thorndike, “Notes upon some Medieval Latin Astronomical, Astrological and Mathematical Manuscripts at the Vatican,” *Isis* 49 (1958), p. 39; Schuba, p. 195.

²³⁷ Benjamin and Toomer, p. 72; Schuba, p. 201.

Accipe rotulas ...²³⁸

ff. 268^{rb}-271^{va} (*olim* 254^{rb}-257^{va}): *Practica*, Proemium B, Cap. 1-30
15th cent. (AD 1473-1478)²³⁹

Vo

Vatican, Biblioteca Apostolica Vaticana, ms. Reg. lat. 1241

ff. 171r-178r: *Practica*, Proemium B, Cap. 1-47

AD 1493²⁴⁰

Vμ

Vatican, Biblioteca Apostolica Vaticana, ms. Rossiano 732 (*olim* X,112)

ff. 47^v-60^r: *Compositio*

f. 61^r: Star List 1

f. 61^v: Star List 2

ff. 62^r-66^v: *Practica*

15th cent.²⁴¹

Vπ

Vatican, Biblioteca Apostolica Vaticana, ms. Urb. lat. 1399

ff. 27^{ra}-29^{rb}: *Practica* (subgroup A)

14th cent.²⁴²

Vρ

Vatican, Biblioteca Apostolica Vaticana, ms. Urb. lat. 1408

ff. 7^r-13^r: *Compositio*, Proemium – Cap. 16

ff. 13^v-14^r: different proemium (“Nomina instrumentorum astrolabii et eorum que in eo continentur”)

ff. 14^r-20^r: *Practica*, Cap. 1 – 47

– This version shows significant variation from the base text, particularly in the first 6 capitula.

²³⁸ Thorndike and Kibre, entry 155-7.

²³⁹ Schuba, p. 221.

²⁴⁰ Fol. 178^r.

²⁴¹ Benjamin and Toomer, p. 90.

²⁴² Cosimus Stornajolo, *Codices Urbinales Latini*, 3: *Codices 1001-1779* (Rome, 1921), p. 306.

14th cent.²⁴³

Vσ

Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 1108

ff. 162^v-164^r: *Practica*, Proemium – Cap. 24 line 6 (“... et maiorem, inter quas”)

14-15th cent.²⁴⁴

Vτ

Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 3099

ff. 28^{ra}-33^{va}: *Compositio*, Proemium – Cap. 16

ff. 33^{va}-35^{ra}: unidentified astrolabe material

35^{rb}-38^{va}: *Practica* (subgroup A)

AD 1472²⁴⁵

Vυ

Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 3127

ff. 13^r-17^v: *Practica* (subgroup A)

ff. 17v-18r: *De re perdita invenienda*

ff. 18^r-23^{vr}: Profatius Judaeus, *Compositio novi quadrantis*, inc.: “Compositurus novum quadrantem accipe tabulam planum ...”²⁴⁶

14th and 15th cent.²⁴⁷

Vφ

Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 3133

ff. 58^r-62^v: *Compositio*, Proemium – Cap. 16, Cap. 20 and 21

14th cent.²⁴⁸

Vχ

²⁴³ Stornajolo, p. 312.

²⁴⁴ Augustus Pelzer, *Codices Vaticani Latini*, 2.1: *Codices 679-1134* (Vatican City, 1931), pp. 719-725.

²⁴⁵ Jeannine Fohlen, “Colophons et souscriptions de copistes dans les manuscrits classiques latins de la Bibliothèque Vaticane (XIV^e et XV^e s.)”, in *Roma, magistra mundi. Itineraria culturae medievalis*, ed. Jacqueline Hamesse, Textes et Études du Moyen Âge 10.1 (Louvain-le-Neuve: Fédération Internationale des Instituts d’Études Médiévales, 1998), 1: 264.

²⁴⁶ Thorndike and Kibre, entry 241-8.

²⁴⁷ Hahn, p. 198.

²⁴⁸ C. Philippe E. Northaft, “Ptolemaic Orbs in Twelfth-Century England,” *Mediterranea. International Journal for the Transfer of Knowledge* 3 (2018), p. 175.

Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 4037

ff. 168^r-180^v: *Compositio*

ff. 181^v-186^r: *Practica*

15th cent.²⁴⁹

Vψ

Venezia, Biblioteca Nazionale Marciana, ms. VIII.33 (*olim* XI,106) (= 2499)

Copy A: ff. 92^{ra}-97^{va}: *Compositio*, Proemium – Cap. 19 line 6 (“... diametrum RS divisum |”)

f. 97^{r-v}: Star List 3-B

ff. 98^{va}-99^{va}: *Practica*, Proemium – Cap. 19 line 12 (“... occidentalem et cetera |”)

15th cent.²⁵⁰

Xα

Copy B: ff. 100^r-111^r: *Compositio*

ff. 111^r-115^v: *Practica*, Proemium – Cap. 46

Xβ

Venezia, Biblioteca Nazionale Marciana, ms. VIII.77 (*olim* XI, 79) (=3223)

ff. 18^r-19^v: *Practica*, Proemium – Cap. 12 line 2;²⁵¹ Cap 28 line 2 – Cap. 37 line 7; continuation on fol. 19^v is illegible

ms is partly damaged and often illegible

14th cent.²⁵²

Xγ

Venezia, Biblioteca Nazionale Marciana, fondo antico 343 (= Z[anetti] 343) (=1877)

ff. 2^v-6^r: *Practica*

14th cent.²⁵³

Xδ

Washington, Library of Congress, Rare Book and Special Collections, ms. 95

ff. 75^r-76^r: *Practica*, Proemium – Cap. 5 line 6 (“... continebunt 360 gradus |”)

²⁴⁹ Daniel Tangri, “Demosthenes in the Renaissance: A Case Study on the Origins and Development of Scholarship on Athenian Oratory,” *Viator*, 37 (2006), 558 note.

²⁵⁰ Kristeller, *Iter Italicum*, 2: 228.

²⁵¹ Ms Xγ: there appears to be a folio missing after fol. 18^v, which would account for the gap in the text.

²⁵² Giuseppe Valentinelli, *Bibliotheca Manuscripta ad S. Marci Venetiarum*, 6 vols. (Venice, 1868-1873), 4: 257.

²⁵³ Valentinelli, *S. Marci Venetiarum*, 4: 275.

AD 1456²⁵⁴

Wθ

Wien, Österreichische Nationalbibliothek, ms. Palatinus 2323 (*olim* Rec. 1678)

ff. 80^v-81^r: Star List 1

f. 83^v: Star List 2

14th cent.²⁵⁵

Wδ

Wien, Österreichische Nationalbibliothek, ms. Palatinus 2367 (*olim* Univ. 930)

ff. 77^r-87^r: *Compositio*

ff. 87^r-92^{vb}: *Practica*

f. 194^r: Star List 1

f. 196^r: Star List 2

15th cent.²⁵⁶

Wα

Wien, Österreichische Nationalbibliothek, ms. Palatinus 2386 (*olim* Philos. 271)

ff. 1^r-4^{rb}: *Compositio*

ff. 4^{rb}-6^{va}: *Practica*

14th cent.²⁵⁷

Wβ

Wien, Österreichische Nationalbibliothek, ms. Palatinus 3105 (*olim* Univ. 933)

ff. 73^{va}-76^{rb}: *Practica*

15th cent.²⁵⁸

Wγ

Wien, Österreichische Nationalbibliothek, ms. Palatinus 5145 (*olim* Univ. 362)

ff. 5^{va}-10^v: *Practica*

²⁵⁴ Seymour de Ricci, and W. J. Wilson, *Census of Medieval and Renaissance Manuscripts in the United States and Canada* (New York, 1935), 1: 235-236.

²⁵⁵ *Tabulae codicum manu scriptorum praeter Grecos et orientales in Bibliotheca Palatina Vindobonensi asservatorum*, 2 (1868), p. 57.

²⁵⁶ *Tabulae codicum*, 2 (1868), p. 63.

²⁵⁷ *Tabulae codicum*, 2 (1868), p. 66.

²⁵⁸ *Tabulae codicum*, 2 (1868), p. 197.

15th cent.²⁵⁹

Wλ

Wien, Österreichische Nationalbibliothek, ms. Palatinus 5277 (*olim* Philos 68)

ff. 110^v-116^v: *Compositio*

f. 110^v: Cap. 17

f. 111^v: Cap. 18 (alternate version)

f. 113^r-115^r: Cap. 18

f. 115^v: Cap 17 (repeated)

f. 116^{r-v}: Cap. 18 (repeated)

16th cent.²⁶⁰

Wε [and Wε₂]

Wien, Österreichische Nationalbibliothek, ms. Palatinus 5337 (*olim* Medicus 78)

ff. 116^{va}-120^{rb}: *Practica*, Proemium B, Cap. 1-47

14-15th cent.²⁶¹; AD 1395?²⁶²

Wζ

Wien, Österreichische Nationalbibliothek, ms. Palatinus 5412 (*olim* Rec. 1676)

f. 159^r: Star List 2

15th cent.²⁶³

Wη

Wolfenbüttel, Herzog August Bibliothek, Cod. Guelf. 76.1 Aug. 2^o

ff. 2^{ra}-13^{vb}: *Compositio*, Proemium – Cap. 18

ff. 14^{ra}-22^{vb}: *Practica*

14th cent.²⁶⁴

Wι

²⁵⁹ *Tabulae codicum*, 4 (1870), p. 39; David Juste, “MS Vienna, Österreichische Nationalbibliothek, 5145” (update: 05.02.2018), *Ptolemaeus Arabus et Latinus. Manuscripts*, URL = <http://ptolemaeus.badw.de/ms/529>.

²⁶⁰ *Tabulae codicum*, 4 (1870), pp. 82-85.

²⁶¹ *Tabulae codicum*, 4 (1870), p. 104.

²⁶² Fol. 120^{rb}: ... finiti anno [*illeg.*]95^o, 19 die mensis Aprilis

²⁶³ *Tabulae codicum*, 4 (1870), p. 118.

²⁶⁴ Otto von Heinemann, *Die Handschriften der Herzoglichen Bibliothek zu Wolfenbüttel*, II *Die Augusteischen Handschriften* (1900), 3: 391 (catalogue entry 2725); reprinted as *Kataloge der Herzog-August-Bibliothek Wolfenbüttel. Die Augusteischen Handschriften* (Frankfurt am Main, 1966), vol. 6.

Wolfenbüttel, Herzog August Bibliothek, Cod. Guelf. 81.26 Aug. 2^o

f. 139^r: 2 star lists; see Part III: Lists of Fixed Stars – Appendix II.

ff. 139^v-140^r: *Compositio*, Cap. 5 only.

ff. 132^r-139^r: another astrolabe text, inc. “Fiat una tabula de cupro sive latone ...”²⁶⁵

f. 140^v: unidentified text: “Compositio instrumenti pro mediis locis planetarum reperiendis.”

AD 1461²⁶⁶

Wκ

Wrocław, Biblioteka Uniwersytecka, ms. IV F 19

ff. 218^v-220^r: *Practica*

15th cent. (1482)²⁶⁷

Wμ

Zurich, Zentralbibliothek, ms. C 364

ff. 2^r-4^v: Astrolabe text, inc.: “Astrolabium ita construitur. Accipe rotulas ...”²⁶⁸

ff. 5^r-8^v: *Practica*

AD 1482.²⁶⁹

Zα

²⁶⁵ Thorndike and Kibre, entry 557-5; Zinner, *Verzeichnis*, entry 899.

²⁶⁶ Otto von Heinemann, *Die Handschriften der Herzoglichen Bibliothek zu Wolfenbüttel*, II *Die Augusteischen Handschriften* (1900), 4: 37-38 (catalogue entry 2816); reprinted as *Kataloge der Herzog-August-Bibliothek Wolfenbüttel. Die Augusteischen Handschriften* (Frankfurt am Main, 1966), vol. 7. Zinner (*Verzeichnis*, entries 899 and 7056) says A.D. 1461.

²⁶⁷ “Katalog rękopisów dawnej Biblioteki Uniwersyteckiej we Wrocławiu” [unpublished catalogue in manuscript form], vol. 8 (ca. 1920-1944), p. 57. Date on fol. 220^r is indecipherable. Date on fol. 246^v is 1482. Date on fol. 278^r is 1480 (note, foliation skips from 264 to 275; therefore fol. 278^r is really fol. 268^r).

²⁶⁸ Thorndike and Kibre, entry 155-8.

²⁶⁹ Fol. 8^v. However, Leo Cunibert Mohlberg, *Katalog der Handschriften der Zentralbibliothek Zurich*, 1 *Mittelalterliche Handschriften* (Zurich, 1951), p. 85, entry 216, says 16th century.

E. The Manuscripts of Each Section

Note: 0-0] means that the text ends in the last named capitulum;
]0-0 means that the text begins in the first named capitulum.

	<i>Compositio</i>				<i>Star Lists</i>	<i>Practica</i>	
	Pro.	I	II			III	Pro.	1-47
Aα	P	1-6	7-16	17-18	SL 1; SL 2		]46-47
Bα	P	1-6	7-16				
Bβ						P	1-40 ¹
Bγ	P	1-6	7-16	17-22		P	1-47 ²
Bδ				]20-22		P	1-47
Bε	P	1-6	7-16	17-22		P	1-24, 26-47
Bε ₁						P	
Bζ	P	1-6	7-16			P	1-10, 13-32, 34-37, 40-47 ³
Bη	P	1-6	7-16			P	1-10, 13-18, 20-22, 24-29, 32-33, 36-37, 40-47 ⁴
Bθ		]2-6	7-16	17-22	SL 1; SL 2	P	1-47 ⁵
Bι	P	1-6	7-16		SL 3-B	P	1-10, 13-22, 24-37, 40-47 ⁶
Bκ	P	1-6	7-16	18, 20-22 ⁷		P	1-10, 13-22, 24-34, 36-37, 40-47 ⁸
Cα							1-10, 13-18, 20-23, 25-26, 28-33[
Cβ	P	1-6	7-16				
Cγ						P	1-22, 24-47 ⁹

¹ Bβ: The text of the last half of Cap. 39 and all of Cap. 40 is seriously corrupted.

² Bγ: ordered ... 41, "De re perdita" (*marg.*), 42

³ Bζ: ordered ... 27, 42-44, 28-32, 34-37, 40-41, 33, "De re perdita," 45-47, [*other material*], Proemium.

⁴ Bη: ordered ... 27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47.

⁵ Bθ: ordered ... 41, "De re perdita," 42

⁶ Bι: ordered ... 27, 42-44, 28-32, 34-37, 40-41, 33, "De re perdita," 45-47.

⁷ Bκ: ordered ... 16, 20-22, 18.

⁸ Bκ: ordered ... 7, 19, 8-10, 13-18, 20-22, 24-27, 42-43, 30-31, 34, 44, 28-29, 32, 36-37, 40-41, 33, 45-47.

⁹ Cγ: ordered ... 10, 13, 11-12, 14

Cδ	P	1-6	7-16		SL 3-A	P	1-10, 13-18, 20-22, 24-29, 32-33, 36-37, 40-47 ¹⁰
Cε	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47
Cζ ₁		]1-6	7-16		SL 1-A	P	1-10, 13-18, 20-22, 24-29, 32-33, 36-37, 40-47 ¹¹
Cζ ₂ ¹²							28-29, 32-33, 36-37, 40-41, 43-47
Cη	P	1-6	7-16	17-22	SL 1; SL 2	P	1-22, 24-47
Cθ	P	1-6	7-16				
Cι	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47
Dβ	P	1-3[
Dγ	P	1-6	7-16	18-22 ¹³	SL 2; SL 3-B	P	1-10, 13-22, 24-37, 40-47 ¹⁴
Dδ						P	1-47
Dη	P	1-6	7-16	17-22 ¹⁵	SL 1; SL 2	P	1-13, 15-43 ¹⁶
Eα	P	1-6	7-16	17-22		P	1-22, 24-47
Eβ	P	1-6	7-16	17-22		P	1-47
Eγ						P	1-10, 13-18, 20-22, 24-29, 32-33, 36-37, 40-47 ¹⁷
Eδ	P	1-6	7-16	17-22	SL 1-A; SL 2; SL 3-B	P	1-47
Eε					SL 3A		
Eζ	P	1-6	7-16	17-22	SL 1-A; SL 2; SL 3-B	P	1-22, 24-47
Eη	P	1-6	7-16	17-22		P	1-47

¹⁰ Cδ: ordered ... 27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47.

¹¹ Cζ: there are two versions of some of the capitula, as listed under Cζ₂. Ordered ... 27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47; 43₂-44₂, 28₂-29₂, 32₂, 36₂-37₂, 40₂-41₂, 33₂, 45₂-47₂.

¹² Cζ₂: for the order of the second versions of the capitula in this ms, see the previous footnote.

¹³ Dγ: ordered ... 15, 21, 16, 19, 20-22, 18

¹⁴ Dγ: ordered ... 27, 42-44, 28-32, 34-37, 40-41, 33, 45-47.

¹⁵ Dη: ordered ... 10, 22, 11 ... 15, 19-20, 16, 21, 17-18.

¹⁶ Dη: ordered ... 6, 8, 7, 9, 10, 13

¹⁷ Eγ: ordered ... 27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47.

Εκ					P	1-22, 24-29, 31-46 ¹⁸
Ελ						1-17, 19-47 ¹⁹
Εμ	P	1-6	7-16	SL 3-B	P	1-10, 13-22, 24-34, 36-47 ²⁰
Εν	P	1-6	7-16			
Εο	P	1-6	7-16	SL 1; SL 1-A		1-37, 40-47 ²¹
Επ				SL 1		
Ερ					P	1-11, 13-37, 40-47 ²²
Εσ						1-47
Ετ	P	1-6	7-16	17-22	SL 1; SL 2	P 1-47
Ευ	P	1-6	7-16	17-22		P 1-46 ²³
Εφ	P	1-5[
Γα	P	1-6	7-16	17-22		P 1-47
Γβ	P	1-6	7-16	17-22		P 1-47 ²⁴
Γγ						1-24, 26-47
Γδ	P	1-6	7[
Γε						]16-47
Γζ	P	1-6	7-16	17-22		P 1-47
Γα			]14-15[	]20[		P 1-11, 13-37, 40-47 ²⁵
Κα					P	1-47 ²⁶

¹⁸ Εκ: ordered ... 6, 31, 11-12, 37-39, 7-10, 13-29, 32-36, 40-46. Fol. 172 which included Cap. 47 is now lost.

¹⁹ Ελ: ordered ... 9, 11-12, 10, 13-17, 19-31, 33, 32, 34-36, 39, 37-38, "De re perditā," 40-47.

²⁰ Εμ: ordered ... 15, 16, 19(*marg.*), 17, 18, 20-21, 30(*marg.*), 31(*marg.*), 24-26, 34(*marg.*), 27, 42-44, 28-29, 32, 36, 39(*marg.*), 37, 40-41, 33, 38(*marg.*), 45-47.

²¹ Εο: ordered ... 27, 42-44, 28-32, 34-37, 40-41, 33, "De re perditā," 45-47, extra chapter.

²² Ερ: ordered ... 10, 13-16, 11, 17-22, 24-26, 23, 27, 42-44, 28-32, 34-37, 40-41, 33, 45-47.

²³ Ευ: ordered ... 41, "De re perditā," 42

²⁴ Γβ: ordered ... 41, "De re perditā," 42

²⁵ Γα: ordered ... 8, 11, 9-10, 13-22, 24-26, 23, 27, 42-44, 28-32, 34-37, 40-41, 33, "De re perditā," 45-47.

²⁶ Κα: ordered ... 15, [additional material], 16(II. 5+), 17, 16(II. 1-4), 18

Kγ						P ²⁷	1-24, 26-27
Kδ						P	1-47
Kε						P	1-47 ²⁸
Kθ						P	1-47
Kι							]5-32, 34-47 ²⁹
Lα					SL 3-A		
Lβ	P	1-5[	]7-16	17-22		P	1-47
Lγ	P	1-6	7-16	17-22		P	1-47
Lδ						P	1-21[
Lε	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47
Lζ	P	1-6	7-16	18, 20-22 ³⁰	SL 1-A	P	1-10, 13-37, 40-47 ³¹
Lη	P	1-6	7-16	17-22		P	1-47
Li							1-19, 42-47
Lκ	P[					P	1-28[³²
Lλ						P	1-22, 24-29, 32-33, 36-37, 40-47 ³³
Lμ						P	1-34, 36-47
Mα						P	1-10, 12-18, 20-22, 24-29, 32-33, 36-37, 40-47 ³⁴
Mγ	P	1-6	7-9[	]13-16			1-10, 12-37, 40-47 ³⁵
Mδ	P	1-6	7-16	17-22		P	1-47
Mζ				22			
Mη	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47

²⁷ In ms Kγ the Proemium follows Caps. 1-27.

²⁸ Kε: ordered ... 22, 24-26, 23, 27, 42-44, 28-32, 33(*marg.*), 34-36, 40-41, 37-39, 45-47.

²⁹ Ki: ordered ... 22, 24-26, 23, 27, 42-44, 28-32, 34-36, 40-41, 37-39, 45-47.

³⁰ Lζ: ordered ... 16, 20-22, 18.

³¹ Lζ: ordered ... 8, 19(*marg.*), 9-10, 13-18, 20-22, 23(*marg.*), 24-27, 42-43, [additional material], 30(*marg.*), 31(*marg.*), 34(*marg.*), 44, 28-29, 32, 35(*marg.*), 36-37, 40-41, 33, 45-47, "De re perdita"(*marg.*).

³² Lκ: ordered ... 3, 21, 22, 4 ... 20, 23

³³ Lλ: ordered ... 27, 42-44, 28-29, 32, 36-37, 40, 33, 45-47.

³⁴ Mα: ordered ... 27, 42-44, 28-29, 32, 36-37, 40, 33, 45-47.

³⁵ Mγ: ordered ... 27, 42-44, 28-32, 34-37, 40-41, 33, "De re perdita," 45-47.

Mθ	P	1-6	7-16		SL 1-A		
Mι						P	1-47
Mκ	P	1-6	7-16		SL 3-B	P	1-47
Mλ	P	1-6	7-16	17-22 ³⁶	SL 2; SL 3-B	P	1-47 ³⁷
Mμ						P(B)	1-47 ³⁸
Mν	P	1-6	7-16	17-22 ³⁹	SL 1-A; SL 3-B	P	1-47
Μο	P	1-6	7-16	17-22	SL 1	P	1-47
Mπ							1-47
Mρ				17-22			
Mσ				17-18			
Mτ						P	1-43, 45-47 ⁴⁰
Mυ	P	1-6	7-16	17-22		P	1-47
Mφ	P	1-6	7-16	17-22		P	1-47
Mχ				17			
Mψ				17-18			
Nα	P	1-6	7-16	17-22		P	1-47
Nγ						P	1-47
Nδ	P	1-6	7-16	17-22		P	1-47
Nε	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47
Nζ						P(B)	1-47 ⁴¹
Oα	P	1-6	7-16				
Oβ						P	1-11, 13-47 ⁴²
Oγ						P	1-47
Oζ	P	1-6	7-16	17-22		P	1-47
Oη	P	1-6	7-16			P	1-10, 13-18, 20, 24-29, 32-33, 36-

³⁶ Mλ: ordered ... 15, 22, 18, 17, star list, 21, 20, 16.

³⁷ Mλ: ordered ... 10, 13-15, 11-12, 16-27, 42-44, 28-32, 34-37, 38(*marg.*), 39(*marg.*), 40-41, 33, 45-47.

³⁸ Mμ: ordered ... 22, 24-26, 23, 27, 42-44, 29-36, 40-41, 45-47, 37-39.

³⁹ Mν: Cap. 22 follows the *Practica* text.

⁴⁰ Mτ: ordered ... 22, 24-26, 23, 27, 42-43, 28-36, 40-41, 37-39, 45-47.

⁴¹ Nζ: ordered ... 10, 12, 11, 13

⁴² Oβ: ordered ... 10, 13, 15, 14, 16, 11, 17-36, 40-47, 39, 37, 38.

							37, 40-47 ⁴³
Oι						P	1-47
Oκ	P	1-6	7-16		SL 3-B		
Oμ	P	1-6	7[
Oν						P	1-32, 34-38, 42-44 ⁴⁴
Oξ	P	1-6	7-16	17-22		P	1-47
Oο	P	1-6	7[
Oπ	P	1-6	7-10[
Oρ						P	1-23, 25-47 ⁴⁵
Oσ	P	1-6	7-16			P	1-10, 12-18, 20-22, 24-29, 32-33, 36-37, 40-47 ⁴⁶
Oτ	P	1-6	7-16	17-22		P	1-47
Oυ	P	1-6	7-16	17-22		P	1-47
Oφ			]13-16	20-21			1-47 ⁴⁷
Oχ						P	1-10, 12-18, 20-21[
Oψ					SL 3-B		
Pα	P	1-6	7-16	17-22		P	1-47
Pβ						P	1-47
Pγ	P	1-6	7-16	17-22		P	1-47
Pδ	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47 ⁴⁸
Pε						P	1-3[
Pζ						P	1-10, 13-18, 20-22, 24-29, 32-33, 36-37, 40-47 ⁴⁹
Pθ	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47
Pι						P	1-11, 13-32, 34-37, 40-47 ⁵⁰

⁴³ Oη: ordered ... 10, 13-14, 16, 15, 17-18, 20, 24-27, 42-43, 28, 44, 29, 32, 36-37, 40-41, 33, 45-47.

⁴⁴ Ov: ordered ... 7, 11-12, 8-10, 13-27, 42-44, 28-32, 34-38.

⁴⁵ Oρ: ordered ... 33, *other astrolabe material*, 36 ...47, 34, 35.

⁴⁶ Oσ: ordered ... 27, 42-44, 28-29, 32, 36-37, 40, 33, 45-47.

⁴⁷ Oφ: ordered ... 27, 42-44, 28-41, 33₂(*marg.*), 45-47.

⁴⁸ Pδ: ordered ... 41, "De re perdata," 42

⁴⁹ Pζ: ordered ... 22, 24-27, 42-44, 28-29, 32-37, 40-41, 33, 45-47.

⁵⁰ Pι: ordered ... 10, 13-16, 11, 17-22, 24-26, 23, 27, 42-44, 28-32, 33₁, 34-37, 40-41, 33₂, 45-47, "De re perdata"(*marg.*).

Pκ						P(B)	1-47 ⁵¹
Pλ	P	1-6	7-16	17-22			
Pμ	P	1-6	7-16	17-22		P	1-47
Pν	P	1-6	7-16	17-22		P	1-47
Pξ							1-47
Pο	P	1-6	7-16	17-22	SL 1-A; SL 2; SL 3-B	P	1-47 ⁵²
Pπ	P[				SL 3-A/3-B		
Pρ	P	1-6	7-16	17-22		P	1-47
Pσ						P	1-47
Pτ	P	1-6	7-16	17-22	SL 2; SL 3-B	P	1-22, 24-47
Pυ	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47
Pφ	P	1-6	7-16				1-47 ⁵³
Pχ						P(B)	1-47 ⁵⁴
Pψ		]4-6	7-16				
Pω						P[	9-47
Qα	P	1-6	7-16		SL 3-B		3, 37
Qβ	P	1-6	7-16	17-22	SL 1	P	1-47
Qγ	P	1-6	7-16	17-22		P	1-47
Qδ	P	1-6	7-16	17-22	SL 1; SL 2	P	1-45
Qε						P	1-22, 24-29, 32-33, 36-37, 40-47 ⁵⁵
Qζ							1-43, 45-47 ⁵⁶
Qη							1-11, 13, 15-47 ⁵⁷
Qθ						P ⁵⁸	1-47
Qι						P	1-22[

⁵¹ Pκ: ordered ... 10, 12, 11, 13 Cap. 4 skips from fol. 30^v to fol. 4^r.

⁵² Pο: 23(*marg.*).

⁵³ Pφ: ordered ... 27, 42-43, 28-32, 34-41, 33, 45-47.

⁵⁴ Pχ: ordered ... 10, 12, 11, 13

⁵⁵ Qε: ordered ... 27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47.

⁵⁶ Qζ: ordered ... 22, 24-26, 23, 27, 42-43, 28-36, 40-41, 37-39, 45-47.

⁵⁷ Qη: ordered ... 10, 13, 15-16, 11, 17-22, 24-26, 23, 27, 42-44, 28-32, 34-36, 33, 40-41, 37-39, 45-47.

⁵⁸ Preceded by a list of chapter rubrics.

Qλ	P	1-6	7-16	17-22		P	1-47
Qμ	P	1-6	7-16	17-22	SL 2; SL 3-B	P	1-37, 40-47 ⁵⁹
Rα	P	1-6	7-16	17-22	SL 2; SL 3-B	P	1-10, 13-22, 24-37, 40-47 ⁶⁰
Rβ	P	1-6	7-13[
Rγ						P[	]2-3[,]6-31[⁶¹
Rδ	P	1-6	7-16	17-22 ⁶²		P	1-47
Rε	P	1-6	7-16	17-22 ⁶³		P	1-47 ⁶⁴
Sα						P	1, 4, 6-23
Sβ	P	1-6	7-16	19-22	SL 2; SL 3-B	P	1-10, 13-22, 24-37, 40-47 ⁶⁵
Sγ					SL 2		
Sδ	P	1-6	7-16	17-22		P	1-47
Sε					SL 1		
Sη						P	1-47
Sθ	P	1-6	7-16			P	1-10, 13-18, 20-22, 24-29, 32-33, 36-37, 40-47 ⁶⁶
Sι	P	1-6	7-16			P	1-10, 13-18, 20-22, 24-29, 32, 36- 37, 40-47 ⁶⁷
Sκ	P	1-6	7-16	17-22		P	1-47

⁵⁹ Qμ: ordered ... 10, 11(*marg.*), 12(*marg.*), 13(*marg.*), 14-22, 23(*marg.*), 24-33, 34(*marg.*), 35-37, 40-47.

⁶⁰ Rα: ordered ... 27, 42-44, 28-32, 34-37, 40-41, 33, 45-47.

⁶¹ Rγ: The bottom half of folio 74 has been torn out, except for a small wedge restored in 1974 as fol. 73bis. Missing are the sections Proem. line 18 to Cap. 2 line 3 and Cap. 3 line 15 to Cap. 6 line 1. However some partial lines from the missing sections can be found on the wedge (recto and verso).

⁶² Rδ: ordered ... 10, 22, 11 ... 16, 19-21, 17-18.

⁶³ Rε: ordered ... 15, 19, 20, 16-18, 21-22.

⁶⁴ Rε: ordered ... 31, 33, 32, 34 -36, 39, 37-38, 40

⁶⁵ Sβ: ordered ...19(*marg.*) 20-27, 42-44, 28-29, 30(*marg.*), 31(*marg.*), 32, 34(*marg.*), 35(*marg.*), 36-37, 40-41, 33, 45-47.

⁶⁶ Sθ: ordered ... 27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47.

⁶⁷ Sι: ordered ... 27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47.

Sλ	P	1-6	7-16			P	1-10, 13-18, 20-22, 24-29, 32, 36-37[, 42-44 ⁶⁸
Tβ						P(B)	1-47
Tδ	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47
Uα	P	1-6	7-9[
Vα	P	1-6	7-16			P	1-10, 13-18, 20-22, 24-29, 32-33, 36-37, 40-47 ⁶⁹
Vβ	P	1-6	7-16	17-22 ⁷⁰		P	1-47
Vγ						P	1-10, 13-18, 20-22, 24-29, 32-33, 36-37, 40-47 ⁷¹
Vε	P	1-6	7-16				
Vη						P(B)	1-47
Vθ				17-18			
Vι	P	1-6	7-16	17-22		P	1-47
Vκ	P	1-6	7-16		SL 3-B		
Vμ						P(B)	1-47
Vν	P	1-6	7-16			P	1-37, 40-47 ⁷²
Vξ							1-46[
Vο						P(B)	1-30
Vπ	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47 ⁷³
Vρ						P	1-10, 13-22, 24-37, 40-47 ⁷⁴
Vσ	P	1-6	7-16				1- 47 ⁷⁵
Vτ						P	1-24[⁷⁶

⁶⁸ Sλ: ordered ... 27, 42-44, 28-29, 32, 36, 37(ends on line 5).

⁶⁹ Vα: ordered ... 27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47.

⁷⁰ Vβ: ordered ... 16, 19-21, 17-18, 22

⁷¹ Vγ: ordered ... 27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47.

⁷² Vν: ordered ... 27, 42-44, 28-32, 34-37, 40-41, 33, "De re perditā," 45-47.

⁷³ Vπ: ordered ... 41, "De re perditā," 42

⁷⁴ Vρ: ordered ... 27, 42-44, 28-32, 34-37, 40-41, 33, "De re perditā," 45-47.

⁷⁵ Vσ: ordered ... 16, alternate version of 18, 17, 18

⁷⁶ Vτ: ordered ... 9, 11, 10, 13, 12, 14

Vυ	P	1-6	7-16			P	1-10, 13-18, 20-22, 24-29, 32-33, 36-37, 40-47 ⁷⁷
Vφ						P	1-38, 40-47 ⁷⁸
Vχ	P	1-6	7-16	20-21			
Vψ	P	1-6	7-16	17-22		P	1-47
Wα	P	1-6	7-16	17-22	SL 1; SL 2	P	1-47
Wβ	P	1-6	7-16	17-22		P	1-47
Wγ						P	1-10, 13, 16-18, 20-22, 24-29, 32-33, 36-37, 40-47 ⁷⁹
Wδ					SL 1; SL 2		
Wε				17-18			
Wζ						P(B)	1-47 ⁸⁰
Wη					SL 2		
Wθ						P	1-5[
Wι	P	1-6	7-16	17-18		P	1-47 ⁸¹
Wκ		5					
Wλ						P	1-32, 34-47
Wμ						P	1-47
Χα	P	1-6	7-16	17-19[	SL 3-B	P	1-19[
Χβ	P	1-6	7-16	17-22		P	1-46
Χγ						P	1-12[,]28-37[⁸²
Χδ						P	1-47
Zα							1-47

⁷⁷ Vυ: ordered ... 27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47.

⁷⁸ Vφ: ordered ... 10, 13-16, 11, 12(*marg.*), 17-27, 42-44, 28-32, 33(*marg.*), 34-37, 38(*marg.*), 40-41, 33, 45-47, "De re perdita."

⁷⁹ Wγ: ordered ... 10, 13, 16-18, 20-22, 24-27, 42-44, 28-29, 32, 36-37, 40-41, 33, 45-47.

⁸⁰ Wζ: ordered ... 10, 12, 11, 13

⁸¹ Wι: ordered ... 10, 13-28, 11-12, 29

⁸² Χγ: There appears to be a folio missing after f. 18^v, which would account for the gap in the text. After Cap. 37 line 7, the next folio-side (19^v) is badly damaged and illegible. The actual contents of this leaf cannot be determined.

F. The Text

I leave it to others to do a full textual analysis of the treatise based on this critical edition. However, I will make some preliminary comments.

First, the text is surprisingly consistent. Variants result mainly from homoioteleutons, or from later interlinear explanatory insertions (“scilicet ...”) which are sometimes incorporated as text in derivative manuscripts. There are a few places where words are replaced by other words of the same meaning (*Post hoc / Postea / Deinde; aut / vel*). Some variants are obvious spelling errors, while others are mis-readings by the scribe of his exemplar. Rarely does the text deviate significantly.

The lettering given in the text and the diagrams is a different matter. It varies from manuscript to manuscript although for the most part, whatever variation there may be, the lettering of the text and of the diagram in a particular ms generally agree. (Variations increase when there is no diagram.)

The main problem is with some of the later letters in the alphabet – some scribes repeat letters or use symbols that are not immediately recognizable as letters. And it is not just a failure to “understand” the geometry of the text – since there is no meaning to the letters being copied per se – that is, they do not form part of a recognizable “word” which would act as a check – the copyist needed to decipher the letters as written in his exemplar.

- *X* can morph into *T*.
- *V* (by extending the left side upwards) can curve over into a *6* which then becomes *G* and later a *g*; or the *V* could become a *b*. *V* can also be confused with *N*, and vice versa.
- *C* can become *T* and vice versa.
- Lower case *r* can lose its horizontal stroke and become *l*.
- *S* is problematical since it is sometimes written as *ʃ* (which can be read as *l*) and sometimes like *8* which in turn can become *g*. (Sometimes the two forms of *S* appear in the same diagram, e.g., ms Ok.)

I have not taken much note of word order (unless a variation is significant), given the number of manuscripts which needed to be collated. As long as all the words are there, with the correct grammatical endings, nothing is noted.

Also, where pairs of words have identical meaning (*aut / vel* or *meridianlis / meridianus*) the variation is not always noted, unless such information might in some way be useful, e.g., for creating stemma.

As for the division of the text into capitula (especially in the *Practica* section), I have followed the traditional divisions of Skeat (and as printed by Gunther) for ease of reference especially vis-à-vis past scholarship. It is noted where some capitula are sometimes divided into two, or where pairs of capitula are combined into one in some manuscripts.

By the same token the numbering of the capitula (again, especially in the *Practica* section) is somewhat artificial. Scarcely any manuscript numbers the items and when it does happen it

seldom matches our modern numbering. The ordering of the capitula, or “mis-ordering” in terms of the text as presented here, is noted in the previous section of the introduction where the text or parts of the text which appear in each manuscript are noted.

In some cases the idea of the text is presented in two different but equally valid ways. The choice I have made for the main text could be seen as arbitrary; the second version, of course, appears among the variants. The same can be said about certain explanatory words which are added in some manuscripts, e.g., the addition of *astrolabii* to *in dorso*; these words may or may not have been included in the main text.

G. Arabic Astrolabe Terms¹

There are particular problems when dealing with the Latin transcriptions or transliterations of Arabic terms for parts of the astrolabe. The variants are manifold, almost endless, and it is impossible to decide on any one “correct” form. Scribes often had trouble reading the Latin of their exemplars, and the Arabic terms were so foreign to them that any number of variations could occur. Some of the terms had entered Latin up to 200 years before the Pseudo-Māshā’allāh text was compiled, so there was ample time for variations to develop, and ample time afterwards to create even more, while the text was being copied and recopied. (A few words, such as “almucanthat”² did become standardized in Latin, and those forms are used here.)

Given the large number of variants for each Arabic word, it is impossible to “scientifically” choose one. Even the variations which sound most like the Arabic original cannot be trusted, since they seem to appear randomly, and often vary from instance to instance even in the same manuscript. In this text, therefore, I have somewhat arbitrarily chosen one reading and to list all the other variants in the apparatus criticus. This choice is not to suggest that it is in any way the definitive Latin version, merely that at some time, somewhere, it was one of the variants used.

I add here an “index” of Arabic astrolabe terms,³ using modern transliteration. The first instance of each in the text provides more information about the part of the astrolabe being discussed, and its Latin and English versions.

C = *Compositio*; P = *Practica*; var. = variants/apparatus criticus
E.g., C 1-5(var.) = *Compositio*, Cap. 1, line 5, apparatus criticus

¹ Given the different systems for transliterating Arabic letters, I have used the one found in Hans Wehr, *A Dictionary of Modern Written Arabic*, ed. J. Milton Cowan (Wiesbaden: Otto Harrassowitz, 1961). I have also not used assimilation for *al-* in the English transliterations.

² Note that *almucanthat*, regardless of the variations in spelling, is uninflected, nor is it assigned a gender. Most of the other words transliterated from the Arabic are treated in the same way.

³ For the Arabic names of the stars found in this treatise, see Lists of Fixed Stars – Appendix I: Catalogue of Stars.

- al-^cankabūt* (*alhantabuz*): C 11-14, C 11-fig.; C 12-5; P Proem-15, P Proem-19; P ProemB 19; P ProemB 23; P 3-18; P 14-1(var.); P 23-3(var.); P 25-1(var.); P 25-2; P 25-3(var.); P 29-3(var.); P 30-3(var.); P 30-5(var.); P 31-6(var.); P 31-8(var.); P 32-3(var.); P 32-5(var.)
- al-faras*: C 6-1, C 6-7, C 6-fig.; P Proem-21; P ProemB-25
- al-ḥabs* (*alhabor*): C 1-fig.; P Proem-3; P ProemB-6
- al-ḥalqa* (*alhantica*, *alhelka*): C 1-fig.; C 2-fig.; P Proem-3; P ProemB-5
- al-^ciḏāda*: C 4 passim; C 5 passim; P 11 passim; P 12 passim
- al-^citāqua*: C 4-27; C 12-15; C 13-5; C 16-5
- al-miḥwar*: P Proem-19
- al-mismār* (*almiznir*, *almizanar*): C 6-fig.
- al-muqaṅṅarāt* (*almucanṅharat*): C Proem-5, C Proem-8; C 5 BIS-4; C 12-3, C 12-fig.; C 13 passim; P Proem-7, P Proem-10, P Proem-11; P ProemB-11; P ProemB-14; P ProemB-15; P 3 passim; P 4-5, P 4-6; P 5-3; P 8-3, P 8-4; P 10-3; P 14-2(var.), P 14-3(var.); P 16-4(var.); P 17-3; P 20-3(var.); P 23 passim; P 24-1(var.); P 25 passim; P 30-3; P 30-5; P 30-7(var.); P 31-6; P 31-8; P 32-3; P 32-4(var.); P 32-5; P 37B-2; P 39-13
- al-murī*: C 1-5; C 11-9, C 11-11, C 11-fig.(var.); P Proem-18; P ProemB-22; P 3-12; P 7-1, P 7-3; P 8-3, P 8-5, P 8-8, P 8-9; P 24-8(var.); P 28-3; P 28-5; P 29-2/3(var.); P 29-3; P 29-5(var.); P 29-6(var.); P 34-7(var.); P 34-8; P 39-10bis; P 39-12/14(var.); P 39-13; P 39 13/14(var.); P 39-14; P 39-18; P 39-19; P 39-27; P 40-3; P 40-4; P 40-6; P 41-3; P 41-4(var.); P 42-16
- al-quṭb*: C 6-1, C 6-4. C 6-fig.
- al-sumūt*: C 12-4; C 14 passim; C 15 passim; C 16-2; C 19 passim; C 20 passim; P Proem-10; P 17 passim; P 18 passim; P 19-4

Unidentified (possibly) Arabic-based terms:

asuji: C 1-fig.

atena, *antena*, *anthena*: C 1-fig.; C 2-fig.

I have found the following particularly useful in researching Arabic astrolabe terms:

William H. Morley, *Description of a planispheric astrolabe, constructed for Shāh Sultān Husain Safawī, King of Persia ...* (London, 1856), reprinted in Robert T. Gunther, *The Astrolabes of the World* (Oxford, 1932; rept. London, 1976), 1: i-iv, 1-50, plus 21 plates.

Paul Kunitzsch, *Glossar der arabischen Fachausdrücke in der mittelalterlichen europäischen Astrolabliteratur*, Nachrichten der Akademie der Wissenschaften in Göttingen, I. Philologisch-Historische Klasse, 1982, no. 11 (Göttingen, 1983), pp. 455-571.

H. The Lists of Fixed Stars

The editing of the lists of fixed stars (Part III) raised a number of problems. While there are two main lists (SL 1 and SL 2) associated with the text, there are several others which also circulated with it. Some of these are variants on the main lists; others are simply quite different lists – with a different selection of stars, and different co-ordinates. And sometimes these lists are found in manuscripts which do not even contain the Pseudo-Māshā'allāh text, or are separated from the text in their manuscripts by a few or by many folios.

Paul Kunitzsch surveyed medieval star lists in 1966¹ and noted those associated with Pseudo-Māshā'allāh (Types VIII, VII and XI) but this was not a critical edition. At his suggestion, I have examined the original manuscripts, reworked his material, and added manuscripts of which he was unaware. His Type VIII is my Tabula 1/SL 1 (the shorter version of which is Tabula 1-A); his Type VII is my Tabula 2/SL 2; and his Type XI is my Tabula 3, broken down into Tabula 3-A and 3-B (SL 3-A, SL 3-B). Other lists associated with the text – otherwise known or unknown – have not been edited. However, Appendix II to the Lists of Fixed Stars does try record what other star lists I have found in some mss with Pseudo-Māshā'allāh.

There are some obvious problems with editing star lists. First, copying errors abound, especially with numbers. As well, the transliteration of Arabic star names can be very confusing. Whether this results from different transliteration efforts, or attempts to rewrite a given pronunciation in another fashion, or simply copying errors by scribes who had no idea of what a “correct” form might be (or who could not decipher their exemplar) cannot be determined. As for the numbers, confusion between “0”, “6”, and “9” (and sometimes “5”) is common; the medieval “7” and “4” can also be confused. And scribes were not always careful to fully distinguish between “2” and “3”, and even at times between these and “1”! Close examination is required in reading the manuscripts, to determine what was originally written.

Of course, the co-ordinates themselves are not established: there is no “original” version, and an early error in copying can lead to a large number of (erroneous) copies. So to say that one reading is preferred to another is fruitless. In some ways my star lists are arbitrary, which is why examining the apparatus criticus is crucial in working with these lists.

Although there is really no such thing as an “original” base list, I have tried to standardize the entries so that the reader can more easily identify the star name and the position. For SL 3-A I have preferred ms Oψ and for SL 3-B mss Mλ and Po. I acknowledge that this is completely arbitrary, since for most of these entries the names are transliterated Arabic star names, with no real “standard” spelling in Latin. And for this reason I have entered in the apparatus criticus, and recorded in Appendix I to the star lists, all the versions of the star names that I could decipher in the manuscripts, even when the “correct” version was obvious. For example, I record “Algetonar” which should be “Algetenar” and “Rygel” which should be “Rigil”. I feel that the various ways of

¹ Paul Kunitzsch, *Typen von Sternverzeichnissen in astronomischen Handschriften des zehnten bis vierzehnten Jahrhunderts* (Wiesbaden: Otto Harrassowitz, 1966).

spelling a star's name might be of interest to other scholars working in this field.

Because there is a great deal of other material which should be noted about the entries in the star lists, as well as for the stars included in rete diagrams (Cap. 11) and occasionally in the text, I have gathered this background and explanatory material in Appendix I to the star lists, organized by the star's Bayer designation, with its own index of star name variants to aid the reader in finding the appropriate material.

Technical points for the Lists of Fixed Stars:

At the beginning of each List or Tabula, I have noted the manuscripts which have been collated. For the precise folios, consult this Introduction (section D).

I also point out which manuscripts have the Pseudo-Māshā'allāh text associated with the star list, and which do not.

For SL1 and SL 2, I have included an English translation, using common modern star names. For SL 1-A, SL 3-A, and SL 3-B I did not feel it was necessary to produce a facing English translation; comparison with SL 1 and SL 2, or an examination of Appendix I to the List of Stars should answer any questions about the meaning of the Latin.

I. Editorial Principles

This project aspires to be a collation of all copies of the text in manuscript form. (No attempt will be made to collate printed editions with this text.) In the editorial process, the most reasonable reading (especially in terms of the mathematics) has been chosen.

Trivial variants have been suppressed (obvious spelling errors, minor changes in word order, words or phrases with the same meaning, e.g., *cumque/et cum*). In some cases a variant of this kind is given without sigla and simply noted by *many* (many manuscripts) or *some* (some manuscripts). I have erred on the side of inclusion rather than exclusion, especially for technical terms and names, so that the reader has an idea of the range of spellings for such words as "Ptolemy."

I have standardized certain orthographic variations of medieval Latin, for instance the interchange of "c" and "t" (*spacium, spatium; tocius, totius*), or "i" and "y" (*limbus, lymbus; diameter, dyiameter*) or "c" and "ch" (*arcus, archus*). Similarly such common substitutions as *capud* for *caput* and *emisperium* for *hemisperium* are generally not noted.

With the transcribed Arabic words in the texts, as noted above, a special problem arises. While I have chosen to use a spelling as close to the Arabic as possible, I have also striven to include in the apparatus all renderings for those interested in these matters of language.

Sometimes I have also tried to preserve the non-normal abbreviations or script, e.g., maintaining the "3" ending for some variants even though this is often a terminal form of "m" – but not necessarily and therefore the effort to record it.

The lemma, the variant and the sigla are given in roman type; editorial comments, e.g., *om.* or *add.*, are given in italic.

The apparatus criticus is keyed to line number. Where a variant involves two or more lines, they are listed separately after all the variants for the first line. Since the plan is to publish this text on line, no extraordinary attempt has been made to save space.

The apparatus is negative, that is, only variants (and their manuscripts) are listed, except in the few cases mentioned above where variants of arabic astrolabe terms and names of authorities are recorded for every manuscript for the benefit of those studying such matters.

The diagrams are those found in the manuscripts, redrawn by the editor. They are numbered according to the capitulum with which they are associated; thus, there are gaps in the numbering when a capitulum does not have a diagram, e.g., *Compositio*, capitulum 3. The apparatus lists those manuscripts with the labeling, as well as those which either omit the labelling or have variant labels. In some cases where the diagram or labelling is significantly different, a second version of the diagram is given.

A few footnotes have been created where my comments might prove useful to the reader either for understanding the text or my editorial choices.

The apparatus follows the most modern style, in which the codes are given in English rather than Latin. Codes and abbreviations are:

<i>add.</i>	added
<i>and elsewhere</i>	and elsewhere (i.e., the same variant is found elsewhere for the same lemma)
<i>before</i>	variant appears before lemma
<i>canc.</i>	cancelled
<i>corr. to / from</i>	corrected to / from
<i>del.</i>	deleted
<i>diff. hand</i>	written in a different hand
<i>exp.</i>	expunged
<i>illeg.</i>	illegible
<i>interlin.</i>	interlined
<i>lac.</i>	lacuna, space
<i>later hand</i>	written by a later hand
<i>many</i>	many mss have this variant
<i>marg.</i>	in margin
<i>om.</i>	omitted
<i>rep.</i>	repeated
<i>rubric</i>	rubric, heading
<i>some</i>	some mss have this variant
<i>superscr.</i>	superscript
<i>twice</i>	word written twice

!	<i>sic</i> , manuscript so reads
?	dubious reading
	new line in manuscript

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Addendum 1
Lost Manuscripts and Erroneous, Non-Functioning, and Ghost References

Assisi, Biblioteca del Sacro Convento, Fondo Antico Communale, ms. 369, ff. 1-24

Theological treatises; reference found in the additional notes to Francis J. Carmody's *Arabic Astronomical ...*; most probably an erroneous entry for Ravenna, Biblioteca Classense, ms. 269.¹ Note: because of the unclear handwriting, some have interpreted the manuscript number as "769"; no manuscript 769 exists in the Assisi collection.

Baltimore, Library of Robert Garrett, no. 99

Now Princeton, University Library, ms. Garrett 99²

Basel, Öffentliche Bibliothek der Universität, ms. F-II-25

Erroneous reference for Basel, Öffentliche Bibliothek der Universität, ms. F-III.25³

Basel, Öffentliche Bibliothek der Universität Basel, ms. F-III-33⁴

Ff. 8v-16r: Liber Messehalla, De receptione et questionibus seu interrogationibus

Cambridge, Trinity College Library, ms. 1216 (*olim* O.3.44)

Now London, British Library, ms. Egerton 844

Dresden, Sächsische Landesbibliothek, ms. 10661

Erroneous reference for München, Bayerische Staatsbibliothek, Clm 10661⁵

Dresden, Sächsische Landesbibliothek, ms. C-79^{m6}

Completely destroyed during World War II.

¹ Both the Assisi and the Ravenna manuscripts are catalogued in the same volume: Mazzatinti, *Inventari*, vol. 4.

² W. H. Bond, ed., *Supplement to the Census of Medieval and Renaissance Manuscripts in the United States and Canada* (New York: Bibliographic Society of America, 1962), p. 200.

³ Zinner, *Verzeichnis*, entry 7024.

⁴ Zinner, *Verzeichnis*, entry 7024 originally had F-II-25 (in error for F-III-25 – see above), but corrected in his master copy (Institute for the History of Science, Johann Wolfgang Goethe University, Frankfurt am Main) to F-III-33.

⁵ From Francis J. Carmody, *Arabic Astronomical and Astrological Sciences in Latin Translation. A Critical Bibliography* (Berkeley and Los Angeles: Univ. of California Press, 1956), p.25

⁶ Fols. 1r-84; 14th/15th cent. Franz Schnorr von Carolsfeld, *Katalog der Handschriften der königl. Öffentlichen Bibliothek zu Dresden* (Leipzig, 1882), 1: 196.

Kaliningrad, *see* Königsberg

Königsberg, Staats- und Universitätsbibliothek, ms. Folio 1735

Now Toruń, Uniwersytetu Mikołaja Kopernica, Biblioteka Główna, ms. 74

Lyon, Bibliothèque des Augustines déchaussés de la Croix-Rousse, ms. 170

Unable to trace nor otherwise identify⁷

Magdeburg, Stadtbibliothek, ms. IV 307 4^o, 1, item 1

Cited in Zinner, entry 7067, who also indicates that it was written in German. In any event, the manuscripts from the Magdeburg Stadtbibliothek were all lost during World War II.⁸

Metz, Bibliothèque Médiathèque (*olim* Bibliothèque Municipale), ms. 1217, ff. 67^r-84^{v9}

Destroyed during World War II.

Napoli, Biblioteca Statale Oratoriana del Monumento Nazionale dei Girolamini, ms. CF.1.20 (*olim* Pil. XXIV no. VII, also known as Mandarinini 31 (or XXXI) from the 1897 catalogue.¹⁰

Now in a Private Collection; *see* above, ms Qμ.

Paris, Bibliothèque nationale de France, ms. lat. 16659, ff. 171^r-189^v

Erroneous entry for Paris, Bibliothèque nationale de France, ms. lat. 16649.¹¹

Roma, Library of Prince Baldassarre Boncompagni, ms. 51 (*olim* 326) ff. 16^v-18^r

Unable to trace nor otherwise identify¹²

⁷ Found in the 1667 inventory of books by one “Frère Éloi”. The library was gradually dispersed during the 18th century. *See* Henry Martin, “Bibliothèque des Augustines déchaussés de la Croix-Rousse de Lyon: Catalogue de leurs manuscrits,” in his *Catalogue des manuscrits de la Bibliothèque de l’Arsenal* (Paris, 1899), 8: 245-249, 266.

⁸ Paul Oskar Kristeller, *Latin Manuscript Books Before 1600*, 4th ed. by Sigrid Krämer, *Monumenta Germaniae Historica Hilfsmittel* 13 (Munich: Monumenta Germaniae Historica 1993), p. 576.

⁹ 13th century. *Catalogue Général des Manuscrits des Bibliothèques Publiques de France. Départements*, 48 (Paris, 1933), pp. 411-412.

¹⁰ Enrico Mandarinini, *I Codici Manoscritti della Biblioteca Oratoriana di Napoli* (Naples/Rome, 1897), pp. 53-54; often cited as Pil. XXIV no. VII and Mandarinini XXXI. The use of Roman numerals has led to a number of careless citations, e.g., “24-6” and “Mand. 21”.

¹¹ Error in the additional notes in Carmody, *Arabic Astronomical ...*, p. 24.

¹² Enrico Narducci, *Catalogo di Manoscritti ora posseduti da D. Baldassarre Boncompagni*, 2nd ed. (Rome, 1892), p. 19: 94 folios, 14th cent.

- Roma, Library of Prince Baldassarre Boncompagni, ms. 104 (*olim* 279), ff. 1^r-10^v
Unable to trace nor otherwise identify¹³
- Roma, Library of Prince Baldassarre Boncompagni, ms. 128 (*olim* 40) ff. 3^r-9^r
Unable to trace nor otherwise identify¹⁴
- Rovigo, Biblioteca dell'Accademia dei Concordi, ms. 13
A totally erroneous shelfmark for ms. Silvestriano 88 (q.v.) in the same library.
- Salzburg, Stiftsbibliothek Sankt Peter, ms. Inc. 800
Now New Haven, Yale University Medical Library, ms. 25
- Toledo, Biblioteca Capítular, ms. 98-20
Now Madrid, Biblioteca Nacional, ms. 10009
- Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1313
Erroneous reference for Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat 1373¹⁵

Addendum 2 Spurious References: Other Astrolabe Texts

These references have appeared in various lists and databases as possible astrolabe texts by Pseudo-Māshā'allāh, but upon examination do not contain the text as we have it. The sources of some of these references are given, but for many of them the source of the original suggestion has been lost.

Amsterdam, Universiteit van Amsterdam, Bibliotheek, ms. II C 1 (catalogue 1333), ff. 25-47¹
Contains *Isagoge*, *Ars astrologie*, and Māshā'allāh astrological texts including *De rebus eclipsium*.

Catania, Biblioteca Universitaria, ms. 85
See Catania, Biblioteca Universitaria, ms. 87²

¹³ Narducci, p. 67: 41 folios, 15th cent.

¹⁴ Narducci, p. 81: 10 folios, 16th cent.

¹⁵ Error in the additional notes in Carmody, *Arabic Astronomical ...*, p. 25.

¹ Listed by Masi as a possible copy of the astrolabe text.

² See Mariano Fava, "Codices latini catinenses," *Studi Italiani de Filologia Classica*, 5 (1897), 433-435. He cites shelf-mark "85" in error for "87" (q.v.).

Catania, Biblioteca Universitaria, ms. 87³

Fols. 184^v-191^v: *Compositio novi quadrantis; Utilitates novi quadrantis*

Fols. 224-253: John of Gamundia, astrolabe text⁴

Darmstadt, Universitäts- und Landesbibliothek, ms. 765

Fol. 137^v: star catalogue only, and not the one usually found with Pseudo-Māshā'allāh.⁵

Dresden, Sächsische Landesbibliothek, ms. N100

Fols. 1r-10v: Prodocimo de'Beldomandi, *Compositio astrolabii et operatio*⁶

Fols. 20r-24v: Profatius Judaeus, *Compositio novi quadrantis*⁷

Edinburgh, Royal Observatory, Crawford Library, ms. 3.28, ff. 41^v-48^v

The use of the astrolabe preceded by the astrolabe construction treatise, translated by Johannes Hispalensis;⁸ the *Practica* are probably by Johannes as well (but not the set sometimes found with Pseudo-Māshā'allāh)..

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms. Amplon, F^o 38, ff. 13^r-15^v

A yet-to-be-identified astrolabe text, inc.: *Astrolabium sic componas. Describe circulum ...*⁹

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms. Amplon, F^o 395, ff. 122^{rb}-124^{vb} (*olim* 121^{rb}-123^{vb})

A yet-to-be-identified astrolabe text, inc.: *Astrolabium constituitur hoc modo recipe tabulas ...*¹⁰

³ See Fava, "Codices latini catinenses," pp. 433-435; G. Tamburini in Mazzatinti, *Inventari*, vol. 20, pp. 133-148. Note: Fava gives the shelf-mark as "85"; Tamburini as "87", citing Fava but changing his "85" to "87". Ms 85 contains other, non-astronomical material.

⁴ Identified in Thorndike and Kibre, item 1292-2.

⁵ Zinner, *Verzeichnis*, entry 10996; Paul Kunitzsch, *Typen von Sternverzeichnissen in astronomischen Handschriften des zehnten bis vierzehnten Jahrhunderts* (Wiesbaden: Otto Harrassowitz, 1966), p. 88.

⁶ Thorndike and Kibre, item 1164-1; also 331-5 (for "Canones utilites astrolabii").

⁷ Thorndike and Kibre, item 241-8.

⁸ Ker, 2: 569.

⁹ Zinner, *Verzeichnis*, entry 884; Thorndike and Kibre, item 155-9; Schum, p. 32.

¹⁰ Thorndike and Kibre, item 154-8; Schum, pp. 278-281.

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms. Amplon. Q^o 316, ff. 36r-38r
A yet-to-be-identified astrolabe text, inc.: *Investigantibus nobis practicam astrolabii ...*¹¹

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms. Amplon. Q^o 366, ff. 82r-84r
Maslama, *De astrolabii*, inc.: *Cum volueris facere astrolabium, fac tabulam planam ...*¹²

Erfurt, Universitäts- und Forschungsbibliothek Erfurt/Gotha, ms. Amplon. Q^o 386, ff. 98^v-102^r
A different treatise on the astrolabe;¹³ see ff. 130^r-150^v for Pseudo-Māshā'allāh.

Erlangen, Friedrich-Alexander-Universität Erlangen-Nürnberg, Universitätsbibliothek, ms. 554
(*olim* Irm. 729), ff. 17^r-40^v
Astrolabe text of Christianus de Prachatitz¹⁴

Frankfurt am Main, Goethe Universität, Universitätsbibliothek, ms. Carm. 20, ff. 14^r-30^v
Various astrolabe texts by Andaló de Negro¹⁵

Frauenfeld, Kantonsbibliothek Thurgau, ms. P 142

Mathematical texts in sixteenth-century handwriting, in the middle of which are a large number of pages from various printed books on a wide range of practical topics. Included are 21 folios (plus a single folio bound earlier in the volume) from the 1512 printing of the Pseudo-Māshā'allāh text (both composition and use), found in the *Margarita Philosophia nova*.¹⁶

The folios of the volume are not numbered, so any referencing would be cumbersome.¹⁷

¹¹ Zinner, *Verzeichnis*, entry 7026; Thorndike and Kibre, item 776-2; Schum, pp. 550-551.

¹² Thorndike and Kibre, item 353-9; Schum, pp. 612-614.

¹³ From Schum, pp. 645-647; cited in the additional notes in Carmody, *Arabic Astronomical ...*, p. 25.

¹⁴ Fischer, *Die Lateinischen Papierhandschriften*, p. 207. Reference in the notes of Michael Masi, possibly based on information from Frances J. Carmody.

¹⁵ Gerhard Powitz and Herbert Buck, *Die Handschriften des Bartholomäusstifts und des Karmeliterklosters in Frankfurt am Main* (Frankfurt a.M.: Klostermann, 1974), p. 435. Reference originally from Jordanus Database, Munich.

¹⁶ See below, Addendum 3, Printed Editions of Pseudo-Māshā'allāh, *On the Astrolabe*, no. [1.].

¹⁷ Microfilm and initial cataloguing of contents supplied by Menso Folkerts.

Grenoble, Bibliothèque Municipale, ms. 814, ff. 34^r-40^r

A text on astrology by Masha'halla.¹⁸

Grenoble, Bibliothèque Municipale, ms. 1814, ff. 34^r-40^r

Error in the additional notes in Carmody, *Arabic Astronomical ...*, p. 25 for Grenoble, Bibliothèque Municipale, ms. 814, ff. 34^r-40^r

Heidelberg, Ruprecht-Karls-Universität, Universitätsbibliothek, cod. Sal. VII,60, ff. 1^r-15^r

A yet-to-be identified astrolabe text, "Descriptio et Vsu Astrolabii" (a.d. 1718)

Kraków, Biblioteka Jagiellońska, ms. 709 (*olim* DD.III.33), ff. 168^r-175^v

Various unidentified astrolabe texts:¹⁹ ff. 168^r-171^v; 171^v-172^r; 172^r-175^v

From the additional notes in Carmody, *Arabic Astronomical ...*, p. 25.

Kraków, Biblioteka Jagiellońska, ms 1843, ff. 232^r-247^v

Another astrolabe text, inc.: Cum volueris facere astrolabium accipe laminam eris ...

From the master copy of Zinner's *Verzeichnis* in Frankfurt-am-Main (entry 7054f).

Kraków, Biblioteka Jagiellońska, ms 1844, ff. 170^v-184^r (pp. 340-369)

Fols. 161^r-170^r: Christianus de Prachaticz

Fols. 170^v-184^r: various instruments/mathematical texts

Fols. 184^r-196^v: Prosdocimo de'Beldomandi, *Astrolabe construction*²⁰

From the additional notes in Carmody, *Arabic Astronomical ...*, p. 25.

Kraków, Biblioteka Jagiellońska, ms. 1865, ff. 172^r-179^r (pp 349-363)

Fols. 172^r-175^r: Profatius Judaeus, *Compositio novi quadrantis*

Fols. 175^v-179^r: Johannes Eligerus de Gondersleuen, *De utilitate quadrantis*

From the additional notes in Carmody, *Arabic Astronomical ...*, p. 25²¹.

Kraków, Biblioteka Jagiellońska, ms 1927, ff. 80^r-83^r (pp. 161-167)

Profatius Judaeus, *Compositio novi quadrantis*

From the additional notes in Carmody, *Arabic Astronomical ...*, p. 25.

¹⁸ *Catalogue général des Bibliothèques publiques de France. Départements 7. Grenoble* (Paris, 1889), pp. 245-246. Recorded in the additional notes in Carmody, *Arabic Astronomical ...*, p. 25 (as ms. 1814).

¹⁹ *Catalogus ... Jagellonica*, vol. 5 (1993), p. 126.

²⁰ From my personal notes made in the autumn of 1973.

²¹ From my personal notes made in the autumn of 1973.

Leipzig, Universitätsbibliothek, Cod. 1469, ff. 6^v-7^{v22}

Part of a *Practica* of the astrolabe text, but not Pseudo-Māshā'allāh's.

Lincoln, Cathedral Library, ms 148, ff. 98^r–

Fols. 94r-102v: De tabula umbre, inc.: “Ad notitiam tabule umbre ...”

From the additional notes in Carmody, *Arabic Astronomical ...*, p. 24.

London, British Library, ms. Harley 321, ff. 24v-28r (pp. 46-53)

A *Practica* of the astrolabe text, possibly based on Pseudo-Māshā'allāh's.

“Nomina instrumentorum astrolabii [later hand:] sive Astrolabii declaratio et usus, per Simonem de Bredon”

London, British Library, ms. Harley 5402, ff. 81r-104v

“Incipit prologus in libro Meshalle”: not astrolabe text

London, British Library, ms. Sloane 780, ff. 49^r-53^r (*olim* 160^r-164^r)

Practica of the astrolabe, but not Pseudo-Māshā'allāh's text.

London, British Library, ms. Sloane 2479, ff. 1^r-7^r (*olim* 110^r-116^r)

Some other astrolabe text, inc.: “Astrolabium sic construitur. Recipe tabulas de auriscalco ...”²³

Lüneburg, Ratsbücherei, ms. Misc. D.2^o.13, ff. 127^{rb}-131^{rb}

Nechaius Bodaius Zabith (?), *Canones astrolabii*;²⁴ a reworking of Pseudo-Māshā'allāh.

Madrid, Biblioteca Nacional, ms. 10053 (*olim* Toledo, Biblioteca Capitular, ms. 98-21), ff. 9r–

Millás Vallicrosa, suggested that this might contain the table of stars for Pseudo-Māshā'allāh's text,²⁵ but it is in fact some other set of astronomical tables

Madrid, Biblioteca Nacional, ms. 10063 (*olim* Toledo, Biblioteca Capitular, ms. 98-19), ff. 12ra-13ra

Some other astrolabe text, possibly by Johannes Hispalensis.²⁶

Metz, Bibliothèque Médiathèque (*olim* Bibliothèque Municipale), ms. 1223, ff. 31^{vb}-32^{rb}

Listed in the additional notes in Carmody, *Arabic Astronomical ...*, p. 24; not the Pseudo-Māshā'allāh text.

²² From the master copy of Zinner's *Verzeichnis* in Frankfurt-am-Main (entry 7038a).

²³ Thorndike and Kibre, entry 155-8.

²⁴ Wierschin, pp. 30-38.

²⁵ Millás Vallicrosa, *Traducciones*, p. 184.

²⁶ Millás Vallicrosa, *Traducciones*, p. 158.

München, Bayerische Staatsbibliothek, Clm 27, ff. 79^r-110^r

From the additional notes in Carmody, *Arabic Astronomical ...*, pp. 24 and 25.

Fols. 79^r-98^r: Another astrolabe text, inc.: “Astrolabium facere cum volueris. Primo fac tabulam illius magnitudinis quam vis”²⁷

Fols. 100r-110v: Use of the astrolabe, inc.: “Qui nonnulli ob nimiam oaccurratationem”²⁸

München, Bayerische Staatsbibliothek, Clm 25005,²⁹ ff. 1^r-28^v

Astrolabe text ascribed to Johan of Gamundia, inc.: “Quoniam practica astronomie absque instrumentis ...”³⁰

München, Bayerische Staatsbibliothek, Clm 25010,³¹ ff. 12r-18v³²

An unidentified astrolabe text.

München, Bayerische Staatsbibliothek, Clm 25024, ff. 26^r-36^r

German text.

Napoli, Biblioteca Nazionale “Vittorio Emanuele III”, ms. VIII-C-43, ff. 43^r-52^r

A different collection of capitula on using an astrolabe. The prologue has the same incipit as Pseudo-Māshā’allāh (with the addition of “astrolabii”), but quickly differs from our text. Not Johannes Hispalesis either.

Oxford, Bodleian Library, ms. Ashmole 361, ff. 57^r-63^r

A different set of instructions for the use of an astrolabe.

Fols. 45^r-56^v (from the additional notes in Carmody, *Arabic Astronomical ...*, p. 25) do not contain an astrolabe text.

Oxford, Bodleian Library, ms. Ashmole 393

Fols. 96^r-96^v (from the additional notes in Carmody, *Arabic Astronomical ...*, p. 25) contain part of Chaucer, “Tretis off the Astrolabye”

²⁷ Thorndike and Kibre, entries 155-2 and 1103-11..

²⁸ Thorndike and Kibre, entry 1225-4: “Practica astrolabii Pragensium.”

²⁹ Carolus Helm, et al., *Catalogus Codicum*, vol. 2, part 4 (1881), p. 156.

³⁰ Thorndike and Kibre, entry 1294-2.

³¹ Carolus Helm, et al., *Catalogus Codicum*, vol. 2, part 4 (1881), p. 155.

³² Note: the ms contains a number of unnumbered blank folios in the middle of its texts.

Oxford, Bodleian Library, ms. Bodley 68, ff. 26^f-34^f

A different astrolabe treatise, inc.: “Astrolabium ita construitur. Accipe tabulas de auricalco ...”³³

Listed in the additional notes in Carmody, *Arabic Astronomical ...*, p. 25.

Oxford, Bodleian Library, ms. Bodley 472, ff. 30^v-36^f

A treatise on the quadrant.

Listed in the additional notes in Carmody, *Arabic Astronomical ...*, p. 25.

Oxford, Bodleian Library, ms. Canon. Misc. 340, ff. 49^f-56^f

A different treatise, perhaps by John of Seville, inc. “Dixit Johannes: Cum volueris facere astrolabium, accipe auricalcum optimum ...”³⁴

Listed in the additional notes in Carmody, *Arabic Astronomical ...*, p. 25.

Oxford, St. John’s College, ms 188, ff. 92^r-98^v, 99^v³⁵

A different treatise on the use of the astrolabe; unidentified.

Paris, Bibliothèque nationale de France, ms. lat. 7272, ff. 45^{ra}-59^{vb}

A different treatise on the use of an astrolabe; with a similar incipit: “Nomina instrumentorum sunt hec. Primo est annulus sive armilla ...”

Paris, Bibliothèque nationale de France, ms. lat. 7352A, fol. 132r-140v

A different astrolabe treatise, unidentified; incipit: “Quantitatum ea est natura ...”

Salamanca, Universidad de Salamanca, Biblioteca. ms. 2138, ff. 304^v-319^r

A very free Spanish translation and not the Latin text.³⁶

Salamanca, Universidad de Salamanca, Biblioteca, ms. 2621, ff. 89^r-95^r³⁷

Fols. 81-89: Robert of Chester or Prosdócimo de Beldomandi, inc: “Quia plurimi ob nimiam ...”³⁸

Fols. 89-95: Fabrica astrolabii, inc.: “Quamvis astrolabii tam modernorum quam

³³ Thorndike and Kibre, entry 155-8.

³⁴ Thorndike and Kibre, entry 454-8

³⁵ Although numbered 92-99, three blank folios earlier in the manuscript were not numbered; therefore these are actually folios 95-102.

³⁶ Beaujouan, *Salamanque*, p. 120.

³⁷ Beaujouan, *Salamanque*, p. 173.

³⁸ Thorndike and Kibre, entry 1228-5; also 331-4/5.

veterum ...³⁹

Fol. 116^r contains a star list often found with the Māshā'allāh text. It has been edited by Paul Kunitzsch.⁴⁰

Sankt Gallen, Kantonsbibliothek Vadiana, ms. 412

Fols. 86r-92v: another astrolabe text, inc.: "Cum vero astrolabium facere seu componere voleris"⁴¹

Toledo, Biblioteca Capitulare, ms. 98-19

Now Madrid, Biblioteca Nacional, ms. 10063, q.v.

Toledo, Biblioteca Capitulare, ms. 98-21

Now Madrid, Biblioteca Nacional, ms. 10053, q.v.

Toledo, Biblioteca Capitulare, ms. 98-27, ff. 35r-48v

A different astrolabe text, possibly by John of Seville⁴²

Vatican, Biblioteca Apostolica Vaticana, ms. Barb. lat. 3453

An erroneous listing in Carmody⁴³; the manuscript contains a single 16th or 17th-century Spanish political text

Vatican, Biblioteca Apostolica Vaticana, ms. Ottob. lat. 399

An erroneous listing in Carmody⁴⁴; the manuscript contains the major books of the Bible

Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1353⁴⁵

Fols. 72ra-73ra: unknown astrolabe text, inc.: In quadrato posito in dorso astrolabii ...⁴⁶

Fols. 73ra-76ra: a *Practica* text incorporating much of Pseudo-Māshā'allāh (Cap. 1-47) but extensively revised and expanded.

³⁹ Thorndike and Kibre, entry 1164-1.

⁴⁰ Paul Kunitzsch, *Typen von Sternverzeichnissen in astronomischen Handschriften des zehnten bis vierzehnten Jahrhunderts* (Wiesbaden, 1966), p. 47.

⁴¹ Thorndike and Kibre, entry 351-1.

⁴² Transcription in Millás Vallicrosa, *Traducciones*, pp. 322-327; inc.: "Dixit Iohannes: Cum volueris facere astrolabium accipe auricalcum optimum ..." (Thorndike and Kibre, entry 454-8].

⁴³ Carmody, *Arabic Astronomical ...*, p. 25.

⁴⁴ Carmody, *Arabic Astronomical ...*, p. 25.

⁴⁵ See Schuba, p. 23.

⁴⁶ Not in Thorndike and Kibre.

Fols. 76rb-76va: Version B of the Pseudo-Māshā'allāh *Practica* prologue but again extensively revised; inc.: Scribitur enim ipsum primo posteriorum ...⁴⁷

Fols. 76vb-80rb: "Henricus" astrolabe text, inc.: Ad faciendum asstrolabium accipe materiam ligni ...⁴⁸

Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1384⁴⁹

Fols. 58r-60r contain a set of astrolabe canons, but not by Pseudo-Māshā'allāh.

Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1391, ff. 195v-198v

Text on the projection of a sphere onto a plane.⁵⁰

Vatican, Biblioteca Apostolica Vaticana, ms. Reg. lat. 1195⁵¹

Fols. 34^r-51^v: A different text on the use of the astrolabe, inc. "Incipit practica astrolabium et primo de nominibus partium matri. Nomina instrumentorum astrolabium sunt hec. Primo est annulus ...".

Vatican, Biblioteca Apostolica Vaticana, ms. Ross. 1106⁵²

Fols. 1^r-6^r, Profatius Judaeus, Compositio novi quadrantis, inc.: "Compositurus novum quadrantem accipe tabulam planam ..."⁵³

Fols. 6^v-12^r, Use of the quadrans, inc.: "Utilitates quadrantis novi breviter ..."⁵⁴

Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 3113,

Fols: 50-67: Practica/Tractatus quadrantis, inc.: "Debes scire quod ..."⁵⁵

⁴⁷ Variation on Thorndike and Kibre, entry 1414-3.

⁴⁸ Not in Thorndike and Kibre.

⁴⁹ From the master copy of Zinner's *Verzeichnis* in Frankfurt-am-Main (entry 7056g).

⁵⁰ Listed in Carmody, *Arabic Astronomical ...*, p. 25. and in the master copy of Zinner's *Verzeichnis* in Frankfurt-am-Main (entry 7056a).

⁵¹ From the additional material in Carmody, *Arabic Astronomical ...*, p. 24.

⁵² From the additional material in Carmody, *Arabic Astronomical ...*, p. 25.

⁵³ Thorndike and Kibre, entry 241-8.

⁵⁴ Not in Thorndike and Kibre.

⁵⁵ Thorndike and Kibre, entry 396-4. This item, found in the additional material in Carmody, *Arabic Astronomical ...*, p. 24, could be an error for Vat. lat. 3133.

Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 4085

ff. 85^r-93^v: A practica text, but not Pseudo-Māshā'allāh, inc.: "Nomina instrumentorum astrolabii sunt hec." Noted as "tractatus astrolabii" in the explicit.

Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 4087

Fols: 74v-81r (*olim* 86v-93r): John of Seville (?), on the astrolabe, inc.: "Dixit Johannes. Cum volueris facere astrolabium ..." ⁵⁶

Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 4385

Fols: 134ra-139rb: A different astrolabe construction text, inc.: "Si vis facere abstrolabium [sic] describere primo rotulam unam ..." ⁵⁷

Fols. 139rb-143vb: a different use text, inc.: "Nomina instrumentorum astrolabii haec sunt ..."

Wien, Österreichische Nationalbibliothek, ms. Palatinus 2452⁵⁸

Fols 1-10: Johannes Hispanus, Liber Astrolabii, inc.: "Dixit Johannes cum volumus ..." ⁵⁹

Wien, Österreichische Nationalbibliothek, ms. Palatinus 4987⁶⁰

Fols. 78v-84r: another astrolabe text, inc.: "Scribit Aristotiles primo posteriorum an omni scienti ..." ⁶¹

Fols. 84v-93r: Profatius Judaeus, De compositione novi quadrantis, inc.: "Compositurus novum quadrantem ..." ⁶²

Wien, Österreichische Nationalbibliothek, ms. Palatinus 5145

Fols. 58r-71r: Christianus de Prachatice, Tractatus de compositione astrolabii, inc.: "Circa initium astrolabii ..." ⁶³ [But see above for Pseudo-Māshā'allāh, *Practica*.]

⁵⁶ Thorndike and Kibre, entry 454-8.

⁵⁷ Not in Thorndike and Kibre.

⁵⁸ From the additional material in Carmody, *Arabic Astronomical ...*, p. 24.

⁵⁹ Thorndike and Kibre, entry 454-8.

⁶⁰ From the additional material in Carmody, *Arabic Astronomical ...*, p. 25.

⁶¹ Thorndike and Kibre, entry 1412-6.

⁶² Thorndike and Kibre, entry 241-8.

⁶³ Thorndike and Kibre, entry 207-7.

Wien, Österreichische Nationalbibliothek, ms. Palatinus 5184⁶⁴

Fols. 25r-36r, 37r-49v: Prosdocimo de Beldomandi, De compositione astrolabii (inc.: “Quamvis de astrolabii compositione ...”) ⁶⁵ and De utilitate astrolabii (inc.: “Quia plurimi ob nimiam quoque ...”) ⁶⁶

Fols. 76r-86v: Profatius Judaeus, De compositione novi quadrantis, inc: “Compositurus novum quadrantem ...” ⁶⁷

Wien, Österreichische Nationalbibliothek, ms. Palatinus 5296⁶⁸

Fols.1r-22v: John of Gmunden, De compositione et usu astrolabii, inc.: Quoniam practica astronomiae ...” ⁶⁹

Fols. 134r-140r: Profatius Judaeus, De compositione novi quadrantis, inc: “Compositurus novum quadrantem ...” ⁷⁰

Addendum 3

Printed Editions of Pseudo-Māshā'allāh, *On the Astrolabe*

Insofar as I have been able to trace them, the following is a list of all the editions in which the text of Pseudo-Māshā'allāh has been published.

[1.] *Margarita Philosophica nova*. Ed. Gregor Reisch. Strasbourg: Johann Grüninger, 1512.¹

The text is one of the addenda, entitled *De compositione et utilitate Astrolabii* (appendices, fol. Hii^r-Miv^v). This version (and the later reprints) begins by following the medieval text of Ps.-Māshā'allāh but soon becomes a completely different version, at least in the *Compositio* section. Here the printed

⁶⁴ From the additional material in Carmody, *Arabic Astronomical ...*, p. 25.

⁶⁵ Thorndike and Kibre, entry 1164-1.

⁶⁶ Thorndike and Kibre, entry 1228-5.

⁶⁷ Thorndike and Kibre, entry 241-8.

⁶⁸ From the additional material in Carmody, *Arabic Astronomical ...*, p. 25.

⁶⁹ Thorndike and Kibre, entry 1294-2.

⁷⁰ Thorndike and Kibre, entry 241-8.

¹ See John Ferguson, “The *Margarita Philosophica* of Gregorius Reisch. A Bibliography,” *The Library. Transactions of the Bibliographical Society*, ser. 4, 10 (1929) 194-216.

text has a bit of the Prologue and about half of Cap. 1 (Grüninger, Cap. I);² nearly all of Cap. 2 (Cap. II); virtually all of Cap. 3 (Cap. III); and nearly all of Cap. 4 and of the first 31 lines of Cap. 5 (Cap. IV). However after this Cap. V on almucantars differs from Cap. 13; Cap. VI on azimuths is not Cap. 14; Cap. VII on unequal hour lines is not Cap. 16; Cap. VIII on inscribing the equatorial circle and the tropics differs from Cap. 7; Cap. IX on the rete differs from Cap. 11; Cap. X on inscribing the zodiac is not Cap. 8; Cap. XI on inscribing stars on the rete differs from Cap. 10; Cap. XII on inscribing the twilight line is not Cap. 21. The star list contains only 27 stars.

In the early parts taken from the medieval Ps.-Māshā'allāh text there are small but significant errors which indicate that the editor did not really understand what he was reading or copying and which vitiate the usefulness of the text. It should be noted, however, that in Cap. 2/II, the data (e.g., for the position of the sun in the zodiac at the beginnings of the months) have supposedly been updated to "1494" (as noted in the text of Cap. II), although I have not tested this.

The text of the *Practica* as printed is closer to the medieval text found in the manuscripts, although there are numerous additions and omissions. The prologue material on the parts of the astrolabe was not included in the printed edition; Grüninger's cap. 1 to 6 are Ps.-Māshā'allāh's cap. 1 to 6; Grüninger's cap. 7 to 10 are four new chapters on the unequal hours in the daytime, the unequal hours in the night, the equal hours in the night, and the equal hours in the day; then Grüninger's cap. 11-19 are Ps.-Māshā'allāh's cap. 7 to 15; Grüninger's cap. 20 is only half of Ps.-Māshā'allāh's cap. 16; Ps.-Māshā'allāh's cap. 17 is missing; Grüninger's cap. 21-23 are Ps.-Māshā'allāh's cap. 18-20; Grüninger's cap. 24 is Ps.-Māshā'allāh's cap. 21 and 22; Grüninger's cap. 25-40 are Ps.-Māshā'allāh's cap. 23-38; Grüninger's cap. 41 and 42 are Ps.-Māshā'allāh's cap. 39; Grüninger's cap. 43 is Ps.-Māshā'allāh's cap. 40 and 41;³ Grüninger's cap. 44 is Ps.-Māshā'allāh's cap. 42; Grüninger's cap. 45 is Ps.-Māshā'allāh's cap. 43 and 44; and Grüninger's cap. 46-[48]⁴ are Ps.-Māshā'allāh's cap. 45-47.

Note: the original 1503 Freiburg edition of the *Margarita Philosophica* printed by Johann Schott does not contain this text, nor does his March 1504 edition (Strasbourg),⁵ the February 1508 edition (Basil: Michael Furter and Johann Schott), nor the 1517 edition (Basel: Michael Furterius).

Of the editions printed by Grüninger, the earlier February 1504 Strasbourg⁶ and the March

² Hereafter the capitula of the *Compositio* as printed by Grüninger are designated by Roman numerals; those designated by Arabic numbers are the Ps.-Māshā'allāh capitula as edited here.

³ The value of 93° (for the sidereal year) in Ps.-Māshā'allāh, cap. 40, is revised to 87° 19' (for the tropical year) in the printed text, cap. 43.

⁴ The last two capitula in the printed text are unnumbered.

⁵ No actual place of publication is specified in the volume. Some library catalogues list the place of publication as Strasbourg or Freiburg, but Ferguson (p. 195) doubts that it was printed in either of these cities, nor in Basel (where Schott was in 1508).

The general listing of Strasbourg as place of publication stems from the fact that the colophon (fol. tt iv^v) credits the work to Schott of that city. However, the colophon continues with the words "Chalcographi Ciuis," or "Printer to the city," which may in fact mean that the place of publication was indeed Strasbourg.

⁶ Title: *Aepitoma omnis phylosophiae, alias Margarita phylosophica*

1508 Strasbourg⁷ editions also do not contain this material.

[1A.] *Margarita Philosophica nova*. Ed. Gregor Reisch. Strasbourg: Johann Grüninger, 1515.

The text is identical to the 1512 edition, although retypeset, which changes the lineation and the pagination; the diagrams and the star list, however, seem to have been printed from the same blocks or type as the earlier printing. The text is found on fol. Gvi^r–Liii^r; the added “geographical astrolabe” material is on fol. Kii^r–Kii^v.

[1B.] *Margarita Philosophica*. Ed. Gregor Reisch. Basel: Henricus Petrus [/ Officina Henricpetrina], 1535.

The reset text (pp. 1362-1415) is virtually identical to the earlier editions printed by Grüninger, but with the abbreviations expanded and the occasional substitution of a word (I noticed “Facies que ...” becoming “Facies igitur ...”). New diagrams. The “geographical astrolabe” material (pp. 1416-1420) now follows the *Practica* section.

[1C.] *Margarita Philosophica*. Ed. Gregor Reisch. Basel: Sebastian Henric Petrus [/ Officina Henricpetrina], 1583.

The text (pp. 1275-1329) is identical to the 1535 Basel edition, although it has been retypeset so that the pagination and lineation differ. However, the diagrams are identical to the 1535 edition. The “geographical astrolabe” material (pp. 1330-1334) follows the *Practica* section.

[2A.] *Margarita filosofica del R.P.F. Gregorio Reisch* Trans. Gio. Paolo Gallucci. Venice: Barezzo Barezzi, 1599.

Contains (pp. 1034-1080) an Italian translation of the Latin printed edition and therefore covers the same ground. It is not possible to say which edition was used, although given that the “geographical astrolabe” material, found on pp. 1081-1084, also follows the *Practica* section, it is probable that either the 1535 or the 1583 edition was used.

As well the data in cap. 2 of the *Compositio* is updated to “1592” and the value given in the *Practica*, cap. 43 is also 87° 19' as in the printed versions.

Gunther cites a “1593” edition (p. 135) in error for this edition of 1599.

[2B.] *Margarita filosofica del R.P.F. Gregorio Reisch ...* Trans. Gio. Paolo Gallucci. Venice: Iacomo Antonio Somascho, 1599

[2C.] *Margarita filosofica del R.P.F. Gregorio Reisch ...* Trans. Gio. Paolo Gallucci. Venice: Iacomo Antonio Somascho, 1600

Both 2B and 2C are identical to Venice: Barezzo Barezzi, 1599. It appears that Somascho obtained unbound sheets from the first printing, produced new title pages, and issued the volume twice under his own imprint.

[3.] Chaucer, Geoffrey. *A Treatise on The Astrolabe addressed to his son Lowys*. Ed. Walter W. Skeat. Early English Text Society, Extra Series 16. London: Oxford University Press, 1872.

⁷ Also titled *Margarita Philosophica Nova*.

Contains, pp. 88-105, an edition of the *Practica* text, as found in ms Cη.

While most of Skeat's EETS edition was reprinted in 1894 as part of the complete works of Chaucer, the Ps.-Māshā'allāh material was not republished.⁸

[4.] Gunther, R. T., ed. *Chaucer and Messahalla On the Astrolabe*. Early Science in Oxford 5. Oxford, 1929.

The text (pp. 195-216) and translation (pp. 137-167) of the *Compositio*, based on ms Cη, with some readings from mss Oζ and Oη. Also the text (pp. 217-231) and translation (pp. 168-192) of the *Practica*; the Latin is a virtual reprint of Skeat's 1872 edition, implicitly acknowledged. Some readings from the Reisch editions are also included.

This text, while covering the whole of the Pseudo-Māshā'allāh treatise (but not the star list except for a facsimile reprint of ms Cη fols. 70v-71r), is troublesome because of the idiosyncracies of the base manuscript.

What is generally not known is that much of the work was done, at least of the translation, not by Gunther but by a Sister Lavinia of Gloucester in the 1920s. There was correspondence to this effect in the Museum of the History of Science, University of Oxford, in the early 1970s; this was reported to me at the time by my doctoral supervisor, the late John D. North, then Assistant Curator of the Museum. He also mentions this in his *Chaucer's Universe* (Oxford: Clarendon Press 1988), p. 45 note 11.

[5.] Ron B. Thomson, ed. *Jordanus de Nemore and the Mathematics of Astrolabes: De plana spere*. Studies and Texts 39. Toronto: Pontifical Institute of Mediaeval Studies, 1978.

Contains (pp. 179-185) a re-edition of the *Compositio*, Cap. 17 and 18, based on the 1929 text collated with mss Pδ, Pμ, and Pο and attempting to correct the most egregious errors in these capitula as printed by the Gunther. Note: this is identical to my Oxford D.Phil. thesis of 1974.

[6.] *Pèlerin de Prusse on the Astrolabe*. Text and translation of his *Practique de astrolabe*. Ed. Edgar Laird and Robert Fisher. Medieval and Renaissance Texts and Studies 127. Binghamton: Medieval and Renaissance Texts and Studies, 1995.

Contains (pp. 84-87) the text and translation of the Proemium to the *Practica*, with modifications of the edition in Gunther.

⁸ Geoffrey Chaucer, *The Complete Works*, ed. Walter W. Skeat (Oxford: Clarendon Press, 1894), vol. 3, pp. lvii-xci, 175-241, 352-367

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