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Exploring the Relevance of the Star-positions in the Medieval Illuminated Manuscripts of Hyginus' *De Astronomia*

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Abstract This paper analyzes the agreement between pictures and text in the 20 extant manuscripts of Hyginus' *Astronomia* which are illuminated and marked with stars, the majority of which date from the second half of the 15th century. It focuses on the number and position of the stars on the constellation figures, and systematically inventories in each manuscript all discrepancies between picture and text. The existence of independent constellation albums and the disconnection between the activities of *pictor* and *scriptor* could suggest a great mismatch of the two main features of illuminated manuscripts. The results of the investigation on these manuscripts are in fact more ambiguous. It actually appears that in some cases the positions of the stars precisely match the wording of a manuscript and lead to the conclusion that star-positioning might have sometimes been a secondary process adjusted to the very text of the illustrated manuscript.

Summary 1 Introduction. – 2 The Corpus. – 3 Marking the Stars. – 4 Individual Description and Evaluation. – 5 Misreadings and Misrepresentations. – 6 Asterization and Celestial Pattern. – 7 Conclusion. – Apparatus.

Keywords Hyginus. Illuminated Manuscripts. Ancient Constellations. Star Iconography. Astrothesy. Ancient Astronomy. Medieval Astronomy.

1 Introduction¹

Marion Dolan's 2007 lament over how little scholarly attention has been paid to the illustrated manuscripts of Hyginus' *De Astronomia* is less valid today,² as the recent contributions of Kristen Lippincott³ and the catalogue

1 This paper has been considerably improved by the help and revision of Kristen Lippincott. I remain fully responsible for all its shortcomings.


2 See Dolan 2007, 4 and also 107: "The numerous illustrated manuscripts of Hyginus are mostly neglected in art historical literature, they have not been studied either individually nor as a manuscript tradition".

3 See Lippincott 2014; Lippincott (The Saxl Project).

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volumes by Dieter Blume, Mechthild Haffner and Wolfgang Metzger⁴ have brought astronomical illustration back under the spotlight by continuing the early work on astronomical manuscripts pioneered by Fritz Saxl, Hans Meier and Patrick McGurk.⁵ In general, though, all these studies have tended to focus more on art historical concerns, with Lippincott primarily addressing the iconographic features of the manuscripts and Blume, Haffner and Metzger being mostly concerned with codicological issues.⁶ With the recent exception of Elly Dekker's study of the Leiden *Aratea*,⁷ few scholars have studied the placement of the stars in the illustrations of these manuscripts. We believe that such an endeavour might be useful to historians of astronomy, and serve to improve our philological understanding (including pictorial stemmatology) of these works.

This paper addresses only the illuminated manuscripts of Hyginus that are marked with stars and, with regard to this restricted corpus, it tackles a question previously raised by Dolan: "Are the illuminators reading the poem and creating images in accordance with their readings or simply following ancient models?"⁸ The aim, therefore, is to consider systematically the relationship between the positions of stars as prescribed by the individual texts found in these manuscripts and where the stars actually appear in the accompanying illustrations.⁹

Before providing a systematic analysis of the codices and considering the positioning of the stars in connection with the textual readings in detail, it is worth considering the characteristics of the corpus and attempt to reconstruct the process of asterization.¹⁰ Beyond the main issue of pictorial adherence to the text, we will briefly address the question of the correspondence between the manuscript illustrations and actual pat-

4 See Blume, Haffner, Metzger 2012a-b, 2016a-b.

5 Saxl 1915, 1927; Saxl, Meier, Bober 1953; MacGurk 1966.

6 None of the recent editions of the text of *De Astronomia* (Serra 1976, Vitobello 1988, Le Boeuffle 1983, Viré 1992a) have discussed the illustrations that appear in the manuscripts, though Viré does mention which ones are illustrated in her 1981 handlist.

7 Cf. Dekker 2010.

8 Dekker 2010, 7: "Are the illustrators reading the poem and creating images in accordance with their reading, or mainly copying earlier exemplars?"

9 Several websites have been used with profit for this study. I would like to mention especially: The Saxl Project (<http://www.kristenlippincott.com>), especially Hyginus/Commentary and the entries on the individual manuscripts (*ad vocem*); The Warburg Institute Iconographic Base (<http://warburg.sas.ac.uk>), under: Magic and Science/Astronomy and astrology/Hyginus; Certissima signa (<http://certissimasigna.sns.it>); Mirabile (<http://www.mirabileweb.it>); as well as the digital resources of the various libraries mentioned.

10 This investigation would not have been possible without the remarkable work of Kristen Lippincott. I greatly thank her for her support and advice. For a general study on the Hyginus manuscripts and the pictorial tradition, see The Saxl Project.

terns of the stars in the night sky. The case of astronomical illustrations is indeed peculiar, in that they are supposed to correspond ultimately to observable phenomena. Given that the figures of the constellations are arbitrary cultural frameworks intended to codify the representation of real sectors of the sky, with each figure thus subject to a set of accepted posture and attributes, the stars that punctuate each figure should maintain specific relations with each other, and should reproduce a pattered structure analogous to what is visible in the night sky. The question that remains to be answered is whether any differences between pictorial astrothesy found in our manuscripts and the accepted astronomical schemata of the constellations in the night sky are the result of a positive aesthetic choice or indifference.

2 The Corpus

Viré's 1983 survey of manuscripts of Hyginus' *De Astronomia* listed 88 examples, spanning from the ninth to the 15th century, but only half of which (44) are complete.¹¹ Recent research has added a number of new manuscripts to this list, suggesting that there are possibly as many as one hundred or more surviving manuscripts of the text, assuming that there are still a few extant texts remaining to be discovered.¹² Viré gives a general account of the corpus,¹³ but she appears not to be concerned with the pictorial tradition of the manuscripts.¹⁴ In their recent catalogue of medieval and Renaissance astronomical manuscripts, Blume, Haffner and Metzger list 38 illuminated Hyginus manuscripts, 13 of which were

11 Viré 1992, 10: *amplius octoginta*. At least five illuminated manuscripts with stars have not been taken into account by Viré.

12 Viré 1983, 163-77. Among the manuscripts of Hyginus' text or excerpts that should be added, one should mention: Leiden, Bibliotheek der Universiteit, Voss. Lat. o. 8; Klosterneuburg, Stiftsbibliothek, 685; München, Bayerische Staatsbibliothek, Lat. 10662; Vatican, Biblioteca Apostolica Vaticana, Barb. Lat. 76; Zürich, Zentralbibliothek, Car. C 176.

13 Note that there are mistakes: the Florence, Biblioteca Nazionale Centrale (BNC), Magliab. XI.114,2 is not illuminated (as previously noted by Lippincott); and the Leiden, Univ-bibl., Gronov 21 is only partly illuminated (fol. 55r). Also, the Holkham Hall manuscript is not illuminated (Lippincott - private communication).

14 The only angle from which she deals with this element is that of the inherited educational purpose: "Peut-être ces illustrations sont-elles simplement le prolongement des globes peints dont se servaient les anciens pour rendre la description de la voûte céleste plus accessible au public profane" (1983, 162). See, however, her comment on the Leiden, Voss. Lat. 8° 15 and on the Vatican, Biblioteca Apostolica Vaticana (BAV), Reg. Lat. 123 (1983, 206): "il n'est guère surprenant de constater que, dans l'un comme dans l'autre, les dessins imitent des modèles antiques tant pour le tracé des figures que pour le détail des personnages et l'ornementation des objets: personnages à demi nus, vêtements drapés à l'antique, bonnet phrygien, simplicité des éléments décoratifs".

produced before 1200, and nearly twice as many between 1200 and 1500. From their findings, then, the known corpus of identified illustrated manuscripts marked with stars consists of the following 20 manuscripts (listed chronologically):¹⁵

1. Vatican, Biblioteca Apostolica Vaticana, Reg. Lat. 123 (Spain, 1056)
2. Oxford, Bodleian Library, Digby 83 (England, ca. 1150)
3. Baltimore, Walters Art Museum, W 734 (Northern Italy or France, 1150-1200)
4. Leiden, Bibliotheek der Rijksuniversiteit, Gronovius 21 (France, 1180-1220)
5. Vatican, Biblioteca Apostolica Vaticana, Vat. Lat. 3110 (Florence, 1370-1380)
6. Florence, Biblioteca Nazionale Centrale, Magliabechi XI.114 (Italy, 1380-1420)
7. Vatican, Biblioteca Apostolica Vaticana, Vat. Lat. 3109 (Italy, 1400-1450)
8. Milan, Biblioteca Ambrosiana, T 47 sup. (Italy, 1425-1450)
9. Milan, Biblioteca Trivulziana, N 690 (E. 83) (Padua, 1460)
10. Cambrai, Bibliothèqe Municipale, 993 (Padua, 1460)
11. Oxford, Bodleian Library, Canon. Class. Lat. 179 (Ferrara, 1460-1470)
12. Vatican, Biblioteca Apostolica Vaticana, Urb. Lat. 1358 (Florence, 1470-1480)
13. Pavia, Biblioteca Universitaria, Aldini 490 (Italy, 1470-1480)
14. Siena, Biblioteca comunale degli Intronati, L.VI.25 (Italy, 1474)
15. New York, Public Library, Spencer ms. 28 (Padua, 1475-1480)
16. Freiberg, Andreas-Möller Bibliothek, XI.4.9 (Padua, 1475-1500)
17. Florence, Biblioteca Medicea Laurenziana, Ashb. 1148 (Florence, 1475-1500)
18. Cambridge, Fitzwilliam Museum, 260 (Mantua, 1480)
19. Florence, Biblioteca Medicea Laurenziana, Plut. 89 sup. 43 (Florence, 1482-1483)
20. Vienna, Österreichische Nationalbibliothek, Vindob. Lat. 3111 (Austria, 1491)

Three quarters of these manuscripts were produced in the 15th century, with twelve of these fifteen having been produced in the second half of the 15th century.¹⁶ It is noteworthy that the majority of 15th-century illustrated Hyginus manuscripts are marked with stars (15 manuscripts).¹⁷ The increased ratio in the 15th century suggests that it was easier to find a model with stars indicated to copy during this period, but this does not rule out the possibility that an illuminated, star-marked manuscript could also have been created by adding stars to images derived from a manuscript that did not contain stars.

15 Blume, Haffner, Metzger 2012a, 193-98, 280-83, 396-402, 488-95 and Blume, Haffner, Metzger 2016a, 551-657 for descriptions of the manuscripts.

16 Of the 67 astronomical manuscripts that pre-date 1200, Blume, Haffner, Metzger 2012a list 13 Hyginus manuscripts, only four of which are marked with stars.

17 Blume, Haffner, Metzger 2016a, 552-655.

In this survey, the following manuscripts have not been included: those that provide only excerpts of the *De Astronomia*; the epitomized version known as *Excerptum de astrologia*;¹⁸ manuscripts that show serious contamination from other texts;¹⁹ examples that have fewer than four constellations marked²⁰ and those that contain only a set of pictures apparently connected with the *De Astronomia* but without the actual text of Hyginus.²¹

Admittedly, a study whose focus is restricted to the text of the *De Astronomia* could be regarded as problematic in many ways. One obvious criticism is that the very identification of these manuscripts as an independent corpus is questionable, especially since so many of the selected manuscripts betray evidence of explicit or implicit contaminations from the texts and images that appear as part of other iconographic traditions. More fundamentally, the *De Astronomia* tradition is an integral part of the broader tradition of astronomical literature: as far as iconography is concerned, there is a profound and mutual influence between all the texts involved in this tradition, and more particularly: Eratosthenes' *Catasterismoi*, Cicero's *Aratea*, Germanicus' *Aratea*, *Scholia in Germanicum Basileensia*, *De ordine ac positione stellarum in signis* (deriving from the aforesaid scholia), Pseudo-Bede's *De signis caeli* (or *Scholia in Germanicum Bernensia*), *Aratus Latinus*, and *Aratus auctus*, *Aratus Latinus Recensio interpolata*, *Excerptum de Astrologia*, *Anonymus Sangallensis*, *Scholia in Germanicum Stroziana*. As an integral part of the broader tradition of astronomical literature, there is a profound interdependence amongst all the texts involved, especially given the tradition of bringing together these texts or excerpts from them to form astronomical compendia and miscellanea.²² For example, the astronomical com-

18 Munich, Bayerische Staatsbibliothek (BSB), Clm 59 (15th century). This manuscript is regarded as a "deutsches Hyginus-Derivat" (Blume, Haffner, Metzger 2016a, 79) with "*Delineationes rudes signorum*" (Halm et al. 1892).

19 Berlin, Staatsbibliothek, Lat. Oct. 44 (13-14th century) offers a brief excerptum, conflated with excerpts of Pliny, without any textual information on stars' positions. It is illuminated with coloured drawings of 38 constellation groupings. Oxford, Bodley 614 (fols 18r-22r and 22v-33v) provides Hyginian excerpts conflated with readings from Isidorus, *De natura rerum* and the *scholia Sangermanensia*.

20 For example: Leiden, Univ-Bibl.Voss. Lat. 8°15 (11th century) and St Paul im Lavanttal, Benediktsskabinett 16/1 (*olim* XXV. 4. 20) (11th century).

21 Vatican, BAV, Vat. Lat. 3109, fols 51r-68r (15th century).

22 For example: Baltimore, Walters Art Museum, W 734, which contains texts from Germanicus, Cicero, *Aratus Latinus*, *Recensio interpolata* and the *Excerptum de astrologia*; Vatican, BAV, Vat. Lat. 3110, with excerpts from Germanicus, Martianus Capella and Fulgentius; Milan, Biblioteca Ambrosiana, cod. T 47 sup. with Johannes Sacroboscus' *Libellus de sphaera* and Ps-Aristotle's *De mundo*; Florence, Biblioteca Laurenziana, Plut. 89 sup. 43, which also contains Germanicus' *Aratea*.

pendium known as *Aachen Compilation of 809-812* (which incorporates the *Excerptum de astrologia* and the *De ordine ac positione stellarum in signis*, and survives in numerous ancient manuscripts) had a momentous impact on the pictorial and textual tradition.²³ Also, the text of Pseudo-Bede's *De signis caeli*, which diverges from the *De Astronomia* astrothesy in at least 22 instances,²⁴ frequently interfered with Hyginian tradition in a more or less explicit way, and thus generated confusions.²⁵

The text of the *De Astronomia* is divided into four books: the second one deals with the mythological background of the constellations and the third one with the position of the stars in the constellation. It is striking that in many illuminated manuscripts, and especially in the oldest ones,²⁶ the pictures appear in the second book and not the third one, thus suggesting that the illustrations in these early manuscripts have been included as mythological portraits, rather than astronomical diagrams²⁷ – especially given the fact that none of the manuscripts that carry illustrations to Book 2 has stars marked, and the pictures marked with stars always appear when the constellations are placed in Book 3.²⁸

Following the structure of the *De Astronomia*, the following detailed descriptions of the manuscripts list the constellations according to 41 constellation groupings: the Pleiades have been included as part of Taurus, Corona Borealis appears as part of Centaurus, Libra is half of Scorpio, Serpens is part of Ophiuchus and Triangulum is distinct from Aries. Most of the manuscripts carry 39 pictures (with Draco, Ursa maior and

23 Ramírez-Weaver 2008. On the “fusion of astronomical tradition”, see McCluskey 1998, 130 and Blume, Haffner, Metzger 2016a.

24 See e.g. the major differences between the constellations of Ursa Maior, Hercules, Leo, Gemini and Hydra in the two traditions.

25 This contamination between the differing versions of texts and images has been a focal point of the research carried out by Kristen Lippincott in both The Saxl Project and her publications. See for example, Lippincott 2014 and her comments on Montpellier ms H 452 (The Saxl Project, *ad vocem*).

26 See, for example, for the 11th century: St Paul im Lavanttal, Benediktinskabinett, ms. 16/1 (*olim* XXV. 4. 20); for the 12th century: Wolfenbüttel, Herzog August Bibliothek, Aug. 4° 18.16 (Guelf. 3147) and Vienna, Österreichische Nationalbibliothek (ÖNB), Vindob. Lat. 51; Florence, Biblioteca Laurenziana, Plut. 29.30. The manuscript in Leiden, Universiteitsbibliotheek, Voss. Lat. 4° 92 (12th century) is an exception as there are pictures without stars accompanying book 3. One might also mention Paris, ex-Phillipps 26.235 (12th century), which has belonged to a private collection since 22 June 1973 (cf. Viré 1983: 172): it is inaccessible today, but the illustrations do not have the stars marked (see the photographs in Blume, Haffner, Metzger 2012b, 305).

27 Viré 1983, 206; McGurk 1966: XXII sq.

28 Two 12th-century manuscripts (Vatican, BAV, Reg. Lat. 123 and Oxford, Bodleian Library, Digby 83) conflate the corresponding chapters from book 2 and 3 of *De Astronomia* for each constellation.

Ursa Minor combined as a single figure: *Draco inter arctos*), though some have 38 (with the head of Aries shown 'intra Triangulum').²⁹

3 Marking the Stars

In terms of basic iconographic structure, the illustrations of the constellations with and without stars are the same. When added, the stars are represented by open circlets or dots (coloured in black, red or gold), crosses with two or more bars or star-like symbols (fig. 1).

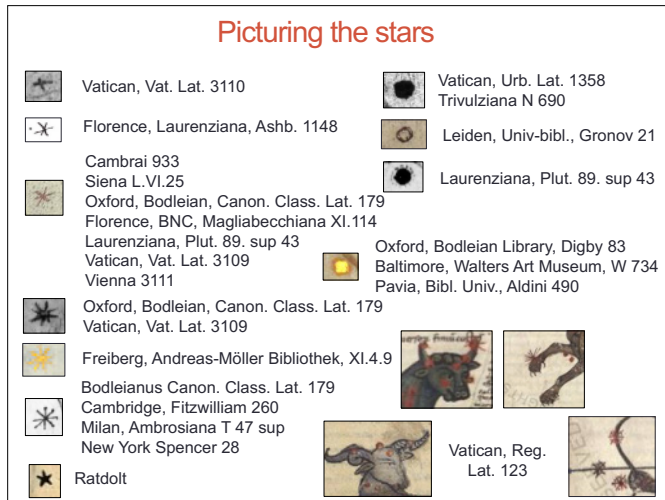
Unlike the more scientific images of the constellations one finds attached to the Ptolemaic tradition (mostly on globes),³⁰ the star-marking process in the Hyginus manuscripts usually follows the drawing of figures, though the addition of the stars is not necessarily by the same hand. Most often, the illustrations are added to the manuscript after the text has been written. The three exceptions to this case are Vatican, BAV, Vat. Lat. 3109; Oxford, Bodleian Library, Canon. Class. Lat. 179 and Digby 83, where the pictures were obviously drawn first (witness the incompleteness of the text, the outlines of the textual blocks and the areas in which the ink of the text overlaps the pictures).³¹ For at least 16 of the 20 Hyginus manuscripts under consideration, the operational sequence seems to involve three or four stages: text > picture > star punctuation (+ star decoration). Moreo-

²⁹ The following manuscripts have incomplete sets of constellations: Leiden, Univ-bibl., Gronov 21 has only five constellations: Bootes, Corona Borealis, Hercules, Lyra and Cygnus; Florence, BNC, Magliabechi XI.114 has only 12 constellations: Ursa Maior, Ursa Minor, Draco, Bootes, Corona Borealis, Hercules, Lyra, Auriga, Ophiuchus, Sagitta, Aquila, Taurus; with blank spaces being left for the remaining ones; Oxford, Bodleian Library, Canon. class. Lat. 179 is missing eight folios and the corresponding pictures for Taurus, Gemini, Virgo, Scorpio, Aquarius, Pisces, Lepus and Orion; Siena, Bib. Com., cod. L.VI.25 is missing three folios and images for Cygnus, Cepheus, Aquila, Delphinus, Pegasus, Canis Maior and Canis Minor; Cambrai, Bibl. Mun. 993 is missing two folios and the illustrations of Cygnus and Cepheus; Cambridge, Fitzwilliam Museum, ms. 260 is missing eight pictures: Draco, Ursa Maior, Ursa Minor, Cassiopeia, Virgo, Libra, Pisces and Eridanus; Freiberg, Andreas-Möller Bibliothek, XI.4.9 is missing one picture: Orio; the first series of pictures of the Vatican, BAV, Vat. Lat. 3109 (32r-50r), consists of an album of 38 constellations and contains the Hyginian text only for four of them (Bootes, Corona Borealis, Hercules and Lyra on fols 32r-34v).

³⁰ Ptolemy, in his recommendations on the construction of a globe exhorts to mark the stars and then draw outlines around them: "As for the configurations of the shapes of the individual constellations, we make them as simple as possible, surrounding the stars within the same figure only by lines, which moreover should not be very different in colour from the general background of the globe" (Ptolemy, *Almagest* 8.3, ed. Toomer 1984, 406); see Dekker 2010, 351.

³¹ Among the other manuscripts of Hyginus, this is also the case for the Paris, ex-Phillips 26.235 ("Die Illustrationen zum dritten, astrothetischen Buch wurden vor dem Text ausgeführt". Cf. Blume, Haffner, Metzger 2012a, 461).

Figure 1. Picturing the stars. Samples of stars from all illustrated mss. of Hyginus' *De Astronomia*



ver, the process appears to reflect the participation of several different hands.³² For example, in the Florentine manuscript in the Biblioteca Laurenziana (Plut. 89, sup. 43), the stars are clearly not by the same hand as the pictures and in the manuscript in Freiberg (Andreas-Möller Bibliothek, XI.4.9), Cancer, Lepus and Orion are only sketches.

In addition to evidence of more than one artist contributing to the illustration cycle,³³ two different kinds of star-marks appear in some of the manuscripts. For example, the combination of dots and open circlets in Vatican, BAV, Urb. Lat. 1358, fol. 124_{rv}, clearly suggests that a first hand had marked a series of ‘place-holders’ for the stars, some of which were then left unfinished (fig. 2).³⁴

In Cambrai 993, it seems that a single scribe was responsible for both text and pictures as they both are executed in the same ink, but the stars have been added in red ink – raising the possibility that there might have been an additional rubricator, who added the stars at a later stage. In the Leiden manuscript, Voss Lat. 8°15, the text was obviously added after the pictures. Four constellations have been additionally marked with stars probably as an afterthought, and the positions of the stars on the top of the Lyra (fol.

32 Not to mention the multiplicity of illuminators in some of the manuscripts, such as in New York Public Library, Spencer 28 (with at least 3 hands, probably five according to G. Mariani Canova, cited in Blume, Haffner, Metzger 2016a, 601).

33 Blume, Haffner, Metzger 2016a, 605.

34 See also Milan, Biblioteca Trivulziana, N 690, fol. 124_v; and Oxford, Bodleian Library, Digby 83, fol. 51_v. See also Spencer 28, fol. 42_v and our comment *infra*.

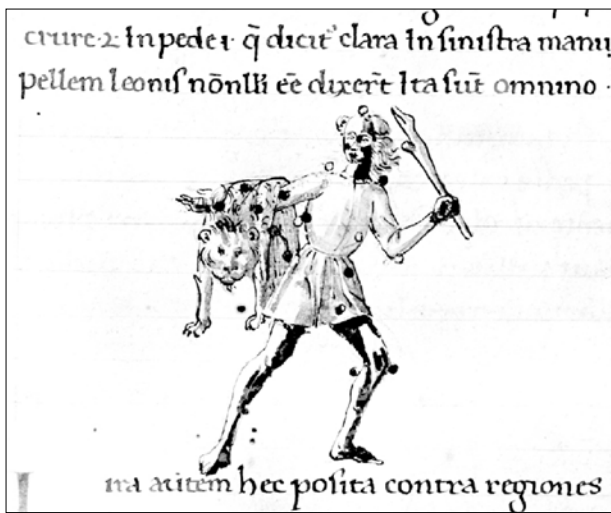


Figure 2. *Constellation of Hercules*. Città del Vaticano, Biblioteca Apostolica Vaticana, Urb. Lat. 1358, 124v. Florence, 1470-1480 (with permission of BAV; from: <http://iconographic.warburg.sas.ac.uk/>)

173v) suggest that the dots were added after the text was written (fig. 3).³⁵

In fact, even when the drawing is made before the text, such as in Vatican, BAV, Vat. Lat. 3110, the 'star-positioner' may in some cases have set to work at the end of the process.³⁶ Vatican, BAV, Vat. Lat. 3109 offers a splendid example of the complexity of the process: the first set of pictures reveals three different stages: raw pencil sketches of constellations already equipped with stars, with guidelines for the later insertion of text (fig. 4); drawings with dots on sheets marked by lines of writing (most of the pictures; fig. 5); drawings with text (only fols 33v-34v; fig. 6). The probable sequence was here: page ruling, sketch with dots, drawing, insertion of the text.

The positioning of stars is a demanding process. The person in charge of it is faced with pictures that correspond to conventional pictorial formulae and do not always correspond with the textual descriptions.³⁷ Virgo, for example, is supposed to receive four stars on her wings (*pennae*), but in some

³⁵ See Lippincott 2014 for a discussion of the construction of this manuscript. In Vatican, BAV, Vat. Lat. 3109, the constellations of Sagitta and Triangulum are missing their stars, probably because the 'star-positioner' has overlooked it. This suggests that asterization of this manuscript was an operation distinct from the illumination.

³⁶ See Blume, Haffner, Metzger 2016a, 555: "Im Unterschied zu den älteren Hyginus-Illustrationen sind hier die Sternpositionen offenbar nach den Angaben des Textes in roter Farbe eingetragen".

³⁷ Many postures are imported from different contexts, transferred from one text to another (deriving from the Aratean corpus or the *De signis* tradition), or from one character to another. The illuminator of Oxford, Bodleian, Canon. Class. Lat. 179 uses the same postural stereotype for the entire family of Andromeda, and in Vatican, BAV, Reg. Lat. 123, Perseus (fol. 189v) and Orion (fol. 199v) have exactly the same posture.



Figure 3. *Constellation of Lyra*.
Leiden, VLO 15: XIII, fol. 173v.
France, 1000-1050? (with permission
of Universitaire Bibliotheken Leiden)



Figure 4. *Constellation of Gemini*. Città
del Vaticano, Biblioteca Apostolica
Vaticana, Vat. Lat. 3109, fol. 40v. Italy,
1400-1450 (with permission of BAV)

manuscripts the figure has no wings,³⁸ and the stars have to be placed on the shoulders or arms. When Argo only has one *gubernaculum*, the stars on each oar often appear on the hull;³⁹ or when Sagittarius is bipedal the stars in the tail (*in cauda*) are often placed on the thigh or omitted.⁴⁰ In addition to two large claws (*chela*), Cancer must have four pairs of small legs (cf. *in quarto pede*), but the number of the legs (sometimes deprived of claws) varies in the manuscripts between three (Oxford, Digby 83 or Baltimore, Walters Art Museum, W 734) and five (Vatican, BAV, Urb. Lat. 1358), and is sometimes even seven (Vatican, BAV, Vat. Lat. 3109). As a result, these depictions of Cancer cannot have the exact number of stars that should appear on its right feet (*in dextris pedibus singulas*).

In many cases, it is simply the orientation of the view adopted for the figure (back or front view) that limits the possibilities of the relevant positioning of stars – such as in the Cambridge, Fitzwilliam 260, where the star *in ventre* of Perseus is marked in the middle of the back.⁴¹ Accuracy in star-positioning is restricted not only by pictorial characteristics, but

38 I.e.: Cambrai 993; Oxford, Bodleian Library, Canon. Class. Lat. 179 and Digby 83.

39 Cambrai 993 and Cambridge, Fitzwilliam 260.

40 Baltimore, Walters Art Museum, W 734.

41 In the globes, the constellations are seen from the rear, but in the texts all constellations are theoretically figured according to our observation and facing us (see Hipparchus,

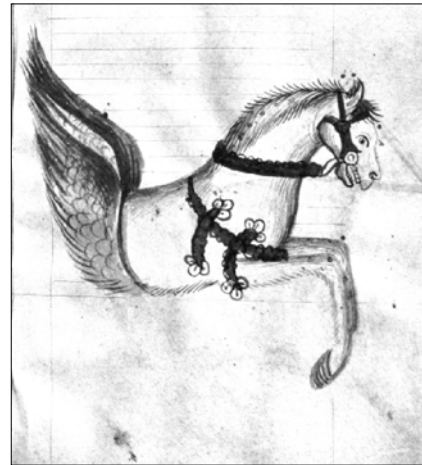


Figure 5. *Constellation of Pegasus*. Città del Vaticano, Biblioteca Apostolica Vaticana, Vat. Lat. 3109, fol. 39r. Italy, 1400-1450 (with permission of BAV)

Figure 6. *Constellation of Hercules*. Città del Vaticano, Biblioteca Apostolica Vaticana, Vat. Lat. 3109, fol. 34r. Italy, 1400-1450 (with permission of BAV)

also by aesthetic choices, such as the need to preserve or even to embellish the pictures: the stars are thus sometimes placed outside of the image (fig. 7),⁴² or groups of stars are placed as a block (fig. 8)⁴³ or a line (fig. 9).⁴⁴

4 Individual Description and Evaluation

In order to test the hypothesis that the ‘star-positioner’ normally relied on the text of the manuscript when placing the stars, it is necessary to review each manuscript individually to check both position and number of the stars in connection with the precise readings that appear in each

1.4.6); on the problems of lateralization also induced by the double referencing system, see Zucker 2008, 46-49; for a detailed comment on the Hipparchan rule see Dekker 2010, 34-38.

⁴² As in Cambridge, Fitzwilliam 260.

⁴³ As in the Cambrai 993.

⁴⁴ As in Pavia, Bibl. Univ., Aldini 490.



Figure 7. *Constellation of Perseus*. Cambridge, Fitzwilliam, ms. 260, fol. 9r (with permission of the Syndics of The Fitzwilliam Museum, Cambridge)



Figure 8. *Constellation of Capricornis*. Cambrai, MAC, ms. A 933, fol. 33r (with permission of Médiathèque d'Agglomération de Cambrai. Service des collections patrimoniales; cliché CNRS/IRHT)



Figure 9. *Constellation of Capricornis*. Pavia, Bibl. Univ., Aldini 490, fol. 91r (with permission of Biblioteca Universitaria di Pavia, MiBACT)

version of the text. In *De Astronomia* Book 3, the total sum of the stars is not systematically given for each constellation.⁴⁵ Beyond this, there is often an inconsistency between the number of stars listed in each part of the constellation and the 'total sum' provided at the end of the list.⁴⁶ The

45 By contrast, the total number is generally given in the *Aratus Latinus* and always present in the *De ordine et positione (summa X, vel fiunt X)*, in the *De signis* and in the *Revised Aratus latinus*.

46 For Delphinus: *omnino est stellarum VIII* (for 10 stars listed); Pegasus: *omnino stellarum XVII* (for 18 stars listed); Cancer: *omnino septemdecim* (for 18 stars listed); etc. Besides, note that this amount is often different from one text to the other: Ursa Maior has 21 (Hyginus), 22 (*De ordine et positione*) or 18 (*De signis*) stars; Auriga has 7 (Hyginus), 9 (*De ordine et positione*) or 10 (*De signis*) stars; etc.

task of comparing the descriptions of the stars and their placement in the manuscripts themselves is also fraught with challenges: ink stains, faint or faded dots (either accidental or supposed to be filled in or replaced by stars), damaged parts, darker zones⁴⁷ or ‘parasitic’ decorations⁴⁸ all add to a certain level of doubt and compromise in one’s readings.⁴⁹

5 Misreadings and Misrepresentations

Apart from the inversion of right and left, which is a constant feature in these pictures due to ignorance or disregard of the so-called ‘Hipparchan rule’ (see note 40), it is worth noting the casual way in which the stars in the arms and legs of a constellation are marked when the text fails to specify a particular side. This haphazard tendency is slightly odd, since the catalogue of stars given by Hyginus is methodical, progressing from top to bottom, and it is always possible to get a clear idea of the figure – even in the absence of lateral descriptors – and know precisely which leg or arm is concerned (fig. 10).

None of the manuscripts is devoid of mistakes, however. Interestingly, the most reliable placement of stars vis-à-vis the text is found in Ratdolt’s edition of the *De Astronomia*, despite the non-Hyginian pictorial origin of the figures of the constellations themselves. A systematic cross-comparison between all manuscripts of both text and picture could (in another study) help establish the possible relations of interdependency between the manuscripts. We have already seen how corrupted readings can impact the positioning of the stars in such a way that we can assume the ‘star-positioner’ either took account of the text he was illustrating, or used a model already integrating the special reading into the picture. One of the most striking cases in point is Aquarius, which is supposed to have 14 stars in the figure of Aquarius himself and 30 for the Water. The manuscripts that have only 16 stars marked in the Water (*Fluvius Aquarii*) in addition to the 14 stars of Aquarius⁵⁰ actually agree with

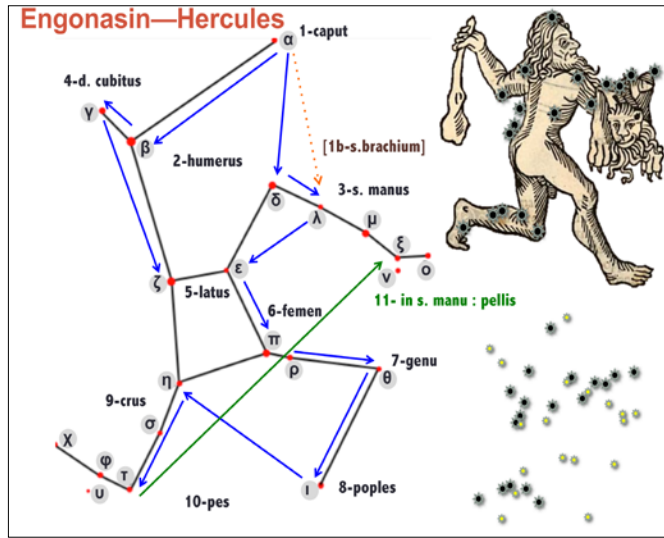
47 E.g.: Pavia, Aldini 490, fol. 78v (Bootes), where the shield is dark and almost entirely black (but supposed to be marked with stars).

48 See especially Vatican, BAV, Urb. Lat. 1358 and Milan, Trivulziana N 690.

49 It is striking that no manuscript version of the text has 21 stars for Virgo, because none has the modern edited reading *in veste decem*, but has either *in veste septem* or *in veste quinque*. Pavia, Aldini 490, for example, shows 24 differences from modern editions of Hyginus, but the discrepancies between the manuscript readings and the pictures are less evident. On the fact that the numbers provided in modern editions do not correspond to what is found in the Hyginus manuscripts, because none of the modern editors consulted any of the 15th-century manuscripts when preparing their editions, see Lippincott (this volume).

50 Florence, Laurenziana, Ashb. 1148 and Plut. 89 sup. 43; Pavia, Aldini 490; Milan, Trivulziana N 690; Milan, Ambrosiana T 47 sup.; New York, Spencer 28; Freiberg, Andreas-Möller Bibliothek, XI.4.9; Vatican, Vat. Lat. 3110; Vienna, Vindob. Lat. 3111; Cambridge, Fitzwilliam 260 and Vatican, Urb. Lat. 1358.

Figure 10. Hercules Trajectory of Hyginian description (from 1 to 11); Ratdolt's picture of *Hercules* with stars; star disposition in Ratdolt (black stars) and observable pattern in the sky (yellow stars)



the reading: *Effusio aquae cum aquario ipso stellarum est XXX* (instead of *Effusio aquae cum aquali (urn) ipsa stellarum est XXX*).⁵¹ Many errors can be ascribed to a misunderstanding of Latin words or expressions, as in New York, Spencer 28 and in the ‘twin’ manuscript, Freiberg, Andreas-Möller Bibliothek, XI.4.9, where *in utrisque pennis quinas* (Cygnus, fol. 43r) was interpreted as meaning “five for both wings” (and not five on each), and *in ipsa testa* (Cancer, fol. 50v) as meaning “on the head itself”, instead of the shell. The words *lumbae*, *femen* and *interscapilium* are particularly affected by the limited linguistic proficiency of the illuminators and the stars placed on these body parts tend to be rather nomadic.

However, the discrepancies in most of the manuscripts go far beyond a misunderstanding of the Latin – thus seriously challenging our hypothesis that the star-positions provide evidence of a careful reading of the texts.⁵²

51 A similar case occurred with Triangulum: the pattern of *Aries intra Triangulum* derives from a misreading of Hyginian text *caput infra Triangulum* in Milan, Ambrosiana T 47 sup. (fol. 54r); Cambridge, Fitzwilliam 260 (fol. 16r); Vatican, Vat. Lat. 3110 (fol. 71v); New York, Spencer 28 (fol. 49r [*intra*, *supra* lineam]); Freiberg, Andreas-Möller Bibliothek, XI.4.9; Oxford, Canon. Class. Lat. 179 (fol. 40v); Pavia, Aldini 490 (fol. 87r); Siena L.VI.25 (fol. 41r); Vatican, Urb. Lat. 1358 (fol. 30v); Milan, Trivulziana (fol. 17v) and Vatican, Vat. Lat. 3109 (fol. 57v). See Lippincott 1993 and Lippincott 2006. See also the regular reading (in Ari) *sub ventre unam, in lumbis tres*, correctly reported on the picture, instead of *sub ventre tres, in lumbis unam* of the edited texts of Hyginus.

52 The main exceptions being New York, Spencer 28; Freiberg, Andreas-Möller Bibliothek, XI.4.9; Siena L.VI.25 and Laurenziana Plut. 89 sup. 43, in which positioning of the stars appears to follow the texts fairly closely.

For simple constellations such as Cetus, with 13 stars dispatched in three clusters (*in extrema cauda II obscuras, ab eo loco usque ad reliqui corporis curvaturam V, sub ventre VI*), how could any ‘star-positioner’ keeping a watchful eye on the text make a mistake? Nevertheless, in Vatican, Urb. Lat. 1358, there are 13 stars listed in the text (organised 2-5-6) and 14 in the picture (2-6-6); in Vatican, Reg. Lat. 123, there are 14 in the text (2-6-6) and 13 in the picture (2-6-5) and in Pavia, Aldini 490 there are 13 stars in the text (2-5-6) and 14 in the picture (2-5-7).

In spite of the comments of some scribes on the importance attached to the astrothesy,⁵³ star-positioning often appears to have been a disconnected and inaccurate process. Indeed, the discord between text and stars seems to prove that the text was rarely checked carefully (or checked at all!) by the man in charge of positioning, especially when there are more stars in the picture than listed in the text.

Before discarding our original assumption altogether, though, we should remember that all copyists generate errors, and that the projection of a set of stars onto a picture is a kind of ‘apograph’, probably even more demanding than a textual copy as it involves the transposition from one medium to another. Perhaps not surprisingly, the constellations with fewer than ten stars (such as Auriga, Sagitta, Aquila, Delphinus, Lepus, etc.) are almost always correct, whereas constellations with a greater number of stars generate a greater number of divergences. Finally, there is also the issue of the attentiveness of the ‘star-positioner’. To take one example, in Vienna 3111, which is obviously a direct copy of one of Ratdolt’s edition of Hyginus,⁵⁴ there are errors in ten constellations and changes in the location of stars in five of them, which is almost twice as many as one sees in the manuscripts such as Siena L.VI.25 or Ashburnham 1148, and more than in New York, Spencer 28, Laurenziana, Plut. 89. sup. 43, or Vatican, Vat Lat. 3110.

⁵³ Oxford, Bodley 614, fol. 18r: *ut hic dispositus*; fol. 34r: *Caveat itaque omnis cui forte huius opusculi de syderum ratione figurati modum transformare placuerit ne quicquam horum signorum aliter quam hic continetur depingat, nec punctos stellarum extra praenotata loca disponat quia in singulis notis figurarumque distinctionibus et formis subtilis continetur intellectus. Sola vero breuitatis causa eorumdem signorum formaturae stellarumque determinata loca hic scriptis nominatim non distinguuntur.* (Those who might be inclined to change the art and nature of this small illustrated treatise on the order (*ratio*) of the stars should be aware not to present these constellations differently from how they are shown here, and also not to place the points of the stars outside the accurately marked places, because each mark with regard to order and shape of the figures has been obtained by careful consideration. For the sake of shortness only have these constellations and the precise places of the stars not been described explicitly in the text). See Saxl 1957, 199 and Lippincott, *ad loc.*

⁵⁴ They share the major error of placing Ursa Maior (instead of Ursa Minor) in the loop near the head of Draco (!). Note that this error may come from the iconographic tradition of the *De ordine ac positione* (i.e.: Paris, Bibliothèque nationale de France [BNF], ms. nouv. acq. 1614), where the stars of Ursa Maior and Ursa Minor have been transposed (five for Ursa Maior and 20 for Ursa Minor).

6 Asterization and Celestial Pattern

The 'asterization' of pictures probably meets a demand to increase the attractiveness and value (i.e.: price) of the manuscripts, but it might also indicate the intent or desire to provide a relevant and potentially more scientific display of the constellations, which consist, after all, of stars that are visible in the sky. Having said that, it must be stressed that the accuracy of star-positioning with respect to the celestial patterns that appear in the night sky is emphatically not an issue taken into account by the different 'star-positioners' of these manuscripts. The text of Hyginus is never revised to take account of cartographic accuracy, nor do any divergences in the positions of the stars reflect the influence of observed data. This is particularly striking for familiar clusters such as the square of Ursa Minor, Orion's belt, the 'W' shape of Cassiopeia or the characteristic structure of Bootes. For this latter constellation, Hyginus explicitly mentions the fact twice that the four stars on *sinistra manus* never set (III, 3: *Huius manum sinistram circulus arcticus includit ita ut neque occidere neque exoriri videatur... quae numquam occidere dicuntur*). The astronomical meaning of this indication is clear: the left hand of Bootes, who is represented standing and with his head more-or-less facing the North Pole, is *above* the head of the figure. In the manuscripts, however, the stars are generally marked both in text and picture on the *sinistra manus*, which is held *down* by his side.⁵⁵ The notable exception to this rule appears in Baltimore, Walters Art Museum, W 734, which provides an ingenious solution to the problem.⁵⁶ The general lack of interest in astronomical relevance is also demonstrated by the absurd position of the Pleiades in front of the muzzle of Taurus in seven manuscripts, proving that the illuminators were completely unaware of the relative position of Aries and Taurus.⁵⁷

Scribes and illuminators are not responsible for this inaccuracy, because the anatomical description of Hyginus bound them to a rigid figurative representation... often impossible to correlate with the physical experience. Whether owing to a corruption of Hyginus' original text or, more probably, to the imperfection of the anatomical references, it is an impos-

55 Except in Pavia, Aldini 490 and Vatican, Urb. Lat. 1358, where the stars are placed on the right hand in both the picture and the text; and in Vatican, Vat. Lat. 123, where the stars are placed on right hand in the text and left hand in the picture.

56 Lippincott 2006.

57 Hyginus, *Astr.* III.20: *Inter huius finitionem corporis et Arietis caudam*. Aries is naturally 'behind' (i.e.: west of) Taurus. The Pleiades appear before the nose of Taurus in following manuscripts: Milan, Trivulziana N 690; Pavia, Aldini 490; Florence, BNC, Magliabechi XI.114; Cambridge, Fitzwilliam 260, Vatican, BAV, Vat. Lat. 3110; Siena L.VI.25; Florence, Laurenziana Plut. 89 sup. 43.

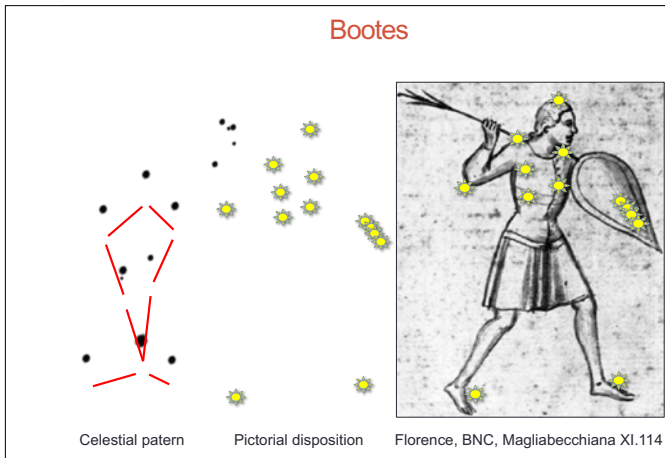


Figure 11. *Constellation of Bootes*. Difference between a pictorial disposition and the celestial pattern

sible challenge in the case of most constellations to draw a realistic figure that respects both the anatomical instructions and the celestial scheme in the positioning of the stars (fig. 11).

The Erathostenian anatomical depiction of the constellations (in *Catasterismoi*), on which the Hyginian text is based (Zucker 2015), had already been revised by Hipparchos and Ptolemaios, in order to match a more realistic structure (see Zucker 2016, 1065 sq.). In short, the only way to eschew the contradiction between literary depiction and visual experience was to abandon Hyginus and his like, and to restart afresh the description with a new structure and a new positioning.⁵⁸

7 Conclusion

The position of the stars in the manuscripts of Hyginus under consideration reflect differing levels of accuracy, but it seems safe to conclude that there are three major factors at play: 1) the descriptions provided in the text, 2) the pictorial conventions of the drawn figures and 3) the relative degree of attentiveness and skill of the person responsible for positioning the stars. The scribe of the text responds to a simple demand – which

⁵⁸ Relying on the tradition of Ptolemy's *Almagest* tradition and above all on Tycho Brahe's accurate observation, the asterization of constellations provided by modern atlases, from Bayer's *Uranometria* (1603) onwards does not follow any more the Hyginus' tradition, which more or less directly determined in the Latin West the major part of astronomical illustration until at least the 12th century and the first translation of the Sufi's version of Ptolemy's catalogue.

is to reproduce a text, from one or more manuscripts, which sometimes include pictures. The scribe is rarely called upon to improve the text, nor is the illuminator often called upon to revise the pictures. Neither was he likely to be an expert in astronomy. As a result, and as might be expected, the pictorial star-structures in our corpus have little in common with the observable patterns in the night sky.⁵⁹ The irrelevance of the arrangement of stars for the constellations compared to the celestial patterns clearly proves that the illustration was not meant to represent the disposition of real stars in the sky but to visually project astrothetic data provided in the ms. A double fidelity to text and sky was impossible anyway. We may nonetheless observe that some medieval texts, such as the *De cursu stellarum* of Gregorius, favored a more acute display of celestial patterns, avoiding the 'pagan' iconography (and nomenclature) for the constellations, and that the manuscripts transmit more relevant sketches with respect to the star clusters, even if the lack of orientation and of celestial context make their identification sometimes unsure.⁶⁰

As for the main issue of our investigation, the conclusion appears to be that of the 20 manuscripts in question, only six (see Appendix 2) show a sufficiently high degree of agreement between text and star-placement. Instead, one sees a series of odd mistakes and divergences, most of which should probably be regarded, up to a certain point, as the kind of accidents characteristic of every process of copying, especially with repetitive and numeric data. Besides, a number of examples show evidence that stars have been often placed in the figures according to extant pictorial models, in fact not always with great accuracy. In response to Dolan's original question as to whether the illuminators of Hyginus manuscripts are reading the poem and creating images in accordance with their readings or simply following existing pictorial models, one must conclude that the evidence appears to vary on almost a case-by-case basis.

59 It stands "zwischen Wissenschaft und Phantasie" as observed in the title of Blume, Haffner, Metzger's catalogue.

60 Bamberg, Staatsbibliothek, ms. Patr. 61, fol. 75v sq. McCluskey writes (2000, 107 and note 29): "the orientation of the stars and the brightness of distinctive ones are clearly indicated - These figures differ from the more artistic but astronomically unintelligible drawings of the classical constellations in manuscripts of Aratus and Hyginus. This striking difference reflects the concern with actual astronomical practice by readers of *De cursu stellarum*". Note that the structures of the twenty or so asterisms appearing in the manuscript is more simple (generally with fewer than 12 stars).

Apparatus

1 Vatican, Biblioteca Apostolica Vaticana, Reg. Lat. 123

The Vatican manuscript, Reg. Lat. 123, is the oldest Hyginus manuscript where the majority of the stars have been marked. The constellations are presented in two series, one with the zodiac, the other with the remaining constellations, following the order of Pseudo-Bede's *De signis caeli* (Ophiuchus after Corona Borealis, Perseus after Triangulum, etc.).⁶¹ In spite of this structure, the text regularly given is Hyginus' and not that of the *De signis caeli*. However, for the last five chapters (Eridanus, Piscis Austrinus, Ara, Centaurus and Hydra) and for Bootes (fol. 189v), Ps.-Bede's description of each constellation is given in addition to Hyginus', and is introduced by the formula *secundum Aratum*.⁶² Other excerpts are scattered in the text, mainly from Isidorus (fol. 176v, fol. 188v, etc.) or Fulgentius (fol. 193v), with no apparent impact on the iconography.

This manuscript is a *unicum* in the tradition. The asterization is chaotic, and it includes many divergences from both texts (Hyginus and Ps.-Bede) as well as with the general Hyginian tradition, but in the final analysis it seems to fit the Hyginian description more than any other known source.⁶³ The asterization is related to Ps.-Bede's description for eight constellations (Ursa Maior, Ursa Minor, Draco, Cepheus, Perseus, Auriga, Delphinus, Hydra) and in two cases the illustration appears as a conflation of both texts (Hercules, Argo). Having said that, the illuminator is not sufficiently competent to deal with astronomical data, and he makes a number of different kinds of mistakes.⁶⁴ For example:

- On fol.185r, dealing with Arctophylax (Bootes) and following the Hyginian description, he misunderstands a blank space left by the scribe with a characteristic shape for a picture of Bootes, and fills it with a picture of Ursa Minor (!).

61 The only deviation from the Pseudo Bede's order concerns the inversion of consecutive constellations (Cassiopeia/Cepheus and Canis Maior/Lepus).

62 This indication is missing before the astrothesic description of Bootes.

63 See Lippincott's 2014, 17 assessment: "With the Vatican illustrations, it is difficult to uncover any dominant rationale behind the placement of the stars. In 11 constellations, they can be connected to the *De signis caeli* text; in 7, to the text of Hyginus. The positioning of the remaining 24 are sufficiently problematic to be unattributable to any single or known pictorial source".

64 Lippincott 2014, 14: "Despite his painterly bravado, it is clear that the artist of the Vatican manuscript is often unsure about many of the details of what he is copying. For example, he misunderstands the structure of the *harpe* held by Perseus and misses the identity of the severed head of Medusa".



Figure 12. *Constellation of Cepheus*. Città del Vaticano, Biblioteca Apostolica Vaticana, Reg. Lat.123, fol. 191r. Spain, 1056 (with permission of BAV)

- The picture of Bootes on fol. 189v (alongside the text of the *De signis caeli*), seems to follow the text of Ps.-Bede (omitting the main star Arcturus, which is missing in the text),⁶⁵ but it offers a characteristic disorder: 16 stars are listed in the text, with an alleged total of 15 (*sunt omnes XV*), while 17 stars are marked on the picture. The four stars on the *right* elbow (*in dextro cubito iiii*) are actually on the left one, with the four stars of the *right* hand (*in dextra manu IIII*), one star is missing on the breast, and two additional ones are marked on the right hand. Hyginus' text for Bootes is given on fol. 185v.
- Ursa Maior (without tail) and Ursa Minor (with long tail) are reproduced twice (fols 184v-185r, fol. 186r: *Draco inter arctos*), with inconsistent asterization.
- The cases in which the illuminator *might* have respected the text (Gemini, Cancer, Capricorn) are very rare.⁶⁶ Given the importance and antiquity of this earliest of all asterized manuscripts, it is important to list all the remaining errors or oddities of the ms.:⁶⁷

65 This star appears in Hyginus' text, correctly quoted on fol. 185r: *in zona unam clarius*.

66 For Gemini, the text duplicates *in sinistro humero unam*, omits *in dextro humero alteram* and the picture has accordingly only one star on the left shoulder. For Cancer, the animal has no claws but five pairs of legs, thus receiving one additional star (*in dextris pedibus singulas obscuras*).

67 Comments in brackets stress the discrepancies with regard to Ps.-Bede's text.

Constellation	ms. text	ms. illustration	Comments
Ursa Maior	Hyginus 19	(a) Hyginus 19 (b) Ps.-Bede 14	- omits one star on each ear [but four instead of nine on the head]
Ursa Maior	Hyginus 17	(ab) Ps.-Bede 7 & 7	[= four stars <i>in humero</i> (instead of the feet)]
Draco	Hyginus 15	Hyginus 15	
Bootes	Hyginus 14 Ps.-Bede 15	Ps.-Bede 14	[four stars <i>in dextro cubito</i> are on the left elbow; omits one star on the breast]
Corona Borealis	Hyginus 9	Hyginus 9	
Hercules	Hyginus 19	Conflation Hyginus/ Ps.-Bede 13	- omits one star on the right shoulder (<i>in utroque humero</i>) - one on the right hand instead of the left (<i>in manu sinistra i</i>) - omits four stars on the left hand (<i>in sinistra manu IIII</i>) - adds a star on the left knee - NB: two partly faded on the leg (<i>in crure ii</i>) [omits one star on the right shoulder (<i>in utroque humero</i> and one <i>in dextra tibia</i>); adds one star on the right foot and one on each flank]
Lyra	Hyginus 9	Hyginus? 8	- omits a star at the bottom (<i>in imo Lyrae, quae ut basis totius videtur, unam</i>)
Cygnus	Hyginus 13	Hyginus 13	
Cepheus	Hyginus 19	Ps.-Bede 20	[omits 3 stars (<i>in manu dextra I, item in cubito obscuram I, in sinistra manu</i>); three stars on the belt (<i>in zona</i>) are on the chest (fig. 12) ¹
Cassiopeia	Hyginus 14	Hyginus 13	- omits the star on the right foot (<i>in pede primori dextro unam</i>) [as in Ps.-Bede] - omits two stars on the throne (<i>in angulis utrisque</i>) - adds two stars on the hands [as in Ps.-Bede]
Andromeda	Hyginus 21	Hyginus 23	- adds two stars on the trees drawn on both sides of the figure [as in Ps.-Bede]
Perseus		Ps.-Bede 17	[inverts right and left hand; adds an unconventional star on the left hand; omits three stars, with regard to the text: <i>in sinistro femine unam in tibia duas</i>]
Auriga ²	Hyginus 7	Ps.-Bede 10	
Ophiuchus + Serpens	Hyginus 17 + 21	Hyginus? 12 + 6	- trampling on Scorpio [as in Ps.-Bede: <i>stans uero supra Scorpionem</i>] - omits three stars on the hands - omits one star on the right knee - omits one star on the right thigh - omits fifteen stars on Serpens

Certissima signa, 153-212

Constellation	ms. text	ms. illustration	Comments
Sagitta	Hyginus 4	Hyginus 4	<ul style="list-style-type: none"> - marks on the tail the two stars <i>in eo loco quo ferrum solet affigi</i> (usually marked on the arrowhead)
Aquila	Hyginus 4	Hyginus? 5	<ul style="list-style-type: none"> - the text is interrupted (fol. 198r) and does not continue on the following page (<i>in utraque penna unam, in cau <da unam></i>) - shows <i>five</i> stars (instead of four) with three stars on the chest instead of one on each wing (<i>in utraque penna i</i>)
Delphinus	Hyginus 10	Ps.-Bede 9	
Pegasus	Hyginus 18	Hyginus 18	<ul style="list-style-type: none"> - probably omits a star on the right leg, supposed to be on the hough (<i>in utrisque poplitibus singulas</i>), but the picture is damaged - adds one star on the wings
Triangulus	Hyginus 3	Hyginus 3	
Aries	Hyginus 18	Hyginus 18	
Taurus	Hyginus 14	Hyginus 18	<ul style="list-style-type: none"> - adds one star on the belly (cf. <i>in ventre unam</i> in Ps.-Bede) - has <i>three</i> stars on the neck instead of two (cf. <i>in collo ii</i>, also in Ps.-Bede) - adds three stars on the shoulder, accompanying an abnormal text (<i>vacuum et cervicem</i> before <i>et interscapilio tres</i>).
Gemini	Hyginus 8 + 8	Hyginus 8 + 8	
Cancer	Hyginus 18	Hyginus 19	<ul style="list-style-type: none"> - adds a star on a fifth foot - the two stars <i>in testa</i> are erased - the stars <i>in chelu</i> (sic) are on the shell³
Leo	Hyginus 19	Hyginus 20	<ul style="list-style-type: none"> - adds one star on the left forefoot
Virgo	Hyginus 17	Hyginus 21	<ul style="list-style-type: none"> - adds one star on each breast - adds one star on each elbow (cf. in Ps.-Bede: <i>in unoquoque cubito unam</i>) - has six stars at the bottom of her dress (<i>stellas ex [sic]</i>) instead of five, seven or ten (cf. Ps.-Bede <i>in penula uestimenti sex</i>)
Scorpio + Libra	Hyginus 12 + 4	Hyginus 15 + 4	<ul style="list-style-type: none"> - adds three stars on the body, corresponding to Hyginus' text (<<i>in interscapilio III</i>>; cf. <i>in spina tres</i> in Ps.-Bede), but omitted in the manuscript⁴
Sagittarius (+ Corona Australis)	Hyginus 15 + 7	Hyginus 15	<ul style="list-style-type: none"> - omits the star <i>in poplite</i> - adds a star on the hand, that could be <i>in pollice</i> - the star <i>in dextro cubito</i> is on the left elbow - stars <i>interscapilio</i> are in the front, on shoulder and hand

Constellation	ms. text	ms. illustration	Comments
Capricornus	Hyginus 20	Hyginus 26	– adds six stars on the horns, in accordance with the aberrant segment given in the text (<i>in cornibus VI</i>) at the end of the description (after <i>in cauda duas</i>): this does not exist in either Hyginus or Ps.-Bede. ⁵
Aquarius	Hyginus 16 + 30	Hyginus? 16 + 8 ⁶	– along with the 16 stars of the human figure (<i>omnino XXII</i> [sic]), has only 8 stars on the Water, while it is supposed to have 30 to respect the text: <i>Effusio aque cum aquali ipso stellarum XXX⁷</i>
Pisces	Hyginus 41	Hyginus? 40	– stars marked (<i>notius</i> : 15; <i>coniunctio</i> : 12; <i>boreus</i> : 13) do not match either Hyginus' (17-12-12) or Ps.-Bede's text (15-12-12)
Eridanus	Hyginus 13 Ps.-Bede 16	Hyginus 12	– omits one star
Cetus	Hyginus 14	Hyginus 13	– omits one star <i>in ventre</i>
Lepus	Hyginus 6	Hyginus 6	
Orion	Hyginus 17	Hyginus 17	– a correction process has been undertaken to align with the Hyginian text, three stars on the cape (corresponding to the Ps.-Bede text: <i>in mantili 3 obscuras</i>) having been partly erased, and seven stars are crossed on the left side (on leg: 2; arm: 2; sword: 3). – stars <i>in dextro cubito</i> and <i>in manu</i> (scil. <i>dextra</i>) are on the left arm (holding the sword)
Canis Maior	Hyginus 19	Hyginus 19 ⁸	
Canis Minor	Hyginus 3	Hyginus 3	
Argo	Hyginus 22	Conflation Hyginus/Ps.- Bede 27	– adds five stars on the stern (cf. Ps.-Bede: <i>in puppi</i> 4) – adds one star on the oar (cf. Ps.-Bede: <i>in utroque humero</i> 5), – omits one on the ship (4 instead of 5 <i>sub reiectu</i> ; cf. Ps.-Bede: <i>in anteriori parte navis</i> 4 ?) ⁹
Centaurus + Lupus	Hyginus 24 + 10 Ps.-Bede 24 + 9	Hyginus? 18 + 8	– omits four stars listed by both Hyginus and Ps.-Bede (<i>in medio pectore equino unam, in ventre ii, in lumbo equino i</i>) – omits four stars of Hyginus' catalogue (<i>interscapilio iiiii</i> ; or <i>in spina ii</i> in Ps.-Bede) – adds two stars on the front paws – omits one star on the head of Lupus (common text of Hyginus and Ps.-Bede: <i>in capite iii</i>)
Ara	Hyginus 4	Hyginus 4	

Certissima signa, 153-212

Constellation	ms. text	ms. illustration	Comments
Hydra + Crater + Corvus	Hyginus 26 + 9 + 8 Ps.-Bede 3 + 3 + 3	Ps.-Bede 3 + 3 + 4	- [adds a star on the beak of Corvus or the body of Hydra].
Piscis Australis	Hyginus 12	Hyginus 12	

1 The text in the manuscript is: *Hic autem habet in capite stellas duas, in manu dextra i, item in cubito obscuram i, in sinistra manu & humero singulas, in dextro humero i, in zona, quae medium eius dividit corpus tres stelle clare videntur, in latere dextro obscura i, in sinistro genu due, utrisque pedibus singule, supra pedem stelle iiii.*

2 The positions of the stars in Auriga are: head, both shoulders, both elbows, two on the hand [*scil.* left = *Heduli*]. In the *De ordine et positione*, the stars are not on the elbows but on the knees, and the stars called *Heduli* are counted twice (four stars on the hand), for a total of 9 stars. The text is misread and *Capra* is considered as a star, different from the star on the right shoulder (*sed in sinistro clariorem quae Capra vocatur*).

3 The animal has no claws, but five pairs of legs; probably the scribe did not understand the word *chela* (*in ea que chelu [sic] dexterio dicitur*). The stars of the claw are often misplaced before the head of Cancer (in BAV Lat. 3110, BAV Lat. 3109, BAV Urb. Lat. 1358, Siena L.VI.25, Bodley Canon. Class. Lat. 179, Trivulziana N 690, Ambrosiana T 47 sup., Cambridge Fitzwilliam 260); they are correctly marked in: Digby 83; New York, Spencer 28; Laurenziana, Plut. 89 sup 43; Florence, Laurenziana, Ashb. 1148; Cambrai 933; Baltimore, Walters Art Museum W 734; Vienna 3111 (see also: Pavia, Aldini 490 [two on the left claw, three before the right one]).

4 The description and picture of Scorpio are on fol. 180r; in the chapter of Ophiuchus there is another picture of Scorpio on fol. 188v, under the feet of Ophiuchus, with identical asterization.

5 On the left forefoot there *might* be an additional star.

6 Note that the two stars pictured on the breast cannot follow the corrupted text (*in utrisque membris*, instead of Hyginus' text *infra mammas singulas obscuras*); similarly a correction *supra lineam* had *que genu* above *in utribus* (omission of *genibus*).

7 On the more common text *cum aquario ipso* see below.

8 Note that Ps.-Bede's description is very different (with 17 stars).

9 Note that in Ps.-Bede Argo (*Navis, quae apud Argivos Argo vocatur*) has only 21 stars.

2 Oxford, Bodleian Library, Digby 83

For each constellation, Digby 83 conflates the chapters from books 2 and 3 of Hyginus.⁶⁸ It seems to follow the iconography of Oxford, Bodley 614, containing the *Recensio interpolata* of Hyginus' *Astronomia* (excerpts conflated with readings from Isidorus' *De natura rerum* and the *scholia Sangermanensia*),⁶⁹ which is also marked with stars,⁷⁰ but it does not provide the textual description of the astrothesy or the exact position of stars, mentioning only the number of stars for each constellation.⁷¹ Digby 83 is generally more complete than Bodley 614 in the asterization, though it also differs from it from time to time.⁷² The positioning of the stars in this manuscript is often faulty. The text contains numerous linguistic errors,⁷³ and the 'star-positioner' regularly places the stars described as *in lumbis* on the genitals (Cassiopeia, Perseus, Orion and Aquarius).⁷⁴ This linguistic inadequacy also could be responsible for the asterization of Cygnus, which theoretically carries five stars on each wing (*in utrisque pennis*

68 A similar case appears in the manuscript London, British Library, Arundel 339, which is without stars.

69 On fols 17v-33v. Blume, Haffner, Metzger 2012a, 390-93; McGurk 1966 (IV): xxiii; Lippincott (The Saxl Project, *ad vocem*). On the family of Oxford, Bodleian, Digby 83, see Saxl 1957, I.99: "Harley 647 is a manuscript of purely classical character which was brought over from France" and was copied into London, BL, Cotton Tib BV; Cotton Tib C I; Harley 2506; Oxford, Bodleian, Bodley 614 and Digby 83. See also Lippincott (The Saxl Project, Hyginus/Commentary: 149-59).

70 Only the zodiacal constellations are in colour, and they are used in a symbolic way referring to the elementary meaning of each trigon, in red (= fire: Aries, Leo, Sagittarius), yellow (= earth), green (= air) and blue (= water).

71 There are many discrepancies between the number of stars given in the text and their pictorial asterization (e.g. for Gemini [fol. 18v-19r]: *Hi habere stellas xii*, while 16 stars are marked on the picture).

72 In Lippincott (The Saxl Project, Hyginus/commentary: 151-59), Elly Dekker has provided a systematic comparison of the two manuscripts and it appears that they are in agreement for 23 constellations and in disagreement in 18 cases. Digby 83 is richer in 13 cases and poorer in 6 cases. For Bootes, Digby 83 has 12 stars (while Bodley 614 has 11), adding two stars on the left hand and omitting one star on the right elbow. Pegasus, however, offers a reverse case (16 stars are marked in Bodley 614, and 12 in Digby 83). In spite of its numerous errors, the scribe of Bodley 614 addresses a *caveat* to the reader (fol. 34r), warning that "these images are not to be drawn indiscriminately as they indicate certain positions of the stars in the sky and should therefore be carefully copied" (Saxl 1957, 199; Lippincott, *ad loc.*).

73 Among many others, see fol. 47r: *intem in cubituto*, and fol. 51r: *habens in capite stellam utramque pennam unam*.

74 As in other manuscripts, the total number of the stars given in the text (*omnino sunt...*) is often incorrect (Cancer: XVI instead of 18; Argo: XX instead of 21; etc.). Note that the positioning of stars is not always accurate (cf. Serpens in Ophiuchus: the stars *in secunda [scil. curuatura] caput versus habet stellas VI* are placed at the end of the tail).



Figure 13. *Constellation of the Scorpion*. Oxford, Bodleian Library, University of Oxford [2016], Digby 83, fol. 56r. England, ca. 1150 (© 2016 Bodleian Libraries. All Rights Reserved)

quinas), but it only has five in all (3 + 2) in the manuscript.⁷⁵ Remarkably, Digby 83 presents Bootes and *Draco inter Arctos* (fol. 44r) together in a single picture (see a similar formula in Baltimore, Walters Art Museum, W 734), and it gives an individual representation of the Pleiades and Hyades (fol. 48v) – unique within Hyginian iconography. Corona Borealis has ten stars, instead of nine in all other manuscripts, and Lepus has seven stars (instead of six), on account of an interpolation from the *Scholia to Germanicus* present in the text (*in extremitate caude unam*).⁷⁶ Pictures and text are in agreement for all but 18 chapters (the differences occurring in Ursa Maior, Bootes, Hercules, Cassiopeia, Perseus, Pegasus, Aries, Gemini, Cancer, Leo, Sagittarius, Capricorn, Aquarius, Pisces, Orion, Eridanus, Centaurus and Hydra), even when the text is corrupt or when

⁷⁵ See also New York, Spencer 28, fol. 43r and Freiberg, Andreas-Möller Bibliothek, XI.4.9, fol. 33r. Note that there is no similar mistake in the manuscripts for Virgo, that has two stars on each wing (*in utrisque pennis bina*).

⁷⁶ Cf. Milan, Ambrosianus T 47 sup. (also with 7 stars, but without the text of the scholia). The text for Canis Minor (*habet stellas tantum tres in ventre*) and the corresponding stars' position in the picture has, to the best of my knowledge, neither a parallel nor an explanation.

the number of stars differs from what we would expect.⁷⁷ However, the position of stars is definitely independent of readings in the manuscripts, as is clearly shown in the chapters on Gemini.⁷⁸ For Pegasus, the textual description is truncated, only mentioning the stars of the head (*in rostro stellae duas, in capite unam, in maxilla unam, in utrisque auribus singulas. Ita sunt omnino stellarum xvi*), but the asterization matches the standard positions, with the remarkable exception of the first four listed stars (*in rostro, in capite, in maxilla*) that are missing. The picture of Scorpio also demonstrates this (fig. 13). It is supposed to represent a crustacean with *in unaquaque earum [scil. chele] duas [...], in fronte stellas tres, in ventre duas, in cauda ii, in acumine [...] duas*.⁷⁹ For the constellation of Capricorn, adorned with 17 stars, the list of those stars is omitted.

Many stars listed in the text are missing in the pictures:

- Bootes - *sub ea [scil. mamma] alteram, in cubito dextro*
- Hercules - one of *in crure duas*
- Cassiopeia - *in quadrato, quo stella deformatur, una*
- Perseus - *in genu [scil. left] alteram*
- Aries - *in cervice, in cauda*
- Leo - *in posteriore [scil. pede]*
- Aquarius - stars missing on the left elbow, right foot; the *effusio stellarum* has not 30 stars but a golden line
- Pisces - the southern fish has 14 stars, instead of 17
- Centaurus - one of *inter scapulas iiiii*
- Lupus - *in posteriore pede primo una, in priore anterioris parte pedis unam*.⁸⁰

A mistake on the asterization of Cancer is due to the picture: the animal has three pairs of legs (instead of four) and the mixing of the claw and

⁷⁷ Virgo, for example, has only 16 stars, in agreement with the text (with only *in veste quinque*, instead of seven or ten).

⁷⁸ Castor in Gemini (fol. 54r) correctly stands on the right side and has 10 stars, but only five are listed in the text, one of which (*infra pedem*) is not marked: *in capite unam <in sinistro humero I, in dextro humero alteram, in utrisque mammis singulas, in dextro genu I,> in sinistro genu I, in pedibus utrisque singulas, et infra sinistrum pedem unam*.

⁷⁹ Other cases of stars marked although not listed in the text: Ursa Maior, with 10 stars on the head, instead of 9 (*septem in capite omnes obscuras, in utrisque auribus unam* [sic: usually *binas*]); 4 marking the rectangle on the body, but only 3 are mentioned (*in humero, inter scapulas, in crure*); Aries with 2 stars in excess, on head and shoulder (in other manuscripts one finds: *in capite, inter scapilio*); Orion with 3 stars, instead of 2 (*in zona duas*); Eridanus with 14 stars, instead of 13; Sagittarius with 3 unlisted stars on right hand, right elbow and the belly.

⁸⁰ Note that in Delphinus (*in ventre tres*) two golden dots are marked but there is a third pale dot close to them.

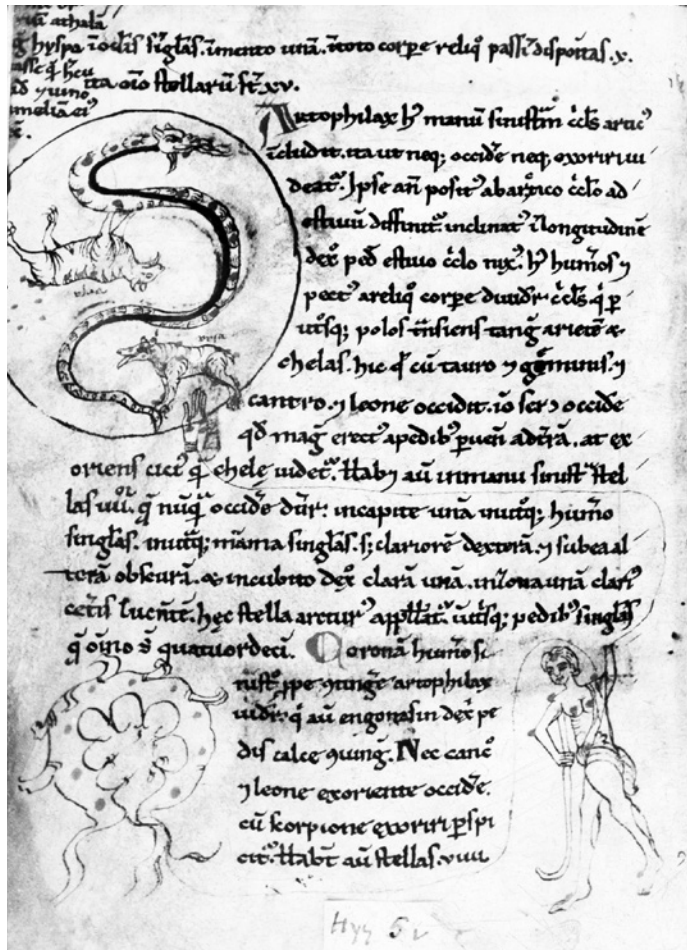


Figure 14. Constellation of Boötes and Draco inter Arctos. Baltimore, Walters Art Gallery W734, fol. 5v. Northern Italy or France, 1150-1200. (© 2017 Walters Art Museum)



Figure 15. Constellations of Boötes and Corona Borealis. Leiden, GRO 21, fol. 55r. France, 1180-1220 (with permission of Universitaire Bibliotheken Leiden)

the first leg leads to the omission of some stars.⁸¹ But, in Auriga, the error in the positioning of Heduli (two stars on the right shoulder instead of *in utroque humero unam*) has no rational explanation. The stars of Hydra are, as usual, differently clustered in the text (3-6-3-3-2-9 = 26) and in the picture (3-3-8-2-9 = 25).

3 Baltimore, Walters Art Museum, W 734

The Walters W 734 manuscript is in poor condition, and the text is often difficult to read (especially for Pegasus and Hydra) and some pictures are hard to analyze properly (Andromeda, Delphinus, Pisces, Eridanus).⁸² The positioning of the stars in this manuscript reflects in general the text. It is noteworthy that the Serpent of Ophiuchus is deprived of stars, despite the list given in the text. Also, the pictorial model for Sagittarius (as a biped satyr) is very rare, and unique in our corpus.⁸³ The manuscript presents other peculiarities in the details of various constellations (Gemini, Leo, Scorpio, Cetus, Argo, Centaurus, as well as the lack of a list of stars for Lupus, with no stars marked on the picture either).⁸⁴ The most striking anomaly concerns Orion, which is deprived of stars on the head in both text and pictures: *Hic habet iii claras in utrisque humeris singulas* (instead of *Hic habet in capite stellas iii claras, in utrisque humeris singulas*). This feature appears elsewhere only in Cambrai 993. Also, Corvus is marked by 9 stars instead of 7, in accordance with the text (*Corvus autem habet in gutture stellam i, in pennis ii, infra pennam ii, ad caudam versus ii* [instead of: *infra pennam ii ad caudam versus*], *in utrisque pedibus singulas. Omnino VII* [sic]), which also appears in Cambridge, Fitzwilliam 260.

But there are also other discrepancies: stars are listed in the text and missing in the picture (Andromeda, Gemini, Cancer, Virgo); stars are wrongly positioned on the pictures (Ophiuchus, Cancer, Sagittarius); and additional stars have been added (Perseus: on the right knee as in the conventional depiction (*ad genu unam*), but not listed in the text; Scorpio: on the body). These particular discrepancies are rather rare, and it can-

⁸¹ Note that the picture of Virgo is deprived of wings, but the corresponding stars are placed on the forearm.

⁸² We assume that a stain is responsible for the fact that Canis Minor seems to have four stars, instead of three (*omnino est stellarum iii*).

⁸³ The corrupt text mentions a *Cornua* (instead of *Corona*), but the satyr has no horns and the seven listed stars of Corona Australis are not marked anywhere.

⁸⁴ See, for instance, the corrupt but consistent text for Leo carrying 2 stars on the paw (instead of one) and none on the belly (instead of 2): *in pede priore unam claram* [in ventre claram unam] *et infra alteram magnam*; or the text for Scorpio, whose picture is deprived of the two stars on the sting: *in cauda V, in acumine ipso quo percutere existimatur <II>*.

not be ruled out that the ‘star-positioner’, who probably had an illustrated model at his disposal, did check and follow the text. Nevertheless, the original and fascinating picture of Bootes (fig. 14) provides evidence of a particular attention being paid to Hyginus’ description of the figure: the left hand of Arctophylax is disconnected from the body and placed inside the circle, where Draco inter Arctos lies, following the opening sentence of the chapter (*Huius manum sinistram circulus arcticus includit ita ut neque occidere neque exoriri videatur*); but there is another line that connects his left shoulder with the picture of Corona Borealis, standing for the opening sentence of the following chapter on that constellation (*Coronam humero sinistro prope contingere Arctophylax videtur*), both text and pictures appearing on the same page.⁸⁵

4 Leiden, Bibliotheek der Rijksuniversiteit, Gronovius 21

The Leiden manuscript, Gronov. 21, illustrates only five constellations (Bootes, Corona Borealis, Hercules, Lyra and Cygnus). Cygnus is incomplete (two parallel lines with two stars), and the other four are rough sketches. Bootes and Corona Borealis are duplicated, appearing both as drawings of a figure marked with stars (open circlets) and as a similar pattern of stars but without the line of the body (fig. 15). The positioning of the stars is correct (Corona Borealis seemingly having nine stars on one of the drawings), and one can only regret that such a promising setting was not continued for the other constellations.

5 Vatican, Biblioteca Apostolica Vaticana, Vat. Lat. 3110

As far as pictures are concerned, Vat. Lat. 3110 is very close to Florence, BNC, Magliabechi XI.114.⁸⁶ In both cases, the pictures generally agree with the text,⁸⁷ especially if we take into account some probably simulta-

⁸⁵ Lippincott 2006.

⁸⁶ Rather than with New York, Spencer 28 as suggested by Alexander 1994, 120: “The positions and movements of the figures in the copy of the Hyginus illustrations at New York Public Library almost invariably correspond to similar ones in this manuscript”.

⁸⁷ Note that for Perseus the picture showing only one star close to the knee agrees with the text (*in dextro femore [unam] ad genu unam*). This also appears in Milan, Trivulziana N 690; New York, Spencer 28; Freiberg, Andreas-Möller Bibliothek, XI.4.9; Oxford, Bodley Canon. Class. Lat. 179 and Pavia, Aldini 490. Similarly, Sagittarius has a star on the thumb (*pollex*) and not on the thigh (*poples*), in agreement with the text (*in pollice unam*).

neous marginal corrections.⁸⁸ The placements are not random, but some stars are incorrectly placed:⁸⁹

- Ursa Maior - the star *in summo interscapilio I* does not figure on the back but rather on the scapula
- Cancer - the five stars of the *Chelae - in ea quae chela dexterior dicitur, tres similes, non grandes; in sinistra similes II* - are in front of the head and not on the claws
- Pegasus - the star *in umbilico* is missing or misplaced above the neck, far from the figure itself.

The star-positions on Serpens (in Ophiuchus) and Hydra are wrong as well, and imply errors in the star numbers. While the standard Hyginian sequence of stars is given in the text (Serpens = 2-4-2-5-4-5 [= 22]; Hydra = 3-6-3-4-2-8 [= 26]), the stars are marked with different groupings (Serpens = 2-3-8-6-4 [= 23]; Hydra = 0-9-6-3-5 [= 23]). Except for Ophiuchus (an additional star on Serpens) and Gemini, all discrepancies in the number of stars result from missing stars in the pictures (in Ursa Maior, Cassiopeia, Andromeda, Serpens in Ophiuchus, Aries, Gemini, Virgo, Argo and Hydra):⁹⁰

- one star on Cassiopeia's leg (only two for *in sinistro femore duae, in genu I*)
- one on Andromeda's arm (*in bracchio unam*)
- one on Serpens' head (*sub capite IIII*)
- one on Virgo's left foot (*in utrisque pedibus*)
- three on Hydra's body

A more blatant mistake marks the Aries picture, where three stars are missing on the neck (*in cervice 3*), and Gemini, where there is one additional star in Pollux' left hand (right Twin) and three missing stars in Castor, including the famous Propous (*in dextro [scil. humero] alteram, in sinistro genu alteram, infra sinistrum pedem i quae tropus [sic] appellatur*). Even though mistakes are not numerous, it is difficult to assume that the 'star-positioner' read the manuscript. This is especially clear in the chapter on Argo, where the illuminated ship is marked with 19 stars, while the list mentions *twice* three stars on the mast, which are absent from the picture (*Haec habet in puppi < IIII, > ad singula gubernacula ad primum stellas 5, ad malum 3, ad alterum 4... sub reiectu 5, ad malum 3*).

⁸⁸ See the marginal additions for Leo (fol. 73r: *interscapilio tres, in media cauda unam*) and Cassiopeia (fol. 68r: *in pede ipsius dextro unam*). See also Centaurus (fol. 77r: *equino*).

⁸⁹ Contrary to what is claimed in Dolan 2006, 330.

⁹⁰ The stars on Ursa Maior's head are erased but probably less than eleven.

6 Firenze, Biblioteca Nazionale Centrale, Magliabechi XI.114

The unfinished Magliabechi XI.114 has only ten pictures, which match the text almost perfectly.⁹¹ If one allows for a corrected lateral re-orientation in Ophiuchus and Serpens, the only error is the addition of a sixth star on the middle of Serpens (*ad ipsam corporis coniunctionem* 5).⁹² The description of the stars of Taurus matches the depiction as long as we take into account a marginal gloss that completes the text (*Praeterea in sinistro genu priore habet stellam unam*).

7 Vatican, Biblioteca Apostolica Vaticana, Vat. Lat. 3109

Vat. Lat. 3109 offers two complete albums of constellations (fols 33r-50r and fols 53r-68r),⁹³ but only the first set is partially accompanied by a text (fols 32r-34v), corresponding to the Hyginian description of five constellations (Draco, Bootes, Corona Borealis, Hercules and Lyra). Only one picture (Bootes) appears wrongly marked, with two misplaced stars on the top of the arms (*in utraque mamma singulas*) and a missing star supposed to be under the star in the right chest (*sub ea [scil. in mamma] alteram obscuram*). The asterization of the pictures, which was completed before the text was written, could not have been based on the text, and the total number of stars suggests several mistakes (Ursa Maior, Bootes, Hercules, Andromeda, Auriga, Ophiuchus, Sagitta, Pegasus, Triangulum, Aries, Taurus, Gemini, Cancer (with seven pairs of legs), Scorpio, Sagittarius, Capricorn, Aquarius, Eridanus, Canis Maior, Centaurus, Hydra and Piscis Austrinus). Sagitta, Triangulum, Corvus and Crater are deprived of stars.

8 Milan, Biblioteca Ambrosiana, T 47 sup.

As far as star-positions are concerned, Ambrosiana T 47 sup. is close to Oxford, Bodleian, Canon. Class. Lat. 179. It usually gives a bigger size to stars qualified as *magna* (except for Aquarius on fol. 57r), but not to stars described as *clara* (see Hercules, fol. 49r and Gemini, fol. 54v). It

91 The textual description is missing for Auriga, but this picture of 7 stars is never mistaken in the corpus (except in Vatican, BAV, Vat. Lat. 3109 and Reg. Lat. 123). Note that the drop capitals are missing from the text.

92 The same addition occurs in Siena L.VI.25; Milan, Ambrosiana T 47 sup.; Oxford, Bodleian, Canon. Class. Lat. 179.

93 Note that style and postures are very different in both sets (cf. fols 40-41r vs fols 58v-59r), and the asterization is independent: Cepheus has no stars on the knees in the first series (fol. 35r) and two in the second one (fol. 53r).

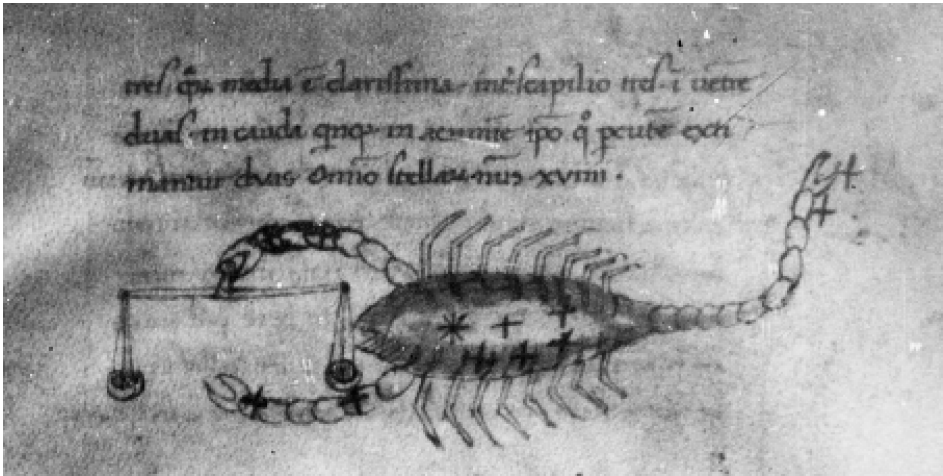


Figure 16. *Constellation of Scorpion*. Milano, Biblioteca Ambrosiana T 47 sup., fol. 56r. Italy, 1425-1450 (with permission of the Biblioteca Ambrosiana)

appears that the asterization of the pictures and possibly the execution of the pictures themselves (as is more clearly the case with Vat. Lat. 3109; Oxford, Bodleian, Canon. Class. Lat. 179 and Digby 83) was certainly performed after the text was written, since some stars partially cover letters of the text (see for example fol. 49r and fol. 50v). The illuminator has not followed the text, however – as is demonstrated by the picture of Bootes showing 2 stars on the belly, which is omitted in the text (corresponding in the tradition to *in utraque mamma singulas*), and missing a star on the chest, which is duly listed in the text (*et sub ea [scil. in humero] alteram obscuram*). The impact of the pictorial tradition is evident in many details, such as in Cassiopeia, where the star *in lumbis* is placed on the genitals,⁹⁴ and the 4 stars of the throne are placed correctly in spite of the flawed text (*in <angulis> utrisque <singulae> clarius ceteris lucentes*). This is also the case for two other constellations where the number of stars is missing in the text but is correct in the picture.⁹⁵

In general, the positioning is very inaccurate (fig. 16),⁹⁶ even on the simpler constellations, such as Sagitta, with one star in the middle and

94 Oxford, Bodleian Digby 83 (for Cassiopeia, Perseus and Ophiuchus) or Vatican, Urb. Lat. 1358. Same placement of the stars *in lumbis* for Aquarius in this ms.

95 Orion with 3 stars on belt and 3 on sword (*in zona <tres> in eo quo gladius... tres*); Hydra: *in quinta usque ad caudam <novem> omnes obscuras*.

96 See Sagittarius, where the star marked on the shoulder might be the star *in pollice* (that is 'on the thumb' of the right hand); or Perseus, having a star on the thigh (*femur*) instead of the calf (*tibia*); or the disposition of the stars of Scorpio (fig. 13).



Figure 17. *Constellation of Cepheus*. Milano, Biblioteca Trivulziana, N 690, fol. 7r. Padua, 1460 (with permission of the Biblioteca Trivulziana © [2016] Saporetti Immagini d'Arte)

one on the tip (as in Oxford, Bodleian, Canon. Class. Lat. 179), instead of *duae reliquae in eo loco quo ferrum solet affigi*. Overall, there are 33 missing stars and 6 additional stars in the pictures of Bootes, Lyra, Cassiopeia, Andromeda, Perseus, Ophiuchus, Pegasus, Taurus, Gemini, Cancer, Scorpio, Sagittarius, Capricorn, Pisces, Lepus, Canis Maior, Canis Minor, Argo, Centaurus and Hydra.⁹⁷

Some omissions are common:

- a star in the chest of Bootes
- *in mediis* in Lyra
- *in dextro genu* in Castor, etc.

The other missing stars are:

- Cassiopeia - one *in sinistro femore*
- Andromeda - *in brachio*

⁹⁷ In Aries, the three stars *in cervice* might be marked, but the ram's neck is abundantly curled and the area very darkened.

- Perseus - one *in tibia [scil. dextro]*
- Taurus - left eye of *utrisque oculis singulas*
- Gemini for Castor - *in dextro genu, in sinistro humero*
- Cancer - one on each foot: *in sinistro pede duas primo, in secundo duas obscuras*
- Scorpio - *in cauda quinque*
- Sagittarius - *in pollice unam*
- Capricorn - one of *in ventre septem*
- Pisces - two on the cord
- Canis Maior - one of *in cauda quatuor*
- Argo - one of *ad malum quatuor*
- Centaurus - one *in lumbo equino*
- Lupus - 3 stars corresponding with *in interscapilio unam claram et in priore parte pedum unam, infra alteram*
- Hydra - *in capite stellas tres.*

There are also some additions:

- a sixth star *in dorso Anguis ad ipsam corporis coniunctionem quinque*⁹⁸
- a star on the left hand of Pollux⁹⁹
- a third star to the left claw of Cancer.¹⁰⁰

The illuminator is surprisingly careless and makes very unusual mistakes. He misses as many as 4 noteworthy stars in Pegasus (*in capite unam, in humero claram unam, in umbilico novissimam unam, in pectore unam*) and enriches small constellations - such as Lepus (3 stars) with an additional star above its shoulders, and Canis Minor with 5 stars (one on each of its hind feet), instead of 3 (*omnino stellarum trium*).

9 Milan, Biblioteca Trivulziana, N 690 (E. 83)

The Trivulziana N 690 manuscript displays fine pictures,¹⁰¹ where ink dots were first marked and then painted in gold. As a result, some dots appear black, red (indicating the underlying adhesive boll) or golden, while others were missed by the man in charge of the final application of the gold. The situation is made even more complex by the fact that the person who first

⁹⁸ Siena L.VI.25; Vatican, Urb. Lat. 1358; Florence, Magl. XI. 114 and Oxford, Bodleian, Canon. Class. Lat. 179.

⁹⁹ Pavia, Aldini 490; Oxford, Bodleian, Canon. Class. Lat. 179 and Vatican, Vat. Lat. 3110.

¹⁰⁰ Pavia, Aldini 490; Oxford, Bodleian, Canon. Class. Lat. 179.

¹⁰¹ It shares some iconographical patterns with the Cambridge, Fitzwilliam 260 (especially Gemini and Argo), but is different for other pictures (e.g.: Capricorn and Scorpio).

marked the positions of the stars with dots intended to function as ‘placeholders’ also added dots as a decorative feature within the constellations (such as Cepheus, Perseus and Auriga). As a result, when the artist came to add gold to the stars, there was ample scope for misinterpretation (fig. 17). For example, Cepheus is marked by 31 dots (!) all properly illuminated with gold, but some of them (one of the two on the right elbow) are not stars (*in cubito unam*); and some of the listed stars are obviously missing (*in sinistro humero, in dextro humero*).¹⁰²

Whereas occasional agreements between the asterization and the manuscript could be cited as evidence of a close reading on the part of the illuminator (such as in the chapter on Delphinus [fol. 15v]),¹⁰³ the sheer number of discrepancies between text and illustration clearly dispels such a hope. The frequent misplacement of stars in this manuscript appears to be the result of the artist’s rather casual attitude to a pictorial model.¹⁰⁴ The star disposition in Capricorn is inaccurate with six stars on the belly (*in ventre VII*), eight on the neck (*in interscapilio VII*) and one on the breast (*in pectore duas*). The asterization of Aquarius seems to mix different traditions, with an additional star on the tibia, a missing star on the hip (*in lumbo interiore*) and two stars not placed on the hands, as the text stipulates (*in utrisque manibus singulas*), but on the breast (following another reading: *in utrisque mammis singulas*).¹⁰⁵ Considering the major mismatches, at

102 It could be the reason of the confusing additional star on Perseus’ head (fol. 11r), and probably of the confusion in the asterization of Aquarius (fol. 25r). See also Eridanus, who has an unwarranted golden dot above the right breast. Conversely, one small dot on the left hand of Sagittarius (fol. 23v), corresponding to *in manu priore unam*, seems to have remained unnoticed. Besides, some pictures are damaged, making quantifiable analysis of the stars difficult (as for Piscis Austrinus, with 12 stars instead of 13, the missing one possibly hidden by a *macula*, fol. 33v).

103 It has two stars placed *vertically* on the cheek, corresponding to *supra caput ad verticem duas alias* (instead of *ad cervicem versus duas*). Andromeda (fol. 9v) has only one star on the arm, in accordance with the variant manuscript reading *in sinistro cubito vel in brachio unam* (instead of *in sinistro cubito I, in brachio I*).

104 See Cancer, where the stars of the *chela*e are placed in a line in front of Cancer and not on the claws (similar to Vatican, Vat. Lat. 3110) and Leo has three stars on the chest (corresponding to *in scapulo tres*). In Scorpio, the three stars *in fronte* are placed in a line on one side of the shell, and the five stars *in cauda* are not marked with gold, but probably indicated by the little inky marks, which went unnoticed by the person in charge of highlighting the dots with gold. In Pegasus (fol. 16v), the horse has three stars on the left knee and one on the right knee (instead of two on each) due to an imprecise transposition from the model; in Taurus (fol. 18r), the star *in pectore* forms a square on the shoulder with the *interscapulo tres*; in Virgo (fol. 22r), one of the seven stars of the dress is misplaced under the right elbow; in Hydra, some stars of Crater and Corvus have been misplaced on to the body of Hydra.

105 See e.g.: Vatican, Vat. Lat. 3110. Argo probably represents a similar case (with two unlisted stars on the prow, and no stars on the mast, despite the descriptor *ad malum IIII* in the text). See also Cambridge, Fitzwilliam 260.

least 13 (and probably 15) pictures fail to agree with the star lists in the manuscript, either with missing or additional stars (Hercules, Cepheus, Perseus, Pegasus, Aries, Taurus, Gemini, Sagittarius, Capricorn, Aquarius, Orion, Centaurus, Argo, Hydra and Piscis Austrinus). The stars of Pegasus are difficult to identify: two are clearly missing (*in humero claram unam, in pectore unam*), two probably misplaced (*in scapulo unam, in umbilico novissimam unam*, marked on the wings and above the neck) and one from the group of *in cervicibus quatuor obscuras*. One star is missing in Taurus (*in fronte mediam unam*), and four are missing in Aries (*in cauda unam, in cervice tres*). Pollux in Gemini has one unlisted star on each hand and Castor has two missing stars (*in sinistro humero, in dextro genu*). In Sagittarius, at least five stars are missing (*in arcu duas, in ventre unam, in scapilio duas*).¹⁰⁶ There is also one missing star in Centaurus,¹⁰⁷ two in Orion (on the hand and on the sword) and eight in Hydra.

10 Cambrai, Bibliothèque Municipale, 993

The positions of the stars in Cambrai 993, whose text appears to be often corrupt, are not congruent with the text.¹⁰⁸ In some cases, the absence of stars might reflect pictorial constraints¹⁰⁹ and the choice of the 'star-positioner' not to place stars on any hidden parts of the body.¹¹⁰ For Orion (fol. 38r), there are three stars on the shoulders (instead of two) and none on the head (instead of three), but this only partially matches the corrupted text: *Hic habet <in capite stellas> tres claras: in utrisque humeris singulas*.¹¹¹ In general, it seems safe to conclude that the discrepancies

106 There is probably a dot marking the star *in manu priore unam*. The star *in pollice unam* (for *poplite*) could be the second star on the left hoof; there is an additional star on the armpit.

107 In fact, two stars are missing on the hindfeet (because *in poplitibus singulas* logically though implicitly refers to hindfeet) half compensated by one additional star on the right front foot.

108 In spite of some striking and original agreements, such as in Perseus where 2 stars are missing (16 instead of 18) both in text and picture: *<in ventre stellam unam, ad genu unam>*; or in Gemini, where 2 stars are missing for Castor *<in dextro humero alteram, in dextro genu I>*; or in Cetus with 7 stars in the belly instead of 6 (*sub ventre septem*).

109 Argo has only one oar instead of two (theoretically marked with stars) in Cambrai 993, as also occurs only in Cambridge, Fitzwilliam 260.

110 In Draco, two stars are missing on invisible parts of the snake's body (left temple and eye), as in Ursa Maior (the ears), or in Bootes, where the left hand hidden by the shield is not marked (*in manu sinistra stellas quattuor*).

111 Exactly the same text and the same placement appear in the Baltimore, Walters Art Museum, W 734.

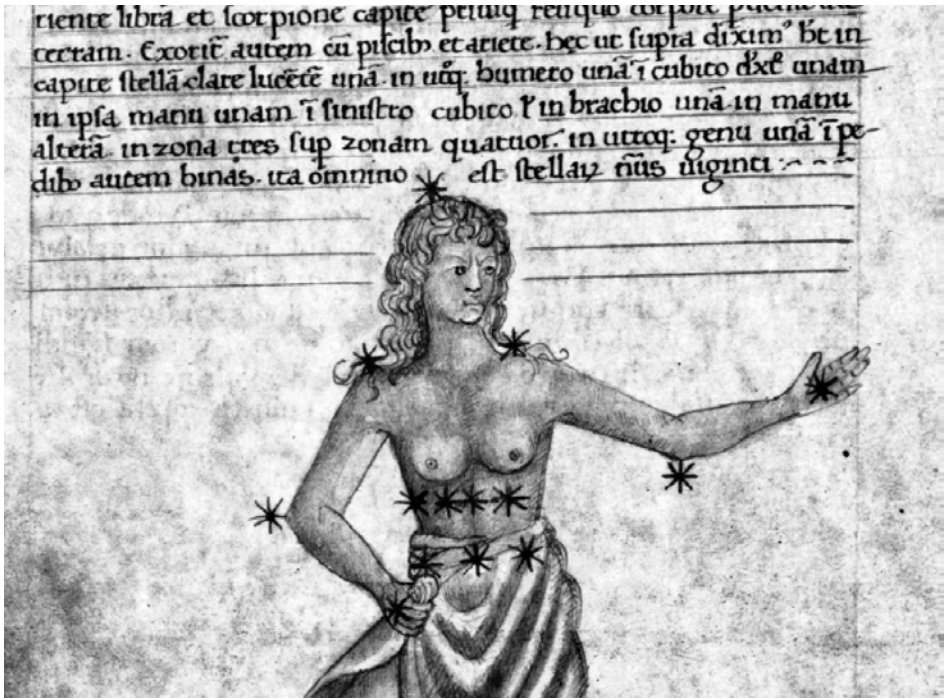


Figure 18. Constellation of Andromeda. Oxford, Bodleian Library, University of Oxford 2016, Canon. Class. Lat. 179, fol. 35r. Ferrara, 1460-1470 (© 2016 Bodleian Libraries. All Rights Reserved)

between text and image are so numerous and diverse that it rules out both strategy and occasional accident. For the larger constellations, both the description and the star-markings are hopelessly muddled (cf. Argo, Hydra and Scorpio).¹¹² The usual repartition of the stars on Hydra is from head to tail within five curves, as it is precisely outlined in the text (fol. 43v: 3-6-3-4-2-8), but the distribution of the stars on the picture is 0-8-4-3-5-0. In most cases, stars are missing – especially for Pisces (17 stars marked among 29 listed, and instead of 41, which is the usual total for the

¹¹² Compare edited text for Scorpio (*Hic habet stellas in his, quae Chelae dicuntur, in unaquaque earum binas, e quibus primae sunt clariores; praeterea habet in fronte stellas III quarum media est clarissima, in interscapilio III, in ventre II, in cauda V, in acumine ipso, quo percutere existimatur, II*) with the manuscript text of Cambrai 993 (fol. 31r): *Hic habet stellas in his, quae Chelae dicuntur, in unaquaque earum binas* [4 stars marked in front of the head], *e quibus primae sunt clariores; praeterea habet in fronte stellas III quarum media est clarissima* [only one star], *Interscapilio (sic) III* [three stars on the body], *in ventre II* [four stars], *in cauda V* [five stars], *in cacumine (sic) ipso, quo percutere existimatur*.

constellation). But in five pictures (Aries, Leo, Sagittarius, Aquarius and Centaurus), there is an additional star, which is not listed in the text. Apart from some conversions between right and left (in Hercules, Andromeda and Ophiuchus), or between hind- and forefoot (Leo), and the absence of a picture and its stars for Corona Austrina (although the text mentions it: *Corona autem Centauri est stellarum VII*), there are substantial discrepancies for 17 constellations (Draco, Ursa Maior, Bootes, Hercules, Andromeda, Pegasus, Ophiuchus, Aries, Taurus, Leo, Sagittarius, Aquarius, Pisces, Orion, Argo, Centaurus and Hydra). There is a clear disconnection between text, pictures and stars, but oddly it is the only manuscript to share the astronomically correct reading for Castor with Vatican, Reg. Lat. 123. In both cases, the figure is exceptionally situated on the right of the picture and has one star on each breast (*in utrisque mammis*) and not one star on each hand (*manibus*) as appears in all other manuscripts.¹¹³

11 Oxford, Bodleian Library, Canon. Class. Lat. 179

The Bodleian manuscript, Canon. Class. Lat. 179, is close to Milan, Ambrosiana T 47 sup. in its pictures,¹¹⁴ and its often corrupted text¹¹⁵ seems to have been written after the drawings.¹¹⁶ The sequence appears to have been that the “*régleur*” set out the proportions of the page and, in some cases, ruled the lines (see fol. 40v), and then the *pictor* probably drew the pictures and marked the stars, before the *scriptor* added the text: witness the fact that the text sometimes bridges a blank left by the “*régleur*” in the middle of a line for a special shape (generally the head of the figure), and by the fact that the *scriptor* seems to have avoided a star stepping over the line (fig. 18).

The folios have been misassembled,¹¹⁷ and there are numerous mistakes and various misplacements in the stars. In Ursa Maior, the ‘star-positioner’ failed to mark three stars on the tail (*in cauda ipsa tres*), and two (α , δ

113 Note that text and picture are missing in Oxford, Bodleian, Canon. Class. Lat. 179 for Gemini, and that the text is missing in Oxford, Bodleian, Digby 83 (without a star either on the hands or the breasts). In Florence, BNC, Magliabechi XI. 114, there is no picture, but the text is *manibus*.

114 Compare e.g.: pictures of Ophiuchus and Cancer in both manuscripts.

115 Apparently the scribe did not read Greek, leaving a blank on fol. 28r for χορευταί (*reliquae autem duae – dicuntur*); cf. linguistic blunders, such as *stellam urnaso* (fol. 30v), for *in naso*; etc.

116 As in Oxford, Bodleian, Digby 83; Vatican, Vat. Lat. 3109 and, probably, Milan, Ambrosiana T 47 sup.

117 See the sequence: Draco, Bootes (fol. 28v), Hydra (fol. 29r), Piscis Austrinus (fol. 29v), Sagittarius (fol. 30r) and Capricorn (fol. 30v).

UMA) of the brightest and most significant stars of the square (*in humero claram unam, in summo interscapilio unam*). In Draco, the text matches the star placements, with the shared omission of two stars (<*in oculis singulas*>); but in Bootes, the picture displays two stars on the breast, which are missing in the text (<*in utraque mamma singulas*>), and omits one listed star on the chest (*sub ea alteram obscuram*). Lyra has only 8 marked stars although nine are listed in the text, and there are missing stars in:

- Cassiopeia - one among *in sinistro femine duas*
- Andromeda - *in brachio unam*
- Pegasus - *in capite unam, in humero claram unam, in pectore unam*
- Aries - *in cervice tres*
- Cancer - two on the legs
- Capricorn - one of *in ventre septem*
- Sagittarius - one among *interscapilio duas, and in pollice unam*
- Canis Maior - one among *in cauda quatuor*
- Centaurus - *in prioribus poplitibus utrisque singulas, in lumbo equino unam*
- Hydra - *in capite stellas tres.*

Extra stars appear in:

- Ophiuchus¹¹⁸
- Cancer - on left claw
- Centaurus - on the belly
- Argo - three in the bow.¹¹⁹

In sum, many of the stars appear to have been loosely copied from a pictorial model and haphazardly placed.¹²⁰

118 Six instead of five stars in Serpens (*in dorso Anguis ad ipsam corporis coniunctionem quinque*). Note that the posture of Ophiuchus and star numbers and misplacements are identical in Milan, Ambrosiana T 47 sup. and Florence, BNC, Magliabechi XI.114.

119 There is a possible influence of *De signis caeli* here, especially for Argo (*habet stellas in anteriori parte navis quatuor*), since in Hyginus' tradition the ship is constantly said to be deprived of bow (*Astr. II.39: divisa enim est a puppi usque ad malum*).

120 See e.g.: the shoulder stars (*in humero*) in Cepheus are misplaced on the breast (fol. 34r); the right thigh stars (*in dextro femore*) of Hercules are marked vertically below the waist and between the legs, rather than on the pubis (fol. 37v); the belly star (*in ventre*) of Sagittarius is placed on the chest; the back star (*interscapilio*) of Lupus is marked on the belly; and the succession of stars in Hydra is 9-6-3-5.

12 Vatican, Biblioteca Apostolica Vaticana, Urb. Lat. 1358

Urb. Lat. 1358 is very close to Pavia, Aldini 490, both placing the four stars of Bootes on the right hand (instead of the left, as all other manuscripts do).¹²¹ Many decorative or accidental marks around the figure, as well as the placement of some stars out of it, make counting the stars extremely difficult (especially in Hercules, Cygnus, Aries, Taurus, Piscis Austrinus and Argo).¹²² Urb. Lat. 1358 shares ten errors with the Pavia manuscript and as many distinctive omissions or additions. In five cases, stars are omitted in both manuscripts, which share exactly the same description:

- Lyra - 7 marked, but 9 listed¹²³
- Aries - the three stars *in cervice* are missing,¹²⁴ and the three stars *in cornibus* are shown on the border of Triangulum
- Castor in the Gemini - *in dextro genu alteram, in sinistro humero unam*
- Hydra - *in capite tres*
- Argo - the three stars on the mast (also missing in the Pavia, Aldini 490) are not misplaced on the bow, but have been omitted.

In five cases, additional stars appear in both manuscripts:

- Ursa Maior has a second star on the shoulder (*in humero claram unam*)
- Andromeda has four stars above the waist, despite the lack of the corresponding section in the text (< *supra zonam quatuor* >)
- Ophiuchus has a star on Serpens (six *in coniunctionem v*)¹²⁵
- Pisces has two extra stars on the cord

121 See Blume, Haffner, Metzger 2016a, 617: “Ob es sich indessen bei der Aldini Handschrift und dem Urbinas 1358 um direkte Abschriften oder um Schwesterhandschriften handelt, bleibt noch zu klären”. Apparently, the distinctive mistakes of each manuscript suggest that they derive from a common model, rather than one from the other. Note that Aldini 490 might have been written in Florence, as was Urb. Lat. 1358.

122 Hercules has unidentifiable marks on the hip, on the right hand, and on the foot, and some apparently duplicated dots (one empty circler and one black dot overlapping); Cygnus has one dot on each wing, under the line of five, which are probably not stars (but considered as such by Lippincott in her description of the manuscript); Aries has two dots far above the rump of the ram, which could be stars (counted as such by Lippincott); Taurus apparently has an eighth star above the nose near the Pleiades; Argo’s hull is very dark, there is a clear and regular dot above the stern and another one on the bow.

123 The missing stars are probably *in scapulis ipsius testudinis ii*, but the technical terminology for Lyra’s parts must have been confusing for many.

124 Note that in the text there is a blank after *in cervice*, where the number of stars should have been mentioned.

125 Serpens’ textual sequence is 2-3-2-5-4-6 (22); and the pictorial sequence is 2-3-2-6-6-4 (23).

- Lepus has a star above the hare's back (as in the Ambrosiana manuscript, T 47 sup.), which is probably due to a conflation with Pseudo-Bede's catalogue (*in dorso nitidam unam*).

Some omissions are unique to Urb. Lat. 1358:

- Draco - one star on the body
- Cassiopeia - one in *in quadrato*
- Andromeda - *in brachio unam*
- Pegasus - one among *in cervicibus quatuor*
- Centaurus - *in manu unam, in medio pectore equino unam*
- Lupus in Centaurus - one star in only nine on the body.

Besides, various figures have additional stars, not listed in the text:

- Bootes - one on the left arm
- Cassiopeia - on the breast
- Sagittarius - two on the bow
- Cetus - one on the second curve
- Canis Maior - one on the hind feet
- Pisces - two near the tail.

The picture of Cancer is particularly unsound, with 18 stars marked (while only 15 are listed)¹²⁶ and in a great disorder - either before the head (whereas they are supposed to be on the claws or on the mouth) or unusually distributed on the five pairs of legs.

13 Pavia, Biblioteca Universitaria, Aldini 490

As mentioned above, Aldini 490 is almost the twin of Vatican, Urb. Lat. 1358 in both its illustrations and text. The text of the latter is slightly better,¹²⁷ while the Pavia, with illuminated drop caps and golden dots as stars, is slightly more deluxe. They share some peculiarities¹²⁸ but many of the omissions in the illustrations occur only in the Pavia manuscript:

- Ursa Minor - one star on the right foot

126 Part of the regular text is missing: < *in sinistro pede primo II, in secundo II obscuras* >.

127 According to Blume, Haffner, Metzger 2016a, 616, the Pavia manuscript is dependent on the Vatican manuscript, Urb. Lat. 1358.

128 Perseus' hands and feet are reversed (*in sinistra manu, quod gorgonis caput vocatur* = right hand; *in sinistro femore ad genu unam* = right leg), as well as Auriga's (*in manu duas* = right hand instead of left one) and Orion's (*in cubito dextro* = on the left elbow). Note that 44 dots are marked in Corona Borealis, but only 9 (a little bigger and regularly placed) can be considered as stars. In Urb. Lat. 1358, the exterior of the crown is decorated with circlets as well.

- Hercules - two stars missing on the lion's skin
- Cepheus - *in cubito unam*
- Andromeda - *in sinistro cubito vel in brachio unam*
- Ophiuchus - *in sinistra manu tres*
- Pegasus - *in umbilico novissimam*
- Aquarius - *in capite duas, in lumbo interiore unam*
- Orion - *in zona tres*
- Crater - *ad fundum duas.*

In four other cases, stars are omitted in both manuscripts, which share exactly the same description:

- Lyra - 7 stars are marked, but 9 listed
- Aries - the three stars *in cervice* are also missing, and the three stars *in cornibus* are in fact on the edge of Triangulum
- Castor in Gemini - *in dextro genu alteram, in sinistro humero unam*
- Hydra - *in capite tres.*

In four cases, additional stars appear in both manuscripts:

- Ursa Maior - a second star in the shoulder (*in humero claram unam*)
- Andromeda - four stars above the waist, despite the lack of the corresponding section in the text (< *supra zonam quatuor* >)
- Serpens - one additional star (six *in coniunctionem v*)
- Pisces - two additional stars on the cord
- Lepus - an additional star above the hare's back (as in Ambrosiana T 47 sup.).

Three other additions occur only in Pavia, Aldini 490:

- Cancer - three stars
- Gemini - one star on the right arm of Pollux
- Cetus - a seventh star on the belly (*sub ventre sex*).¹²⁹

In addition, some stars are slightly misplaced, especially in Virgo, Pegasus and Sagittarius. The star disposition of the stars in the four legs of Cancer does not match the description in the text, and also differs from the placement of the stars in the five legs of Cancer in Urb. Lat. 1358.¹³⁰ The three stars *ad malum* in Argo have been transferred to the bow.

¹²⁹ In Sagittarius, the mark on the right cheek is probably not a star (as e.g.: in Eridanus and Orion).

¹³⁰ The textual description is 1-1-1-1 (right), 2-2-1-1 (left); the picture in Aldini 490 has 1-1-2-1 (right), 2-2-1-1 (left). The Vatican manuscript has 1-1-1 (right), 2-1-2 (left).

14 Siena, Biblioteca comunale degli Intronati, L.VI.25

Siena L.VI.25 is a remarkable manuscript, with some apparently unique readings,¹³¹ and only five instances where the pictures differ from the text.¹³² Unfortunately, three folios are missing¹³³ and one folio is misbound,¹³⁴ so only 33 constellations can be checked. Some additions (*in margine* or *supra lineam*) agree with the actual asterization found in the pictures.¹³⁵ *Serpens* (*Anguis*) in *Ophiuchus* has only three stars on the head instead of five (*in summo capite stellas duas, sub capite tres*) and six instead of five on the back. Other mistakes concern zodiacal constellations: *Aries* has seven stars in the head, while only five are listed (*in capite unam, in utrisque¹³⁶ cornibus tres <in cervice II>*); and a similar situation occurs in the chapter on *Pisces*, where six stars are listed, and 13 are marked instead of the conventional dozen (*Coniunctio eorum habet ad aquilonem spectantes stellas tres, <ad alteram partem III, ad exortum III,> in commissura tres*). Two additional stars appear on the human right scapula and the left flank of *Sagittarius*, and the single star in the right wing of *Virgo* is probably due to a misunderstanding and the assumption that *Protrygeter* was distinct from the wings stars (*quarum una quae est in dextra penna ad humerum defixa, protrygeter vocatur*). On the other hand, one star is missing in *Capricorn* (*in priore [scil. pede] eodem alteram*).

131 Missing both in the text and picture are: the star *in poplite unam* in *Hercules* (fol. 35r); the star *in brachio unam* in *Andromeda* (fol. 37v); and the stars *in pede unam, in inferiore genu unam* in *Sagittarius* (fol. 44r).

132 Apart from the confusion between right and left, as in *Ophiuchus* (*in dextro crure* on the left), *Gemini*, etc.

133 Fol. 36 (with pictures and text for *Cygnus* and *Cepheus*); fol. 40 (with pictures and text for *Aquila*, *Delphinus* and *Pegasus*) and fol. 45 (with picture and text for *Canis Maior*, *Canis Minor* and the text for *Argo*).

134 Fol. 47 (with *Pisces* and *Aquarius*) is between *Orion* (fol. 46v) and *Argo* (fol. 48r). Fol. 47 has been reversed, so that *Pisces* is on the recto and *Aquarius* on the verso. Two constellations are also reversed (*Cetus* before *Eridanus* on fol. 46r).

135 For *Pollux* in *Gemini* (fol. 42r) *in utrisque pedibus singulas* is written in margin, and the two stars are actually marked. *Virgo* (fol. 43r) has seven stars on the dress, in accordance with a correction (six crossed out and replaced by *septem in passim dispositas stellas sex*).

136 *Utrisque* is written *supra lineam* from the same hand.

15 New York, Public Library, Spencer ms. 28

Spencer 28 provides a very accurate asterization with only eight constellations subject to mismatches (Ursa Maior, Bootes, Cygnus, Gemini, Cancer, Scorpio, Lupus and Hydra). Some corrections or additions appear in the margin without apparent impact on the asterization.¹³⁷ Aries has only 16 stars (instead of 18), but the illustration matches the text given in the manuscript; in a marginal gloss, seemingly by the same hand as the main body of the text, there is the mention of two additional stars (*in cauda unam, sub ventre unam*), which are missing from the picture; and the correction of *cruribus* into *cornibus* and *scapulo* into *interscapilio*, suggests the scribe used a control manuscript, but that there was no corresponding effect on the iconography of the pictures.¹³⁸ Cygnus has only 8 stars instead of 13, due to a misunderstanding of the text which results in the placement of only five stars on the wings (2 + 3), rather than five stars in each wing (*in utrisque pennis quinas*).¹³⁹ The number and disposition of the stars of Hydra are perfectly correct, which is really exceptional in our corpus. Mistakes are mostly minor:¹⁴⁰

- Ursa Maior - two stars are missing, since there is only one instead of two on each ear (*in utrisque auribus binas*)
- Bootes - the stars *in sinistra manu* are on the left hand
- Gemini - one star is missing on the right shoulder of Castor (left Twin)¹⁴¹
- Scorpio - one of the two stars of the end of the tail (*in acumine*) is missing

137 fol. 49r: the two stars mentioned in the margin (*in cauda unam in ventre unam*) are missing in the illustration, and the correction *cornibus* for *cruribus* has no effect in the picture. On fol. 48rv there are no stars on Pegasus' ears and two extra stars on its legs, in agreement with the text (*cruribus*), textual mistake for *auribus*, which appears as a marginal correction. However, on fol. 52r (Scorpio) the illustration matches a correction occurring in the margin (*unam*) for the stars of the stings and not the plain text (*in acumine...duas*).

138 Note that on fol. 52v (Sagittarius), we find the reverse operation, with *interscapilio* commenting or replacing *scapulo* in the text. On this same page, *pollice* is written in the margin next to *poplite*, but the star is (correctly) on the thigh.

139 An identical mistake appears in Oxford, Bodleian, Digby 83 (fol. 46r). Note that the scribe did likely not recognize Greek names (see a blank for σύνδεσμον ὑπουράνιου (*syndesmon hypouranion*) on fol. 54r, Pisces); the name Protrygeter is added in the margin of fol. 51v for Virgo.

140 On fol. 42r there is a simple cross (four branches) on the left knee of Hercules, while all stars have regularly eight branches. The 'star-positioner' probably started to mark the star (maybe considering an accidental dot as a 'place-holder', and before marking the right knee) and changed his mind. We do not count it as a star, but the Freiberg manuscript mistakenly reproduced it (see *infra*). Note that on fol. 45v the star *in ventre* is on the back, since Perseus is portrayed from the back.

141 The star marked above Castor's left shoulder, close to the arm of the right Twin (Pollux), corresponds to the star on the hidden right elbow of Pollux.

- Lupus - two stars are missing on the head¹⁴²
- Corvus in Hydra - two stars are missing on the tail (*infra pennam caudam versus duas*).

Cancer provides remarkable exceptions to this general harmony, however. In Cancer, 16 stars are marked (while 18 are listed), and the distribution is completely chaotic: only one star appears on a right leg (*in dextris pedibus singulas*), eight on the claws and none on the shell.¹⁴³

16 Freiberg, Andreas-Möller Bibliothek, XI.4.9

The Freiberg manuscript derives directly for both text and illustration from Spencer 28.¹⁴⁴ Pictures were probably drawn before the insertion of text (see fols 31v, 31r, 41v), but the details of the process is unclear: three pictures are simple sketches without stars (Cancer, fol. 40r; Lepus, fol. 44r; Orion, fol. 44v); one picture is an uncoloured drawing marked with stars (Scorpio, fol. 41r); two pictures are coloured drawings without stars (Leo, fol. 40r; Virgo, fol. 40v).¹⁴⁵ The few corrections occurring in the margins of Spencer 28 are not taken in account by the Freiberg manuscript neither in the text, nor in the illustration.¹⁴⁶ In some cases golden decoration in Spencer 28 is reproduced in Freiberg manuscript (Bootes, Perseus, Aries, Capricorn). In three instances (Bootes, Pisces, Aries) there are textual omissions with respect to Spencer 28, but in spite of that the illustration coincides exactly with Spencer 28.¹⁴⁷

- Bootes - two stars on the chest in the picture (but omission of the corresponding text: *in utraque mamma singulas*)
- Pisces - three stars are missing on the cord (but omission of the corresponding text: *ad alteram partem tres*)

142 Lupus is supposed to have eleven stars (*in utrisque pedibus unam* instead of the more common reading *inter utrosque pedes unam*), in spite of the given total (*sunt numero decem*), but it ends up having 9 (or 10?) stars due to the missing one(s).

143 Cancer has three stars on the 'head' (as in Scorpio, *in fronte stellas tres*), instead of one (*in ore unam*) and two on the shell (*in ipsa testa stellas duas*).

144 See the more circumspect comment of Blume, Haffner, Metzger 2016a, 605: "[...] kopiert sie fraglos die New Yorker Bilderfolge oder eine gemeinsame Vorlage".

145 Note that the drop capitals are missing for Leo (L), Scorpio (S), Lepus (L), Canis Maior (C).

146 Spencer 28, fol. 48r: *auribus* for *cruribus*; fol. 49r, Aries: *cornibus* for *cruribus*, and addition of *in cauda unam sub ventre unam*. However, on fol. 42v (Pisces) *aequinocetialem* is erroneously added in margin (as in Spencer, fol. 54r) as a correction for (*coniunctionem ad) aquilonem*.

147 In one case (Cassiopeia) an omission is common with Spencer 28: *in <angulis> utrisque singulae* (fol. 34v).

- Aries - four stars corresponding to *in lumbis tres posteriore unam* (sic) (instead of *in lumbis tres <in pede> posteriore unam*).

The Freiberg manuscript shares the eight errors of Spencer 28 (for Ursa Maior, Bootes, Cygnus, Gemini, Cancer, Scorpio, Lupus, Corvus), with slight differences in two cases:

- Ursa Maior - four stars (instead of two in Spencer 28) are missing in the head
- Lupus in Centaurus: three stars are missing on the head and one on a foot (*infra [scil. stellam in priore parte pedum] alteram, in capite tres dispositas*) instead of two stars on the head, in Spencer 28.

The latter error is due to the fact that some stars on Lupus in Spencer 28 are dim, and in two other instances (Hercules, Aquarius) faint stars marked on brown-coloured parts in Spencer 28 (lion's skin, hairs) are responsible for omissions from part of the illuminator in Freiberg manuscript:

- Hercules - *in sinistro brachio, in sinistra manu unam, in sinistra manu quatuor*; there is an additional star on the left knee¹⁴⁸
- Aquarius - *in capite stellas duas*

A similar blur on the head of Pegasus probably led the illuminator to mark two stars instead of one near to the ears (*in capite unam*).¹⁴⁹

17 Florence, Biblioteca Medicea Laurenziana, Ashb. 1148

In the Laurentian manuscript, Ashburnham 1148, the same hand (and same ink) is responsible for both the pictures and the position of the stars, and the positioning and number of the stars generally matches the textual description, though there are some omissions in the pictures. For example, the conventional number of stars for Argo in Hyginus' text is 26 (*Ita tota est stellarum XXVI*), though only 18 stars are marked on the picture (fol. 58r), a unique case in our corpus (the other manuscripts featuring between 21 and 26 stars). This is in perfect accordance, however, with the text given (fols 57v-58r), which is quite different from the usual one: *Haec habet in puppi <IIII,> ad singula gubernacula ad primum stellas quinque, ad alterum quatuor, circum carinam quinque, <sub reiectu V,> ad malum quatuor [≠*

¹⁴⁸ The star is half marked in Spencer 28.

¹⁴⁹ In Spencer 28, there is a stain near the star on the head, which could have been considered as the trace of a star. Since the regular text is *in utrisque auribus* (and not *cruribus*) *singulas* the picture may also have been influenced by another pictorial model.

III].¹⁵⁰ The hypothesis that the ‘star-positioner’ has actually placed the stars on the pictures following the text of the manuscript is supported in many cases.¹⁵¹ In the picture of Gemini, Castor has one star on each hand and no stars on the feet, which perfectly complies with the (corrupt) text provided by the manuscript: *in utrisque manibus* (instead of *mammis*)¹⁵² *singulas*, [*in dextro genu I, in sinistro genu I, in pedibus utrisque singulas,*] *et infra sinistrum pedem unam, quae tropus* (sic) *appellatur*. In Aquarius, there are 11 stars listed for the water-carrier¹⁵³ and the stars in the Water have been increased to 19, most likely in order to raise the total number to 30, as outlined in the text.¹⁵⁴ The situation is actually more complex, however, and there are some puzzling discrepancies. For example, Ursa Minor is given 5 stars (instead of 7) and this is a basic mistake. One could always argue that the ‘star-positioner’ misunderstood the word *statio* (*in stationis unoquoque loco stellas singulas clare lucentes*), but there are other examples in the manuscript that are even more perplexing. The conventional Hyginian description of the Serpens (in Ophiuchus) lists the stars from head to tail. In the manuscript text, we read the distribution of 2-3 (elsewhere 4) -2-5-4-6 (22), while the stars on the pictures are marked 5-6-2 (13). Additionally, Aries has 4 additional stars and 3 missing ones. The stars’ positions agree partly with the corrupt text: *in cervicibus III* (instead of *in cornibus III, in cervice II*), and *in lumbis tres* (instead of *sub ventre tres, in lumbis unam*), but there also appears to be the duplication of a group of four stars (*in scapulo quattuor*), which are placed *both* on the shoulder and on the neck. As far as I know, this is an iconographic hapax in the whole tradition of astronomical manuscripts. We have already seen how the word *interscapilium* (replaced here by *scapulum*)¹⁵⁵ has been misinterpreted in

150 A similar difference occurs with Centaurus (fol. 58v): among all Hyginus manuscripts with stars marked, this is the only one marked by only 14 stars, corresponding to the textual variant of the description.

151 See, for example, Andromeda (fol. 44r): there is only one star on the left arm (instead of two expected), following the text *in sinistro cubito uti brachio I* (instead of the regular *in sinistro cubito I, in brachio I*).

152 It has the same text and star position in the Laurentianus Plut. 89 sup. 43.

153 Pavia, Aldini 490 has the same number, but all the other manuscripts display more stars for Aquarius.

154 *Effusio aquae cum ipso Aquario est stellarum XXX*. On the confusion between *aqualis* and *Aquarius*, see *supra*. For a similar case, see Florence, Laurenziana, Plut. 89 sup. 43, where Aquarius has 14 stars and the Water has 16.

155 Note that in the other chapters where the Hyginian *interscapilium* is expected, the text is *intercapsilio* (sic) – except for Pegasus (fol. 48v: *in scapulo*) – and the stars are marked on the shoulders: Ursa Maior (fol. 38v); Taurus (fol. 49v); Leo (fol. 51v); Sagittarius (fol. 53r); Capricorn (fol. 53v); Centaurus (fol. 58v); but Scorpio (fol. 52v) has *interscapilio* and Canis Maior (fol. 57r) has *insterscapillio*.

some manuscripts (Cambrai 993; Cambridge, Fitzwilliam 260; Florence, Laurenziana Plut. 89 sup. 43), but this duplication of stars in Aries is difficult to explain and it looks as though the 'star-positioner' had wanted to represent both his reading of the text (marking the shoulder = *scapulum*) and the cluster that might have appeared in a model used to check the pictures where the text was *interscapilio* (on the backbone or on the neck). All things considered, the total of positioning errors (with respect to the text) is rather low (seven for 41 constellations: Ursa Minor, Hercules, Lyra, Perseus, Ophiuchus, Aries and Taurus). In this case, then, it seems safe to assume that the 'star-positioner' has either marked the pictures according to the text or, at least, corrected the model from which he was copying.

18 Cambridge, Fitzwilliam Museum, 260

The Fitzwilliam manuscript has only 33 pictures,¹⁵⁶ with stars marked in red,¹⁵⁷ which disagree with the text in most cases. The model for the illuminator was clearly not the same as the one used by the scribe, as appears in fol. 15v/16r, with a blank left for Triangulum (*solum*) after the text, and the picture of Aries intra Triangulum on the opposite page. There is no regular similarity in the pictures with any particular manuscript of the group, but the constellations are often very close to various Italian manuscripts. In two occasions the text is emended to correspond to the number of stars appearing in the picture (once in red ink, from the hand of the 'star-positioner').¹⁵⁸ Some lines of the text are missing for three constellations, but the corresponding stars are marked in the picture (Pegasus, Aquarius, Canis Maior). There are missing stars in eight figures:

- Pegasus - one among *in rostro stellas duas obscuras*
- Leo - one probably among the stars *in interscapilio tres*
- Gemini - *in dextro genu unam*

156 Five folios are missing (after fols 1v, 7v, 20v, 24v, 25v) with text (for Ursa Maior, Ursa Minor, Bootes, Scorpio, Cetus and Lepus) and pictures (for Ursa Maior, Ursa Minor, Draco, Cassiopeia, Virgo, Pisces and Eridanus).

157 Note the exception of Lyra (fol. 5r) where one of the nine stars, in a smaller size, is marked in the same black ink as the drawing.

158 Fol. 19v (Leo): *nouem* - in *decem et nouem*, which is the number of the listed stars - is crossed out and replaced by *octo* - which is the number of the *marked* stars; fol. 22v (Capricornus): addition in red ink (used for the marking of stars) of a unit in *omnino stellarum numerus xxi* (becoming *xxii*, in accordance with the picture). Note that a similar though erroneous correction occurs on fol. 21v (Sagittarius) where the number of the stars of Corona Australis (*Corona autem centauri est stellarum VII*), not represented in the picture, was crossed out and replaced by *XIIII*, which is the number of the stars of the whole constellation on the facing page.

- Aries - *in cervice duas, in lumbis unam*
- Centaurus - one among *interscapilio quatuor*
- Lupus (in Centaurus) - probably *in priore parte pedum unam, infra alteram*¹⁵⁹
- Argo - *ad malum tres*
- Hydra - no fewer than seven missing stars on the last part of the body.

Conversely, there are additional stars absent from the text given by the manuscript in nine cases, often due to textual lacunae:

- Hercules - a second star on the right foot (*in pede unam*)
- Ophiuchus - three stars on thigh and feet (while the corresponding 'standard' Hyginian text *in dextro crure unam, in utroque pede singulas* is missing in the manuscript)
- Serpens (in Ophiuchus) - six stars corresponding to *in dorso Anguis quinque*
- Pegasus - two stars on the body (corresponding to *in interscapilio I, <in umbilico novissimam I>* missing in the manuscript)
- Capricornus - seven stars instead of five *in ventre*
- Aquarius - three stars on thigh and feet (corresponding to *<in dextro crure unam, in utrisque pedibus singulas>* missing in the manuscript)
- Canis Maior - one star on the rear foot (corresponding to *<in pede dextro unam>* missing in the manuscript)
- Hydra - eight stars instead of six explicitly mentioned on the end of the tail (*...in tertia quattuor, in quarta duas, in quinta usque ad caudam <VIII> omnes obscuras*)
- Corvus in Hydra - two additional stars on the wings.

Besides, stars are frequently misplaced, notably in Taurus (with seven stars in circle below the muzzle, that are supposed to be the Pleiades/*Vergiliae*),¹⁶⁰ Cygnus and Aquila, and less significantly in Hercules, Cepheus, Perseus, Cancer, Centaurus and Lupus. Apart from these discrepancies, star disposition falls in line with the other 15th-century manuscripts, with its regular mistakes:¹⁶¹ in Sagittarius the star missing on the hindfeet (*in popliti [sic] unam*) appears on the thumb (*pro pollice?*); the four stars of Argo's

159 Stars are not consistently placed, with a distribution reminding the picture of Ambrosiana, T 47 sup (fol. 60r) and Trivulziana N 690 (31v).

160 *Vergiliae* should be *inter huius finitionem corporis et Arietis caudam stellae sunt*. A similar placement occurs in Trivulziana N 690 (fol. 18r), Siena L.VI.25 (fol. 41v), Laurenziana Plut. 89 sup. 43 (fol. 82v) and... Ratdolt's first edition (1482); cf. also Vatican, Vat. Lat. 3110 (fol. 72r), Pavia, Aldini 490 (fol. 87v) and Vatican, Urb. Lat. 1358 (fol. 131r).

161 See also the sequence of stars of Serpens is 2-3-6-6-2-4 on the picture, while it is 2-4-2-5-4-6 in the text.

mast (*ad malum quattuor*) are on the prow; the *interscapilio* stars are not regularly placed on the body,¹⁶² which suggests that the ‘star-positioner’ or his model did not clearly understand the meaning of the word.¹⁶³

19 Laurentianus Plut. 89 sup. 43

The Laurentian manuscript, Plut. 89 sup. 43, has 37 carefully-drawn and coloured pictures with stars that generally match the text, so that the stars missing in the picture are usually also missing in the textual description (cf. Perseus, Virgo, Aquarius and Argo).¹⁶⁴ On fol. 81v, the chapter on Aries immediately follows the chapter on Triangulum without a blank space left for a picture of the latter. This suggests that the scribe may have had the conflated model of “Aries intra Triangulum” in mind,¹⁶⁵ but the illuminator mistakenly used this section to illustrate only the constellation of Triangulum and entirely overlooked the picture of Aries. The Water in Aquarius has only 16 stars (and not 30) in addition to the 14 stars of Aquarius itself, but as with many other manuscripts in this tradition, the text mentions 30 stars in all for the complete constellation, replacing *aquali* (urn) by *aquario* (*Effusio aquae cum aquario ipsa stellarum est XXX*). The two stars missing on the left ear of Ursa Maior (9 for the head instead of 11) might be explained by the fact that only one ear is visible in the profile depiction of the bear’s head (not to mention that the ‘star-positioner’ was running out of space to mark them). Other discrepancies are more difficult to justify, even by the constraints of the iconographical model, such as the missing stars on the head and on the thigh of Cassiopeia. In short, star-positioning or number is problematic for nine constellations (Ursa Maior, Bootes, Hercules, Cassiopeia, Gemini, Leo, Sagittarius, Centaurus and Corvus).¹⁶⁶ In Bootes, where the listed star on the right elbow is missing, a small black dot can be seen and could have been the equivalent of a ‘position-holder’ for the gilder; but there are other similar dots on the right hand of Bootes,

162 See also Cambrai 993; Florence, Laurenziana, Ashb. 1148 and Plut. 89 sup. 43.

163 The star is marked on the chest (Aries), on the shoulder (Taurus, Capricorn, Canis Maior), on the wing (Pegasus), on the back (Scorpio), on the belly (Lupus) and under the belly (Sagittarius).

164 This manuscript is close to Ratdolt edition and Vienna 3111. Quite surprisingly, they all represent Centaurus with cloven hoof as if the animal half were bovine, while it has elsewhere an uncloven hoof as a ‘regular’ ungulate.

165 Lippincott 2006.

166 Note also that on fol. 81r (Pegasus), a second hand has corrected both text and picture (by scratching and erasing), adding an omitted star on the nostril (in red instead of golden as the other dots are) and changing 18 into 17 (or the other way round?) for the total of stars.

as well as in some other pictures of the manuscript (Cassiopeia, Perseus, Gemini, etc.), that cannot be explained in the same way. The asterization of Leo is particularly puzzling, insofar as the lion has only 2 stars in front of the nose and none on the head (for *in capite stellas tres, in cervicibus duas*). For the constellation of Gemini, the picture combines the usual errors associated with the image:

- it inverts Castor and Pollux in the depiction
- it places Propous under the foot of Pollux
- it lists two stars 'on the hands' of Pollux instead of the breast (*in utrisque manibus singulas* instead of *in utrisque mammis singulas*),¹⁶⁷ only one being marked (the other one maybe hidden by Castor's arm)
- it misses the two stars on the knees of Pollux, although duly listed in the text (*in dextro genu unam, in sinistro genu unam*).

Sagittarius offers other challenges, but we have yet to identify a precise process (iconographic model? textual projection? combination of sources?) for the asterization: while one of the stars on the head is missing (*in capite stellas duas*) there is one eccentric star on the thumb, in full agreement with the variant in the depiction of the legs of Sagittarius (*in priore genu I... in pollice (sic) i*).¹⁶⁸ The number of the problematic discrepancies between text and images, in this case, is not high (9 constellations). It could be reasonable, then, to assume that the 'star-positioner' did read the text and follow the textual description, given that no additional stars have been marked.

20 Vienna, Österreichische Nationalbibliothek, Vindob. Lat. 3111

Vienna 3111 is very interesting because it appears to be a direct copy of one of Ratdolt's Venetian editions of Hyginus (either 1482 or 1485), reproducing text and pictures with great attention.¹⁶⁹ Since the drop capitals are missing for each chapter, it should be considered as an unfinished

167 Note that, as mentioned for Bootes, there are two small black dots on the breast.

168 On fol. 52v of New York, Spencer 28, there is a marginal gloss '*pollice*' to *poplite* given in the text (seemingly by the same hand), which clearly refers to this variant, but probably not to this very manuscript. As a matter of fact, the iconographical models are quite different, especially for Centaurus, Eridanus, Auriga and Hercules. The Spencer manuscript has been dated to 1475-80 by Blume, Haffner, Metzger 2016a, 600, and prior to Florence, Laurenziana Plut. 89 sup. 43, which they date to 1482-83 - the same year as the first Ratdolt edition of the text of Hyginus. For a discussion of the problems in dating the Florence manuscript this late, see Lippincott (this volume).

169 A telling proof is given by the fact that the Vienna 3111 reproduces the descriptor *inter scapilio* (wrong for *interscapilio*) from Ratdolt (Aries, Taurus, Leo, Scorpio, Sagittarius, Capricorn, Canis Maior and Centaurus) except in one case, where both texts give

manuscript. In ten cases where Ratdolt's edition offers sound illustrations in agreement with the text, the Vienna manuscript adds errors in the asterization, which does not match the text (Ursa Maior, Cepheus, Perseus, Ophiuchus, Aquila, Pegasus, Capricorn, Canis Maior, Argo, Hydra). In two instances, it reproduces a mistake that already occurred in Ratdolt's edition (Cassiopeia and Gemini).¹⁷⁰ The scribe, who is very likely also the illuminator, clearly did not check the text before reproducing the drawings. Sometimes the overall number of stars listed in the text wrongly suggests that the asterization is correct. For example, in Ursa Maior (21 stars) there is one star missing from the two on the front foot (*in pede priore duas*) and one extra star on the head (providing a total of 12 instead of the 11 listed in the text). In Cassiopeia, the Vindobonensis Lat. 3111 omits, as Ratdolt does, the star mentioned in the text as places on the throne (*in quadrato quo stella deformatur unam*).¹⁷¹ In Gemini both omit a star on the (hidden) left hand of Castor (*in utrisque manibus singulas*). Most of the errors peculiar to Vienna 3111 are due to omissions,¹⁷² which are sometimes unexpected (as in Aquila, where one star among four – *in cauda unam* – is missing, or in Ophiuchus, which has three stars missing);¹⁷³ but there are also a few additions (such as in Cepheus, who receives two stars instead of one on the side – *in latere dextro obscuram unam*) and Hydra, where the text of the manuscript describes the distribution of stars along the body as 3-6-3-4-2-8 = 26. This number and distribution are respected by Ratdolt in his illustrations (3-6-3-4-10 = 26), but not by the Vienna manuscript, which has 3-6-3-2-4-10 = 28.¹⁷⁴ There are also a few slightly displaced stars in Draco, Aries, Leo, Hydra and Virgo.¹⁷⁵

in scapilio in the description of Pegasus. The name given in red letters as caption to the picture of Centaurus in Vienna 3111 as 'Phyllirides' also appears in Ratdolt, as 'Phyllirides'.

170 Note that the later edition of Thomas de Blavis in Venice, which reverses Ratdolt's illustrations, also omits the stars that are not included in Ratdolt's edition (see Taurus and Sagittarius).

171 Not to mention the placing beside the haunch of the two stars of the leg (*in sinistro femore duas*).

172 Perseus: *in dextro femore unam* (missing); Pegasus: *in rostro stellas duas* (both missing); Castor in Gemini: *in utrisque manibus singulas* (one missing on the left one); Capricorn: *inter scapilio habet stellas septem* (one missing); Canis Maior: *in pede posteriore [scil. sinistro] unam* (probably missing on the left hind leg); Argo: *sub reiectum quinque* (one missing).

173 The stars missing are *in dextro crure unam*, *in capite stellam unam* and on the right foot (*in utroque pede singulas*).

174 In this case, the overall number of stars for the constellation is also correct, since Corvus is deprived of two stars (*infra pennam caudam versus duas*).

175 For Virgo, the seven stars *in veste passim dispositas* are marked by a straight line on the knees, but the model shows the same mistake. On Sagittarius, the star is wrongly placed on the left elbow (*in dextro cubito unam*).

Appendix 1. Corpus of Hyginus' Illustrated Manuscripts Marked with Stars

Name	cent.	books	image pagination	situation	comment	Viré
Baltimore, Walters Art Museum, W 734	XII	1-exc. ¹ 2,3,4	01r-18r	cum libro III		GV-n°3
Cambrai, Bibliothèque Municipale, 993	XV	1,3-exc. 2,4	11r-45r	cum libro III		GV-n°11
Cambridge, Fitzwilliam Museum, 260	XV	2,3	2r-33r	cum libro III		GV-n°12
Florence, Biblioteca Nazionale Centrale, Magliabechi XI.114	XV	exc. 1,2-3,4	9r-11r	cum libro III		GV-n°20
Florence, Biblioteca Medicea Laurenziana, Ashb. 1148	XV	2,3	39r-60v	cum libro III		–
Florence, Biblioteca Medicea Laurenziana, Plut. 89 sup. 43	XV	all (3,4,1,2)	72r-91r	cum libro III		GV-n°19
Freiberg, Andreas-Möller Bibliothek, XI.4.9	XV	all	31r-47v	cum libro III	image first?	GV-n°24
Leiden, Bibliotheek der Rijksuniversiteit, Gronovius 21	XI-XII	3, exc. 4,2	55rv	cum libro III		GV-n°32
Milan, Biblioteca Ambrosiana, T 47 sup.	XV	3	47v-61r	cum libro III	image first?	GV-n°47
Milan, Biblioteca Trivulziana, N 690 (E. 83)	XV	3	1r-23v	cum libro III		GV-n°48
New York, Public Library, Spencer ms. 28	XV	all	40r-59r	cum libro III		GV-n°52
Oxford, Bodleian Library, Canon. Class. Lat. 179	XV	all (1,2,4,3)	28r-41v	cum libro III	image first	GV-n°53
Oxford, Bodleian Library, Digby 83 (S.C. 1684)	XII	2,3	44r-67r	cum libro II-III	image first	–
Pavia, Biblioteca Universitaria, Aldini 490	XV	3	77v-97r	cum libro III		–
Siena, Biblioteca comunale degli Intronati, L.VI.25	XV	all	34r-49v	cum libro III		GV-n°66
Vatican, Biblioteca Apostolica Vaticana, Reg. Lat. 123	XI	exc. 2 + 4,3	174r-204v	cum libro II-III		GV-n°75
Vatican, Biblioteca Apostolica Vaticana, Vat. Lat. 3109	XV	2,3	32r-50r	cum libro III	image first	–

Name	cent.	books	image pagination	situation	comment	Viré
Vatican, Biblioteca Apostolica Vaticana, Vat. Lat. 3110	XV	1-4 ; 3-4	65r-78r	cum libro III		GV-n°81
Vatican, Biblioteca Apostolica Vaticana, Urb. Lat. 1358	XV	all	123r-139r	cum libro III		GV-n°79
Vienna, Österreichische Nationalbibliothek, Vindob. Lat. 3111	XV	3, praef.1	112v-129v	cum libro III		GV-n°86
1 Exc. = excerpts of book.						

Appendix 2. Sum of Stars for Each Constellation in the Manuscripts

	Hygin	Baltimore	Cambrai	Cambridge	Florence-Ashb-1148	Flor. Magl. XI-114	Flor. Plut. 89.43	Freiberg	Milan T 47 sup
number of pictures		38	37	33	38	10	38	37	38
Ursa Maior	21	18	17	Abs	21	21	19	17	21
Ursa minor	7	6 [+5]	7	Abs	5	7	7	7	7
Draco	15	15	13	Abs	15	15	15	15	15
Bootes	14	13	10	14	14	14	13	14	13
Corona Borealis	9	9	9	9	9	9	9	9	9
Hercules	19	19	18	19	18	19	19	14	19
Lyra	8 or 9	8 (9?)	8	9	8	9	8	9	8
Cygnus	13	13	Abs	13	13	Abs	13	8	13
Cepheus	19	19	Abs	19	19	Abs	19	19	19
Cassiopeia	12 or 13	13	13	Abs	13	Abs	11	12	13
Andromeda	20 or 21	17	18	20	20	Abs	20	20	20
Perseus	18	16	16	17	19 (-2?)	Abs	17	17	17
Auriga	7	7	7	7	7	7	7	7	7
Ophiuchus + Serpens	17 + 23	17 + 0	17 + 16	17 + 23	17 + 12	17 + 23	17 + 23	17 + 19	17 + 23
Sagitta	4	Abs	4	4	4	4	4	4	4
Aquila	4	4	4	4	4	4	4	4	4
Delphinus	10	10	10	10	9 or 10	Abs	10	10	10
Pegasus	18	14	17	17	18	Abs	17	19	14
Triangulum	3	3	3	3	3	Abs	3	3	3
Aries	17	17	18	14	18	Abs	Abs	16	18 (or 15)
Taurus (Hyades) + Pleiades	14 + 7	15 + 0	12 + 0	14 + 7	13 + 5	14 + 7	14 + 6	14	13 + 7
Gemini	8 + 10	8 + 8	8 + 8	8 + 10	6 + 8	Abs	8 + 7	8 + 10	9 (or 8) + 9
Cancer	18	17	15	18	18	Abs	18	0	17
Leo	19	18	18	18	19	Abs	16?	0	19
Virgo	21	18	18	Abs	18 (?)	Abs	18	0	18
Scorpio + Libra	15 + 4	16 + 4	13 + 4	15 + 4	15 + 4	Abs	14 + 4	14 + 4	10 (or 11) + 4
Sagittarius (+ Corona Australis)	15	15	14	15	13	Abs	13 + 7	15 + 7	15 + 7
Capricornus	20 or 22	20	20	22	22	Abs	20	22	21
Aquarius	14 + 30	14 + 24	15 + 30	14 + 16	11 + 19	Abs	14+16	14 + 16	14 + 16
Pisces	41	11 + 16	17	Abs	38 or 39	Abs	41	41	30
Eridanus	13	13	13	Abs	13	Abs	13	13	13
Cetus	13	14	14	13	13	Abs	13	13	13
Lepus	6	6	6	6	6	Abs	6	0	7
Orion	17	15	15	17	17	Abs	17	Abs	17
Canis Maior	19	19	15	19	19	Abs	19	19	19 or 18
Canis Minor	3	4	3	3	3	Abs	3	3	3
Argo	26	23	22	23	18	Abs	21	23	22
Centaurus + Lupus	24 + 10	23 + 0	22 + 0	23 + 8	14 + 10	Abs	21 + 10	24 + 7	22 + 7
Ara	4	4	4	4	4	Abs	4	4	4
Hydra + Corvus + Crater	26 + 7 + 8	26 + 9 + 8	20 + 7 + 7	20 + 9 + 8	26 + 7 + 8	Abs	26 + 5 + 8	26 + 5 + 8	22 + 7 + 8
PsA	12	10?	12	12	12	Abs	12	12	12

Certissima signa, 153-212

Milan Triv. N 690	New York	Oxford Bodley 179	Oxford Digby 83	Pavia	Siena	Vat. BAV Lat.-3109 (1)	Vat. BAV Lat. 3109 (2)	BAV Lat. 3110	Vat. Reg. Lat. 123	Vat. Urb. Lat 1358	Vienna	Radtolt
38	38	30	38	38	31	38	37	38	41	38	39	39
21	19	16	21	22	13	>10	7	>10	19 & 14	22	21	21
7	7	7	7	6	7	7	7	7	7 & 7	7	7	7
15	15	15	15	15	15	14 or 15	15	15	15	14	15	15
14	14	13	12	13	14	13	13	14	17	15	14	14
9	9	9	10	9	9	9	9	9	9	9	9	9
18	19	19	19	17	18	14	15	19	13 or 15	16 (19)?	19	19
8	9	8	9	7	8	9	9	8	8	7	9	9
13	8	13	8	13	Abs	13	13	13	13	13 (or 15)	13	13
18 (or 31)	19	19	18	18	Abs	16	18	19	20	19 (18)	20	19
13	12	13	12	13	12?	13	12	13	13	14	13	13
20	20	20	19	19	20	16 > 20	21	20	23	20	20	20
17	17	17	16	17	17	18	17	17	17	17	16	17
7	7	7	7	7	7	8	7	7	10	7	7	7
17 + 22	17 + 19	17 + 23	17 + 23	14 + 23	17 + 21	10 + 14	11 + 12	17 + 23	12 + 6	17 + 23	14 + 22	17 + 22
4	4	4	3	4	4	0	Abs	4	4	4	4	4
4	4	4	4	4	Abs	4	4	4	5	4	3	4
10	10	10	9	10	Abs	10	10	10	9	10	10	10
14	18	15	12	17	Abs	14	13	18	18	17	16	18
3	3	3	3	3	3	0	1	3	3	3	3	3
14 or 15	16	15	21	14	18	13 > 16	16	15	18	16 (+2)	18	18
13 + 6	14	Abs	14	14 + 7	14 + 7	10 or 11 + 6	14 + 0	14 + 7	18	14 + 7 (or 8)	14 + 6	14 + 6
10 + 8	8 + 10	Abs	8 + 10	8 + 9	8 + 10	10 + 10	9 + 8	7 + 9	8 + 8	8 + 8	8 + 9	8 + 9
18	16	17	15	21	18	16	15	18	17 or 19	18	18	18
19	19	19	14	19	19	19	15	19	20	19	19	19
18	18	Abs	16	17	19	18 > 20	18	17 or 18	19	18	17	17
10 or 15 + 4	14 + 4	Abs	19	15 + 4	15 + 4	14 + 4	15 + 4	15 + 4	15 + 4	15 + 4	15 + 4	15 + 4
12 or 13 + 6 (?)	15 + 7	13 + 7	15	15 (or 16) + 7	14 + 7	9 + 0	8	15 + 7	15	16 + 7	15 + 7	15 + 7
21	22	21	19	21	21	16 or 17	20	21	26	22	21	22
14 + 15	14 + 16	Abs	13	11 (or 12) + 16	14 + 30	15 + 12	29	14 + 16	16 + 8	15 + 16	14 + 16	14 + 16
37 or 38	41	Abs	38	43	42	34	36	42	40	43	41	41
14	13	13	14	13	13	11	13	13	12	13	13	13
13	13	13	13	14	13	13	13	13	13	14	13	13
6	6	Abs	7	6	6	6	6	6	6	6	6	6
15	17	Abs	17	14	17	16 or 17	17	17	20	17	17	17
18	19	18	19	19	Abs	17	18	19	19	20	18 or 19	19
3	3	3	3	3	Abs	3	3	3	3	3	3	3
19	23	26	21	22	23	24	22	22	27	19(?)	22	23
23 + 7	24 + 9	22 + 10	23 + 8	24 + 10	24 + 10	17 + 6	24 + 7	24 + 10	18 + 8	22 + 9	23 + 10	23 + 10
4	4	4	4	4	4	4	4	4	4	4	4	4
18 + 7 + 7 (?)	26 + 5 + 8	23 + 7 + 8	25 + 7 + 8	22 + 7 + 6	26 + 7 + 8	32 + Abs + Abs	14 + Abs + Abs	23 + 7 + 8	3 + 4 + 3	23 + 7 + 8	28 + 5 + 8	26 + 7 + 8
11	12	12	12	12	12	11	12	12	12	12	12	12

Appendix 3. Discrepancies Between Text and Illustration

Name	number of discrepant chapters
Baltimore, Walters Art Museum, W 734	9(40)
Cambrai, Bibliothèque Municipale, 993	17(39)
Cambridge, Fitzwilliam Museum, 260	12(34)
Florence, Biblioteca Nazionale Centrale, Magliabechi XI.114	1(12)
Florence, Biblioteca Medicea Laurenziana, Ashb. 1148	7(41)
Florence, Biblioteca Medicea Laurenziana, Plut. 89 sup. 43	9(40)
Freiberg, Andreas-Möller Bibliothek, XI.4.9	14(36)
Milan, Biblioteca Ambrosiana, T 47 sup.	20(41)
Milan, Biblioteca Trivulziana, N 690 (E. 83)	15(41)
New York, Public Library, Spencer ms. 28	8(41)
Oxford, Bodleian Library, Canon. Class. Lat. 179	15(33)
Oxford, Bodleian Library, Digby 83 (S.C. 1684)	18(41)
Pavia, Biblioteca Universitaria, Aldini 490	15(41)
Siena, Biblioteca comunale degli Intronati, L.VI.25	5(34)
Vatican, Biblioteca Apostolica Vaticana, Reg. Lat. 123	20(41)
Vatican, Biblioteca Apostolica Vaticana, Vat. Lat. 3109	23(40)
Vatican, Biblioteca Apostolica Vaticana, Vat. Lat. 3110	9(41)
Vatican, Biblioteca Apostolica Vaticana, Urb. Lat. 1358	19(41)
Vienna, Österreichische Nationalbibliothek, Vindob. 3111	12(41)

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