



*The Most Authoritative Copy of*  
*‘Abd al-Rahman al-Sufi’s Tenth-century*  
Guide to the Constellations

دوق نسخة الكتاب صور الكواكب لعبد الرحمن الصوفي

Emilie Savage-Smith



Nearly nine hundred years ago, a scholar working in Baghdad completed transcribing and annotating one of the most remarkable Arabic medieval scientific manuscripts preserved today. The result of his work now resides in the Museum of Islamic Art (MIA) in Doha as MS.2.1998.

The scholar was named ‘Ali ibn ‘Abd al-Jalil ibn ‘Ali ibn Muhammad, and he spent three months of 1125 (519 AH) working in Baghdad on this manuscript. He specifically states that he wrote out this manuscript “for his own use,” and so he may not have been a professional copyist – though his handwriting is very good and pleasing. Because he prepared it “for his own use,” he must have been particularly interested in astronomy and the constellations of stars visible in the heavens. It is also evident that he was intent upon producing the most authoritative version possible of the treatise he was transcribing.

The treatise he was copying so carefully was the most important treatise on constellation iconography to be produced in the Islamic world – and one that later was to have great influence in Latin Europe (Kunitzsch 1986; *Encyclopaedia of Islam* / 3: “Abd al-Rahman al-Sufi”; *Encyclopaedia Iranica*: “Abd al-Rahman b. ‘Omar Sufi”). Its title is simply the *Book of the Constellations of the Stars* (*Kitab suwar al-kawakib*). It was composed 160 years before our copyist was at work, and it was written not in Baghdad but rather in Shiraz.

The author was Abu’l-Husayn ‘Abd al-Rahman ibn ‘Umar al-Sufi – today usually referred to just as ‘Abd al-Rahman al-Sufi or simply as al-Sufi. He was an important astronomer in Shiraz at the Buyid court of ‘Adud al-Dawla (r.949–83). The book was designed to be accurate for the year 964 (353 AH) and he presumably wrote it shortly before that year. Since al-Sufi was eighty-three years old when he died in 986, it is evident that he composed this treatise somewhat late in his life, in his early sixties.<sup>1</sup> We also have preserved today four additional astronomical treatises by him: three on the astrolabe and one on the celestial globe.

His first treatise on the astrolabe was written for an unspecified patron while al-Sufi was still in the town of his birth, Rayy – today a few ruins incorporated into the suburbs of Tehran, but in the ninth and tenth centuries an extremely important center of learning, with much exchange of scholars with Baghdad to the west. The astrolabe (pl. 116) was made in 984 (374 AH) by a slightly younger contemporary of al-Sufi, al-Khujandi (d. *circa* 1000), who worked under the patronage of the Buyid ruler Fakhr al-Dawla at an observatory in Rayy (Allan 2002, 22–25).

All astrolabes have ten to twenty, sometimes more, major stars indicated on them. In al-Sufi’s first treatise on the astrolabe the stars described as useful for placement on an astrolabe reflect the early Arabic system of star naming and not the Greek/Ptolemaic system.<sup>2</sup> This suggests that at this time (while he was still in Rayy) al-Sufi was not yet well acquainted with the *Almagest* written by the famous Alexandrian astronomer Ptolemy (d. *circa* 168). The *Almagest*, originally in Greek, was translated into Arabic in the early ninth century and became the major source for mathematical astronomy, as well as the source of the classical Greek system of stellar constellations (such as Orion, Cassiopeia, or Ursa Minor with the pole star in its tail) so familiar to all of us today.

116 (*facing page*) Planispheric astrolabe (diam. 15 cm), made by Hamid ibn al-Khidr al-Khujandi, Rayy or Baghdad, 984–85. MIA, Doha (SI.5.1999).



117 Celestial globe made by Ja'far ibn 'Umar ibn Dawlatshah al-Kirmani in 1362, showing Hercules hanging upside-down with his head next to the constellation of Serpentarius (Ophiuchus). Museum of the History of Science, Oxford (44790).

However, during the time between al-Sufi's composing in Rayy his first treatise on the astrolabe and 964, when he was in Shiraz under the patronage of 'Adud al-Dawla, al-Sufi had become very familiar with the *Almagest* – so much so that he could present in the *Book of the Constellations* a description of the constellations that combines Greek/Ptolemaic traditions with Arabic/Bedouin ones. Later, after the *Book of the Constellations* was completed (before 964), al-Sufi prepared for 'Adud al-Dawla a completely revised treatise on the design and use of the astrolabe (Vafea 2006, 44–53). Later yet, al-Sufi composed a third, concise treatise on the astrolabe for a son of 'Adud al-Dawla named Abu'l-Fawaris Shirzil (Vafea 2006, 157–231).

Finally, when he was nearly eighty years old, al-Sufi wrote a treatise on the celestial globe, which he dedicated to a son of 'Adud al-Dawla, who, after the death of his father, had become ruler of Kirman as well as Iraq (Vafea 2006, 2–3). Thus we see a career curve that shows remarkable activity late in his working life, from his early sixties to his early eighties.

The celestial globe played a fundamental role in the production of the *Book of the Constellations*, so we need to pause to consider what such a globe looked like at this time. Regrettably, we have no globe preserved today that was made before the time of al-Sufi, although we know that they were produced as early as the ninth century in Baghdad. The earliest preserved globe was made in Spain, in Valencia, in 1080 or 1085, some hundred years after al-Sufi died.<sup>3</sup> It has rather rubbery human figures, none of them clothed, and the iconography bears little resemblance to the illustrations in





118 Inscription giving the maker and date of construction and the indebtedness to the *Book of Constellations* of Abu'l-Husayn 'Abd al-Rahman al-Sufi for the coordinates, from a celestial globe made by Ja'far ibn 'Umar ibn Dawlatshah al-Kirmani in 1362; the inscription is engraved over an older, partially rubbed-out inscription, which seems to record that the globe was made by Ja'far for a patron named Muhammad ibn Asil. Museum of the History of Science, Oxford (44790).

al-Sufi's treatise, except that all forty-eight of the classical Greek constellations are illustrated on the globe, just as in al-Sufi's treatise, with the stars indicated by circles.

There is a more obvious similarity between the images in the MIA manuscript and those on later celestial globes. The globe made in Kirman (not far from Shiraz) in 1362 (pl. 117; Savage-Smith 1985, 32, 221–22), besides having the instrument-maker's name and date, also has an engraved inscription (pl. 118), stating "The stars were placed (*rusimat*) according to the *Book of Constellations* by Abu'l-Husayn 'Abd al-Rahman al-Sufi, after increasing their longitudes by 6 degrees 3 minutes to our time in the year 764 AH [1362], [which is also] 732 in the Yazdigird calendar and 1674 of the Alexandrian era."

This inscription is interesting for two reasons: it shows that al-Sufi's treatise provided the coordinates of latitude and longitude for later instrument-makers when placing their stars on a globe; and it brings up the matter of the *Book of Constellations* being "accurate for the year 964 (353 AH)."

Now you might think that star positions would not change, but indeed they do (that is, their longitudes change, not their latitudes), and this is because of the precession of the equinoxes. The Earth's axis wobbles as the Earth spins, just as a spinning top wobbles, and this produces precession (Pasachoff 2000, 488–89). This means that at the spring and autumn equinoxes the stars that are visible near the horizon just before the sun rises will appear to move over time – even within one lifetime, if a person lives to be about seventy years old. The longitudes of the stars will shift slightly; al-Sufi

stated that they shifted westward one degree every sixty-six years, while others took a value of one degree every seventy years. This shift, or precession, has great significance over time. Ultimately, about 13,000 years from now, Polaris will no longer be the Pole Star indicating North, but rather Vega will be the brightest star close to the North Pole. In more practical terms today, it means that for every astronomical instrument on which you have stars indicated as well as the ecliptic (the apparent path of the sun), after seventy years the instrument will be out of date, or inaccurate by one degree for stars near the ecliptic. In other words, all the astrolabes and globes that we see in museums today are out of date and would not function properly if you tried to use them now. This need for updating every seventy years or so may account for why there are so many astrolabes and globes preserved today. Because of this precession, or shifting, al-Sufi was able to adjust his longitudes of stars so that they were precisely correct for only one year – that is, 964.<sup>4</sup>

While al-Sufi did not write a treatise on the celestial globe until he was eighty years old, he did employ celestial globes in the design of his *Book of the Constellations* some twenty years earlier. There is one account that associates al-Sufi with the actual making of a celestial globe. The historian Ibn al-Qifti (d.1248) records that in the year 1043 an Egyptian instrument-maker by the name of Ibn al-Sunbudi saw “in a library in Cairo a globe made of silver, executed by (*min ‘amal*) Abu’l-Husayn al-Sufi for the ruler ‘Adud al-Dawla, whose weight was 3,000 dirhams and whose price was consequently 3,000 dinars” (Ibn al-Qifti 1903, 440). In our historical sources, however, al-Sufi is never referred to as *al-asturlabi* (the astrolabe-maker), which was the common designation for all astronomical instrument-makers, no matter what type of instrument they made. For that reason, and because there is no corroborating evidence for this account given by Ibn al-Qifti, I am inclined to think that Ibn al-Qifti’s informant confused the manufacture of a celestial globe with the reliance of a maker on al-Sufi’s treatise for the coordinates and images, as stated in inscriptions similar to the one on the globe (pls. 117 and 118). This type of statement, citing al-Sufi’s *Book of Constellations* as a source, is found frequently on globes of the thirteenth and fourteenth centuries preserved today (Savage-Smith 1985, 27, 31–32, 86–87; Maddison and Savage-Smith 1997, 1:123–24, 2:420).

In addition to authoring treatises on stars, astrolabes, and globes, al-Sufi was an observational astronomer, often employing instruments that were much larger than an astrolabe or globe in order to have greater precision. For example, he was well known for having made observations that enabled him to determine more accurately the obliquity of the ecliptic (Sayılı 1960, 104–07; Vafea 2006, 3). Most famously today, ‘Abd al-Rahman al-Sufi is credited with the “discovery” of the Andromeda Nebula, more accurately termed the Andromeda Galaxy (Kunitzsch 1987). It would be more precise, however, to say that he is the first to mention the Galaxy in a written treatise. In the *Book of the Constellations*, in the context of a discussion of the Bedouin constellations overlapping the area occupied by the Ptolemaic constellation of Andromeda, al-Sufi clearly described the Andromeda Galaxy (M31), which he said was “a cloudy blotch (*latkha sahabiya*) situated very close to the fourteenth star [v *Andromedae* in modern



119 Area of sky including the constellation of Andromeda and the Andromeda Galaxy (circled); lower right shows the diagram of Andromeda from a copy of ‘Abd al-Rahman al-Sufi’s *Book of Constellations* made in Baghdad in 1125 by ‘Ali ibn ‘Abd al-Jalil ibn ‘Ali ibn Muhammad; in both, the corresponding major stars have been connected by colored lines. MIA, Doha (MS.2.1998, folio 63a).

120 (p. 130) Constellation of Orion as seen on a globe, from a copy of ‘Abd al-Rahman al-Sufi’s *Book of Constellations* made in Baghdad in 1125 by ‘Ali ibn ‘Abd al-Jalil ibn ‘Ali ibn Muhammad for his own use. MIA, Doha (MS.2.1998, folio 126a).

121 (p. 131) Constellation of Orion as seen in the sky, from a copy of ‘Abd al-Rahman al-Sufi’s *Book of Constellations* made in Baghdad in 1125. MIA, Doha (MS.2.1998, folio 126b).

nomenclature], located at her right side” (‘Abd al-Rahman al-Sufi 1954, 128). Although the Andromeda Galaxy is approximately 2.5 million light-years away, it is visible to the naked eye on moonless nights, even when viewed from areas of moderate light pollution. Plate 119 shows the area of the sky occupied by Andromeda much as seen with the naked eye, with the major stars forming the constellation connected by red lines, and the Galaxy circled in red. In the MIA manuscript the constellation of Andromeda is shown in the lower right corner, with the corresponding major stars connected by blue-green lines.<sup>5</sup>

It is evident from his description that it was actually the Bedouins who first observed the Andromeda Galaxy, and not al-Sufi himself. Professor Paul Kunitzsch has argued that in one copy of al-Sufi’s treatise, now in the Bodleian Library in Oxford, the Galaxy is indicated on the nose of the larger of two superimposed fishes visualized by the Bedouins as lying across the Ptolemaic figure of Andromeda.<sup>6</sup> This particular illustration of Andromeda overlaid with the Bedouin images of fishes is not found in the MIA manuscript, although in the middle of the discussion of Bedouin images for this particular area of the sky, the copyist has made the annotation (probably added later) to the bottom of folio 64a: “Here is her picture with a fish arising from her two legs.” In the MIA copy, on the Ptolemaic figure of Andromeda as seen in the sky there is – in the correct location – a small red splotch (encircled in blue-green in pl. 119), but it may simply be an accidental offset of ink from the facing page.

We must remember that all observations of the sky at this time were made by the naked eye. There were no telescopes or lenses available. From the end of the ninth or beginning of the tenth century, Islamic astronomers did occasionally use “observation tubes,” particularly to view the new crescent moon on the horizon (Morelon 1996, 9–10). These were, however, tubes *without* lenses – they were simply a means of eliminating light interference.







صُورَةُ الْجَبَّارِ وَهُوَ الْجُوزَا  
عَلِيٌّ مَا بَرَى فِي السَّمَاءِ



عن بعض الأصناف  
عن بعض الأصناف  
عن بعض الأصناف

Note that to get proper alignment, the diagram of Andromeda (pl. 119) had to be tilted. This serves as a convenient reminder that the diagrams in al-Sufi's treatise were not oriented by the points of the compass. The stars comprising Andromeda, for example, can never be seen in the skies in a vertical, upright position, but this is not indicated in the manuscript diagrams (see pls. 132 and 133), where all human figures are depicted upright. In all early copies of the treatise, even the *names* of directions of the compass are omitted. In addition, the diagrams were not plotted, though I have noticed a tendency in recent discussions by art historians to speak of the plotted constellation diagrams (for example, Brend 1994). There is no grid or point of reference from which they could be plotted. In other words, the diagrams are not "scientific" diagrams in any measured or quantitative sense.

But let us look further at the contents of this remarkable treatise, as it is preserved in the MIA copy (MS.2.1998), comprising 179 folios.<sup>7</sup> The treatise opens with a long introduction in which al-Sufi dedicates the work to his patron in Shiraz, 'Adud al-Dawla, and then goes on to explain the sources he used in preparing the book.

Following the introduction, all forty-eight classical constellations are discussed individually. Each constellation chapter has four sections. As an example, I will take the chapter for one of the most familiar of all constellations – Orion. It opens (fol. 123a) with a rubricated title *kawkabat al-jabbar wa-huwa al-jawza'* (the constellation of the giant, also known as *al-jawza'*). *Al-jawza'* was the Bedouin name for an even larger giant (possibly feminine) that overlapped with the area of Orion and Gemini. Following the title, this section begins with a verbal description of the constellation and its stars (in this case thirty-eight) as presented by Ptolemy in the *Almagest*, often criticizing Ptolemy for overlooking certain stars. In classical antiquity, the constellation outlines were based on Greek mythological figures (Orion the hunter, in this instance), but al-Sufi does not attempt to recount the myths that gave rise to the original iconography. Al-Sufi describes Orion (fol. 123a, lines 3–5) as looking like "a man having a head, two arms, and two legs . . . with a stick (*asan*) in his hand and a sword at his middle." Throughout this portion of the constellation chapter, the major stars are assigned numbers and described in terms of the general form of the constellation figure. Occasionally, distances between stars are given as multiples of a *dhira'* (forearm), which is a unit of angular distance approximately equivalent to the breadth of a thumb when it is held up at arm's length against the sky and defined by al-Sufi as 2 degrees 20 minutes (Kunitzsch 1961, 118, no. 322a).

The second section presents a description of the same area of the sky, but in terms of the indigenous Arabic constellations and star-groups recognized by Bedouins. In this section, the positions of the Bedouin stars are given in terms of their distances in *dhira'* from Ptolemaic stars. In the ninth century (a century before al-Sufi worked), a number of early lexicographers and grammarians had recorded the pre-Islamic Arabic poetry and rhymed proverbs that reflected the earlier Bedouin tradition of delineating the skies. In his introduction, al-Sufi provided us with the names of three such authors whose treatises he employed for his knowledge of pre-Islamic Bedouin constellation

imagery: Ibn Kunasa (d. *circa* 823), Ibn al-‘Arabi (d. *circa* 846), and Abu Hanifa al-Dinawari (d. 895 or 902).

All three treatises are now lost. For that reason, al-Sufi’s own *Book of the Constellations of the Stars* becomes an important source of information on this topic. The sections on Bedouin constellations are not illustrated, with the exception of the chapter on Andromeda, which in the MIA copy has an illustration of three Bedouin constellations – a camel, a horse, and a fish – that were imagined to be near Andromeda. More will be said of this shortly.

The third section of each constellation chapter presents two drawings of the Greek/Ptolemaic constellation: one as seen on a globe, one as seen in sky. The globe view (pl. 120) presents an external view as if looking from outside the sphere of stars, while the other view (pl. 121) presents it viewed as if standing on earth and looking up at the underside of the sphere of stars. The result is that the figures are reversed left to right (or east to west). The basic outlines of the Greek mythological figures were maintained, though sometimes with substantial changes. For example, Orion in Greek mythology was a hunter carrying a lion’s skin over his arm. In all Islamic depictions, including this one, he is seen with an elongated sleeve rather than an animal skin.

The two illustrations of Orion (pls. 120 and 121) are a reminder that the majority of so-called “modern” star names are actually Latinised Arabic star names. The star on his left shoulder, for example, is  $\alpha$  *Orionis*, the tenth-brightest star in the sky, whose “modern” name Betelgeuse derives from the Arabic *yad al-jawza’* (arm of the giant), while the star on his right front foot, the seventh-brightest star in the sky ( $\beta$  *Orionis*), is called Rigel, from the Arabic for foot (*rijl*). The rightmost of the three stars forming Orion’s belt,  $\delta$  *Orionis*, takes its name Mintaku from the Arabic for the entire belt, *mintaqat al-jawza’* (the belt of the giant). The great Nebula of Orion (M42) does not seem to have been recorded at the time.

Ptolemy’s *Almagest* had no constellation illustrations, and therefore could not have served as a source for these portions of the treatise. In his introduction, however, al-Sufi gives us some clues as to his sources. He speaks of having seen an illustrated book on constellations in the handwriting of ‘Utarid ibn Muhammad al-Hasib, a ninth-century astronomer and mathematician; the book is regrettably lost today.<sup>8</sup> Al-Sufi also reports having seen a number of celestial globes made by instrument-makers in Harran (between the northern reaches of the Euphrates and Tigris rivers), as well as a particularly large globe made by ‘Ali ibn ‘Isa, an important instrument-maker working in Baghdad in the early ninth century.<sup>9</sup> None of these early globes or books on constellations is known to have survived, so we cannot evaluate al-Sufi’s work in terms of the specific sources he employed.

We do, however, have an important clue as to his working method. According to the eleventh-century polymath Abu’l-Rayhan al-Biruni (d. 1048), al-Sufi had told the astronomer Abu Sa’id Ahmad al-Sijzi, who was working in Shiraz at the same time, that he (al-Sufi) “had placed thin paper (*al-kaghidh al-raqiq*) on the sphere [of a celestial globe] and wrapped it around its surface until it conformed very neatly (*muhandam<sup>m</sup>*) to its surface area. Then on top of it, he drew the constellations (*suwar*) and indicated



اسماء الكواكب

سجل الكواكب الجوزان بالاربع مت على ان الجليل

العرض	الطول	الاسم	الوصف
1	ط	م	السيافى الذى في راس الجوز وهو الثلثة المقادير
2	ط	م	النير الذى على المنكب الايمن وهو يوزن الى الخوصى
3	ط	م	الذى على المنكب الايسر
4	ط	م	المانى الذى تحت هيرا
5	ط	م	الذى على البرموز الايمن
6	ط	م	الذى على السباع الايمن
7	ط	م	المانى الذى على راس الاربعه الاضلاع الى الشمال اليمنى
8	ط	م	المقدم من الضلع الجنوى
9	ط	م	الذى على الضلع الشمالى على الكف اليمنى ايضا
10	ط	م	الذى على صدر النير ان اوصو المنقح من الضلع الشمالى
11	ط	م	المقدم من الايمن المذنبه العمادات الكتلاب
12	ط	م	المانى منهما
13	ط	م	المقدم من النير الذى من الاربعه الى كفا على خط حسيه على
14	ط	م	المقدم من الضلع
15	ط	م	التاسع وهو المدمر من الاربعه المقدم الى ايضا
16	ط	م	الباقى وهو الثلثة من الاربعه
17	ط	م	اخذ الثلثه الى خط الجوز الايمن للذي ليس من الشمال
18	ط	م	المانى من اربعة ارباع السماء
19	ط	م	المانى من اربعة ارباع السماء
20	ط	م	الرابع من اربعة ارباع السماء
21	ط	م	الخامس من اربعة ارباع السماء
22	ط	م	السادس من اربعة ارباع السماء
23	ط	م	السابع من اربعة ارباع السماء
24	ط	م	الثامن من اربعة ارباع السماء
25	ط	م	الباقى الذى في البلد وهو ارباع الى الجنوب
26	ط	م	المقدم من الملهه التى على المذنبه
27	ط	م	الوسط منها
28	ط	م	الثالث من الثلثه
29	ط	م	الثاني من الثلثه وهو على طرف السيف وهو على مقبضه
30	ط	م	المقدم من الثلثه وهو الشمال المصطفى على السيف
31	ط	م	الاول من الثلثه الذى على السيف
32	ط	م	الثاني من الثلثه الذى على السيف
33	ط	م	الثالث من الثلثه على طرف السيف
34	ط	م	المقدم منهما

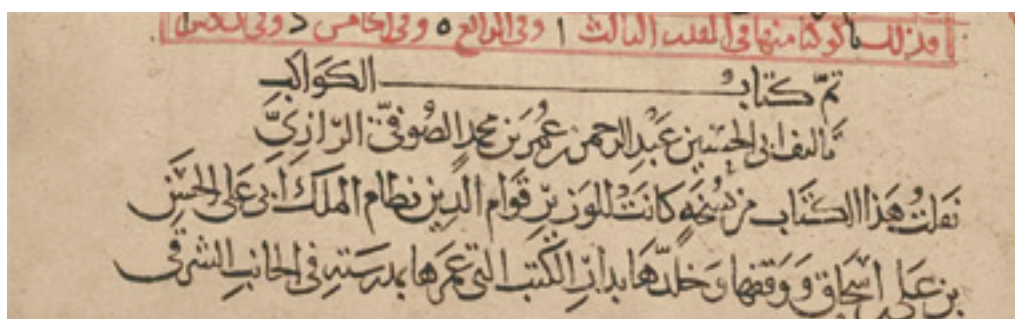
122 Star catalogue for Orion, showing the entries for the first 34 of 38 stars forming the constellation, from a copy of 'Abd al-Rahman al-Sufi's *Book of Constellations* made in Baghdad in 1125.

the stars with dots in accordance with the way they appeared through the transparency (*bi'l-shaffaf*)."<sup>10</sup> What globe this might have been, of course, we do not know.

What we know with certainty was that al-Sufi intended his treatise on the constellations to be of use to owners of celestial globes. For why else would he have included, for each and every constellation, a picture of how it looked on a celestial globe? The globe view, moreover, always precedes the sky view for all forty-eight constellations.

The fourth and final section in each constellation chapter reproduces the star list for that constellation given by Ptolemy in the *Almagest*, but with certain important modifications (pl. 122). Each star is numbered within the constellation and said to have





123 Beginning of the colophon, beneath the star catalogue for the last constellation, the Southern Fish (Piscis Austrinus), from a copy of ‘Abd al-Rahman al-Sufi’s *Book of Constellations* made in Baghdad in 1125. MIA, Doha (MS.2.1998, folio 161a).

a specified position within the constellation (“on the left leg,” “on the right side,” etc.), all of which is derived from the *Almagest*. In the case of the entry for Orion, al-Sufi adheres strictly to the *Almagest* when describing the stars on the long sleeve, stating that the nine stars are “in the skin (*al-jild*) worn on the left arm,” even though in the descriptive portion of the chapter al-Sufi had said they were on an elongated sleeve (*al-kumm*). Coordinates are then given for each star in terms of degrees and minutes of degrees. The first three columns to the left of the descriptive statement provide the longitudes, which al-Sufi took from the *Almagest* but increased by 12 degrees 42 minutes to correspond to al-Sufi’s epoch of the beginning of the year 1276 of the era of Alexander (1 October 964). The next two columns give the latitudes, for the most part those of Ptolemy. Finally, the far-most left-hand column provides the magnitudes, ranging from 1 to 6 (1 being the brightest). Al-Sufi re-observed the magnitudes himself and made substantial changes from Ptolemy’s list (Kunitzsch 1986, 57).

In order to appreciate fully the importance of this particular copy now in the MIA, it is necessary to examine fully the colophon of the manuscript – that is, the statement at the end of the treatise where the copyist states when and under what circumstances he made the copy. It is an unusually long and involved colophon, and to go through it line by line may be a bit tedious, but I think we must do just that. Three distinguished scholars – Barbara Brend, Robert Hillenbrand, and David King – prepared a translation of the colophon as part of their extensive sale catalogue entry (Sotheby’s 1998, 33–48, lot 34), and we are all indebted to their fine work. There are places, however, where I read the text slightly differently.<sup>11</sup>

The colophon begins at the bottom of folio 161a (pl. 123 and Appendix), beneath the star catalogue for the final constellation, the Southern Fish (Piscis Austrinus), with the copyist speaking in the first person:

The end of the *Book of Stars*,  
written by Abu’l-Husayn ‘Abd al-Rahman ibn ‘Umar ibn  
Muhammad al-Sufi al-Razi [that is, from Rayy].

I copied this book from a copy that belonged to the *wazir* Qiwam al-Din [ibn] Nizam al-Mulk Abu ‘Ali al-Hasan ibn ‘Ali ibn Ishaq,<sup>12</sup> which he endowed as a *waqf*, for its everlasting preservation, to the library [*dar al-kutub*] that he had built in his *madrasa* in the eastern quarter

[the colophon continues overleaf on folio 161b (pl. 124), with a reference to the famous Nizamiya Madrasa built by Nizam al-Mulk in Baghdad in 1067]

of Baghdad. ☉

And it [that copy] was in the handwriting of Hibat Allah ibn Bishr al-Sham’i. Its

مِنْ مَلِيئَةِ السَّلَامِ ۝ وَهِيَ خَطُّ هَيْبَةَ اللَّهِ بْنِ بَشِيرٍ الشَّمْعِيِّ تَارِيخُهَا الْجُمَادَى الْأُولَى سَنَةِ  
 سَبْعٍ وَعِشْرِينَ وَارْبَعِ مِائَةِ الْحِجْرَةِ وَقَدْ ذَكَرَ هَيْبَةُ اللَّهِ أَنَّهُ نَقَلَهَا مِنْ نُسخَةِ فَرَجِ بْنِ  
 عَبْدِ اللَّهِ الْجَبَلِيِّ الْمُجَمَّرِ مَوْلَى أَبِي الْحُسَيْنِ الصُّوفِيِّ مُصَنَّفَ هَذَا الْكِتَابِ وَتَلْمِذَهُ  
 وَأَنَّ فَرَجَ بْنَ قُرَيْشٍ نَقَلَ عَلَى اسْتِزَارِهِ وَأَخَذَ خَطَّهُ فِيهَا بِالْحِجْرَةِ ۝ وَنَقَلْتُ  
 هَذَا الْكِتَابَ مُقَلِّدًا لِهَيْبَةَ اللَّهِ بْنِ بَشِيرٍ وَمُحْتَدِيًا فِعْلَهُ فِي السَّخْرِ وَالصُّورِ وَتَبَيَّنَ  
 مَوَاضِعَ الْكُتُوبِ وَقَعَ الْفُرَاقُ مِنْ هَذَا الْكِتَابِ فِي مُسْتَهْلِ الْحَرَمِ سَنَةِ تِسْعٍ  
 عَشْرَةَ وَخَمْسِينَ كَتَبَهُ لِنَفْسِهِ عَلِيُّ بْنُ عَبْدِ الْجَلِيلِ عَلِيُّ بْنُ مُحَمَّدٍ مَدِينَةِ السَّلَامِ  
 وَالْحَمْدُ لِلَّهِ وَصَلَوَاتُهُ عَلَى سَيِّدِنَا مُحَمَّدٍ وَآلِهِ الطَّاهِرِينَ  
 وَسَلَامُهُ

وَعَارَضْتُ هَذَا الْكِتَابَ مِنْ أَوْلَادِهِ إِلَى آخِرِهِ فِي مَدِينَةِ الْمَدِينَةِ ذَكَرَهَا بِالْبَيْتِ الَّذِي خَلَّتْ  
 حُرَانُهُ الْمَلِكُ عَبْدُ الْمَدِينَةِ ابْنُ شَمَّاعٍ فَخَسِرَ مِنْ رِزْقِ الْمَدِينَةِ رَضِيَ اللَّهُ عَنْهُ وَهِيَ نُسخَةُ  
 خَطِّ جَبَلِيِّ مَوْلَى ابْنِ الْكُوْتِيِّ وَالْإِصْلَاحَاتُ الَّتِي بَيَّنَّهَا الْإِطْرَاقُ فِي هَذَا الْكِتَابِ إِلَى الْحُسَيْنِ الصُّوفِيِّ  
 مُصَنَّفِ هَذَا الْكِتَابِ وَالصُّورِ جَمِيعًا صَنَعَهَا ابْنُ الْحُسَيْنِ الصُّوفِيِّ بِيَدِهِ وَهَذَا النَّسخَةُ  
 تَمَّتْ فِي خِرَازِنِ الْمَلِكِ فِي يَوْمِهِ حَتَّى انْتَهَتْ إِلَى السَّعْدِيَّةِ فَمَرَّ بِهَا أَبُو الْقَاسِمِ الْفَيْيَاقِيُّ بِاللَّهِ  
 فَوَقَّعَهَا ۝ وَابْتَدَأَ الرَّبَائِعُ وَصَحَّحْتُ هَذَا الْكِتَابَ بِغَايَةِ الاجْتِهَادِ وَأَصْلَحْتُ مِنْ صُوَرِهِ مَا  
 أَمَكَرَ إِصْلَاحًا مَوْضِعًا وَمَلَأْتُ بِكُنْ صَوْتَهُ مُغَرَّدًا فِي أَرَاقِ صَفْحَتَيْهِ إِلَى الْكِتَابِ  
 بَعْدَ التَّصْبِيهِ وَاجْتَدَيْتُ فِي عَمَلِ الصُّورِ صَنَعًا صُوفِيًّا وَرَسَمُهُ بِاللَّهِ الْوَقِيْتُ

124 Continuation of the colophon from a copy of 'Abd al-Rahman al-Sufi's *Book of Constellations* made at Baghdad in 1125. MIA, Doha (MS.2.1998, folio 161b).

date was Jumada I 427 H [March 1036]. Hibat Allah had said that he copied it from a copy by Faraj ibn 'Abd Allah al-Habashi the astronomer (*al-munajjim*), a protégé (*mawla*) and pupil of Abu'l-Husayn al-Sufi, the author of this book. And [Hibat Allah also said] that Faraj read that copy of his to his teacher [al-Sufi] and had gotten his signature [testifying] to its accuracy. ☉ I transcribed this book, copying precisely Hibat Allah ibn Bishr and imitating his method of working (*fi'l*) in regard to the transcription (*naskh*), the drawings (*suwar*), and the illustration (*tabyin*) of the positions of the stars. The copying of this book was done during the beginning [*mustahall*] of Muharram of the year 519 [circa 7 February 1125], and 'Ali ibn 'Abd al-Jalil ibn 'Ali ibn Muhammad copied it for his own use [*li-nafsihi*] in Baghdad.

Praise be to God, and blessings and peace be upon our lord Muhammad and his pure family.

As if that is not enough, the copyist then continues on the same page with eight more lines of information, writing in a hand that has slightly more ligatures (pl. 124, lower half):

I compared this book from its beginning to end, during the month of Safar of the year mentioned earlier [March 1125], with the copy that was made for the treasury of al-Malik ʿAdud al-Dawla Abu Shujaʿ Fana-Khusraw ibn Rukn al-Dawla, may God be pleased with him, and it was a copy in an upright? (*mujallas*) script derived from Kufic, and all of the corrections and additions which were in it were in the handwriting of Abuʿl-Husayn al-Sufi, the author of this book, and all the drawings (*suwar*) were the work of (*sanʿa*) Abuʿl-Husayn al-Sufi in his own hand.

And this copy moved about amongst the treasuries of the rulers of the Banu Buway [the Buyids] until it reached al-Sahliya, head housekeeper (*qahramana*) of the Prince of Believers [the caliph] al-Qaʿim bi-Amr Allah (d.1075),<sup>13</sup> and he [the caliph] bequeathed it as a *waqf*. ☉

I have confirmed the transmission [of the text; *al-riwaya*]<sup>14</sup> and corrected this copy with utmost diligence. I improved its illustrations as much as it was possible to do so in their given position, but when this was not possible, I drew it by itself on leaves of paper which I added to the book after the poem. And in the production of the illustrations (*suwar*) I took as a model the workmanship (*sanʿa*) and draftsmanship (*rasm*) of al-Sufi. [Only] in God is there success.

From this colophon we learn that our copyist employed two copies (or what are called “exemplars”) to create his own copy – one used in February and another in March of 1125. We also learn that the second copy, the one that had been made for al-Sufi’s patron ʿAdud al-Dawla, had been owned by various Buyid rulers in Iraq until it finally came into the hands of a woman named al-Sahliya who held the position of *qahramana* (manageress of the women’s quarters) at the court of the caliph al-Qaʿim bi-Amr Allah.

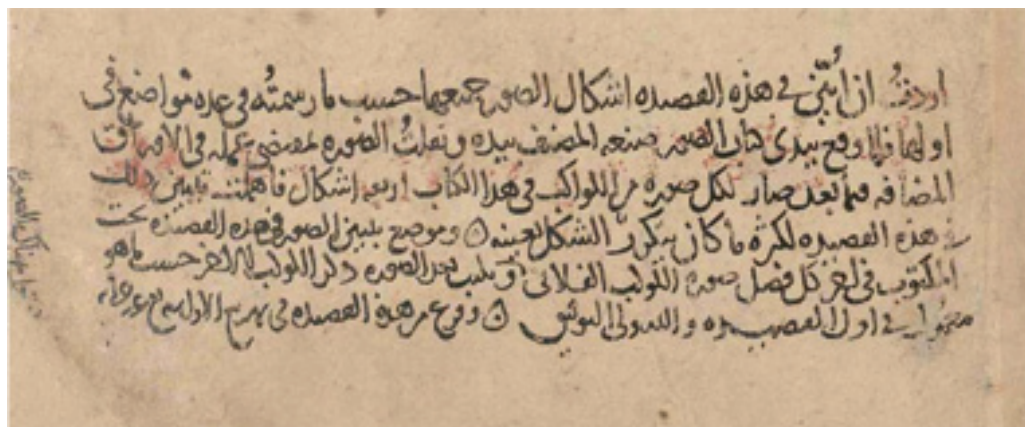
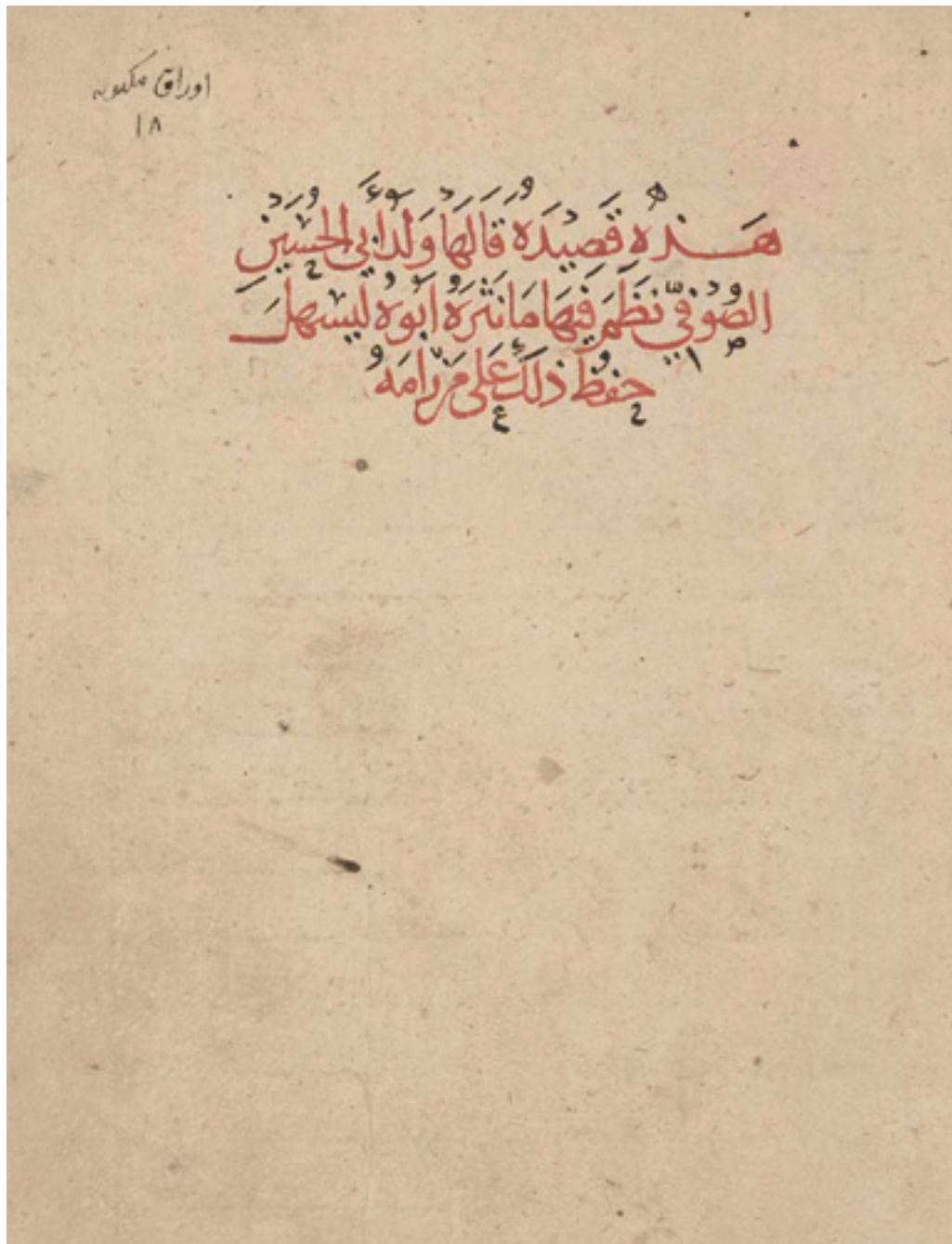
Notice also that the copyist mentioned that he added leaves of paper “after the poem.” The poem immediately follows the colophon given above. The relatively short didactic poem on the stars was written by al-Sufi’s son, as is evident from the title page for the poem (pl. 125), and the MIA manuscript contains the earliest preserved copy of it (Carey 2009). However, at the end of the poem there are no extra leaves of paper with drawings on them, but rather there is yet another colophon written by our copyist (pl. 126), in which the copyist again speaks in the first person:

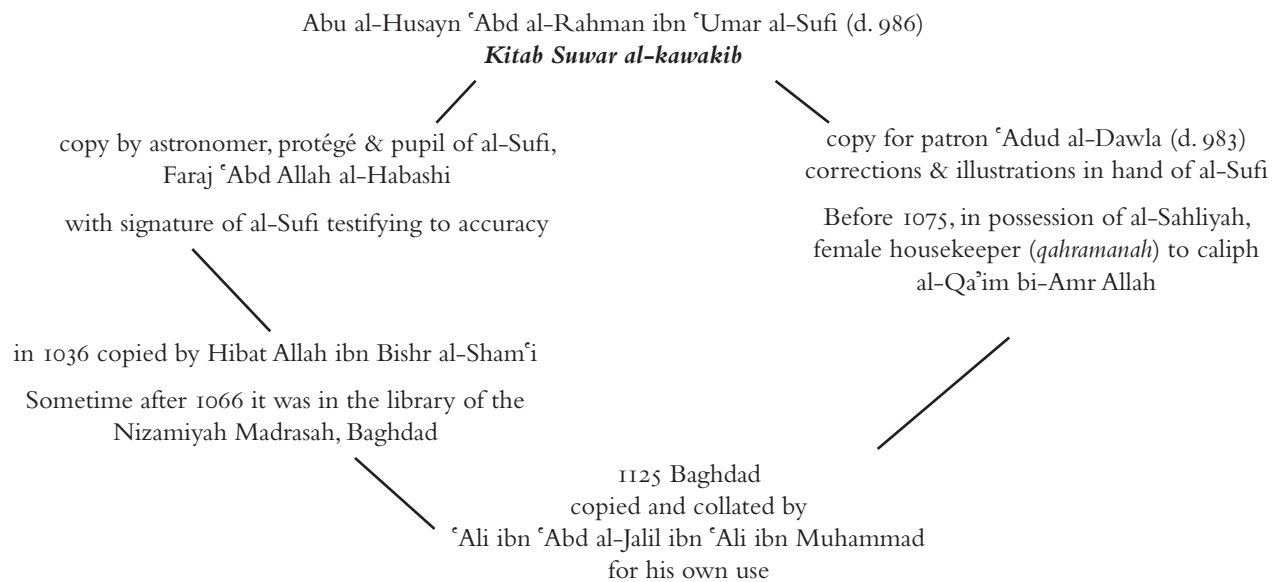
I desired to make clear in this poem all the types of illustrations (*ashkal al-suwar*), in keeping with what I recorded, in a number of places at its [the poem’s?] beginning.<sup>15</sup> For when I encountered personally (*bi-yaday*) the book of illustrations that the author had composed in his own hand, and I had copied the illustration (*al-sura*), following carefully (*bi-muqtāʿa*) his work, onto the leaves added later, each illustration (*sura*) of the constellations in this book had four forms (*ashkal*). But I omitted illustrating (*tabyin*) that in this poem because the same form was often repeated. ☉



125 Title page for the didactic poem, reading “This is a poem that the son of Abu’l-Husayn al-Sufi composed (*qala*), in which he versified what his father had written in prose in order to facilitate the memorization for whoever wishes,” from a copy of ‘Abd al-Rahman al-Sufi’s *Book of Constellations* made in Baghdad in 1125. MIA, Doha (ms.2.1998, folio 162a).

126 (*below*) Final colophon by the copyist, written at the end of the didactic poem, from a copy of ‘Abd al-Rahman al-Sufi’s *Book of Constellations* made in Baghdad in 1125. MIA, Doha (ms.2.1998, folio 179a).





127 Diagram illustrating the relationships between the exemplars used by the copyist of a manuscript copy of ‘Abd al-Rahman al-Sufi’s *Book of Constellations* made in Baghdad in 1125.

The copyist appears to be saying that because each constellation is shown twice (once as on a globe and once as seen in the sky), and each constellation is discussed first in the prose treatise by al-Sufi and then again in the short didactic poem by his son, this resulted in his having four drawings for each constellation. However, since the illustrations in the poem would for the most part simply repeat those in the earlier prose treatise, he decided to omit the illustrations in the poem. As will be seen, however, he did in fact include illustrations for the first four constellations, at which point he presumably grew a bit tired. That his exemplar from which he was copying had illustrations in the poem is made clear from the sentence that follows, in which he states that he copied the label or legend “illustration of . . . (*surat* . . .)” at the point where there was an illustration for each constellation, though, as indicated above, he omitted the illustration itself:

The placement of the illustration in this poem is under the legend at the end of each *fasl*. The illustration (*sura*) of a given constellation [here a mark in the text inserts a now nearly illegible marginal comment] . . . after the illustration (*sura*) there is written the discussion of the next constellation in accordance with what was done at the beginning of the poem. And God it is who bestows success. ☉ The completion of the copying of this poem was during the month of Rabi’ I . . . [? of the same year, April 1125].

Putting together all this information, we come up with the following relationship between the various copies or exemplars employed by our copyist (pl. 127). It is evident that al-Sufi had direct influence on the accuracy of both exemplars (neither of which are preserved today). The exemplar our copyist used in February of 1125 was from the collection in the famous Nizamiya Madrasa library in Baghdad, and it had been copied in 1036. That, in turn, had been copied from an earlier copy made by a protégé and pupil of Sufi. That pupil, al-Habashi, had read it to his teacher and obtained al-Sufi’s signature as to its accuracy. The second exemplar that he used in March to April 1125 had been made for al-Sufi’s patron ‘Adud al-Dawla (sometime before 983, when the latter died), and all the corrections and illustrations (but not the text) were in the handwriting of al-Sufi himself. You could not have a better pedigree than that for a copy of the treatise.





128 Samples of two collation notes from a copy of 'Abd al-Rahman al-Sufi's *Book of Constellations* made in Baghdad in 1125; on folio 55b (left) the collation note is placed between the two images illustrating the constellation of Delphinus; on folio 66b (right) the collation note (now badly worn through thumbing of the volume) is placed in the lower corner of the page beginning the section on the twelve zodiacal constellations. MIA, Doha (MS.2.1998, folios 55b and 66b).

It has been suggested by the three scholars who prepared the Sotheby's sale catalogue that additions or corrections made in brown ink to the text and labels were made in February (that is, on the basis of the 1036 copy) and those in a slightly blacker ink were made in March, after finding the copy made for 'Adud al-Dawla (Sotheby's 1998, 35). I am not convinced that this holds true consistently. There is no doubt, however, that our copyist made changes and corrections to both the text and the illustrations. But on the basis of which exemplar is anything but clear.

Furthermore, not much additional help is provided by a note that occurs periodically throughout the volume (pl. 128), which roughly translates as: "Corrected by comparison with the original and made accurate; and corrected . . . [?] . . . against another copy in the handwriting of the author." These are standard collation notes, placed at the end of ten-folio quires.<sup>16</sup> They are a means by which the copyist kept track of what he had compared and collated and what he has not. They are not to be taken to refer specifically to a nearby illustration, as Brend, Hillenbrand, and King have suggested. Rather puzzling is the fact that they are all written in the brown ink that Brend, Hillenbrand, and King assign to the earlier period of February 1125. From their contents, however, it is evident that they must have been written *after* the second copy was available. Moreover, none of these notes occur in the portion of the manuscript





129 Constellation Cepheus, from a copy of 'Abd al-Rahman al-Sufi's *Book of Constellations* made in Baghdad in 1125; on the right-hand side is the figure as seen on a globe, while the figure as seen in the sky is on the left-hand side. MIA, Doha (MS.2.1998, folio 23a).

that contains the poem, so we do not know if the poem was part of just one of the copies or both, and, if just one, which one. This lack of information becomes crucial when we try to explain the radically different figure of Cepheus that illustrates the poem, compared with the two figures of Cepheus that illustrate the treatise proper.

Two views of Cepheus (pl. 129) accompany the *Book of Constellations* by al-Sufi, while a single depiction of Cepheus (pl. 130) occurs in the poem written by his son. Our copyist makes no comment regarding these radically different compositions. In addition to the obvious difference in hats and clothing, the external stars between the legs of the two figures in the prose treatise (pl. 129) are not indicated on the Cepheus figure from the poem (pl. 130). These stars are labeled “These are the sheep (*al-aghnam*)” because the stars of Cepheus were traditionally viewed by Bedouins as a shepherd with



130 Constellation Cepheus in the poem written by the son of 'Abd al-Rahman al-Sufi; only one figure is provided; it is the constellation as seen in the sky, although it is not so labeled. MIA, Doha (MS.2.1998, folio 166a).

his dog and sheep. Notice also that the two Cepheus figures illustrating the prose treatise (pl. 129) are not identical. The one on the left is drawn in red ink, unclothed, and has an ovoid helmet with no fur, while the one on the right is clothed and wears a helmet trimmed with fur. The one on the right has also been redrawn in places with a darker black ink using a stylus, perhaps suggesting revision from the second exemplar.

The northern constellation of Boötes presents a different conundrum. Only four constellations are illustrated in the poem (Ursa Major, Ursa Minor, Draco, and Cepheus, each with a single illustration, all of them a “sky view”). Therefore, for Boötes we have only one set of diagrams, those illustrating the prose treatise by the father (pl. 131). The two figures are dressed similarly, except for the headgear and hairstyles. But something is wrong here, for the star placements are the same for both figures; the globe figure should be reversed right to left, and it is not. The three-line label under the right-hand (globe) figure reads, in translation:

This figure was in its construction incorrect because I made it exactly that way, and the reason [for doing so] is that it was reversed, with its south to the north and its north to the south, in accordance with what the author stipulated.

This statement, if I have understood it correctly, raises more questions than it answers. I think the copyist is telling us that he purposely made this figure in this way (incorrect though it is) because he was following the instructions, or illustration (which one, is not clear from the Arabic), of the author himself. Since it is written in slightly darker





131 Constellation of Boötes, with the globe figure on the right and the sky figure on the left, from a copy of ‘Abd al-Rahman al-Sufi’s *Book of Constellations* made in Baghdad in 1125. MIA, Doha (MS.2.1998, folio 26a).

ink, this would suggest – following the Brend, Hillenbrand, and King theory regarding the inks – that it was written after seeing the copy that had illustrations in al-Sufi’s hand. But why would al-Sufi – or any noted astronomer – make such a basic astronomical mistake as to fail to flip or reverse the globe figure in relation to the sky figure? And if the label *was* added *after* seeing al-Sufi’s autograph, then what happened to the original figure drawn before the copyist saw the autograph? Or, was it that way in *both* exemplars? Moreover, the comment about the directions is curious (“with its south to the north and its north to the south”), for it is the East–West directions that need to be reversed, not the North–South.<sup>17</sup>



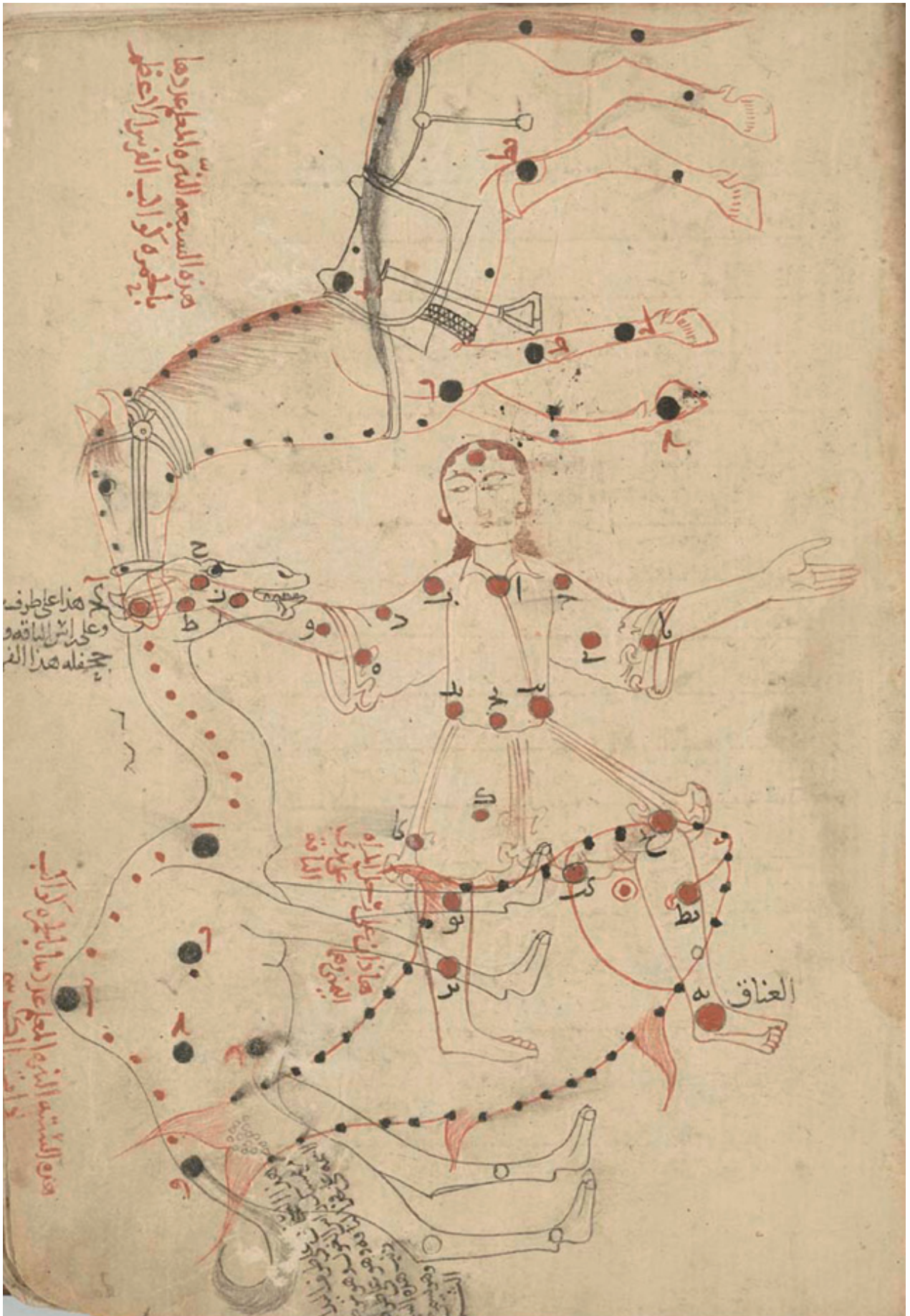
132 Constellation of Andromeda, with the globe figure on the right-hand page and the sky figure on the left, from a copy of 'Abd al-Rahman al-Sufi's *Book of Constellations* made in Baghdad in 1125. MIA, Doha (MS.2.1998, folios 62b–63a).

Another way in which our copyist made changes can be seen in the constellation of Andromeda (pl. 132). The two figures are fairly similar, for both wear typical three-pointed Seljuk crowns, though the globe figure wears ankle-length pantaloons and pointed black slippers, while the sky figure has bare legs and feet. Our copyist, however, went to some lengths to change the position of the feet. Initially the feet on both figures were splayed, but the right foot of the globe figure and left foot of the sky figure have been altered. It is not clear when this alteration was made, for there is no particular evidence that it was made in March after seeing the copy having drawings in al-Sufi's hand. Moreover, this alteration is of no significance in terms of the constellation design, for there are no stars in these feet. In other words, it would have no effect on the accuracy of the drawing.

133 (facing page) Constellation of Andromeda with three Bedouin constellations of a horse, camel, and fish, from a copy of 'Abd al-Rahman al-Sufi's *Book of Constellations* made in Baghdad in 1125. MIA, Doha (MS.2.1998, folio 65a).

The Bedouins populated the area of Andromeda with three animals: a horse, a camel, and a large fish. This copy is very rare in illustrating all three of these Bedouin images, superimposed over the classical form of Andromeda (pl. 133). This illustration is an exciting find – one that was rather overlooked in the sale catalogue. I suspect that this entire illustration, and the text on the back, may well be an addition made after seeing the second exemplar with its diagrams in al-Sufi's hand, for the quire of the manuscript has an extra folio at this point (eleven instead of ten leaves).





هذه السبعة النيرة المعروفة  
بأسماء كوكب النيرة الأعظم

هذا على طرف  
وعلى النيرة  
يختلف هذا النيرة

هذه السبعة النيرة المعروفة  
بأسماء كوكب النيرة الأعظم

هذه النيرة  
على النيرة  
هذه النيرة

العناق

هذه النيرة  
على النيرة  
هذه النيرة



134 (left) Constellation of Andromeda with three Bedouin constellations of a horse, camel, and fish, from a copy of ‘Abd al-Rahman al-Sufi’s *Book of Constellations* made in Mosul in 1170. Bodleian Library, University of Oxford (MS Huntington 212, folio 74b).

135 (right) Colophon of a copy of ‘Abd al-Rahmān al-Sufi’s *Book of Constellations* dated 400 H (= 1009–10) and signed al-Husayn ibn ‘Abd al-Rahman ibn ‘Umar ibn Muhammad. Bodleian Library, Oxford (MS Marsh 144, p. 419).

Only one other manuscript is recorded as having such an illustration (pl. 134), a manuscript now in the Bodleian, MS Huntington 212, copied in Mosul in 1170 (566 AH), forty-six years after the MIA copy.<sup>18</sup> This manuscript is evidently in poor condition and has been withdrawn from use. Textually, the 1170 Mosul copy appears closely related to that of the MIA copy. MS Huntington 212 also contains (on fol. 40b) an illustration of the constellation Cassiopeia overlaid with a camel, the same Bedouin camel that encroaches upon the territory of Andromeda (Wellesz 1964, 89, pl. 15; Savage-Smith 1992, 52, pl. 2.34). Unfortunately the portion of the text in the MIA copy that concerns Cassiopeia is an Ottoman replacement with only a single crude sketch of Cassiopeia made much later. It is likely, however, that the MIA manuscript did at one time include a comparable diagram of Cassiopeia with a Bedouin asterism.

Despite this defect, the manuscript copy now in the MIA is undoubtedly our most authoritative copy in terms of the age and accuracy of the exemplars from which the copyist produced it, and very valuable in terms of Bedouin imagery. But is it our earliest copy?



In the sale catalogue (Sotheby's 1998, 33), our three authorities (Brend, Hillenbrand, and King) listed the three earliest copies of al-Sufi's treatise, in chronological order, as:

- 1005–1011 St Petersburg, Institute of Oriental Studies, Russian Academy of Sciences, Arab. 185 [MS 85 Rosen Catalogue, MS C 724]
- 1009 Oxford, Bodleian Library, MS Marsh 144
- 1125 The present manuscript [now MIA, MS.2.1998]

We can in fact eliminate the St Petersburg copy from this list, for it is a sixteenth-century copy, probably made in Istanbul.<sup>19</sup> It consists of two discreet parts, each with its own colophon. One colophon states that it was based on a copy made in Cairo in 1011 (402 AH), which was said to have been made from an al-Sufi autograph; the second part states that it was based on a copy made in 1005 (396 AH) and collated with an exemplar that was copied from an autograph. Whatever the ages of the copies employed by its copyist, the St Petersburg manuscript itself is clearly not older than the MIA copy, nor more reliable.

That leaves us with the Oxford copy, and of course the one now at the MIA. The Oxford copy is a very famous manuscript that has been reproduced in facsimile and often cited as one of the earliest (if not *the* earliest) illustrated Arabic treatise preserved today.<sup>20</sup>

If the date given in the colophon (400 AH; 1009–10) is correct (pl. 135), it was copied within forty-five years of al-Sufi's original text. The name appearing in the colophon as the copyist is al-Husayn ibn 'Abd al-Rahman ibn 'Umar ibn Muhammad, and it has been interpreted as being al-Sufi's son (Wellesz 1959; Brend 1994; Carey 2009, 182). The poem, undoubtedly composed by the son, is not included in this copy, which is a curious omission if the son is actually the copyist and illustrator. However, there are other, more serious, problems with this colophon.

There are five particular areas of concern. First, the colophon (pl. 135) occurs on a fragmentary piece of paper, surrounded by the Latin notes of Christianus Ravius, written in 1644 while in Constantinople, stating that he copied missing parts of the manuscript from a more recent copy of the work (Wellesz 1959, 1–2). There are today about eleven folios in a slightly different hand than the rest of the volume. Second, the spacing of the lines of text on the back side of the fragment is not quite the same as the text spacing on other leaves, and the script differs in size and form from that of the rest of the volume. Third, the paper for the entire manuscript (and not just the fragmentary colophon) does not seem quite right for a manuscript of the very early eleventh century.<sup>21</sup> But then we have very few such ancient copies preserved with which to compare it. Fourth, the two lines of the colophon (pl. 135) read:

[1] *katabahu wa sawwarahu al-Husayn ibn 'Abd al-Rahman ibn 'Umar ibn Muhammad fi sana* (“al-Husayn ibn 'Abd al-Rahman ibn 'Umar ibn Muhammad copied it and illustrated it in the year”)

[2] *arba'a mi'a sana* (“400 year”)

136 (p. 148) Virgo as seen on a globe, from a copy of 'Abd al-Rahman al-Sufi's *Book of Constellations* dated 400 H (1009–10) and signed al-Husayn ibn 'Abd al-Rahman ibn 'Umar ibn Muhammad. Bodleian Library, Oxford (MS Marsh 144, p. 223).

137 (p. 149) Virgo as seen in the sky, from a copy of 'Abd al-Rahman al-Sufi's *Book of Constellations* dated 400 H (1009–10) and signed al-Husayn ibn 'Abd al-Rahman ibn 'Umar ibn Muhammad. Bodleian Library, Oxford (MS Marsh 144, p. 224).

138 (p. 150) Virgo as seen on a globe, from a copy of 'Abd al-Rahman al-Sufi's *Book of Constellations* made at Baghdad in 1125. MIA, Doha (MS.2.1998, folio 93a).

139 (p. 151) Virgo as seen in the sky, from a copy of 'Abd al-Rahman al-Sufi's *Book of Constellations* made in Baghdad in 1125. MIA, Doha (MS.2.1998, folio 93b).



وذكر العذر اعلى ما  
رى في الكثره



كوكبه العبد من  
سنة السما









تُرَى فِي السَّمَاءِ

صُورَةُ الْعِزْرَةِ عَلِيٍّ مَا



Under close examination, these two lines of the colophon do not seem to be in the same hand as the text itself, and are written in a different ink. Lastly, the final word of the second line of the colophon is very curious. It appears to be the word *sana* (year) repeated, but it is written differently from the way it is written in the previous line, and it is grammatically incorrect. It may have been added later, or it may be another word entirely that has not yet been deciphered.

In other words, the colophon appears very possibly to have been added *later*. This manuscript, MS Marsh 144, has consequently been classified as a “semi-fake” by A. Soudevar, a specialist in Islamic manuscripts, who proposed that the manuscript itself actually dates from the twelfth or thirteenth century (Soudavar 1999, 262–63). Earlier, Barbara Brend had proposed an ingenious solution to the disturbing discrepancies in this manuscript by suggesting that al-Husayn ibn ‘Abd al-Rahman ibn ‘Umar ibn Muhammad, whom she takes to be the son, began the copy, but then died. Then at a later date, possibly before the 1130s (a century and a quarter later), the manuscript was “restored” (re-copied?) and completed “in a style heavily indebted to Central Asia” (Brend 1994). The manuscript has recently been the subject of much scrutiny in Oxford, with a seminar being held for art historians and other interested parties to discuss the matter. The general conclusion was that there are serious problems with this colophon, but that the manuscript is of a respectable age, probably completed shortly before 1200, one person proposing that it may have been made in Egypt.

There is also one additional feature that convinces me, as a historian of science, that MS Marsh 144 could not have been made by the son of the astronomer al-Sufi, and that is the way the constellation of Virgo is depicted as compared to the drawings in the MIA manuscript. The two pictures of Virgo in the MIA manuscript (pls. 138 and 139) each have wings. The colored painting of Virgo as seen on a globe (pl. 138), although quite attractive, has been added much later, for both would have been line drawings without coloration. In contrast to the two in the MIA manuscript, the figures of Virgo in the Oxford manuscript (pls. 136 and 137) have lost their wings.

In al-Sufi’s *Book of the Constellations*, several stars in Virgo are specified in the text as well as in the star catalogue to be on the wings, and are described with phrases such as “on the tip of the left, southern, wing” and “the foremost of the three which are on the right, northern, wing.” In other words, wings are specified and required for this constellation. Their omission in the Oxford copy would never have been made by an astronomer. As a result of this omission, however, and because the Oxford manuscript carries this early date of 1009, it has entered the literature, quite erroneously I feel, that Virgo was transformed by al-Sufi into a “dancing girl” (for example, Berlekamp 2011, 123–25). Rather, it is a change produced by an aberrant, though very talented, copyist and artist, and it argues strongly against it having been made by al-Sufi’s son, who was an author in his own right of a didactic poem on constellations.

In summary, then, a general consensus seems to be emerging that this famous manuscript now in Oxford was in fact produced not at the beginning of the eleventh century, but at the end of the twelfth century. If this is the case, and it seems very likely that

it is, then the manuscript now in the MIA is not only the most authoritative copy, but also the oldest copy, of what came to be one of the most influential treatises in the history of astronomy.

‘Abd al-Rahman al-Sufi’s illustrated book was not a treatise concerned with the mathematical technicalities of astronomy, but rather one that served a broader purpose, which no doubt accounts for its immense popularity and later influence. Because of its remarkable illustrations of all forty-eight classical constellations – each with two views – the treatise could be enjoyed by armchair astronomers who wanted to identify the constellations on their globes, for – just as in eighteenth-century Europe – every wealthy gentleman and prominent ruler would have had a globe as part of his library and collection of treasures.

At the same time, the star catalogues for each constellation served as an important direct source of star coordinates for makers of astrolabes and globes. Moreover, the accompanying text by al-Sufi provided fascinating comparisons between the star lore of pre-Islamic times (which was a prominent feature of early Arabic poetry) and the classical Greek conceptions of the skies. Whether it was ‘Abd al-Rahman al-Sufi’s intention or not, this treatise was instrumental in displacing the traditional Bedouin constellation imagery and replacing it with the Greek/Ptolemaic system which ultimately came to dominate all astronomy. And anyone lucky enough to be able to look through this entire manuscript will be captivated by its dual images: the globe view mirroring the sky view, and both reflecting the order and beauty of the heavens and God’s creation.

## Notes

- 1 He was born in Rayy on 14 Muharram 291 (7 December 903) and died on 13 Muharram 376 (25 May 986), completing 85 lunar years or 83 solar years (Ibn al-Qifti 1903, 227). See Sezgin 1978, 212–15.
- 2 The description of star positions is according to the old Arabic tradition, and when he attempts to use the Ptolemaic system errors occur. Al-Sufi later refuted certain ideas that were presented in this early treatise (Vafea 2006, 480–82, 490–91).
- 3 It was made in 1080 (473 AH) or 1085 (478 AH) by a well-known astrolabe maker Ibrahim ibn Sa’id al-Sahli al-Wazzan in collaboration with his son Muhammad (Florence, Istituto e Museo di Storia della Scienza, inv. no. 2712; see Savage-Smith 1985, 24, 217; Dekker 2004, 112–18). An undated and unsigned globe of essentially the same time period, and of very similar design, is now in the Bibliothèque nationale de France (Dekker and Kunitzsch 2008–09).
- 4 Al-Sufi adjusted the coordinates of celestial longitude (by adding 12° 42’ to those in the *Almagest*) to correspond to the beginning of the year 1276 of the Alexandrian era, which is equivalent to 964 CE.
- 5 Al-Sufi called the constellation of Andromeda “the constellation of the chained woman” (*surat al-mar’a al-musalsala*), adding that she was also called “the woman who never had a husband.”
- 6 Oxford, Bodleian Library, ms Marsh 144, p. 167. This manuscript is discussed in some detail at the end of this essay. In the illustration next to star number 14, and on the nose of the larger fish, three vertical marks have been made, surrounded by a circle of dots and dashes; this is the only known example of a possible representation of the Galaxy in an Arabic copy of this



particular figure, for in other copies of this figure (such as that in Oxford, Bodleian Library, ms Huntington 212), there are no similar marks on the nose of the larger fish. Kunitzsch (1987) also provides an example of a possible representation of the Andromeda Galaxy from a Latin copy showing the two fishes over the bodice of Andromeda. The illustration of Andromeda with two overlaid fishes from ms Marsh 144 has also been reproduced in Wellesz 1959, pl. 11; Wellesz 1964, pl. 7.

- 7 Folios 1 (including title page), 3, and 8 of the introduction are later (Ottoman) replacement leaves, as are folios 35–44 (entries Cygnus, Cassiopeia, Perseus, and partially Auriga) and folios 68–75 (entries for Aries and Taurus).
- 8 ‘Utarid ibn Muhammad al-Hasib is said to have also written on the astrolabe and armillary sphere; Ibn al-Nadim 1871–72, 278; Dodge 1970, 2:658; Sezgin 1978, 161; Vafea 2006, 32–33.
- 9 Ibn al-Nadim 1871–72, 284; Dodge 1970, 2:671; Vafea 2006, 24–27. ‘Ali ibn ‘Isa’s treatise on the astrolabe is the earliest still preserved (Cheikho 1913; Schoy 1927). The modern editors of al-Sufi have erroneously added “al-Harrani” to ‘Ali ibn ‘Isa’s name (‘Abd al-Rahman al-Sufi, 5, line 15); in the MIA copy, this portion of the text is an Ottoman replacement page, but it also has al-Harrani added to the name (ms.2.1998 fol. 3a, line 5).
- 10 Abu’l-Rayhan al-Biruni adds to this account the comment: “And that is an [adequate] approximation when the figures are small, but it is far [from adequate] if they are large.” This passage occurs in al-Biruni’s *The Book of the Plane Projection of Constellations and the Melon-shaped Projection of Countries* (*Kitab fi tastih al-suwar wa tabtikh al-kuwar*). The translation is that of the present author; for a slightly different translation and the Arabic text, see Berggren 1982, 53 and (Arabic) 89, lines 20–25; see also Richter-Bernburg 1982, 116.
- 11 I wish to thank Geert Jan van Gelder, Hugh Kennedy, Luke Treadwell, and Alasdair Watson for making suggestions regarding the reading of the colophon. All errors of interpretation, however, remain my own.
- 12 Celebrated minister to the Saljuk sultans Alp Arslan and Malikshah (*Encyclopaedia of Islam* / 2: “Nizam al-Mulk”).
- 13 The twenty-sixth ‘Abbasid caliph, who ruled 1031–75, coinciding with the end of the Buyid dynasty and the beginning of the Saljuk period in Iraq (*Encyclopaedia of Islam* / 2: “al-Ka’im Bi-amr Allah”). In the ‘Abbasid caliphate, the *qahramana* was effectively the manageress of the women’s quarters and second only to the queen mother among the caliph’s female establishment.
- 14 The term *al-riwaya* was used in *ijzas* in expressions such as *bi-haqq al-riwaya*, meaning “with right to teach on the authority of another.”
- 15 The meaning is obscure here, but a possible interpretation is that the copyist is referring to the earlier colophon that preceded the poem.
- 16 Their first occurrence is on 33b (intervening Ottoman replacement leaves have disturbed the numeration), then 45b, 55b, 66b, 76b, 86b, 96b, 106b, 116b, 126b, 136b, 146b; between 66b and 76b there are also several Ottoman replacement leaves, but the foliation is not affected, while between 55b and 66b there are no replacement leaves, but there are eleven instead of ten leaves in the quire. The volume has been foliated with numbers placed on the right-hand leaves (the ‘b’ side of a folio).
- 17 Boötes is one of the few constellations that at times appears to stand upright, with the head to the North.
- 18 The copy was possibly dedicated (in a now partially illegible dedication) to Sayf al-Din Ghazi II, at that time the Zangid Atabeg ruler in Mosul. See Wellesz 1964, 89–90.
- 19 For sample illustrations and a discussion of the manuscript, see Caiozzo 2009, 118. The manuscript is bound with seventeen woodcut printed pages of an illustrated Latin constellation text, *Poeticon Astronomicum*, by Julius Higinus, which have been inserted beside each image; the copy at one time belonged to Taqi al-Din al-Misri, director of the observatory in Istanbul in the late 1570s.
- 20 For example, Yves Porter says of this manuscript: “The Oxford copy of the *Suwar* is one of the key monuments of Islamic painting. Indeed, it is the oldest complete illustrated manuscript that

