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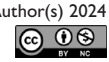
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Carolingian eclipse rules and the *Liber Nemroth*: Some remarks on a recent hypothesis

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Abstract
This short note responds to a recent article on "Occultation Records in the Royal Frankish Annals for A.D. 807: Knowledge Transfer from Arabia to Frankia?" by Ralph Neuhäuser and Dagmar L. Neuhäuser (*JHA* 55, no. 3). It shows that, contrary to a key claim made in this article, the presence of rules for predicting solar and lunar eclipses in manuscripts associated with the so-called Seven-Book-Computus of 809 is due to the influence of the *Liber Nemroth*, a text with roots in the pre-Islamic Near East.

Keywords
Carolingian Europe, eclipses, *Liber Nemroth*, Royal Frankish Annals, Seven-Book-Computus

In 2006, Arno Borst published his critical edition of a voluminous Carolingian compilation of mostly computistical and astronomical material, which according to his hypothesis was first assembled in Aachen in 809. Modern scholars have referred to this compilation by a variety of different names, though the label Seven-Book-Computus has proven especially popular.[1] One section in Borst's reconstruction of the Seven-Book-Computus that may be considered particularly interesting to historians of pre-modern astronomy is the one his edition identifies as ch. V.15a and reproduces from three manuscripts. It deals with the prediction of eclipses, presenting a 24-year rule for the reoccurrence of solar eclipses and a 177-day rule for expecting a lunar eclipse after a solar one.[2] These two rules have no precedent in earlier Latin *computus* literature, nor can the information in question be found in classical Roman sources circulating in Carolingian Europe such as Pliny the Elder's *Naturalis historia*.[3] Their actual point of origin was first revealed in print by Immo Warntjes, who in 2014 reported on an earlier discovery made

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by David Juste that the same eclipse rules appear in the *Liber Nemroth*, a unique cosmological and astronomical treatise written in dialogue form and accompanied by illustrations and diagrams.[4]

Research on the *Liber Nemroth* has been hampered to some extent by the lack of any printed edition of the text, let alone a critical one. Nevertheless, recent efforts by Barbara Obrist, David Juste, and Isabelle Draelants have led to the accumulation of a large body of reliable information about the work—its content, sources, and manuscript transmission.[5] One of the most important findings in this respect has been that many of the cosmological and astronomical doctrines that characterize the *Liber Nemroth* have counterparts in Syriac texts written up to the eighth century. Although its precise origins are still shrouded in uncertainty, it is now clear that the *Liber Nemroth* is a Near Eastern work originally written in a Semitic language, or at the very least based on such works.[6]

While it is not easy to assign a definite date to the *Liber Nemroth*, a reference to *Annus Mundi* 6298 (according to a version of the Alexandrian world era) in its discussion of solar eclipses suggests that the text underwent some stage of its redactional history in or shortly after 807.[7] A recent manuscript discovery made by Thomas Falmagne and Isabelle Draelants has pushed the date of the earliest surviving textual witness to the middle third of the ninth century.[8] From two references to Nemroth in a text by Eugenius Vulgarius, which were first brought to the attention of scholars by David Juste, it had previously already been clear that the *Liber Nemroth* must have existed by *c.*900.[9] Based on the chapter division used in a 2018 study by Draelants,[10] the following chapters in the *Liber Nemroth* can be identified as sources underlying ch. V.14a–16a in Borst's reconstruction of the Seven-Book-Computus:

V.14a: *Liber Nemroth*, ch. 16–17 (on the rising and setting of signs).

V.15a: *Liber Nemroth*, ch. 30, 36, 40 (on eclipses).

V.16a: *Liber Nemroth*, ch. 48–56 (on periods of planetary motion).[11]

This information is crucial when it comes to assessing the validity of a hypothesis put forward in a recent article on "Occultation Records in the Royal Frankish Annals for A.D. 807," published in *JHA* vol. 55, no. 3.[12] According to the two authors (Ralph Neuhäuser and Dagmar L. Neuhäuser), a diplomatic delegation that was famously sent by the Abbasid caliph Hārūn al-Rāshīd to Charlemagne served as a vector for the transmission of astronomical knowledge from the Islamic world to Carolingian Europe. They propose that this knowledge transfer left certain traces in the *Royal Frankish Annals*, in a passage that immediately precedes the annalist's account of the arrival of Hārūn al-Rāshīd's envoy in Aachen in 807. Specifically, the passage records: (i) a lunar eclipse on 2 September of the previous year (806), with the Sun at 16° Virgo and the Moon at 16° Pisces; (ii) a conjunction of Jupiter and the Moon on 31 January, which was the 17th day of the Moon; (iii) a solar eclipse on 11 February, with the Sun and Moon located at 25° Aquarius; (iv) a second lunar eclipse on 26 February, with the Sun at 11° Pisces and the Moon at 11° Virgo; (v) an alleged solar transit of Mercury lasting at least 8 days from 17 March, which was probably a sunspot; (vi) a third lunar eclipse on 22 August, at the third hour of the night, with the Sun at 5° Virgo and the Moon at 5° Pisces.[13]

One argument the authors of "Occultation Records" make is that the "completeness" of the record of solar and lunar eclipses visible between September 806 and August 807 reveals that these eclipses were predicted in advance using knowledge about eclipse patterns that was available to astronomers in the Islamic world, but not to Latin Christians.[14] Besides the mentioned passage in the *Royal Frankish Annals*, the authors see evidence of such a knowledge transfer in the Seven-Book-Computus, namely, in the aforementioned chapter V.15a and its use of a 177-day period in connection with lunar eclipses.[15] According to them, this period amounts to "the first working eclipse prediction scheme in the Latin West, which can be applied successfully; this knowledge was transferred by the A.D. 807 delegation and may originate from the *Almagest*."[16] The authors are in fact aware of the parallel attestation of the same rule in the *Liber Nemroth* (ch. 40), but they dismiss the importance of this fact by arguing that the *Liber Nemroth* depends on the Seven-Book-Computus, as opposed to vice versa.[17]

In support of this position, they refer to a 1981 article on the *Liber Nemroth* by Steven J. Livesey and Richard H. Rouse, who suspected that the text was composed after the ninth (namely, in the tenth or early eleventh) century, suggesting Montecassino as one possible place of origin.[18] The authors of "Occultation Records" follow this suggestion, noting that two ninth-century witnesses to some chapters of the Seven-Book-Computus (MSS Rome, Biblioteca Casanatense, 641, and Montecassino, Archivio della Badia, 3) originated at the same monastery. They treat this as evidence that "the Seven Book Computus with solar eclipse knowledge would have been available in Montecassino, when the Liber Nemroth might have been compiled,"[19] even though neither codex contains any of the three chapters (V.14a–16a) connected with the *Liber Nemroth*. The authors' reliance on Livesey/Rouse is somewhat puzzling given the degree to which this study has been corrected and superseded by the research published over the past two decades and more. Their own assertion according to which "[i]t is disputed whether Liber Nemroth or Seven Book Computus is earlier" wrongly suggests that scholars are currently divided over this chronological question.[20] In actual fact, scholarship on the *Liber Nemroth* has progressed considerably since 1981, to the extent that many of the conclusions put forward by Livesey/Rouse, especially their insistence on a late and purely Western origin of the text, must now be considered refuted and out of date.

A second argument that "Occultation Records" adduces to confirm the anteriority of the Seven-Book-Computus concerns a list of eight solar eclipses that allegedly occurred in 760–812, which Borst's edition numbers as ch. V.10.[21] The authors assume that copies of this list appear in the two aforementioned manuscripts from Montecassino, which is what underlies their claim about the "solar eclipse knowledge" available at that monastery.[22] Yet, this is not borne out by Borst's edition of the list in question, whose apparatus indicates that the Montecassino manuscripts contain an entirely different account of the solar eclipses of 760, 764, and 787 and make no mention of the remaining five eclipses up to 812.

In its standard form the list mentions eclipses on 30 November 810 and 27 April 811, the latter being a fictitious date that the authors believe was predicted on the basis of a 5-month period for solar eclipses known from the *Almagest*. They conclude from this that the "eclipse periods inherent in the Seven Book Computus go beyond the rules in Liber Nemroth," which is supposed to confirm that the latter were derived from the former work.[23] This argument carries no logical force, however, since there is no good reason to assume a shared origin for the eclipse list in ch. V.10 and ch. V.15a, which contains

the rules for predicting eclipses. Here it is important to note that ch. V.14a–16a do not appear in the earliest known witnesses to the Seven-Book-Computus such as MS Madrid, Biblioteca nacional de España, 3307 (*c.*820), which Borst used as the guide manuscript for his edition. The authors of "Occultation Records" instead refer to the attestations of these chapters in MS Melk, Stiftsbibliothek, 412, pp. 29–30 (written at Saint-Germain d'Auxerre, *c.*840) and MS Vatican City, Biblioteca Apostolica Vaticana, Reg. lat. 309, fol. 3r (from Saint-Denis, 859/860),[24] but they fail to mention that the former manuscript, which is our earliest witness, contains only a small handful of chapters associated with the Seven-Book-Computus, while in the latter manuscript the relevant material (ch. V.15a–16a) was added by a later hand. Far from being a precisely circumscribed work with a single place of origin, the computistical "encyclopaedia" reconstructed by Borst is, in fact, a heterogeneous compilation of individual textual objects, which are attested in varying configurations across dozens of early medieval manuscripts.[25] The notion that these objects must have all been derived from a single "master text" produced at Aachen in 809–812, which is what the authors seem to have assumed,[26] should accordingly be questioned.

The possibility that ch. V.14a–16a were somehow refashioned to produce the corresponding passages in the *Liber Nemroth* is extremely remote and deserves to be rejected on several grounds, starting with the internal cohesion of the *Liber Nemroth*. One of the hallmarks of this text is its calendrical style, which is alien to the mainstream of early medieval Latin *computus* but has known counterparts in the Christian Near East. This includes the habit of counting the days and months of the year from 1 October and a reckoning of years based on a version of the Alexandrian (sometimes known as "Antiochene") world era.[27] In line with its habit of beginning the year in October, the *Liber Nemroth* counts the signs of the zodiac from Libra rather than Aries.[28] This very unusual convention is mirrored in the second half of ch. V.14a of the Seven-Book-Computus (*Ortum signorum duodecim qualibet diei vel noctis hora . . .*), whose content corresponds to that of ch. 16–17 in the *Liber Nemroth*,[29] but nowhere else in the same compilation.

It can hardly be considered plausible that the *Liber Nemroth*'s characteristic approach to counting signs and years was an import from the Seven-Book-Computus, or that its ch. 16–17, 30, 36, 40, and 48–56 somehow originated as highly creative elaborations upon the chapters edited by Borst. Instead, the conclusion that best fits the known facts is that the 177-day rule regarding lunar eclipses entered circulation in Carolingian Europe via the *Liber Nemroth*. Any additional knowledge transfer from the Islamic world, such as that supposedly facilitated by the delegation of 807, is unnecessary to explain why the rule is attested in manuscripts associated with the Seven-Book-Computus. What remains possible, and is perhaps worth considering, is that the delegation of 807—which included two monks from Jerusalem—was somehow causally connected with the appearance of the *Liber Nemroth* in the Latin West.

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Notes

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8. Draelants and Falmagne, *op. cit*. (Note 5).
9. Juste, "On the Date," *op. cit*. (Note 5).
10. Draelants, "Le *Liber Nemroth de astronomia*," *op. cit*. (Note 5), pp. 320–26.
11. Regarding parallels between the *Liber Nemroth* and ch. V.14a and V.16a of the Seven-Book-Computus, see Juste, "Neither Observation," *op. cit*. (Note 5), pp. 189–215; Juste, "Horoscopic Astrology," *op. cit*. (Note 5), pp. 325–8.
12. R. Neuhäuser and D.L. Neuhäuser, "Occultation Records in the Royal Frankish Annals for A.D. 807: Knowledge Transfer from Arabia to Frankia?," *Journal for the History of Astronomy*, 55 (2024), 364–95.
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15. Neuhäuser and Neuhäuser, *op. cit*. (Note 12), pp. 380–81.
16. Neuhäuser and Neuhäuser, *op. cit*. (Note 12), p. 383.
17. Neuhäuser and Neuhäuser, *op. cit*. (Note 12), pp. 381–2.
18. S.J. Livesey and R.H. Rouse, "Nimrod the Astronomer," *Traditio*, 37 (1981), 203–266 (229–231, 250). Neuhäuser and Neuhäuser, *op. cit*. (Note 12), p. 381, attribute to Livesey and Rosue the opinion that the text was compiled "in the 9/10th century".
19. Neuhäuser and Neuhäuser, *op. cit*. (Note 12), p. 381.
20. Neuhäuser and Neuhäuser, *op. cit*. (Note 12), p. 381.
21. Borst, *op. cit*. (Note 1), pp. 1277–9.
22. Neuhäuser and Neuhäuser, *op. cit*. (Note 12), p. 381.
23. Neuhäuser and Neuhäuser, *op. cit*. (Note 12), p. 382.
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26. Neuhäuser and Neuhäuser, *op. cit*. (Note 12), p. 376.
27. See Nothaft, *op. cit*. (Note 7).
28. See, e.g., the wheel diagrams in MS Paris, Bibliothèque nationale de France, lat. 14754, fols. 203r and 204r, which belong to ch. 10 and 13.
29. Borst, *op. cit*. (Note 1), pp. 1295–6. See Juste, "Neither Observation," *op. cit*. (Note 5), pp. 212, 215 (n. 89); Juste, "Horoscopic Astrology," *op. cit*. (Note 5), pp. 326–8.