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**'Depingo ut ostendam, depictum ita est expositio':
Diagrams as an Indispensable Complement to the
Cosmological Teaching of the 'Liber Nemroth de
astronomia'**

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Isabelle Draelants

3 “*Depingo ut ostendam, depictum ita est expositio:*” Diagrams as an Indispensable Complement to the Cosmological Teaching of the *Liber Nemroth de astronomia*

“Reason sinks into the mind more easily when expressed by drawing than by speech,” says Macrobius in his *Commentarii in Somnium Scipionis* (II, 5, 13), adding, as he introduces his first diagram: “Since our eyes often open the way to the understanding of a problem, it would be as well to draw a diagram” (I, 21, 3).¹ I suspect that these precepts are exactly what the author of the *Liber Nemroth de astronomia* (henceforth *LN*) had in mind when he wrote the didactic dialogue between Nemroth (i.e., Nimrod) and his pupil Ioanton and illustrated it by mixing colored graphs and pictures. This work of cosmogony, astronomy, and computus science (a calculation that determines the calendar dates) is a strange and still rather unknown Latin treatise compiled, to all appearances, sometime between the sixth and the middle of the tenth century. It deserves more attention than it has received until now.²

My aim here is to show how the “auctorial paratext,” as defined by Gérard Genette,³ supports the text of the *LN* and is a visual complement to the doctrinal argument, because it even adds new matter to it. Indeed, the *LN* is made up of more than eighty chapters and fifty diagrams or tables.⁴ Such a concentration of iconographic paratext is quite rare in Latin medieval literature, even in scientific texts. Furthermore, in astronomical Latin works, illustrations and diagrams do not appear before the sixth century. In this scientific dialogue, the image does not have an ornamental value nor does it play a decorative role. The function of the picture and the paratext is not simply mnemonic, as is usually the case in the Middle Ages. Indeed, in the *LN* the text is possibly unintelligible without the accompanying explanatory illustration. The diagrams and tables are arguments unto themselves, a feature shared by other works of medieval science.⁵

Manuscript Tradition and Literary Accounts of the *LN*: A Summary

Before we go into greater detail on the topics and contents of the *LN*, the diagrammatic summary of the manuscript tradition provided in Figure 3.1 (to be read in conjunction with the list of abbreviations in Table 3.1) shows that, despite the small number of extant copies, these were spread all over Europe, but mainly in southern Italy, southern England, and northern France, in places that were part of the Norman kingdoms.⁶ In actual fact, there are only four extant copies of the latin *LN* – one of which I discovered in Turin (*T*) – which date from the eleventh to the end of the thirteenth century. These four extant copies alone have retained the iconographical part of the work. In addition, there exist some fragmentary manuscripts that have kept no more than short passages of it. I have also found one manuscript written in Beneventan script in Montecassino (*M*) during the third quarter of the eleventh century, that preserves a complete copy of chapter 61.⁷ There also exist some records of manuscripts in catalogues of medieval libraries up to the sixteenth century, as well as literary accounts of these works from the tenth century onwards.⁸

Table 3.1: Abbreviations of Manuscripts of the *LN*.

| Abbreviation | Manuscript |
|--------------|---|
| <i>Eg</i> | <i>Eg</i> = London, BL, Ms. Egerton 3314, fol. 48v |
| <i>H</i> | Halle, Landesbibliothek, Ms. Yc. oct. 8, fols. 84r–89r |
| <i>He</i> | Herten, Bibliothek des Grafen Nesselrode-Reichenstein, Ms. 192, fols. 89v–92r (lost) |
| <i>Lr</i> | London, BL, Ms. Royal 7 D XXV, fols. 65r–66r |
| <i>M</i> | Montecassino, Archivio dell'Abbazia, Ms. 318, pp. 29–42 |
| <i>O</i> | Oxford, Bodleian Library, Ms. Ashmole 191, fol. 46r |
| <i>P</i> | Paris, BnF, Ms. lat. 14754, fols. 203r–229r (<i>olim</i> Saint-Victor 877) ¹ |
| <i>T</i> | Turin, Biblioteca civica centrale, Ms. fondo Antonio Bosio, B. 176, fols. 1r–26rb |
| <i>Va</i> | Vatican City, Biblioteca Apostolica Vaticana, Ms. Pal. Lat. 1417, fols. 1r–19v ² |
| <i>Ve</i> | Venice, Biblioteca Nazionale Marciana, Ms. lat. VIII. 22 (2760), fols. 1r–31r |
| <i>Z</i> | Zurich, Universitätsbibliothek, Ms. Car. C 180, fols. 81r–82r |

1. Recently reproduced (as part of the Polonsky Program) at <http://gallica.bnf.fr/ark:/12148/btv1b9072645h>.

2. Reproduced at http://digi.ub.uni-heidelberg.de/diglit/bav_pal_lat_1417/0010.

The Dialogue between Nemroth and Ioanton begins with the *celum inclinatum* (the inclined sky) and ends with the death of Nemroth (chapter 82, as preserved in *Va* and partially in *T*). The summary shows that a part of the manuscript tradition

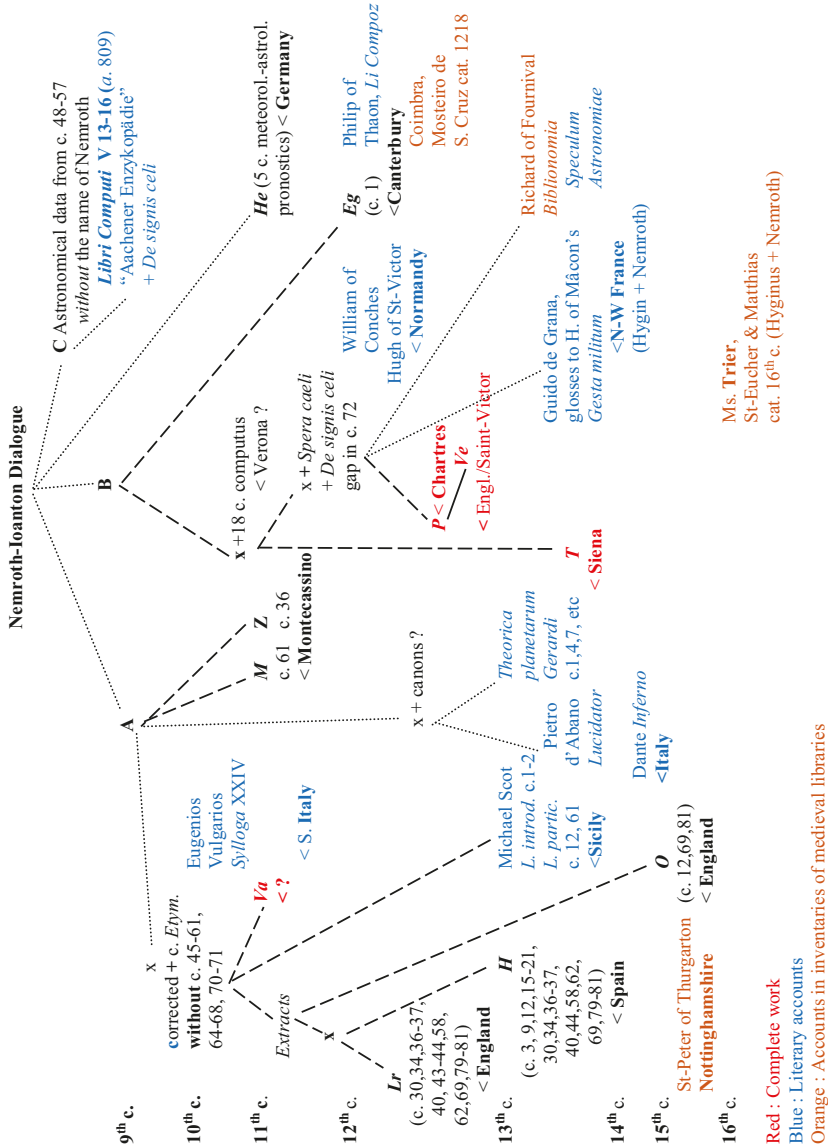


Figure 3.1: Diagram of the manuscript tradition of the *Liber Nemroth*.

bears the mark of a time when some extracts taken from Isidore of Seville's *Etymologiae* (622) and Bede the Venerable's *De natura rerum* (beginning of the eighth century), about the volcanoes of Sicily and the earthquakes, were integrated into the work. The other part of the tradition, well attested in Chartres in the twelfth century, added an exclusively computistic section after chapter 82, bearing the name of *Eusebius Cesariensis*. Every chapter of this section, which is a kind of long appendix, begins with the formula *Si vis scire* (if you want to know . . .) and is clearly marked by Christian computus, which is not the case of the *LN*. In addition, according to the notes of Karl Sudhoff about the lost manuscript of Herten,⁹ this manuscript contained five short chapters about weather forecasting and numerology, with the title *Excerptio de dialogo quem habuit Nemroth Chaldeus cum Ioanton discipulo suo*. These chapters are not found in the surviving manuscripts, which may well indicate that there was originally another section in existence, one concerned with divination.¹⁰

In addition to the manuscripts of the *LN*, some specific literary records referring to it can be identified, as can a few cases of medieval use of it through quotations. Nevertheless, since it is not a matter of iconography or paratext, I am only going to say that many of them point to the south of Italy. This is the case with the quotation of the *LN* found in the *Sylloga* XXIV of Eugenios Vulgarios.¹¹ Vulgarios was a priest who lived in southern Italy at the beginning of the tenth century, taught liberal arts in Naples, and was buried in Montecassino. Another extract from the *LN*, copied in a manuscript kept in Zurich (*Z*), is also related to Montecassino. It is inserted in a work perhaps composed by Pandulphus of Montecassino, who is reputed to be the inventor of the *nocturnal*, a night clock like a tube, using the stars. The *LN* was in circulation in southern Italy as early as the tenth century. Michael Scot, translator and astrologer at the court of the emperor, Frederick II Hohenstaufen, king of Sicily, came across it at the beginning of the thirteenth century (probably in the south of Italy, but scholars familiar with his works also know that part of his education was of Chartrian origin). He used it not only to cite Nimrod among the inventors of astronomy in the first book of his *Liber introductorius*, a work on astrology, but also in the second book, the *Liber particularis*, a kind of encyclopedia of physics.¹² In one of the last chapters of the *Liber particularis*, Michael plays the role of Nemroth in order to answer a question asked by Frederick II about the center and the base of the Earth, the rivers, the salt and fresh waters, and the abyss, which are the subjects of chapters 12 and especially 61 of the *LN*. The other accounts of the *LN* originate from Chartres and northern France, that is, one by the theologian William of Conches in the first half of the twelfth century, who asserts several times that the way Nemroth deals with astrology is *fabulose* (in the imaginary form of a fable), as do Hyginus (64 BC–17CE) and Aratos (third century BCE). The fact is that, as astronomical and mythical

compendia, the *Phaenomena* of Aratos, its *Scholia*, and the later collections of *Aratea*, as well as the poem *De astronomia* of Hyginus, all experienced a later illustrated Latin tradition from the eighth century onwards.¹³ More precisely, I discovered that Guido de Grana (active 1245–84) speaks about Nemroth’s work as being an *Astrologia figuralis* (illustrated astrology) in his glosses on the *Gesta militum* of Hugh of Mâcon (beginning of the thirteenth century), probably made during the time he worked for the archdeacon of Amiens in northern France.¹⁴ All of these accounts tell us that iconography was seen as a dominant feature of the *LN*. Most probably, such pieces of evidence are linked to the presence of the manuscripts of Paris (*P*) and Venice (*Ve*) in Chartres and Saint-Victor. The account of the troubadour, scientist, and bibliophile Richard of Fournival, also living in Amiens in the first half of the thirteenth century, and the mention made by the *Speculum astronomie* around 1255, both refer to a copy that was probably the same or very similar to that preserved in the Venice and Paris manuscripts, because the *Speculum astronomie*, whose author probably used the manuscript owned by Richard, cites some words from the *Spera caeli*, a short astronomical poem which comes immediately before the *LN* in the Paris and Venice copies.

On the other hand, Michael Scot, and probably the astronomer and physician, Pietro d’Abano (1257–1316), used the “southern Italian” tradition. In his *Lucidator*, Pietro d’Abano places Nemroth among the so-called empirical astronomers whose works are *fabulosi* (full of fables): because Pietro is defending Ptolemy’s astronomy, he mocks Nemroth for not knowing about epicycles and excentric circles of the planets, and for failing to understand the retrograde movement of the planets. Nonetheless, he quotes the *LN* at length.¹⁵

Michael Scot’s Account of the Illustrated Dialogue of the *LN* and Clues about its Cultural Identity

We can gain a fuller idea of what the *LN* is if we examine more closely Michael Scot’s *Liber introductorius*, where his preface concludes with a rather long and confused genealogical account of the history of astronomy and astrology, summarized as follows by Lynn Thorndike:

While Zoroaster of the lineage of *Shem* was the inventor of magic, the arts of divination began with *Cham*, the son of Noah, who was both of most subtle genius and trained in the schools of demons. He tested by experience what they taught him and having proved what was true, indi[ca]ted the same on to columns and taught it to his son *Canaan*, who

soon outstripped his father therein and wrote thirty volumes on the art of divination and instructed his son *Nemroth* in the same. When Canaan was slain in war and his books were burned, Nemroth revived the art of astronomy from memory and was, like his father, *deemed a god by many* because of his great lore. He composed a work on the subject for his son *Ioanton*, whose son *Abraham* also became an adept in the art and came from Africa to Jerusalem and taught Demetrius and *Alexander* of Alexandria, who in turn instructed *Ptolemy*, king of Egypt, who invented astronomical canons and table and the astrolabe and the quadrant. The giant *Atlas* brought the art to Spain before *Moses* received the two tablets containing the Ten Commandments.¹⁶

If we look at the precise account of the passage found in Munich, Bayerische Staatsbibliothek, Clm 10268, fols. 19a–b (see Appendix 2, Text 1), we find some significant items for the cultural context and contents of the *LN*.¹⁷ This account states that Nemroth was instructed in astronomical science and that he was considered and worshiped as God himself: “Unde iste Nemroth quia filius tanti viri et talis loco patris computatus est, deus a multis adoratus.” (Therefore, this Nemroth, because he was the son of such a great man, was considered as a god and worshiped by many instead of his father). This is what the second chapter of the *LN* says. Even if Nemroth himself recognizes that there was, before the creation of the stars, a powerful creature above everything, he does not know who he is, and does not recognize that God is the creator. Nevertheless, he calls this powerful creature “Creator:”

And while Nemroth remembered the shape of the sky, he recognized that he had a creator, but he did not know who he was. And he saw the sky rolling on itself, not escaping from its space, and he recognized that it did not have something underneath it, or over it, neither something to which it was suspended; and about this he could say nothing else, except that there is a virtue that supports it. And he called it the “force supporting heaven” and standing under nothing. So one must admire the science of Nemroth, because he had measured the form of the sky and knew the course of the signs and circles of the stars, and the foundation of the earth. And he did not know that a god created that, but he also knew that there was a powerful, domineering creature over there, and he called him Creator. And he painted and described all these things according to their likeness, so that those who were (then) wanted to have him as a god because of his virtue and his knowledge, he who explained the things hidden in the calculation of astronomy. And Nemroth knew that the sky was pure and after that were made the Sun, the Moon and all the stars of the sky. (Appendix 2, Text 2)

This passage also states that Nemroth, full of science and virtue, painted and described all these things “according to their likeness” and revealed hidden things about computus and astronomy. In other words, we are told that Nemroth’s pictures are supposed to exert the same influence on the reader that the forces they represent exert on the universe. As a result, they possess the same performative power as the Creator Himself.

The omnipotence and overweening pride of Nemroth/Nimrod is the crossing point between Nimrod the Astronomer, with whom I deal here, and the parabiblical myth of Nimrod the Giant, who founded the foreign dynasty of the Canaanites, the tribes who ruled over Babylon in southern Mesopotamia in the fifteenth century BCE. Nimrod the Giant founded the city of Nineveh in Assyria and was responsible for the Tower of Babel (Gen. 10:8–12).¹⁸ The mythical and parabiblical character of Nimrod, the giant and the mighty hunter (Gen. 10:9), is well known and widely represented in the Latin literature, while the teaching of the astronomer is known almost exclusively through the *LN*.

Michael Scot also indicates that Nemroth had a pupil, called Ioanton, a name in which we can recognize Yonton, the Syriac name of the fourth son of Noah in the Syriac tradition of the *Cave of Treasures*. This work of a Christian nature, but referring to the Old Testament, collects together apocryphal lore of Jewish provenance; it probably dates from the beginning of the seventh century in its Syriac recensions.¹⁹ Indeed, the name of Yonton most likely originates in the biblical person of Yoqṭân (Gen. 10:25), the latter being, however, a fifth-generation descendant of Noah.²⁰ His Greek name would be *Ionitus*, in whom we can recognize the ancestor of the tribe of Ionians. I might add that Greek people are called *Ionnân* by the Arabs, as stated in an Arabic work about magic, which transmitted Sabian doctrines, called the *Nabatean Agriculture*, written by Ibn Wahshiyya, the Chaldean, in the tenth century.²¹ Can we go so far as to infer that the *LN* has its roots in a competition regarding who was the first representative of the teaching of astronomy, a competition between Nimrod, who may have been seen as the ancestor of the Arabs, and Ioanton, the ancestor of the Greeks? This may not have mattered anymore in the Western Middle Ages, at the time when the Latin version of the dialogue was written, but it may reflect the existence of a claim for a prestigious and learned ancestor and inventor of the science of the sky from the cultural area from which the author of the *LN* originated.

For the moment, let us examine how Nemroth and Ioanton are represented in the *LN* (Figure 3.2). This image is the first of the book in the oldest extant copy, the eleventh-century Vatican Palatine manuscript (*Va*), and it shows Nemroth as *inspector celorum* (investigator of the heavens) and *rex Caldeorum* (king of the Chaldeans), bearing the tilted sky without the stars, next to the giant Atlas called *rex Hispanensium* (king of Hispania). This conforms to what Michael Scot had stated. More precisely, as we shall see, the first chapter of the *LN* says the same thing (*celo verso sine stellis*). The landscape is hilly and undulating, and one can read, to the left, at the feet of Atlas, *Pireni montes* (Pyrenees), which could perhaps be interpreted as evidence of the trans-Pyrenean provenance of the Latin compilation or of its translation. At the feet of Nemroth, the term *montes Amorreorum* refers doubtless to chapter 69 which discusses the measuring



Figure 3.2: (LN III. 1) Atlas bearing the inclined sky with the stars and Nemroth bearing the inclined sky before the creation of the stars. *Liber Nemroth*, Vatican City, Biblioteca Apostolica Vaticana, Ms. Pal. lat. 1417, fol. 1r. Photo © 2018 Biblioteca Apostolica Vaticana.

and establishment of the center of the world by Nemroth.²² No other manuscript except the Vatican Palatine manuscript features these pieces of information in the first picture. For example, the illustration in the Venice manuscript (*Ve*), the “twin” of the Parisian one originating from Saint-Victor (*P*) (both dated to around the third quarter of the twelfth century), is quite sketchy (Figure 3.3). At the other end of the work, we can see Ioanton, thinking about the last lesson received from his master on the various types of rainbow, depending on the position of the Sun (Figure 3.4, corresponding to Illustration 49 in the *LN*). This



Figure 3.3: (LN III. 1) Atlas bearing the sky with the stars. *Liber Nemroth*, Venice, Biblioteca Nazionale Marciana, Ms. VIII.22, fol. 1v. Photo permission of the Biblioteca Nazionale Marciana.

refers to the penultimate chapter 81, *Quid est arcus pacis ut unde fit*, about the origin of the rainbow. There is no such representation of Ioanton in the other manuscripts.

According to Michael Scot's account (see Appendix 2, Text 1), Nemroth taught everything he knew about astronomy to his pupil *ex grandi amore* (with great love) and he did so because his student was asking questions (*in questionibus requisitus*); he taught using charts, graphs and tables (*cum rotis et figuris*). As we shall see, this is all true. It corresponds to what is said in the second chapter,



Figure 3.4: (LN Ill. 49) Ioanton, thinking under the rainbows. *Liber Nemroth*, Vatican City, Biblioteca Apostolica Vaticana, Ms. Pal. lat. 1417, fol. 18v. Photo © 2018 Biblioteca Apostolica Vaticana.

namely that Nemroth pictured the universe *secundum similitudinem suam* (like it was), conversing with his pupil and systematically and consistently answering each of his questions. We are thus dealing here with a work of *narrative astronomy*, addressing cosmogony, astronomy, and computus. Each of the eighty-two chapters is introduced by a question asked by Ioanton and more than half of these are illustrated with diagrams or tables.

The second chapter of the *LN* also states that Nemroth told Ioanton about the hidden things in astronomy (*occulta in compoto astronomie*). This refers to the transmission of a kind of *revelation* by Nimrod, a fact that is reflected in several ancient Christian sources, as in the Syriac *Cave of Treasures*,²³ and supports Nemroth's possession of oracular and astrological wisdom. Without going any further into this complicated subject, I should mention that in the usual Christian apocalyptic tradition, Ionitus is the master and Nimrod the student. In the *LN*, however, it is the opposite. For instance, in the *Recognitiones* of Pseudo-Clementius, or in the Syrian apocalyptic *Revelationes* of the Pseudo-Methodius (3.4) – compiled in Syriac in northern Mesopotamia (i.e., eastern Iraq) in the middle of the seventh century CE under the impact of the Muslim conquest, and then translated into Greek and Merovingian Latin²⁴ – Yonton “came to the East up to the sea called ‘area of the Sun’” (in Latin transliteration from Greek, *Hiliu chora*, Ἡλίου χώρα), “where the sun rises. He received from God the revelation of the wisdom and was the first to make use of everything about the science of the course of the stars. With him, Nimrod was educated in all wisdom.”²⁵ I shall not explore further the question of the connections between both traditions, but I shall simply mention here that I found an echo of this sea called “fire of the Sun” in the *LN*, in chapter 59, “About the seven paths in which the Sun and the Moon and the five planets are running, that Nemroth calls *seas* or provinces.”²⁶ This chapter, illustrated by a complex diagram with text (Illustration 6 of the *LN*, not reproduced here), deals in fact with places corresponding to the planets, called “seas” or “provinces.” In the text and the picture as well, there is a sea for the Sun, called *athir*, a name in which the Greek word *ether* can be recognized, even though it may have been transmitted through another language. This is, with the word *synodus*, the only Greek word used in the *LN*.

Textual and Visual Arguments as Complementary Doctrinal Contents and Pedagogical Tools

So far, we have seen that the pictures, diagrams, tables, and the explanatory material accompanying them, that is to say, the paratext of the *LN*, are equally

likely to provide interesting insights about the cultural context in which it was written. Turning now to the contents of the text, we need to take a closer look at the actual pictures that accompany it. The first chapter states:

Thus, the sky rolls inclined from the south to the north above the Earth, and from the north to the south under the Earth. And, rolling inclined on itself in its rotundity, what seems to be “swept” [i.e. clean, rather than “returned”] is directed by the order of the Creator of the creature. Like a craftsman building a good palace, who first measures the place and digs the foundations and builds it in an orderly fashion until its building is completed. So too Nemroth measured everything of the heaven by his intellect. And he laid the foundations on which he built, thanks to the order of the number, through the chapters referred to above [in the table of contents]. And while he was going through this, he always built better. And all these chapters enhance one another, in the manner of a good artisan who arranges his building with order: in a building, first the foundations are laid in the ground. In the first chapter [there is] a very brief exposition on the “swept” [rather than “returned”] sky, without stars. After that will appear the number. (Appendix 2, Text 3)

There is a strong emphasis in this introductory chapter on two kinds of paratext that are echoing each other in the work and give it its distinctive characteristics. The order and sequence of the chapters structure the work as a building, like the Master Nemroth building his science and as does the Creator building the universe. Mentioning these mental images immediately increases the effectiveness of the picture, another kind of paratext that is very much present in the *LN* through diagrams, charts, and tables.

The keywords of this chapter indicate the main aim of the work: *measuring the universe* “by the intellect” (chap. 1: *per suum intellectum*, as is also stated in chap. 71: *per ingenium inveni* (I found it through cleverness)²⁷ and chap. 82: *per intellectum cognoscitur*), and constructing gradually a building reflecting the cosmos, beginning with its foundations. The base of the entire building and the intellectual investigation is the *number*, or the “order of the number,” a number that will appear, he says, *after the creation of the sky*. In fact, in chapters 69 (*Ve*, fol. 26r; *P*, fol. 223v; *T*, fol. 20va) and 70 (preserved only in *T*, fol. 21ra), we learn that the Sun, the Moon and the stars were created on the third day of the Creation, the 8th of Kalends of April, that is to say, on March 25. Creation itself took place on the 11th of the Kalends of April, on March 22, according to chapter 13 (*Va*, fol. 4r; *Ve*, fol. 5v; *P*, fol. 203v; *T*, fol. 6ra).

The author states that every chapter corresponds to an *expositio* (explanation). This way, Nemroth demonstrates his comprehensive knowledge about the cosmos from the very beginning of its creation with a sky being “swept” (*reversum-eversum*), i.e. still devoid of stars, rather than “tilted” or “upside down without stars.” The latter translation of the participle of *reverso-everso* as “tilted” seems more obvious but is probably inaccurate in this case; incidentally, Michael Scot

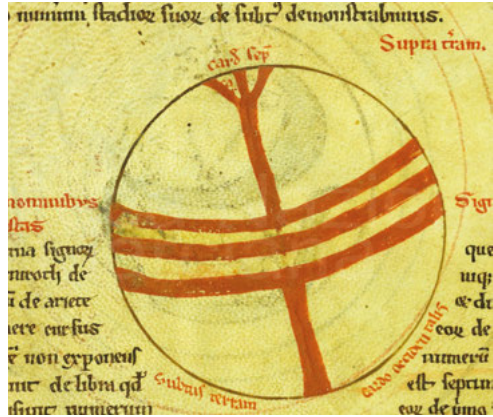
uses the word *pulito* (“cleaned”) to describe the sky when he refers to this passage in the *prohemium* of the *Liber introductorius*.²⁸ Indeed, the first chapter deals with the sky before the creation of the stars and the planets; as we recall from Figures 3.2 and 3.3 above, Nemroth was bearing the sky *inclined* without the stars.

In actual fact, the incipit itself says that the sky *is* inclined. The text of chapters 9 and 12 (see Appendix 2, Texts 4 and 5) confirm this assertion, as does Illustration 7 of the *LN* (Figure 3.5). Chapter 9, about the axis of the sky, states: “And when he looked up to the sky, he saw him turning and inclined in his rotundity. Then, exposing its two pivots, one starting from the north above the Earth, and the other, from the southern part, under the Earth, he said . . .”. Furthermore, chapter 12, which deals with the distances in *stadia* (the ancient unit of measurement) from one planet to another, provides valuable instruction for understanding the diagrams of Nemroth: “For the sky is not what a man encompasses with a regular circle with a compass (*cum circinno*): the outline of the sky is actually inclined, that is why the semicircle is greater than one and a half times the string which is in the middle of the bow.” This means that he who would measure the *central wheel* of the sky – presumably the circumference –, if he divides it into two semicircles, a semi-circumference will be longer than one diameter and a half. This figuration of the inclined sky is the opportunity to show that, except for the version in the Vatican Ms. (eleventh century), the other, later Western illustrators do not seem to have respected the text of chapter 12. Therefore, the sky is drawn in the shape of a spindle by the scribe of Ms. *Va* in Illustration 7 of the *LN* (Figure 3.5a); but the later scribes adapted the picture to the standards of visualization that they were used to, painting the sky like a sphere. It shows that the scribes making diagrams could adapt their presentations to the taste of their cultures. In this respect, it is clear that the degree of conformity between the paratext that is the picture and the text of the actual dialogue has been greatly affected by the process of copying. Some relevant auctorial paratext from chapter 12 about the part of the universe above and under the Earth could originally be seen in Illustration 7 of the *LN* (Figure 3.5), corresponding to chapter 9, with the words *supra terram, subtus terram* accompanying the picture, but these words have gradually disappeared from the manuscript tradition. Notwithstanding this, we are thus dealing with *talking pictures*, which are an integral and authoritative part of the process of imparting, explaining, and acquiring knowledge that takes place between the master and his pupil.

We are already familiar with part of the second chapter (see Appendix 2, Text 2), which states that Nemroth was recognized as a god because of the depth of his scientific knowledge. The first part of the chapter tells us about the sky rolling on itself without escaping from its place; the force maintaining and



(a)



(b)



(c)

Figure 3.5: (LN Ill. 7) a. *Celum inclinatum*. *Liber Nemroth*, Vatican City, Biblioteca Apostolica Vaticana, Ms. Pal. lat. 1417, fol. 3r. Photo © 2018 Biblioteca Apostolica Vaticana; b. *Celum inclinatum*. *Liber Nemroth*, Venice, Biblioteca Nazionale Marciana, Ms. VIII.22, fol. 4v. Photo permission of the Biblioteca Nazionale Marciana; c. *Celum inclinatum*. *Liber Nemroth*, Turin, Biblioteca civica centrale, Ms. Bosio, B. 176, fol. 5va. Photo © Copyright M. Vacchiano.

supporting it in its place is called *virtus* or *fortitudo*. It also says that Nemroth measured the shape of the sky, and knew the course of the signs of the Zodiac and of the stars, as well as the base of the Earth. All this refers to specific chapters of the *LN*. It is clear that the main topic of the *LN* is therefore not astrology but first and foremost cosmology or, more exactly, cosmogony, including astronomy, meteorology, notions about the elements in the sub-lunary world, comparison between macrocosm and microcosm, and geology.

The second main topic is computus, that is to say, the mathematics and time-reckoning required to calculate the date of Easter, or rather, as we should say here, the date of “Passover,” because, in the *Dialogue* between Nemroth and Ioanton, we are dealing in a way with science *prior* to the Christian Era which continued beyond it in a specific cultural milieu. There is a mass of evidence that proves this assertion, as we shall see below. In short, the *LN* makes a statement about the cosmogony, the shape and dimension of the universe, on the roundness of the orb, its motion and nature, on the revolution of the orb and the Sun, on the difference of the Sun’s rising and setting in parts of the world, on the orb of the zodiacal signs, on the orbs of the planets, on lunar eclipses, on Saturn’s retrogression and its return into the zodiacal sign from which it left, on how large the whole universe is in both *stadia* and miles. The text devotes several chapters to lunar and solar eclipses, to the calculation of hours, points, and moments, and, at the end, to elementary qualities of the universe, of the Earth, and of man.

Regarding the form of the dialogue, in each chapter recurring expressions and terminology are used to express the questions of the pupil (“Master, as I asked you”) and the answers of the master (“he answered”, “because he was asked, he said, my disciple”, etc.): the dialogue is indeed written *secundum modum sermonis interrogantis* (in the style of an interrogative speech), exactly as Michael Scot stated about the way he viewed the *LN*. Almost equally frequent is terminology relating to evidence, rather than to proof: “I will show you,” “we show,” “show me,” “show me the explanation,” “above I showed in another explanation” (*ego ostendam tibi, ostendimus, ostende mihi argumentum/expositionem*), “I recognized,” “I knew” (*agnosco, cognosco, ostendimus*, chap. 21), and so on. The master is not actually demonstrating astronomical science in a deductive way, but rather showing the universe by means of assertions and pictures. This use of repeated expressions emphasizes the teaching force of the arguments of the master, but it also grants to the diagrams and pictures drawn by him an equal status as a form of didactic and scientific statement.

The terminology employed in the *LN* underlines at the same time the form, contents, aims, and methods of the dialogue. Compiling a list of the most commonly used words and expressions, we can see that three keywords refer frequently to the central concepts of measure, number, calculation, and astronomy (as in the second chapter). As is stated in chapters 69 and 71, Nemroth spent his time measuring and he strives to provide a graphic representation (called *similitudo*, similarity) of this measure: “ego faciam tibi mensuram in similitudinem ipsius” (I will take for you a measurement that looks like it – that resembles it). This was made through calculation and time-reckoning. Therefore,

the words *computus*, *computare* (calculate) and *numerus* (number, computation) are very frequently used. Indeed, Nemroth devotes at least six chapters to calculation of astronomical and chronological quantities, with numerical values expressed at length in words, and all of these chapters are accompanied by tables or pictures, as in the chapters 12 (about the number of *stadia* between the planets), 19 (about the power of the planets on a part of the day or the night), 26 (about the calculation of the course of the Sun), 59 (about the course of the planets, the Sun, the Moon, and their “paths” called “seas” or “provinces”) and 61 (about the base of the Earth and its stability on the abyss).²⁹ Only twice does Nemroth acknowledge his powerlessness, saying that we cannot know these measurements through pictures but only by actions: “iste mensure non possunt cognosci per picturas nisi per opera”; “nec tu nec alius potest agnoscere similitudinem ipsius per picturam sed per opera . . . et hec non potest pictor depingere” (and neither you nor anyone else can know its aspect from a drawing, but rather by actions . . . and this, a painter cannot depict) (end of chap. 45 and chap. 69). Here doubt is expressed about the ability of a diagram of charted information to reveal to the reader an alternative reality to the actual world, since the actual world has to be walked through in order to obtain an accurate measurement of it.

Above all in this teaching dialogue, pictures, charts, and diagrams are a built-in part of the narrative. The aim of picturing or depicting the universe is demonstrated by the words *depingere* and *inpingere* (chaps. 2, 5, 6, 8, 9, 16, 19, 21, 23, 29, 30, 31, 37, 38). The work structures its arguments by explaining superlunary and terrestrial phenomena with geometrical reasoning, using plenty of diagrams to show the physical aspect of the cosmos.

In particular, as is often the case in books of *computus* and astronomy, Nemroth uses *rotae*, that is to say, circular diagrams that recall the wheel of the sky (*rota celi*)³⁰ and of the planets. In this respect, the *LN* may be compared to the *Liber rotarum*, which is one of the names of the *De natura rerum*, the very well-known encyclopedia of the natural world written by Isidore of Seville (d. 636). “Who does not see a wheel [or: ‘a circular diagram’], how would he count or know on which day of the week the years began, from the origin of the world, until the end?” asks Ioanton in chapter 76 (qui non videt rotam, quomodo numerabit vel agnoscit in qua feria incipiunt anni ab origine mundi usque in finem?). Very frequently, Nemroth invites his pupil to consult the diagram: “as you see in the wheel, it is the same in the sky” (chap. 15); “I will show you/as written/as it appears in the circular diagram” (*in rota*, chaps. 20, 21, 24, 30, 35, 39, 44, 58, 62). This shows the extent to which the paratext here is very much part of the scientific narrative, even if the manuscript tradition has sometimes obscured what the original would have looked like. The power of the drawings is substantial and becomes a kind of visual argument unto itself, one that provides a visual supplement.

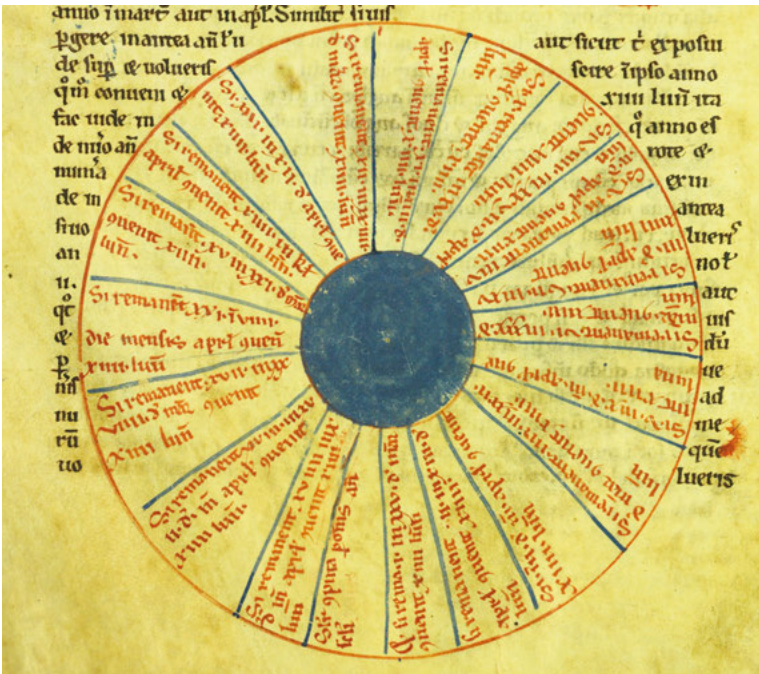
Reflecting the interconnected nature of, and the interaction between, text and image, the wording of the text is even adapted to the form chosen for the illustration, as we can see in chapter 74, about the computation of the concurrents (i.e., numbers denoting the days of the week on which March 24 falls in the successive years of the solar cycle). Illustration 47 of the *LN* (Figure 3.6) accompanies this chapter: in Ms. *Ve*, fol. 27r, the text says “sicut vides scriptum in rota et ita invenies concurrentes . . . vide in quo anno es de annis rote et computa” (as you see it written in the circular diagram, and this way you will find the concurrents . . . see which year you are in from the years of the wheel and count) because the complementary visual and textual information lies in a wheel. However, in manuscript *Va*, fol. 15v, because the same information is there shaped into a chart, it says “sicut vides infra scriptum concurrentes . . . vide in quo anno es de annis infra scriptis, et computa exinde vis antea aut retro, donec finiatur numerus tuus, et sicut ibidem inveneris” (as you see it written below, the concurrents . . . see in which year you are from the years written below, and count from there forward or backwards, until your number is achieved, and as you will have found there). Even if we should consider that both the text and its diagrams and charts are auctorial in the case of the *LN*, since they must have been written together and in a complementary way, the latter example shows that the form of the paratext (wheel or table) can be adjusted by the successive scribes. As a consequence, they would also adapt the words used to refer to the adjusted illustration, but without changing the scientific contents of the diagram.

Doctrinal Contents of the Paratext as Cultural Evidence

It is clear, then, that in the *LN* the diagrams are a necessary complement to the teaching text, and, furthermore, that the teaching matter in the charts and pictures also includes additional text. Yet, the terminology of the *LN* is neither specialized, nor specific. For teaching purposes, it conjures up mental pictures that will help Ioanton – and by extension the reader – understand what Nemroth is explaining. For example, he uses the word *vas* (vessel, container) several times to speak about the universe, and to show how to cut it into two parts in order to understand the measurement of the diameter, or to depict a planet, or even to speak about waters contained under the Earth or about the water passing over igneous stones into the depths of the Earth: “in rota forme celi, aut considera per tuam intelligentiam vas rotundum” (in the wheel of the shape of the sky, or consider with your intelligence a round vessel) (chap. 14); “luna est vas

De numero q' ostendit unum unum in qua ter'

(a)



(b)

Figure 3.6: (LN III. 47) Illustrations for chapter 74. a. Table. *Liber Nemroth*, Vatican City, Biblioteca Apostolica Vaticana, Ms. Pal. lat. 1417, fol. 15v. Photo © 2018 Biblioteca Apostolica Vaticana; b. *Rota*. *Liber Nemroth*, Venice, Biblioteca Nazionale Marciana, Ms. VIII.22, fol. 27v. Photo permission of the Biblioteca Nazionale Marciana.

rotundum” (the Moon is a round vessel) (chap. 46); “et in terra sunt petre . . . sicut vas super ignem – quia sol est vas mirabile – subtus terram est aqua conclusa sicut in vase” (and there are stones in the Earth . . . such as a vessel on the fire – because the Sun is a marvelous container – under the Earth, there is water enclosed like in a vessel) (chap. 61). He speaks about the Earth as a ship floating on waters (“terra stat super aquam et sustinet eam sicut navis,” chap. 61), and evokes the planetary movements with the help of the mental picture of a grinding wheel (“volventia sicut mole” (rolling like a grinding wheel), chap. 36). Apparently in accordance with the iconography of the *Aratea* in late antiquity and the early Middle Ages, he states that the four forces guiding the Moon resemble bulls, and that the force guiding the Sun is like four horses (“quatuor virtutes que portant lunam sunt in similitudinem tauri; ut virtutum que substineret solem . . . sunt sicut quattuor equi,” chap. 31). Nevertheless, none of these images is represented in the illustrations of the *LN*; they remain only mental evocations of mythical cosmology, while all the diagrams and charts have a teaching purpose to reflect cosmological and chronological facticity.

Likewise, the *LN* does not use the usual technical words for the planets, the poles, the ecliptic, for the intercalary month of the Moon, or even for the cosmic winds that have no other specification in the *LN* than a geographical position.³¹ This can be seen, for example, in chapters 3 and 4 about the four winds, with the corresponding second and third illustrations of the *LN*; in chapters 5 and 6 with the corresponding fourth illustration representing the twelve personified winds; in chapter 7 (*De septem fortitudinibus que flant ventum in circuitu septem errantium*: About the seven forces that blow the wind in the circle of the seven planets), with the corresponding fifth illustration, representing seven moving and concentric wheels (*rotae*) of the planets. Almost every time, the master Nemroth links his words to the corresponding picture.

Referring to eclipses, the author uses various expressions such as *obscuritas*, *nigredo*, *inimicitia* (chap. 22, chap. 38: *eclipsis*, *nigredo*; chap. 36, chap. 41: *obscuritas*, *obscuratio*; chap. 36: *umbra caude Pliadum*; chap. 38: *umbra ursi*; chap. 23, “Que sunt inimicitie Pliadum ac Lune et quomodo ad tempus obscurent eam” (What are the enmities between the Pleiades and the Moon and how they obscure it at some times)). In the drawings, he also often refers to old mythical zoological forms of representation like the *umbra ursi*, as in chapter 38, where it states: “Respondit Nemroth dicens, sicut vides pictum, ita est expositio de qua me interrogasti. Et ne dubites, vide, hoc sunt radii solis, nigre autem sunt in umbra ursi” (Nemroth answered, saying: as you see it depicted, this is the explanation about which you asked me. And so that you have no doubt, here are the rays of the Sun, they are black in the shadow of the Bear) (*Ms. Va*, fol. 11r).

The terms *draco Pliadum* (“the dragon of Pleiades”, chap. 22) or *Pliades draconum* (“the Pleiades of the dragons”, chap. 21) or *umbra caude Pliadum* (“the shadow of the tails of the Pleiades”, chap. 36), are probably all corrupted forms of an original different term used to describe this dragon, since the Pleiades have nothing to do with eclipses. Nonetheless, using these terms, the *LN* also represents the Dragon of eclipses that very likely evokes the “Chaldean” snake, depicting what we call today the lunar nodes as the Dragon’s head and Dragon’s tail. It is clear that the illustrator is under the troubling influence of traditional Roman ancient iconography that represents the northern constellation of the *Draco* together with the Bears (*Ursae*). In the mythical astronomy of Mesopotamia, the snake, termed in Syriac *Atalia*, was thought to cast a shadow over or even eat the Moon and to be responsible for provoking the eclipses when the Moon crossed the apparent path of the Sun in the sky.³² Speaking about eclipses in a geocentric world, the ascending node is where the orbiting Moon moves north through the ecliptic, and the descending node is where it moves south through it. This is depicted in several pictures of the *LN*. For example, Illustration 23 of the *LN* (Figure 3.7) represents the thirty lunar phases around the Pleiades’ Dragon and the Bears, and corresponds to chapter 36, *De eclipsi lune*. Similarly, Illustration 26 of the *LN* (Figure 3.8), corresponds to chapter 38, *Qualiter vel inde fiat nigredo que apparet in Luna* (How or whence comes the darkness that appears in the Moon).

In the same vein, Nemroth also speaks about these physical forces of the universe with a colorful and varied language; *fortitudo* and *virtus* are used to describe cosmic forces. More technically, the specific universal twin forces moving the sky up and down are called *descensio* and *ascensio* by Nemroth in chapters 5 (*De duabus fortitudinibus* – About the two forces) and 6 (*De duodecim fortitudinibus que circumdant celum* – About the twelve forces that surround the sky):

Nemroth answered him and said: “My disciple, know that the creator has placed above the sky two very powerful and joint virtues [*virtutes*] in its ascension and descent.” And for this reason, he represented these virtues by the image of two big dragons and he called them *ascensio* and *descensio*. (end of chap. 5. Appendix 2, Text 6)

These “forces” are depicted in the *LN* by two dragons that have survived with the names *ascensio* and *descensio* in the picture from the Venice manuscript (fol. 3r) and the Vatican manuscript, fol. 2r (see Figure 3.9, showing a detail from Illustration 4 of the *LN*). These cosmic forces are located outside the sky, *contra* (in front) of the Zodiac. This is the reason why Nemroth says in chapter 8 in his usual clumsy Latin that he had to depict them “in another place” in the picture rather than together with the signs of the Zodiac because they are *non coherentes* (do not form a whole) in this place:



(a)



(b)

Figure 3.7: (LN III. 23) a. The thirty lunar phases around the “Dragon of the Pleiades” and the Little and Big Bears. *Liber Nemroth*, Venice, Biblioteca Nazionale Marciana, Ms. VIII.22, fol. 13r. Photo permission of the Biblioteca Nazionale Marciana; b. The thirty lunar phases around the “Dragon of the Pleiades” and the Little and Big Bears. *Liber Nemroth*, Vatican City, Biblioteca Apostolica Vaticana, Ms. Pal. lat. 1417, fol. 10v. Photo © 2018 Bibliotheca Apostolica Vaticana.



Figure 3.8: (LN III. 26) *Draco cum Pleiadibus*. *Liber Nemroth*, Turin, Biblioteca civica centrale, Ms. Bosio, B. 176, fol. 10r. Photo © Copyright M. Vacchiano.

Therefore, these forces . . . that run between the seven [planets] and the twelve [signs] are not fixed in the sky. Indeed, what he himself says is that they run between the signs. Alexander settled that these two forces – those named by Nemroth – are the ones he [Nemroth] explained above, and because of that, he did not draw them with the signs, because they are outside the heaven, against the Zodiac, and thus he painted them in another place, not as forming a whole with him. (Appendix 2, Text 7)

This passage provides one of the rare occurrences of the name of Alexander, the only authority named in the dialogue, except the authority of Nemroth himself. This allusion to Alexander as an authority, evoking the Persian conqueror but which can also refer to a Pseudo-Alexander of Aphrodisias, shows that there are several layers of authoritative interventions in the dialogue, apart from the two speakers, Ioanton the pupil and Nemroth the teacher.



Figure 3.9: (LN Ill. 4) Detail of the dragons representing *ascensio* and *descensio*. *Liber Nemroth*, Vatican City, Biblioteca Apostolica Vaticana, Ms. Pal. lat. 1417, fol. 2r. © 2018 Biblioteca Apostolica Vaticana.

A computistic-astronomical work attributed to Alexander is supposed to be the scientific source of chapter 28 (*In quo cognoscet homo quantum stat Sol in uno signo* (In which one may find out how long the Sun stays in a sign) with its corresponding chart, Illustration 17),³³ and also of chapter 35 (*In quo signo currit Luna ut exposuit Alexander* (In which sign runs the Moon, as Alexander explained) with its corresponding chart, Illustration 22),³⁴ showing the position of the Moon in the degrees of the celestial sphere and in the twelve signs. Without going into the technical details, it is useful to note, in order to connect the *LN* with a cultural tradition and with some possible doctrinal sources, that the values of these chapters and charts – as do other numbers and values in the *LN* – may refer to the (Julianized) calendar of Antioch, used in romanized Syria.³⁵ This kind of astronomical calculation was later continued by the eastern Christian (Syrian) Nestorians in Persia, who settled on October 1 as the beginning of the year around the seventh century.³⁶ In addition, some Syriac and Arabic texts using the Seleucid era speak of the “years of Alexander,”³⁷ as

does the *LN*. The roots of the computus of the *LN* may thus have something in common with the Alexandrian computus used by eastern Syrians.

In any case, the references to the name of Alexander may hint at a reworking of the work, but primarily it is one of many pieces of evidence pointing to the fact that the *LN* tells us something about the astronomy of the Chaldeans, that is to say, of Mesopotamia or Syria.³⁸ As shown by chapter 70 (this chapter surviving only in the manuscript of Turin), considering the number as “Chaldean” stresses the reference to a Syriac remote past and suggests the claim for a specific cultural tradition of astronomy. Chapter 70 states, “sicut numerum Chaldeorum per quem probavimus et mensuravimus umbram solis et ascensionem vel descensionem eius” (like the Chaldean number, through which we proved and measured the shadow of the Sun and its ascension and descent). This statement is also a way for Nemroth to assert the existence and the teaching of the number-to-be, announced at the end of the very first chapter (translated above): “And after that will appear the number” – that is, after the Creation of the still empty sky (without stars)! So to speak, in accordance with the character of Nimrod in the biblical and apocryphal tradition, Nemroth is continuing, or, better, redoing, the work of the Creator, making real the order of the universe under construction through his work of measurement. This powerful work of intellectual construction, repeating the work of the almighty Creator, is in turn reflected through both the teaching and drawing of the master Nemroth.

These statements about the power of the master, and the depth of his science expressed through mental images, themselves in turn translated into pictures and charts, stand in marked contrast to the poor and simple level of Latin language and the damaged condition of the *Liber Nemroth*. The poor linguistic level may, once again, indicate various layers of reworking. At the very least, the compiler or translator of the book was clearly not a scientist or a specialist in the field. He employs a vocabulary that is more mythical than astronomical and uses concrete words to express abstract concepts. He tries his best to translate in a language with which he is not familiar, mixing the tenses and forgetting the difference between the cases in declension. I would also add that the original language of the *LN* was probably Semitic, because the conjunction “and” replaces most of the punctuation throughout the text, each part of a sentence beginning with “and,” as in Hebrew or Syriac. Other clues may be found in the text to support this view without necessarily excluding a possible transmission through Greek.

Furthermore, surprising though it may seem, the planetary model of the *LN* for the five planets and the Moon lies outside the Ptolemeian works focused on the qualitative features of the cosmos. The *LN* does not show any knowledge of the theory of epicycles (this is the reason why Pietro d’Abano mocked Nemroth in his text); foreign to classical Greek astronomy, it is also foreign to Arabic

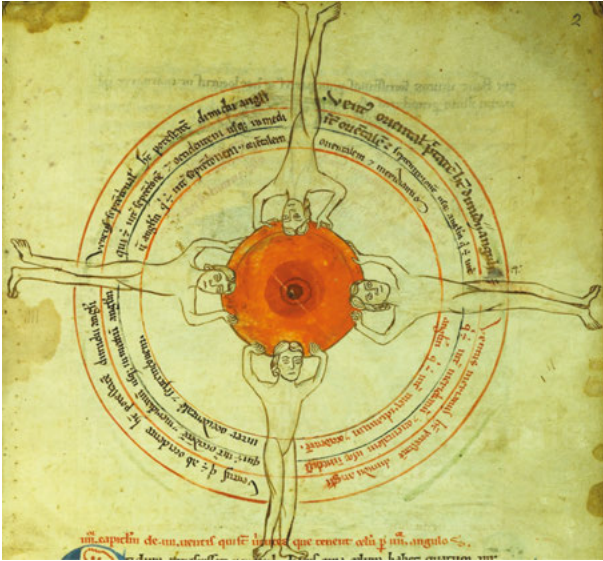
scientific literature as it was discovered in the West from the twelfth century onwards. Furthermore, the *LN* makes no use of astronomical tables, but is based on a link between geometrical reasoning and arithmetical astronomy, similar to the science of the sky which was practiced in ancient Mesopotamia. We may say, in short, that there is a good deal of evidence to suggest that the *LN* is a rare Western survivor of a minority scientific eastern ancient tradition.

The claim to be relying on this scientific tradition is strongly supported by the paratext, as we have already noticed, for example, with the references to Alexander or the drawing of the cosmic Dragon, Atalya. As another example of this, and in order better to highlight the relationship between text and images in this work, and thus how paratext contributes to the construction of authority, let us examine the third chapter which is about “the four winds that rule the sky in its four parts.” It speaks about four cosmic winds “across the places,” which are universal physical forces, called *virtues*, and are created by the Creator to maintain and sustain the sky in its correct central place.³⁹ The forces function, says Nemroth, again using mental pictures, like four invisible links tied through equal places of the universe under (mental) construction:

As Nemroth watched the shape of the sky and its movement, he was amazed by the virtue [i.e. power] of the Creator. And he says that it is appropriate that this heaven be governed by four virtues [i.e. forces] so as not to be moved from one place to another. And he stated it in his writings, saying that heaven is supported by four virtues in four parts, by the ordering of the Creator, so that it does not set itself in motion outside its place. And he does not say about these virtues that it was like the columns that support the building, but as a link through equal parts in the building. And these winds, Nemroth called them “winds through the places” and “virtues in the places.” (chap. 3, Appendix 2, text 8)

We can see here the repetition of the conjunction “and” for each new sentence, and also the colorful language used, telling of columns and ties (links) tied through the universe as a building (*in edificio*) that Nemroth is depicting. The chapter states that these virtues move “across places.” These places refer to the specific areas where each planet moves, as stated in chapter 59, speaking of *loca*, *maria*, and *provinciae* (places, seas, provinces). A similar doctrine about the winds can be found in a Syriac cosmological eighth-century text circulating under the name of Dionysios, bishop of Athens,⁴⁰ and now called Pseudo-Dionysios of Tell-Mahre (ca. 775 CE).

The picture connected with the third chapter about these unusual winds actually provides additional information and weight to it; it is the second illustration of the *LN* (here Figure 3.10); it is wheel-shaped according to the Isidorian mode of the *rotae*. The picture presents four personalized winds as four people whose shoulders bear a central spherical universe; their feet are set in opposite directions. The paratext that is inserted into the picture says something different



(a)



(b)

Figure 3.10: (LN III. 2) a. Four cosmic winds. *Liber Nemroth*, Venice, Biblioteca Nazionale Marciana, Ms. VIII.22, fol. 2r. Photo permission of the Biblioteca Nazionale Marciana; b. Four cosmic winds. *Liber Nemroth*, Turin, Biblioteca civica centrale, Ms. Bosio, B. 176, fol. 3v. Photo © M. Vacchiano.

from the text of the chapter, telling us about the geographical and cosmological regions on which these winds exercise their power:

The wind that starts from the angle that is between the East and the South has the power from the middle of the East to the middle of the South. The wind which starts from the angle which is between the South and the West has the power from the middle of the South to the middle of the East. (Illustration 2 of the *LN* (Figure 3.10))

The text of the diagram goes on to do the same for the three other winds: from the South, from the West, and the North (*meridianus*, *ab occidente*, and *septentrionalis*). If we try to represent this with a modern drawing, we would have something like what is shown in Figure 3.11.

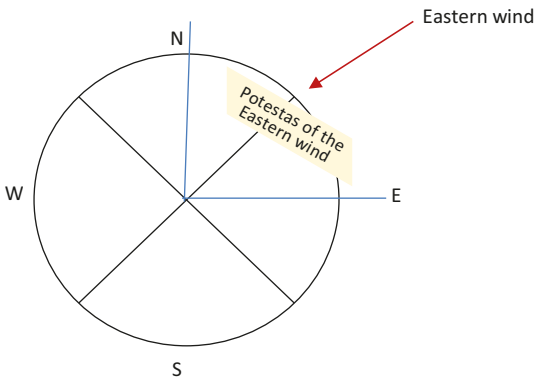


Figure 3.11: Modern rendition of the text of the second illustration of the *Liber Nemroth*.

What can be considered as late evidence of Chaldean science or Syriac sources in the *LN* goes far beyond the doctrine of the cosmic winds discussed above. In terms of calendar and time-reckoning, the beginning of the year on the Kalends of October, as in the Seleucid calendar or rather the later Julianized calendar of Antioch, is another clear piece of evidence of this that we find in several chapters (chap. 10, chap. 13 and Illustration 9 that accompanies it, chap. 71, chap. 75, with the title “The number that shows on what day of the week falls the beginning of the year: the beginning of the years falls on the Kalends of October, as I explained to you above,” and the chart in Illustration 48 that corresponds to chap. 75). Still further evidence may be adduced of the survival of this under-represented tradition of astronomy in the West such as, for example, the computus of the *LN* being based on a solar year of 365 days and a quarter, as in the Julianized calendar of

Antioch (as seen in the last sentence of chap. 26, which deals with the length of the Sun's course: "The sum of the days is 365 and three (double) hours"). The time system is sexagesimal: the time spent by each planet in a sign is expressed in multiples of six and the divisions of time in hours, points, moments, degrees (*horae*, *puncti*, *momenta*, and *gradi*) are given as multiples of six. The duration of this world corresponds to 7,000 years, in all the tables covering the planetary cycles, in chapters 48 to 57 concerning the periods of the planet's transits (e.g., chap. 48: "Mars planeta quomodo currit in signis et quanto annos ibidem stat" (The planet Mars. How it runs in the signs and how long it stays there), with the corresponding chart in Illustration 29 about the count of Mars's cycles from the year 72 from the Creation to 6920, as found in Ms. *P*, fol. 215r; *Va*, fol. 17r; *T*, fol. 11va). In short, many other specific data, whether included in the text or in the paratext, can be shown to have much in common with Syriac cosmological literature, as I have argued elsewhere.⁴¹

Conclusion

I hope here to have demonstrated that the *LN* is a teaching dialogue of narrative, arithmetical, and geometrical astronomy, one based on computus and calendar science, as opposed to the demonstrative astronomy more typical of the Ptolemeian or Arabic astronomical tradition. In this work of the master Nemroth teaching his pupil Ioanthon, the text and its diagrams and charts jointly perform a pedagogical role in a relationship of great interdependence. Consisting of diagrams and charts, the function of the image as a paratext is not mnemonic in the *LN* as is often the case in the Middle Ages, nor does it have merely an ornamental value. Here, the picture is didactic; it clarifies and redefines the text. The text cannot do without the diagrams nor be understood without them: the diagrams are a crucial and independent mode of communication and the text constantly refers to them. The diagrams and charts in the *LN* are thus an integral part of the text and, in turn, they repeat significant parts of it or even use additional text to highlight and elucidate it. This body of illustrations is thus an auctorial paratext and, as such, it has as much power as the text and is essential to the comprehension of the main narrative.

Complementary texts and diagrams engage in a dialogue with each other, as do Nemroth and his pupil in order to show the strength of a science of the universe that mankind received from very ancient and admirable forebears.

Yet, the vicissitudes in the written transmission of the *LN* in the Latin West resulted in a loss of material and in the deformation of its original message, as

much in the narrative as in the diagrams. This makes the task of the historian or editor very difficult when attempting to distinguish between inputs relating to the Western cosmological and iconographical medieval traditions and matters reflecting astronomical notions foreign to Greco-Latin ones. Nevertheless, this does not prevent us from seeing the *LN* as an extraordinary example of the transmission of a work derived from a minority ancient tradition in Mesopotamia – one whose authority was constructed precisely on a fruitful dialogue between text and visual paratext – perhaps through Alexandrian Persia or Nestorian Syria, but which was mediated by neither Ptolemeian nor Arabic astronomical science. Further investigations shall doubtless provide more clues about where the work was compiled, how it was put together, and how it came to settle in the Latin West.

Appendix 1: List of the Illustrations (Diagrams and Charts) of the *LN*

- Ill. 1: Nemroth holding up the inclined sky without stars, and Atlas holding it up with stars (chap. 1).
- Ill. 2: Four winds “across the places” exerting their power on the parts of the sky and holding it in its place (chap. 3).
- Ill. 3: Four winds/virtues “across the places” exerting their power on other parts of the sky (chap. 4).
- Ill. 4: Twelve winds/virtues with wings blowing into their trumpets in order to put the sky into its motions of ascension and descent (chaps. 5 and 6).
- Ill. 5: Seven “wheels” of the planets (chaps. 7 and 12?).
- Ill. 6: Signs of the Zodiac in the course of the year, with their planetary houses, circuits, “ways,” and the zodiacal periods of the planets (chap. 59).
- Ill. 7: The inclined universe, *cardines*, diameter, and circumference (chaps. 9, 12, and 14).
- Ill. 8: Signs of the Zodiac and their power on a part of the day or night (chaps. 10 and 15).
- Ill. 9: Signs of the Zodiac and months of the year (chap. 13).
- Ill. 10: Boundaries of the course of the signs and the poles (chap. 14).
- Ill. 11: “Powers” of the planets on the zones linked to two or three signs (chap. 15).
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- Ill. 13: Diurnal and nocturnal power of the planets and the signs of the Zodiac (chap. 19).

- III. 14: Personification, “power” of the planets and planetary metals (*factura*) (chap. 20).
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- III. 27: Duration of the Moon’s light phase (from 1 to 15) above the Earth, expressed in hours and points (chap. 43).
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- III. 29: Mars’s transit through the Zodiac, starting from Scorpio (chap. 48).
- III. 30: Number of Mars’s cycles, from the year 72 from the Creation to 6920 (chap. 49).
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- III. 33: Jupiter’s transit through the Zodiac, starting from Sagittarius (chap. 51a).
- III. 34: Number of Jupiter’s cycles, from the year 216 from the Creation to 6912 (chap. 52).
- III. 35: Venus’s transit through the Zodiac, starting from Sagittarius (chap. 53).

- III. 36: Number of Venus's cycles from the year 288 from the Creation to 6912 (chap. 54a).
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- III. 39: Shadow measurements, given in feet, at the first hour of the twenty-fourth day of each month (chap. 58).
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- III. 41: Equivalence between hours (1–12), points (5–60), and moments (30–360) (chap. 62).
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- III. 44: Calculation of the fourteenth lunar day from March 25 to April 5 for every year (chap. 72).
- III. 45: Calculation of the epacts (age of the Moon) by division and remainder (chap. 73).
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- III. 47: Calculation of the day (*feria*) marking the beginning of the year (chap. 75).
- III. 48: Regulars (day of the week in which falls the first of the paschal Moon) and the number of days in the months, starting from October (chap. 77).
- III. 49: Ioanton observing the different rainbows depending on the position of the Sun (chap. 81).

Appendix 2: Extracts from Latin Primary Sources Cited

Text 1: Michael Scot, *Liber introductorius*

Et cum iste Cham tot et talia cognovisset, optans eandem artem perpetuo conservari ut valeat successoribus sui eam in duabus collumpnis [sic] constanter scripsit, quarum una fuit enea, altera vero latericia. Causa est ut quodcumque iudicium advenisset ignis aque iam habens *prophetiam finis mundi per aquam et ignem*, altera collonarum integra permaneret quia si ignis causa aliquo eneam liquifaceret *latericia* incolumis remanet, et econverso; quod factum est et hee collumpne sunt *hodie in Syria*, transacto quippe diluvio aquarum. Iste Cham genuit filium nomine

Chanaam, quem eius pulcritudine dilexit multum. Et ideo ipsum *docuit in hac arte* quantum plus potuit pervigili cura qui, cum esset iam factus patre subtilior in omni sciencia artium, quas pater sciebat amore sapiencie, *30. volumina librorum de artibus divinationis* composuit ordinate. Hic genuit filium unum nomine *Nemroth* quem dilexit ultra modum et volens quod ipse sit *sapiens in eiusdem artibus* more condam patris sui Cham. Discipulos quamplures accepit in domo propria causa filii sui *Nehenroth* [sic] et eos cum illo *ex omni sciencia earum artium* quas noverat *dilligenter instruxit*. Cum vero iste Chanaan famosus esset scienciarum et ut deus computaretur populus sue patrie, devenit in grandem gueram qua ordinatum fuit prelium generale. Ipse vero cum quadam die deceptus bello regis Egyptiorum incidens constituto gladio intreptus [sic] est et eius patria per illum regem devicta est, et *omnes libri quos cum grandi labore studii longo tempore composuerat sunt combusti* eo quod domus eius combusta est ut [fol. 19rb] multe aliarum. Post vero mortem eius venit iste *Nemroth* filius eiusdem Chanaan, quicquid *de arte ipse et socii sui* noverant in unum coligens examinatione memorie, eandem *artem astronomie* quam melius potuit reperavit. Unde *iste Nemroth* quia filius tanti viri et talis loco patris computatus est, *deus a multis adoratus et in questionibus requisitus*. Hic vero *Nemroth* inter ceteros familiares sociorum habuit *discipulum* nomine *Ioanton*, cui omnia *ex grandi amore* omnia sue sciencie *recitavit*, eum docens in omni sciencia toto posse. Et docendo illum ei *composuit librum tocius artis astronomie* qui dicitur *Nemroth*, in quo libro sunt magnalia cum *rotis et figuris*. (Munich, Bayerische Staatsbibliothek, Clm 10268, fols. 19ra–b)

Text 2: Liber Nemroth, chapter 2, De una virtute qua dicit Nemroth que sustinet celum

Et dum recordaretur *Nemroth formam celi*, cognovit quod habuisset creatorem, sed non cognovit quis esset. Et vidit celum volvens in semetipsum non exiens de loco suo. Et agnovit quod non habuisset de subter quod illud impedisset, nec desuper per quod suspenderetur. Et in hoc non potuit dicere aliud nisi quia *virtus* sit que hoc sustinet. Et eam nominavit *fortitutinem* sustententem celum et stantem sub nullo, ut ammiranda sit sciencia *Nemroth*, quod *mensurasset* formam celi. Et cognovit cursum signorum et circulos stellarum et *fundamentum terre*. *Et non agnovit quod deus creasset eam*. Set et hoc cognovit quia *desuper creatura fortis et dominatrix sit, et nominavit eam creatorem*. Et *depinxit* et scripsit omnia *secundum suam similitudinem*, ita ut qui tunc fuerunt voluerunt *illum habere ut deum* propter suam virtutem et scientiam, dicente illo occulta in *compoto astronomie*. Et cognovit *Nemroth* quia celum fuisset purum. Et post hec factus est sol et luna et omnes stelle. (Va, fol. 1v; T, fol. 3v)

Text 3: *Liber Nemroth*, chapter 1. *De forma celi et quomodo decurrit inclinatum*

Celum igitur *inclinatum* volvitur a meridiano usque in septentrionem super terram et de septentrione ad meridianum sub terram. Et in rotunditatem suam volvens sese *inclinatum* et quod eversum [reversim *Va*] videtur directum *per preceptionem creatoris* creaturae. Ut homo opifex bonum instruens palatium, qui primum *mensurat* locum et fodit fundamentum et edificat ordinabiliter illud donec adimpleatur edificium suum. Ita et *Nemroth mensuravit* omnem causam celi *per suum intellectum* et posuit *fundamentum* super quod edificavit *ordine numeri* per capitula superius denominata. Et dum perlegisset, eadem semper in melius construxit. Et omnia ista capitula se invicem condecorant, ut bonus opifex qui edificium suum ordinariter disponit: primo in edificio fit fundamentum in terra. Et primo capitulo *expositio* minima *celo verso sine stellis*. Et post hoc apparebit *numerus*.

(*Ve*, fol. 1rv; also in *Eg*, fol. 48v; *T*, fol. 2v; and *Va*, fol. 1r)

Texts 4 and 5: *Liber Nemroth*, parts of chapters 9 and 12

Chap. 9 (*De axe celi*): Et dum aspiceret ad celum vidit illud [*illum Va*, *T*] *volvens et inclinatum* in sua rotunditate; exponens tunc illi *duos cardines* unum a septentrione super terram et alterum a parte meridiana subtus terram.

(*Va*, fol. 2v; *Ve*, fol. 4v; *T*, fol. 5ra)

Chap. 12 (*De numero stadiorum quot stadia sunt de uno signo usque ad alium*): Circuitus autem celi est *inclinatus* propterea scilicet est medius circulus grandior quam una pars et media corde que est in medio arcu.

(*Va*, fol. 4r; *Ve*, fol. 5r; *P*, fol. 203v; *T*, fol. 6ra)

Text 6: *Liber Nemroth*, end of chapter 5, *De duabus fortitudinibus*

Et audiens hoc *Nemroth* respondit ei et dixit: Discipule meus, cognoscas quia super celum posuit creator duas virtutes fortissimas atque coniunctas in elevationem vel descensionem eius. Et propter[ea] virtutes has *depinxit* in similitudinem *duorum draconum* magnorum et vocavit eos *ascensionem* et *descensionem*.

(*Ve*, fol. 2v; *T* fol. 4ra; *Va* fol. 2r with a text christianised by the scribe: *quia deus super celum posuit duas creaturas virtutes firmissimas*)

Text 7: *Liber Nemroth*, chapter 8, *De duobus fortitudinibus quas disposuit Nemroth que currunt inter signa celi*

Igitur ipse fortitudines disponente Nemroth que discurrunt inter .vii. et .xii. non sunt fixe in celo. Nam quod ipse dixit quia discurrunt inter signa, disposuit Alexander dicens quia iste due *fortitudines* quas ait ipse Nemroth ipse sunt quas exposuit superius. Propter hoc non *depinxit eas* cum signis, quia sunt forinsecus celi contra Zodiacum, et sic eas *depingens in alio loco* non ut coherentes in ipso, nisi ut impararet [adimpleret *Va*] *narrationis expositionem* de fortitudinibus celi.

(*Va*, fol. 2v; *Ve*, fol. 3v; *T*, fol. 5ra)

Text 8: *Liber Nemroth*, chapter 3, *De quatuor ventis qui regunt celum per quattuor partes*

Cum vidisset *Nemroth formam celi* et commotionem ispius, miratus est in *virtute creatoris*. Et dixit quia istud celum oportunum est ut a *quatuor virtutibus* regatur et non moveatur de loco in alium [alio *Va*]. Disposuitque *in scriptura sua* [scripturis suis *Va H*] dicens quia celum sustinetur a quatuor virtutibus per quatuor partes [a quatuor partibus *Va H*] per ordinationem *creatoris* ne commoveatur de loco suo. Et non dixit de ipsis virtutibus ut sint sicut colonne que sustinent edificia *set quasi ligamentum in edificio per partes coequales*. Et istos octo [*om. Va*] ventos nominavit *Nemroth* per loca, ventos, et in locis, virtutes.

(*Va*, fol. 1v; also in *P*, *Ve*, *T*, and *H*)

Notes

1. First quotation: “Animo facilius inlabitur concepta ratio descriptione quam sermone.” Second quotation: “quia facilius ad intellectum per oculos via est, id quod sermo descripsit visus adsignet.” See edition in Willis 1970. Quotations cited in Hiatt 2007, pp. 152 and 169, n. 8. Translation from Eastwood and Grasshoff 2004, p. 53.
2. For a complete historiographical overview, see Draelants 2018a, where the manuscript tradition, the testimonies, and new findings about it are outlined, with a complete table of the chapters of the *LN*. Here, suffice it to say that, after the first account of the text published by Steinschneider 1871, p. 380, no. 38, and Haskins 1924, pp. 336–45, and following the long pioneering article of Livesey and Rouse 1981 and the polemical reaction of Lemay 1987, Barbara Obrist has written three articles mainly on the question of the winds and the center of the world in the *LN* (Obrist 1994; Obrist 1997; and Obrist 2011). The question of the planetary longitudes is also treated in Juste 2004b and one can find

- a discussion of the *LN*'s date in Juste 2004a. Dronke 1986 discussed the connections between Dante and the *LN* in an appendix. Nevertheless, interest in the text is increasing, as demonstrated by the international conference on computus held in Galway (July 2016), where an entire session was dedicated to the *LN*, with the four papers of B. Obrist, D. Juste, Ph. Nothaft, and I. Draelants (see Draelants forthcoming).
3. Genette 1987.
 4. The numbering of the illustrations in the *LN* is mine. See the complete table of the chapters and the corresponding figures preserved in the manuscript tradition in Draelants 2018a, pp. 321–26. See Appendix 1 for a simplified list of these illustrations in the *LN*: these are referred to throughout this chapter as “Illustrations,” to distinguish them from the selected images being reproduced here, which are referred to as “Figures.”
 5. In this respect, it is similar to the *Dragmaticon* of William of Conches (written 1144–55); see Ramírez-Weaver 2009. On medieval astronomical iconography, see Eastwood 2007.
 6. This diagrammatic summary does not claim to be a *stemma codicum*: it is an attempt to show the relationships between the various copies of the *LN*; it is updated compared with Draelants 2018a.
 7. See the edition and commentary of this long chapter in Draelants 2018b.
 8. See Draelants 2018a for details and comments, and Fig. 1 (Manuscript tradition).
 9. See Sudhoff 1917, pp. 309–12.
 10. David Juste’s paper given during the sixth Computus Conference in Galway (July 2016) discusses these chapters. Juste 2004a also draws attention to some corresponding values in the *LN* and in Book V of the Carolingian *computus*-compendium (ca. 807–9) published by Arno Borst under the title *Libri computi* or *Aachener Enzyklopädie* (Borst 2006).
 11. See Juste 2004b.
 12. For a recent edition of this work, see Voskoboinikov 2014. Michael Scot’s quotations from the *LN* are commented in Grebner 2008 and detailed in Draelants 2018b.
 13. See, for example, in his *Philosophia*, II, 2 (edition in Maurach 1974, II, 3, §9–§10, p. 44): “Tribus igitur modis auctoritas loquitur de superioribus: fabulose, astrologice, astronomice. Fabulose loquitur inde NEMROD, HYGINUS, ARATUS” (the authors speak three ways about the upper things: in the form of a fable, astrologically and astronomically).
 14. In Guido’s glosses, the name is spelled “Nehemroth.” See Könsgen 1990 for a partial transcription of some of the glosses on books I and IX.
 15. See Federici Vescovini 1985, esp. pp. 77–78 (“Il liber Nemroth”); and Federici Vescovini 1986, pp. 795–804.
 16. See Thorndike 1923, pp. 321–22, who stated that this extract was within the *Prohemium* (as is repeated in Livesey and Rouse 1981 p. 244), but the preface is already finished at this point in the text. See also Pingree 1994, pp. 54–55. All emphases in italics in quotations from primary sources are mine.
 17. Livesey and Rouse 1981, pp. 244, 245, transcribe a part of the passage of the *Liber introductorius* that discusses Nemroth. One can read the same quotation in Oxford, Bodleian Library, Ms. Bodley 266, fols. 24va–b. On fol. 25ra (fol. 19va in the Munich manuscript), there is a drawing representing the giant Atlas (*Athalax*) bearing the sky divided into twelve quarters with the Sun, the Moon and the planets and, outside the sphere, the names of the Signs of the Zodiac.
 18. See, for example, Schützing 1961; van der Toorn and van der Horst 1990; and Kugel 1998, pp. 229–32 (for the Tower of Babel).

19. The edition of the *Cave of Treasures* in Bezold 1883–88 has since been superseded by Su-Min Ri 1987; Su-Min Ri 2000; and Toepel 2001.
20. As Su-Min Ri 2000, p. 356, points out; see also Toepel 2006, pp. 244–45. See Gero 1980; and Toepel 2006, on the Jewish origins of Yonton. Clemens Leonhard’s opinion differs from this (Leonhard 2001, pp. 287–88 and n. 112), since he thinks that the *Cave of Treasures* was the first source to “invent” the character of Yonton/Ioanthon.
21. In the *Nabatean Agriculture* (translated in Latin), *Anthakia* (Antioch) is also mentioned. The Persian priests are named *magi*, a name used for Zoroastrian priests at the time when Persians settled in Babylon. The work deals with two people descended from Adam’s sons: the Canaanites and the Chaldeans. The Sabeian sect is sometimes seen as the latest manifestation of the Nabatean school, which is considered to be the last phase of Babylonian literature between the Seleucids (Seleucos was proclaimed king in 305 BCE) and the Muslim invasion.
22. This chapter has been edited and commented by Obrist 2011.
23. The *Cave of Treasures*, chaps. 45, 11, and 27, 6–11, speaks of Nimrod’s Revelation or Nimrod’s Oracle as an astrological work (Toepel 2006, p. 241). See Bezold 1883, vol. 1, p. 234, l. 7. Budge 1927, pp. 37–38, did not identify it as such and thought that it was a book on divination: “One of the most important sections of the ‘Cave of Treasures’ is that which contains a description of the Magi and their visit to Jerusalem . . . They are here grouped with the Chaldeans, who were presumably Babylonians, but they themselves are called the ‘wise men of Persia.’ Both these bodies of sages had studied the motions of the ‘Malwâshê,’ or Signs of the Zodiac, for centuries, and through them they felt that they were able to forecast with accuracy the course of events on this earth. The Magi . . . thought that the king of the Greeks was about to attack the land of Nimrod. At length they consulted their great astrological work which is here called ‘Gelyânâ dhe Nemrôdh,’ i.e. the ‘Revelation of Nimrod,’ and there they learned that a king was born in Judah.”
24. For Reinink 1993, pp. v–xxix, the work may have been compiled in 692, under Abd el-Mali in northern Mesopotamia (Singâr); Toepel 2001, p. 536, says that the main source of the *Revelations* was *The Cave of Treasures*. Su-Min Ri 1987 thinks that the *Revelations* were written or translated into Greek, then put into Latin by a monk called Peter during the eighth century.
25. See Reinink 1993, p. 3 and passim; and Su-Min Ri 2000, pp. 319–20 and 328, who quotes the Bible in French (*Rév.* III, 2). For the Latin version, see Sackur 1898, pp. 63–64 or, more recently, Garstad 2012.
26. Chap. 59: De septem viis in quibus currit Sol et Luna ac quinque stelle quas nominavit Nemrot mare vel provincias.
27. Ms T, fol. 21rb (the other manuscripts do not contain either chapter 71 or chapter 70 about leap years).
28. I am indebted to Eleonora Andriani for this observation.
29. Some of these values are explored in Draelants forthcoming. Chapter 61 is edited and translated in Draelants 2018b.
30. See also the title of chapter 46: *De luna quod sit omni tempore rota illius plena splendore* (About the Moon, and when its wheel is full of brightness).
31. On these cosmic winds in the LN, see Obrist 1997.
32. See Claude-Villey 2011–12, pp. 376–77 and Baudry 2014, pp. 20–21 for later Byzantine examples.
33. Ms. Va, fol. 8r; Ve, fol. 10r; P, fol. 208r; T, fol. 9r.

34. Ms. *Va*, fol. 10r; *Ve*, fol. 12v; *P*, fol. 211v, lacking in *T*.
35. The Seleucid era, beginning in 311/312 BCE, also called the Year of Alexander, was adopted by the Macedonian court. It was used before romanization commenced under Caesar in 47 BC and is maintained in the Julianized calendar that was used for the computus in Alexandria.
36. See Grumel 1958, pp. 98–110; see also p. 174, where he states that from the fourth century, Antioch's calendar, beginning October 1st, is the official calendar of Antioch's patriarchate.
37. See Claude-Villey 2011–12, p. 36.
38. For other examples, see Draelants forthcoming.
39. About the cosmic winds in the *LN*, see Obrist 1994 and Obrist 1997.
40. See edition in Kugener 1907. The Syriac title in the manuscript says “Computus of the revolution time, in which there is no mistake, compiled by saint mar [*sic*] Dionysius, bishop of Athens.” See also Furlani 1917.
41. See Draelants forthcoming; I also gave a paper at the 52nd International Congress on Medieval Studies, in Kalamazoo in May 2017: “The ‘Liber Nemrod de astronomia’: A Rare Transcultural Witness to the Syriac Measurement of the Cosmos?”