PER HOLMBERG

Watching Star Wars with Viking Age Subtitles

An analysis of cohesion and coherence in the Rök runestone inscription

Introduction

The Rök runestone, erected in the early Viking Age in what today is Middle Sweden, is famous for its enigmatic message. Who is the mounted warrior described on the front side of the stone, and who are the twenty kings whose names are carved on the opposite side? Why does the text suddenly, as it seems, mention an event on Zealand? Why are nine numbers left out between 'the second' and 'the twelfth' in the numbering of different parts of the text? The list of puzzling details is long, and a major challenge has been to find a context that makes the various details meaningful.

This work was supported by The Swedish Research Council (Rök Runestone Revisited 2016-02493). I am especially thankful to Maria Sundin for the check of astronomical details, and for comments given by Stina Ericsson, Anna-Malin Karlsson, Susanna Karlsson, Per Ledin, Tommaso Milani, Mikael Nordenfors, Alessandro Palumbo, Ida Västerdal, and the participants in seminars in Gothenburg, Linköping, Stockholm, Södertörn, Umeå and Uppsala. I also want to thank Lance Carter for playfully suggesting connections to the starry sky already in 2016.

Holmberg, P., Professor in Swedish, Department of Swedish, Multilingualism and Language Technology, University of Gothenburg. "Watching Star Wars with Viking Age Subtitles. An analysis of cohesion and coherence in the Rök runestone inscription". *ANF* 137 (2022), pp. 5–32.

Abstract: The famous early Viking Age Rök runestone inscription has been considered missing linguistic links which would have shown how its passages are connected. This study challenges these previous assumptions. It shows, to the contrary, that the riddles of the front side can be understood as closely connected to riddles of the opposite side. A key to the interpretation is that the riddles are taken to concern what is visible from the stone: the lunar changes of the year, the sunrise at the autumn equinox and the movement of stars the same night – all conceived as dimensions of an ongoing cosmological battle.

Keywords: Rök, runestones, Viking Age, riddles, text linguistics, ethnoastronomy.

DOI: https://doi.org/10.63420/anf.v137i.27894

The main conclusion of 150 years of scholarly effort has been that the inscription lacks linguistic links that could indicate how its passages are semantically interrelated, and consequently, that the textual gaps have to be filled by imagined biographical facts or narratives that would suffice to keep the passages together (cf. e.g., Bugge 1878; Schück 1908; von Friesen 1920; Wessén 1958; Lönnroth 1977; Harris 2006, 2009, 2010). To put it in terms of text linguistics, research has agreed on the weak *cohesion* of the text, and elaborated other ways of reaching a satisfying *coherence* (Halliday and Hasan 1976), although there is hitherto no agreement on how to achieve this goal.

This study challenges the conclusions of previous research. It argues that the cohesive linguistic linking may contribute to the meaning of the text more than has previously been noticed. Further, the study develops the idea that a coherent interpretation of the text is not primarily a result of what can be *imagined* in terms of lost background knowledge, but a result of what can be *watched* in the process of reading.

An analysis of cohesion and coherence is made more difficult by the fact that no indisputable reading order has been established (see Lönnqvist 1999 and Åkerström 2021 for the different possibilities). This study, therefore, focuses on the parts of the inscription whose reading order is undisputable (marked with A, B, and C in Figure 1): the two introductory lines of dedication on the first broadside (A); the following nine lines (B) that continue on the front side and the first narrow side; and finally, the nine vertical lines that constitute the central part of the second broadside (C) of which the last cannot be read in full today due to a damage of the stone. This selection does not imply any argument on whether other lines should be read before the nine latter lines or not. I will refer to these three passages as the main passages since they are visually foregrounded and inscribed with normal short twig runes only, in contrast to the other passages which involve different ciphers. Together, the main passages make up more than three-quarters of the entire inscription. Figure 1 shows how they are distributed on the more than man-high granite slab in twenty lines, out of the total of twenty-eight. For the sake of clarity in this article, the passages are called A, B, and C, respectively, and the information units are numbered for each passage.[1]

[1] Information unit is a term in the social semiotic model that is applied in this study for the analysis of cohesion. It is used for clauses (as well as clause complexes like B:1, B:2, C:1, C:2 and elliptic clauses like C:3) from the point of view of the so-called textual metafunction, i.e., 'in the flow of discourse', cf. Halliday and Matthiessen 2014: 114–19).

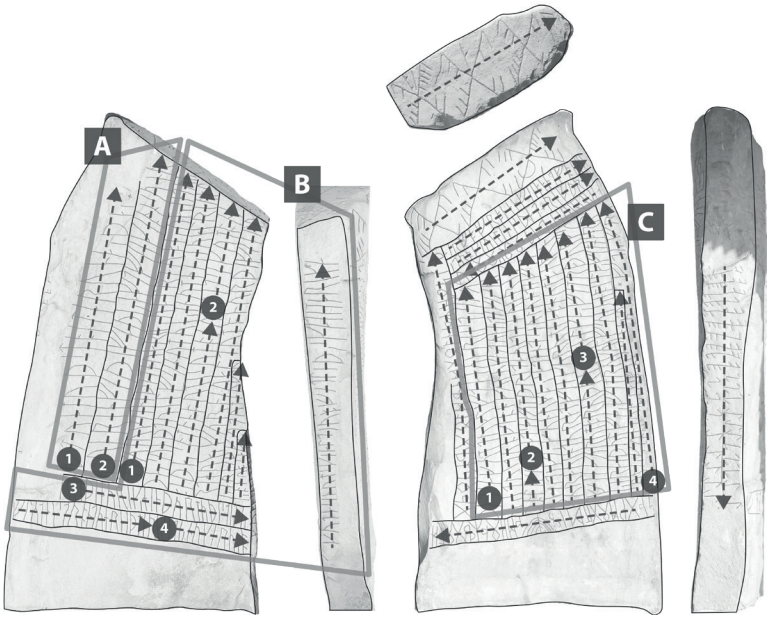

Figure 1. The place of the three main passages (A, B and C) on the Rök runestone. (Numbers refer to starting points of the information units of each passage, cf. Figure 2 below.) (Marco Bianchi (CC BY) and photo: Bengt A. Lundberg, RAÄ (CC BY).)

The text for analysis is presented in Figure 2 with transliteration of the runes, Old Norse transcription and English translation from Holmberg, Gräslund, Sundqvist and Williams 2020: 20 with some minor revisions. At instances where most scholars suggest other alternatives (in B:1, B:3, C:1 and C:2), these proposals are presented in brackets (following Wessén 1958 and Lönnroth 1977). The information unit C:4 is not included as it is not lexicogrammatically interpretable due to the damage of the stone (see Harris 2015 and references therein for the discussion of some of the possible reconstructions of the line).

In what follows, I first present the theoretical concepts and an overview of previous research. I then show how a stronger connection between different parts of the inscription can be established and what this means for the solving of the riddles.

A:1	aft uamuþ stąnta runaʀ þaʀ +
	Aft Vāmōð stãnda rūnaʀ þāʀ.
	After Vāmōðʀ stand these runes.
A:2	⟨i⟩n uarin faþi faþiʀ aft faikiąn sunu
	Æn Varinn fāði, faðiʀ, aft faigiãn sunu.
	And Varinn, the father, made them after the death-doomed son.
B:1	sakumukminiþathuariaRualraubaRuaRintuaR þaRsuaþtualfsinumuaRinumnaRtualraubu baþaRsąmąnąumisumąnum ᛬
	Sagum Ygg minni [alt. mōgminni] þat, hværiaʀ valrauðaʀ vāʀin tvāʀ þāʀ, svāð tvalf sinnum vāʀin numnaʀ at valrauðu, bāðaʀ sãmãn ã̃ ȳmissum mãnnum?
	Let us say for Yggʀ this as a memory [alt. Let us say this folk memory], which battlefield spoils were two there, which twelve times were taken as battlefield spoils, both from one to another?
B:2	þatsakumąna rthuaRfurniualtumąnurþifiaru miRhraiþkutumauktu miRąnubsakaR
	Þat sagum ãnnart, hvā'ʀ fur nīu aldum ã̃n urði fiaru meðr hraiðgutum, auk dōmiʀ æ̃nn umb sakaʀ?
	This let us say as second, who nine generations ago lost their life with the Hraiðgutaʀ; but decides still the matter?
B:3	raiþiaurikRhinþurmuþistiliR flutnastrąntuhraiþmaraR
	Raið iau, rinkʀ [alt. rēð Þiōðrīkʀ] hinn þurmōði, stilliʀ flutna, strãndu Hraiðmaraʀ.
	Ride the horse did the bold champion [alt. rule did Theodoric the bold], chief of men, over the shores of the Hraiðsea.
B:4	sitiRnukaruRą kutasinumskialtiubfatlaþRskatimarika
	Sitiʀ nū garuʀ ã̃ guta sīnum, skialdi umb fatlaðʀ, skati mæringa.
	Sits now armed on its horse, the shield strapped, foremost of the famous.
C:1	þatsakumtualftahuarhistʀsiku naʀituituąkiąnkunukaʀtuaiʀtikiʀsua þąlikia+
	Þat sagum tvalfta, hvar hæstʀ sē gunnaʀ [alt. hæstʀ sē Gunnaʀ] etu vēttvängi ã̃, kunungaʀ tvaiʀ tigiʀ svāð ã̃ liggia?
	This let us say as twelfth, where the horse of the battle [alt. the horse of Gunn] sees food on the battlefield, where twenty kings lie?
C:2	Þatsakumþritauntahuariʀt uaiʀtikiʀkunukaʀsatintsiuluntifia kurauinturatfiakurumnabnumburn ⟨i⟩ʀfiakurumbruþrum+
	Þat sagum þrēttāunda, hværiʀ tvaiʀ tigiʀ kunungaʀ sātin at Sīulundi [alt.: Siolundi] fiagura vinddura [alt.: fiagura vintur] at fiagurum nampnum, burniʀ fiagurum brøðrum?
	This let us say as thirteenth, which twenty kings were at the Grove of Sparks [alt.: on Zealand] in four directions [alt. during four winters], of four names, born of four brothers?
C:3	ualkaʀfimra͡þulfsu niʀhraiþulfaʀfimrukulfsuniʀhąislaʀfimharuþ ssuniʀkunmuntaʀfimþirnaʀuniʀ×
	Valkaʀ fim, Rāðulfs syniʀ, Hraiðulfaʀ fim, Rōgulfs syniʀ, Hã̄īslaʀ fim, Haruðs syniʀ, Gunnmundaʀ fim, Bernaʀ syniʀ
	Five Valkis, sons of Rāðulfʀ, five Hraiðulfʀs, sons of Rōgulfʀ, five Hã̄īsls, sons of Haruðʀ, five Gunnmundʀs, sons of Bern.

← Figure 2. Transliteration of the runes, Old Norse transcription and English translation of the three main passages of the Rök inscription. (Numbering indicates information units in each passage; spatium in the transliteration indicates a change of lines.)

Coherence and cohesion

The difference between coherence and cohesion is "a distinction between connectivity of the surface [i.e., cohesion] and connectivity of underlying content [i.e., coherence]" (Beaugrande and Dressler 1981: 12). Thus, *coherence* is a notion that summarises the meaning connections and inferences that a reader can make in the reading process while construing "connectivity of underlying content". *Cohesion*, on the other hand, captures the linguistic resources with a specific function to link clauses, clause complexes or longer passages together to text, so creating "connectivity of the surface". The resources the reader may draw on to understand the coherence of a text is not limited to its linguistic cohesive choices, but also include his or her understanding of aspects of the situational and cultural context.

The study applies a social semiotic model for analysing cohesion which identifies four general categories: conjunction, reference, ellipsis, and lexical organisation (Halliday and Matthiessen 2014: 611–57). Conjunction is the explicit expression of semantic relations between clauses. Common types of conjunctive relations are additive (e.g., *and*), temporal (e.g., *then*), causal (e.g., *so*), or adversative (e.g., *yet*). Reference is how expressions, often pronouns, can refer to other items in the text (endophoric) as well as to entities outside the text (exophoric). Ellipsis is the grammatical strategy to leave out an element that can be presupposed since it has been used in a previous clause, which for example, makes it possible to give very short but perfectly clear answers to yes/no questions. Lexical organisation, finally, enables lexical choices of items "that are related in some way to those that have gone before" (ibid: 642). This involves several options: One expression may be repeated in a following clause (*tree – tree*), replaced by a synonym that is more or less close in meaning (*climb – mount*), elaborated by a hyponym (*tree – oak*), specified by a meronym (*tree – trunk*), or just followed by a collocation (*tree – climb*). In this way, a text may be held together by strings of semantically related lexical expressions, so-called *referential chains*, that consist of items that

have a lexicalised relation (*tree – oak* etc.) as well as expressions that are used temporarily as synonyms or hyponyms in a specific text (*tree – the green giant* etc.). The referential chains thus, contribute both to the endophoric web of the text, and to its potential of exophoric references.

An analysis of the cohesion of a text cannot be accomplished without analysis of its coherence since cohesion is never merely a matter of lexical forms. Cohesion, whatever subcategory, is only at hand if it contributes to the coherence of the text. Thus, understanding coherence and cohesion is a dialectic process. An assumption about the coherence of a text may be supported by the observation of certain cohesive links, but an alternative interpretation of its coherence may make another potential pattern of cohesion appear. The basic assumption of this study is that interpretations of coherence that can be substantiated by cohesive links should be preferred.

Previous research

To take on a reanalysis of the Rök inscription, it is first necessary to understand how previous research has established a generally accepted knowledge about some cohesive links *within* its main passages, while attempts to understand also the relations *between* these passages have reached entirely different conclusions.

Cohesion within the main passages

Already, the first scholars who studied the Rök runestone inscription in the nineteenth century noted that it was much easier to find cohesive relations within segments of the text, which were identified as passages in the inscription's composition, than finding longer chains of cohesive links that would keep these passages together.

The first two clauses of the inscription were found to be strongly connected by several types of cohesive choices: the referential chain between *aft Vāmōð* 'after Vāmōðʀ' (A:1) and *aft faigiãn sunu* 'after the death-doomed son' (A:2); the ellipsis that presupposes *rūnaʀ þāʀ* 'these runes' from the first clause as a grammatical complement to *fāði* 'made', lit. 'colored' in the second one; and the additive conjunction *æn* 'and' in the beginning of the second clause (Liljegren 1833: 243; Hildebrandt 1866: 91; Bugge 1878: 10).

Regarding the next passage, some strong, cohesive connections were noted already by early research. The interrogative adverb *hvā'ʀ*, 'who' (B:2) seems to be answered by the noun phrase that includes the four runes that are read as a morpheme *ri(n)kʀ* (B:3) and has been taken to form either a (part of) a noun with the meaning 'champion' or the last part of a name: **aurinkʀ* 'lord of the island' (Stephens 1866: 232); **Auðrīkʀ* 'Audricus' (Noreén 1886: 25–26); **þiōðrīkʀ* 'king of a whole people' (Bugge 1878: 41), *Þiōðrīkʀ* 'Theodoric' (Vigfússon and Powell 1879: 452), **jáurikʀ* 'the horse-rich' (Kabell 1964), *rinkʀ* 'champion' (Ralph 2007: 150–1). Anyway, this referential chain apparently continues with *stillir* (B:3) and *skati* (B:4), both of which have the meaning 'chief' or 'leader' in each of the two parts of the metrically composed stanza that ends the passage (Bugge 1878: 41–2, 46–8).

In the last main passage, an obvious referential chain appears through the repetition of *tvair tigir kunungar* 'twenty kings' or literally 'two tens of kings'. The first instance (in C:2) is given to specify where the reader can find a wolf ('the horse of Gunnr', or possibly 'the horse of the battle' as proposed by Holmberg 2016: 95). The second mention of the twenty kings (in C:2) concerns a question about their identity. The referential chain continues (as argued already by Bugge 1878: 53–6) with a list of the names of the kings and their fathers (in C:3). As regards these cohesive links within the passage, there is consensus in previous research. The difficulty to connect the content of the passage to the front side inscription has, however, seemed insurmountable.

Coherence and cohesion between the main passages

Scholars have not agreed on any cohesive links between passages except the referential chain of the reader that is expressed by the repeated first person plural verb form *sagum* with the meaning 'we say' or 'let's say' (B:1; B:2; C:1; C:2, and three more instances in encrypted lines). The many interpretations of the Rök runestone inscription can, therefore, be seen as the outcome of attempts to solve the problem of the supposed weak cohesion between passages, and even so establish the coherence of the inscription.

Three main strategies have been tried. Either a set of lost biographical facts has been presupposed (e.g., Bugge 1878; Schück 1908; von Friesen 1920), or a set of now unknown narratives (e.g., Wessén 1958; Lönnroth 1977; Harris 2006, 2009, 2010). It has also been suggested that the inscription may turn out to be coherent if we focus on what can be watched from the place of the stone (Holmberg 2016; Holmberg, Gräslund, Sundqvist

and Williams 2020). In what follows, I will argue that crucial shortcomings of the two former models motivate that the third alternative should be tried out more consistently. With a term borrowed from film studies, I will here refer to this perspective as a sightscape model (Grasseni 2014).

The biographical model

When Sophus Bugge in 1878 presented the first complete interpretation of the Rök inscription, it was natural to examine whether Vāmōðr could be the key figure of all passages, since this is one standard option for textual cohesion in rune stone inscriptions from the later Viking Age. Arguing for this solution, Bugge claimed that the two battlefield spoils were captured by Vāmōðr in his last battle, that Vāmōðr is described as a riding champion as he was buried on his horse, and finally, that the twenty kings had fallen in the same battle, possibly killed by Vāmōðr. In terms of cohesion, this suggests a referential chain that connects the name Vāmōðr in the memorial formula (in A:1) with lexical items in the following passage. Bugge reads **þiōðrīkʀ* 'king of a whole people' (in B:3) and attributes this title to Vāmōðr together with *stilliʀ* 'leader' (B:3) and *skati* 'chief' (B:4). The proposal is that the deceased Vāmōðr was praised as king over the people of Östergötland, who Bugge identified with the Hraiðgutaʀ who are mentioned in the same passage (1878: 30–53).

For later attempts to apply the biographical model, this chain is broken through the identification of *þiōðrīkʀ* with Theodoric the Great (Vigfússon and Powell 1879: 452), or some namesake to him (von Friesen 1920: 46–8; Malone 1934: 76–84). The new challenge was to explain Theodoric's role in the biography of Varinn and Vāmōðr. Either it was solved by assuming a claim of kinship (Schück 1908: 27–28; Grønvik 2003: 118–9), or by imagining enmity between Theodoric and the kin of Varinn and Vāmōðr (von Friesen 1920: 82–3). Both alternatives make it possible to construe a referential chain that, although weakly, connects Theodoric and the Hraiðgutaʀ (in B) to the twenty kings on the other (in C). All of them can be understood as cohyponyms, either in a long line of Vāmōðr's relatives or in an enumeration of Vāmōðr's enemies. A supporting strategy has been to imagine some ritual practice that would strengthen the coherence of the inscription. Thus, it has been suggested that Theodoric would have been invoked for the sake of Vāmōðr's post death welfare (Höfler 1952: 81–2, Nielsen 1969: 31–2), and that the twenty kings are inscribed as a curse for his revenge (von Friesen 1920: 93–7).

The biggest problem, or set of problems, for all attempts to apply the biographical model is what seems to be the discontinuity of time and space between passages. In 1920, Otto von Friesen tried to explain the surprising leap from the 'second' (*anart* in B:2) to the 'twelfth' (*tvalfta* in C:1, followed by *þrēttāunda* 'thirteenth' in C:2) as a numeration that corresponds to the scribe's order of inscription, but the explanation makes it necessary to introduce a rather arbitrary division of the text (von Friesen 1920: 7–12; the same weakness applies to Holmberg 2016: 74–48). Von Friesen also took on painstaking investigations to localise both the name of the people *Hraiðgutaʀ* (B:2), the place name *Hraiðmarr* (B:3), and the place name *Siolund* (C:2) to the same Baltic Sea area and thus, somewhat strengthen the cohesion of the text by this referential chain of places. However, the solution requires that *Siolund* is accepted as an unattested dialect name for *Sillende*, and that this name – which is normally taken to refer to the southern part of the Jutland Peninsula – was a name of the East Prussia region where also the *Hraiðgutaʀ* may have lived (ibid: 39–46, 69–71, 108–40). Neither these suggestions, nor other, have been accepted as sustainable solutions to the problems of temporal and local discontinuity (see, e.g., the critique in Wessén 1953: 161–77). I will show that they can be solved, but only if the biographical model is left behind.

The narrative model

The narrative model for establishing coherence has dominated twentieth-century research after the publication of Elias Wessén's interpretation in 1958 (cf. e.g., Lönnroth 1977; Gustavsson 1991; Widmark 1993; Harris 2006, 2009, 2010). For the scholars who have worked with this model, the inferences of the biographical model appear to be far too speculative, and I agree with the main line of this critique. By supposing a set of now-forgotten hero narratives, where each narrative corresponds to a passage of the inscription, the research could discard doubtful biographical assumptions. Scholars have differed in the assessment of whether the intended hero stories can be reconstructed. The most pessimistic conclusion might be Wessén's:

> The […] narratives, which Varin has rendered in brief summary, have certainly been well known to contemporary people, but they are not to us. They have belonged to the treasure of East Norse narratives of the early Viking Age, and they have disappeared without leaving any trace in the written tradition. (Wessén 1958: 22, my translation)

On the optimistic end of the scale is Lars Lönnroth who, in 1977, argued that a comparison with hero narratives in medieval sources can give a relatively good idea about the intertextuality that was relevant at the carving of the monument. Theodoric the Great, assumed to be the rider at the Rök runestone frontside, plays a role in several medieval poems as Dietrich von Bern. Lönnroth especially suggests that parallels should be traced to the fragment of the Old English ninth- or tenth-century poem *Waldere* and the Old Norse thirteenth-century poem *The saga of Þiðrek of Bern*, which is based on German sources. Both of them mention how the trustworthy sword Miming changes ownership, and Lönnroth assumes that this sword is one of the battlefield spoils mentioned in the Rök inscription. Similarly, Lönnroth explicates the Rök passage about the twenty kings by parallels and analogues to several medieval hero narratives, above all the story about Friðleif the Dragon Slayer, in Saxo Grammaticus' twelfth-century work *Gesta Danorum*, who is told to have defeated twelve brothers (Lönnroth 1977: 28–37; see also Höfler 1963: 96).

Scholars who have taken the inscription to be an assemblage of such narrative fragments have tended to assume that these narratives were chosen by Varinn to illustrate heroic deeds, bravery and fame. A slightly different proposal has been developed by Joseph Harris (e.g., 2006, 2009, 2010) who argues that the narratives on which Varinn is supposed to allude were selected to express different aspects of his belief in life after death. While Harris interprets Theodoric (in B) as an example of immortality through individual fame, the twenty kings (in C) are understood to exemplify immortality through membership in the collective of the *Männerbund* (see e.g., Harris 2006: 101–102, 2010: 101; cf. Höfler 1952).

For the perspective of the narrative model, the assumed weak cohesion between passages is not a problem but an argument. The model makes it easy to accept discontinuity between the main passages B and C both in terms of key figures and their spatial and temporal positions. The explanation is simply that the content of each passage is retrieved from a particular narrative source. Thus, it is usually accepted that the Hraiðgutaʀ (in B:2) refers to the Ostrogoth people of Theodoric the Great, and that the Hraiðsea is some part of the Mediterranean Sea (in B:3), while *Siolund* (in C:2) is the Danish Island Zealand (e.g., Wessén 1958: 18, 24). The gap between the 'second' (*anart* in B:2) and the 'twelfth' (*tvalfta* in C:1, followed by *þrēttāunda* 'thirteenth' in C:2) is more problematic, but one *ad hoc* solution has been to assume that nine more narrative fragments once existed, on wooden tablets (Wessén 1953: 167; 1958: 19–20), woven tapestries (Schück 1908: 29) or other runestones (Jacobsen 1961: 35–38).

It has proved difficult to question the narrative model, as it is, of course, difficult to contradict statements about what is said to have disappeared. However, it is reasonable, I think, to reject assumptions about imagined hero narratives if it can be shown possible to understand the inscription as more coherent without them.

The sightscape model

The sightscape model takes into account that runestone inscriptions primarily focus on what can be perceived at the specific place of the stone, in contrast to runic sticks, manuscripts, or other movable inscribed artefacts (Holmberg 2016: 71–3; Holmberg, Gräslund, Sundqvist and Williams 2020: 12; cf. the discussion on spatiotemporal relevance in Holmberg 2021a). Of course, runestones are, just like all texts, capable of referring to other places, but from the sightscape perspective it is argued that it must make sense for the inscription to be read (over and over again) in the very place where the stone was erected, as "the meaning of the inscription resides not only in the words of their texts, but also in the very materiality of the monuments that preserve those words" (Jesch 1998: 462).

The possibility to apply a sightscape model to the Rök inscription was blocked as long as all scholars accepted the Theodoric interpretation *rēð* (or *raið*) *Þiōðrīkʀ* 'rule (or ride) did Theodoric' (in B:3). Therefore, it was crucial that Bo Ralph in 2007 showed that the segmentation *raið jau rinkʀ* 'ride the horse did the champion' is just as likely, and that the riding champion can be interpreted as a metaphor for the sun on tour over the firmament as it could be seen from Rök. This supports Ralph's conclusion that the two initial riddles concern the exchange of light between the sun and the moon, and the rising sun (Ralph 2007: 150–3; cf. Holmberg 2016: 89–90; Holmberg, Gräslund, Sundqvist and Williams 2020: 21–24; Holmberg 2021a: 47–50; Ralph 2021: 670–677; Williams 2021).

Some different conclusions are noticeable among scholars who have elaborated a celestial body interpretation of the first part of the inscription. Ralph's identification of the first riddle's battlefield spoils (the *valrauƀaʀ … tvāʀ* in B:1) as moonlight and sunlight, is challenged by Holmberg's suggestion (2021) that the riddle concerns the phases of the moon (*ný* and *nið*). If the latter alternative is preferred, the series of riddles begins by drawing the reader's attention to the 12 months and 24 half months of the year. As regards the second riddle, the death of the champion nine ages ago (*fur nīu aldum*) has been explained as the dark years after the volcano eruptions nine generations before the erection of the Rök stone

(Holmberg, Gräslund, Sundqvist and Williams 2020: 23; cf. Williams 2021), but also as the midwinter darkness nine months before the autumn equinox (Holmberg 2021a). No matter which options may be considered the most convincing, the first part of the inscription seems to open itself for a sightscape reading.

The next main passage of the inscription has, however, been a harder challenge. One proposal is that the kings should be identified as Odin's warriors meeting the wolf of Ragnarök, which implies that this final battle has been thought to take place near Rök, if the sightscape model is to be maintained (Holmberg, Gräslund, Sundqvist, and Williams 2020: 26–8). The authors suggest that the twenty kings are referred to already with the nouns *flutna* 'men' and *mæringa* 'famous men' (in the phrases *stillir flutna* 'chief of men' B:3, and *skati mæringa* 'leader of the famous' in B:4). However, the connection must be considered uncertain, as the sun-rider on tour over the firmament is not expected to be called the chief or leader of Odin's warriors. It should also be noted that the metaphoricity present in their interpretation of passage B (the battlefield spoils stand for the light; the riding champion stands for the sun) is totally absent in this interpretation of passage C (the kings *are* warriors). In this respect, it would be easier to argue for Ralph's idea that the twenty kings stand for winds blowing from different directions (Ralph 2021: 678–683).

The sightscape model has not yet succeeded in showing how these two main passages are spatially and temporally related, although some preliminary attempts are made. It has been argued that the mentioning of the *Hraiðgutar* (in B:2) can be understood as a metaphorical expression for the east, not a reference to a historical people (Holmberg 2016: 89–90; see also Brink and Lindow 2016: 181). Further, a new interpretation is suggested that replaces the Danish Island *Siolund* with *Sīulundr* 'Grove of Sparks' (in C:2) (Holmberg, Gräslund, Sundqvist and Williams 2020: 26–27). Finally, the interpretation *fiagura vinddura* 'in four directions' (in C:2) is preferred to *fiagura vintur* 'during four winters' (Ralph 2007: 155). These suggestions will all prove valuable when the sightscape model is used to frame the analysis of the cohesion and coherence.

Cohesion and coherence between the two sides of the Rök runestone

In this section, I will show how a new line for the interpretation appears, if the reading tries to maximise the potential continuity between the two main passages B and C, which make up the major part of the front side inscription and the inscription on the opposite side respectively. As a starting point, I accept the idea that (B) is kept together as a pair of riddles about the moon and the sun (without, for the time being, taking a position on the various proposals in Ralph 2007, Holmberg 2016, Holmberg, Gräslund, Sundqvist and Williams 2020, Holmberg 2021a, Ralph 2021, and Williams 2021). The implication for (C) that should be tried first is then, of course, that its pair of riddles concerns the stars. That would give the inscription a consistent focus on the rhythm of the heavenly bodies. The moon, the sun, and the stars are mentioned together for example when the Eddic poem *Vǫluspá*, in stanza 5, describes the chaotic state of the cosmos before the gods had determined the rhythm of time:

> *Sól varp sunnan, | sinni mána,*
> *hendi inni hægri | um himinjǫður;*
> *sól þat né vissi | hvar hon sali átti,*
> *stjǫrnur þat né vissu | hvar þær staði áttu.*
> *máni þat né vissi | hvat hann megins átti.*
> (Vǫluspá, 5)
>
> From the south, Sun, companion of the moon,
> threw her right hand round the sky's edge;
> Sun did not know where she had her hall,
> the stars did not know where they had their stations,
> the moon did not know what might he had.
> (Larrington 2014: 4)

It is easy to understand that the star alternative has been forsaken by previous attempts to apply the sightscape model, since the Old Norse sources may seem to say too little about the stars to substantiate that this theme was central at the time of the Rök monument. However, the silence of the sources should not be taken offhand as a sign of a lack of astronomical interest or knowledge.

One reason why so little is known about the names of the stars and constellations in pre-Christian Scandinavia is that the Latin astronomic terminology was a deeply integrated part of the Christian mission. Some of the first preserved manuscripts with Old Norse text are handbooks

of Christian time reckoning, which presents the movements of heavenly bodies over the firmament with the main purpose to maintain the synchronisation of the Christian Easter celebration (Gunnlaugsson, 2007: 88; see also Vilhjálmsson 1991). When, for example, the Icelandic *Rímtöl* presents the principles for Christian time reckoning, it indeed gives Icelandic names of the twelve constellations of the zodiac (*hrútr* 'the Ram', *uxa* 'the Ox', *tveggia brédra* 'the Two brothers' etc., cf. *Rímtöl*, Rim 1, 66–70, in Beckman and Kålund 1916: 53–6), but the words should probably be understood as translations of the Latin terms, which are given in parentheses after each of the Icelandic words (*aries*, *taurus*, *geminos* [sic], etc.), although the possibility cannot be ruled out that any of the Icelandic words predates the Christian mission.

After all, there are a few preserved names of star configurations that are clearly not translations of the Latin terms. The crucial question in this context is whether these pre-Christian names support the idea that the firmament was conceived as a place of dramatic conflict similar to themes of the Rök inscription. In the best source, a brief glossary in one of the manuscripts for *Rímtöl* (Gml. Kgl. Sml. 1812 4to, dated to 1192 AD), four groups of stars are, for unknown reasons, given both Latin and Icelandic names. The constellation Auriga is named *Asar barðage*, 'the Battle of the æsir [the principal gods in Old Norse religion]'. The Hyades (in the Taurus constellation) are called *Ulfs keptr,* 'the Wolf's jaw'. The Pleiades (in the same constellation) are glossed as *VII. stirni,* i.e., *Sjau-stirni*, 'the Seven stars'. The constellation Orion, finally, is called *Fiskikarlar*, 'the Fishermen', possibly because the two bright stars recognized in the Greco-Roman tradition as Orion's shoulders were instead perceived as two heads of figures (Beckman and Kålund 1916: 72–5).[2]

Two of these astronomical terms offer promising parallels to the Rök runestone inscription. Firstly, the name *Asar barðage*, 'the Battle of the æsir' resembles the inscription's interest in events on the battlefield. Secondly, the name *Ulfs keptr*, 'the Wolf's jaw' makes the Hyades a good candidate for the reference to the inscription's kenning for the wolf

[2] The script of the glossary is written with ink other than the main text and is at certain points hard to read. In the edition, some characters are marked with brackets as uncertain: [*a*]*sar barð*[*a*]*ge*; *ulfs keptr*; *vii. stirni*; *fi*[*ski*]*karlar* (Beckman and Kålund 1916: 72). The last emendation is supported by Icelandic and Norwegian folkloristic evidence. Fritzner (1867: article on *stjarna*) explains similar names for Orion (*Fiskesveinar*, *Fiskekallar* etc.) based on the information that the extremely bright star Arcturus in the constellation of Boötes was called *Fiskene* 'the fishes'.

hæstʀ gunnaʀ (either it should be read 'the horse of Gunnʀ' or 'the horse of the battle').

It must be admitted that the connection between the main passage C of the Rök inscription and the firmament may seem speculative, and it is necessary to ask how it can be substantiated empirically. In what follows, I will show that the consistent celestial body interpretation sketched above is provided with unexpected support by an analysis of the inscription's cohesion and coherence. In the first section, I present the endophoric evidence for this interpretation, i.e., how it connects the two main passages B and C with each other. Then I present the exophoric evidence, i.e., how the monument can be related to its sightscape.

The endophoric evidence for a celestial body interpretation

Through the analysis of cohesion and coherence of the Rök inscription, it is possible to identify some referential chains that, stronger than any proposal in previous research, connect the main passage B to the main passage on the opposite side (C). They concern (1) the key figures, (2) the spatial relations, and (3) the temporal relations between the two passages.

In terms of key figures, firstly, the proposed solution of the riddles in passages B and C would make all textual items of the inscription that metaphorically refer to the moon, the sun, or the stars cohyponyms. The decisive advantage over previous proposals, however, is that a meaningful and strong cohesive link appears between passages B and C. The phrases *stilliʀ flutna* 'chief of men' (in B:3), and *skati mæringa* 'leader of the famous' (in B:4) become descriptions of the sun who shares the daily westward route over the firmament with the stars, but in terms of brightness surpasses them all. This makes both expressions function as a clue to the foregoing riddle about the sun (B:2) as well as to the following riddles about the stars (C:1 and C:2). See Figure 3.

In terms of spatial relations, secondly, the interpretation examined here makes it possible to argue that all events of passages B and C take place in the same location. Previous research has agreed that the events of the first pair of riddles (B:1 and B:2), as well as the events of the second pair (C:1 and C:2), are localised to battlefields. It has never, though, been suggested that it could be the same battlefield. However, this interpretation becomes possible if it is accepted that the place in C:2 is not *Siolund* 'Zealand' but *Sīulundʀ* 'the Grove of Sparks' (Holmberg, Gräslund, Sundqvist and Williams 2020: 26–7). See Figure 4, left column.

	The champion = the sun	The kings = the stars
B:1		
B:2	*hvā'ʀ* 'who'	
B:3	*rinkʀ hinn þurmōði* 'the brave champion'	
	stilliʀ 'chief	*flutna* of men'
B:4	*skati* 'leader	*mæringa* of the famous'
C:1		*kunungaʀ tvaiʀ tigiʀ* 'twenty kings'
C:2		*hveriʀ tvaiʀ tigiʀ kunungaʀ*' which twenty kings'
C:3		*Valkaʀ fim, Rāðulfs syniʀ, Hraiðulfaʀ fim, Rōgulfs syniʀ, Hā̃īslaʀ fim, Haruðs syniʀ, Gunnmundaʀ fim, Bernaʀ syniʀ* 'Five Valkis, sons of Rāðulfʀ, five *Hraiðulfʀs, sons of Rōgulfʀ, five Hā̃īsls, sons of Haruðʀ, five Gunnmundʀs, sons of Bern*'

Figure 3. Referential chains of key figures in the Rök main passages B and C.

	The battlefield	The direction(s)
B:1	*valrauþaʀ* 'spoils of the battlefield'	
B:2		*meðr hraiðgutum* 'with the Hraiðgutaʀ' i.e. in the east
B:3		*strāndu Hraiðmaraʀ* 'over the shores of the Hraiðsea' i.e., over the eastern horizon
B:4		
C:1	*vēttvāngi ā̃* 'on the battlefield'	
C:2	*at Sīulundi* 'at the Grove of Sparks	*fiagura vinddura* in four directions' [one of them eastern direction]
C:3		

Figure 4. Referential chains of place in the Rök main passages B and C.

This proposal about the Grove of Sparks was put forward without any motivation, other than the assumption that the name is an alternative name for the Ragnarök battlefield (ibid). If the riddles about the twenty kings concern the stars, the name makes better sense. The word *sía* 'spark', which forms the first part of the suggested name, is a relevant word for the denotation of stars. Actually, this word is used by Snorri Sturluson in the story about their creation:

> Þá tóku þeir síur ok gneista þá er lausir fóru ok kastat hafði ór Múspellsheimi, ok settu á miðjan Ginnungahimin bæði ofan ok neðan til at lýsa himin ok jǫrð. (*Gylfaginning* 8)
>
> Then they took molten particles and sparks that were flying uncontrolled and had shot out of Muspell and set them in the middle of the firmament of the sky both above and below to illumine heaven and earth (Faulkes 1987: 12).

There is one more spatial referential chain to comment on, the chain of directions (in Figure 4, right column). In the sun riddle (in B:2), the phrase *meðr hraiðgutum* has been understood as a reference to the eastern part of the sky since this is the direction in which this mythological people were thought to live, and thus, the phrase *strãndu Hraiðmaraʀ*, 'over the shores of the Hraiðsea', could be interpreted as the champion's ride over the eastern horizon (Holmberg 2016: 89–90; Holmberg, Gräslund, Sundqvist and Williams 2021: 24; Williams 2021). The phrase that seems to point out directions for the twenty kings does not specify them more than talking about *fiagura vinddura*, literally 'four wind doors' (C:2). The phrase may fit the conception that the wind can blow from any point around the horizon, and it has been interpreted as a reference to the four cardinal directions (Ralph 2007: 155; cf. Holmberg, Gräslund, Sundqvist and Williams 2020: 26–27). If the twenty kings as well as *hæstʀ gunnaʀ* 'the horse of the battle' should be identified as specific groups of stars this means that the intended directions may be the cardinal points of the celestial equator.

In terms of temporal relations, thirdly, an application of a sightscape model to riddles that concern specific groups of stars entails that a specification of time should be given in the inscription. I want to argue that this is actually at hand.

The pre-Christian system of hours was not divided into 24 hours, but 16. Thus, each hour lasted 90 minutes, based on the time it takes the sun to move one-sixteenth of the circle of the horizon. The first hour of the

Table 1. Pre-Christian Scandinavian division of the day in sixteen hours.

Pre-Christian hours	Corresponding modern time
First	4.30 a.m. –
Second	6 a.m. –
Third	7.30 a.m. –
Fourth	9 a.m. –
Fifth	10.30 a.m. –
Sixth	12 a.m. –
Seventh	1.30 p.m. –
Eighth	3 p.m. –
Ninth	4.30 p.m. –
Tenth	6 p.m. –
Eleventh	7.30 p.m. –
Twelfth	9 p.m. –
Thirteenth	10.30 p.m. –
Fourteenth	12 p.m. –
Fifteenth	1.30 a.m. –
Sixteenth	3 a.m. –

new day started at 4.30 a.m., and the second at 6 a.m. and so on. Table 1 gives the equivalents for the two systems, although, of course, the Old Norse time reckoning lacked the modern precision (see Magnusen 1839: 165–92; cf. also Magnusen 1844).

It is to be noted that the riddle about the sunrise (B:2) starts *Þat sagum ãnnart.* This has always been understood as an enumeration of parts of the text 'this let us say as second' as it happens to be the second riddle. However, we could try to understand the phrase as an allusion to the second pre-Christian hour which was conceived as the prototypical time for the sunrise (although it occurs exactly at 6 a.m. only twice a year, at equinoxes). In that case, it is this time indication that the reader is reminded of by the unexpected adverb 'now' in the description of the rising sun (B:4). The two riddles about the stars have similar introductory phrases. The first of them (C:1) starts *Þat sagum tvalfta*, 'This let us say at the twelfth [hour]'. This would be at 9 p.m. when the stars are visible, except for the bright summer nights. At this point, we are asked about the horse of the battle who is looking for food at the battlefield. The next

	The hours of the day
B:1	
B:2	*Þat sagum ānnart …* 'Let us say this at the second [hour] …'
B:3	
B:4	*Sitiʀ nū …* 'Sits now …'
C:1	*Þat sagum tvalfta …* 'Let us say this at the twelfth [hour] …'
C:2	*Þat sagum þrēttāunda …* 'Let us say this at the thirteenth [hour] …'
C:3	

Figure 5. Referential chain of time in the Rök main passages B and C.

riddle (C:2) asks for the identity of the twenty kings, and it seems that we can solve this riddle better if we wait for the stars which are visible at 10.30 p.m.: *Þat sagum þrēttāunda*, 'This let us say at the thirteenth [hour]'. Cf. Figure 5.

In this way, the much-debated enumeration of the inscription can be understood, not as a curious gap, but as a cohesive linking between different phases of the day.

The exophoric evidence for a celestial body interpretation

Based on the referential chains that are presented above we are close to being able to examine how the Rök monument (at least the passages B and C) may have functioned as a cosmological commentary on the rhythm of celestial bodies. A condition that is not yet met, however, is a specification of the day of the year. Such specification is decisive for the examination of the passage (C), which according the cohesive analysis could consist of two star-riddles, as the visibility of specific groups of stars varies constantly during the year. For this reason, I accept the suggestion that the Rök riddles were inscribed primarily for a reading at autumn equinoxes (Holmberg 2021a) which seems to have been the time for the new year festival in the pre-Christian Scandinavian calendar, and a critical point for the ritual maintenance of the rhythm of light (Dahllöf 1990: 36–44; Nordberg 2006: 29–36). I am well aware that this conclusion about the intended

time for inscription's reading must be further evaluated. However, so far there are no alternative proposals that can contribute with a solution.

The reading of the first two riddles (in passage B) in the context of the autumn equinox, creates a link between observations that are foundational for the lunar and the solar calendars. The first riddle (B:1) concerns the twelve changes of lunar phases which are completed around the autumn equinox of the solar calendar according to Old Norse time reckoning (Holmberg 2021a: 45–47). The second riddle (B:2) concerns the sunrise in the transition between the old and the new year, nine months after midwinter when the sun was not visible in the east (ibid: 47–50). The latter of these riddles should, as discussed above, be solved at the second hour (6 a.m.). This is the time when the sunrise occurs at autumn equinoxes. Which observations during the following night, if any, can support the solutions of the riddles on the opposite side (passage C)?

> This let us say at the twelfth [hour], where the horse of the battle [i.e., the wolf] sees food on the battlefield, where twenty kings lie?

The first riddle of this passage (C:1) should be solved at the twelfth hour (9 p.m.). While the sun makes its journey across the sky, its bright light makes the stars invisible to the eye. But after dusk, a partly new starry sky will appear each night as the stars' positions during the year gradually shift in relation to the sun. Thus, the day of the autumn equinox (like any other day of course) is not only characterised by a unique time and place for the rising of the sun, but also by a unique pattern of stars at each hour. However, due to the slow change in the orientation of the earth's axis (the so-called precession of the equinoxes, 1° every 72 years), we cannot make the same observations today as the Rök runestone readers made more than thousand years ago. Figure 6 presents the eastern starry sky at the autumn equinox 9 p.m. the year 800 (58th latitude) as it can be reconstructed.[3]

At the same time as we are faced with the challenge of finding the place where the wolf sees food on the battlefield, the star cluster the Hyades, called *Ulfs keptr,* 'the Wolf's jaw', in the *Rimtöl* glossary, is visible in the east (see Figure 6). The Old Norse name is clearly inspired by the V-form of its brightest stars which could easily be likened to a wide-open mouth of an animal. If we dare to assume that the wolf association was

[3] For the reconstruction of the starry sky of 23 September AD 800, I have used the interactive sky cart on the astronomical website *Heavens Above* developed and maintained by Chris Peat https://www.heavens-above.com

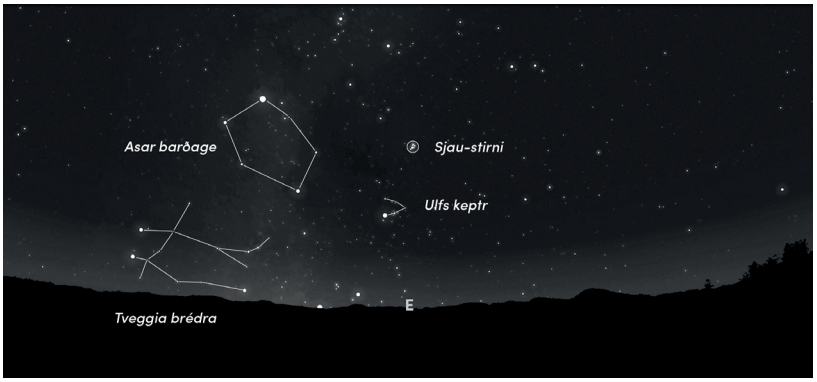

Figure 6. The eastern starry sky of autumn equinox 800 CE 9 p.m. (58th latitude). The lines between stars in the constellations follow modern conventions. (Margareta Brisell Axelsson (CC BY).)

valid already in the context of the Rök runestone erection, this presents a very concrete solution to what seemed to be an insoluble riddle: Here it is, the place of the threatening wolf. Notably, *Ulfs keptr*, is in this very hour found at about the same place as the sun rose this morning.

It is harder to know what food (*etu*) the wolf is looking for. Previous research has taken for granted that the food is the twenty kings, but if the twenty kings are fully visibly only in another hour (see below), then maybe the wolf is looking for another victim. A good candidate is the moon that in its orbit passes very close to the Hyades, on rare occasions even through the jaw of the wolf.

> This let us say at the thirteenth [hour], which twenty kings were at the Grove of Sparks in four directions, of four names, born of four brothers?
>
> Five Valkis, sons of Rāðulfʀ, five Hraiðulfʀs, sons of Rōgulfʀ, five Hā̃īsls, sons of Haruðʀ, five Gunnmundʀs, sons of Bern.

The final riddle of the passage (C:2–C:3), which asks about the identity of twenty kings, should be solved at the thirteenth hour (10.30 p.m.). The twenty kings have been mentioned already in the previous riddle, but only to indicate where the wolf can be found. For some reason, we are expected to wait before answering who they are. What has happened, due to the rotation of the earth, is that several new stars have become visible in the eastern sky. The constellation of *Gemini* 'The twins' (*Tveggia brédra* in

Rimtöl) has become completely visible in northeast and most of Orion (*Fiskikarlar* in the *Rimtöl* glossary) has risen over the horizon. Later in the same hour, the star of *Procyon* will rise at the eastern point of the celestial equator. The conceptualisation of this celestial scene at the time of the erection of the Rök runestone monument is beyond the limits of our knowledge. Anyway, the main point is that, in the thirteenth hour, new bright stars have appeared in the eastern sky. During the rest of the night, these stars will pursue the wolf, *Ulfs keptr*, westwards across the firmament. These stars would then have played the cosmological role of the warriors of Odin (the *einherjar*) who fight every night in preparation for the final battle with the wolf at Ragnarök (*Vafþrúðnismál*, stanzas 40–41, cf. Holmberg, Gräslund, Sundqvist, and Williams 2020: 26–8).

Although it is impossible to draw any definite conclusions about the exophoric reference of this riddle, it can be argued that none of its elements contradicts the assumption that the riddle concerns some specific groups of stars. The kinship relations between the kings of the riddle could have indicated the order of the stars' appearance. If so, the twenty kings' four fathers (Rāðulfʀ, Rōgulfʀ, Haruðʀ, and Bern) would be stars that are visible before their "sons", due to their celestial westernmost position and/or supreme brightness. As discussed above, the first riddle of main passage B can be interpreted as a riddle about the 24 half months of the year. If the principle of maximal coherence between main passages B and C is maintained, the most appealing alternative would be that the twenty kings together with their four fathers represent the same division of the year. In that case, each of the four fathers is a star at the celestial equator that can mark the transition to a new quarter of the year (one of them the newly risen *Procyon*). Each father, along with the five star sons who follow him across the sky, could show the six half months of one quarter.

Conclusions

Previous scholarly efforts to understand the Rök runestone inscription have presented a great variety of different interpretations, and for a lot of details this study owes them gratitude. However, one hundred and fifty years of research has created so many imaginative ideas about the background of the monument that it has become hard to hold on to the goal: a coherent text. Therefore, this study has explicitly argued that the

interpretation should give priority, not to what can be imagined, but to what can be watched, both on the stone (cohesion) and from the stone (sightscape coherence).

Three decisive results of the cohesion analysis shall be highlighted. Firstly, the try-out to understand all key figures of the main riddle passages as heavenly bodies, made a strong cohesive link appear between parts of the inscription that have previously seemed more or less unrelated (cf. B:3–C:3 in Figure 3). Secondly, events that were thought to be spread out geographically could be located to the same place, the battlefield of the firmament (cf. B:1–C:2 in Figure 4). Thirdly, the puzzling enumeration of three parts of the inscription, previously much debated, could be understood as specifications of different times during the day (cf. B:2–C:2 in Figure 5). This means that the study has managed to make much stronger connections between the main passages B and C than previous research.

On this basis, the study has shown how it is possible to understand the four riddles of the inscription's main passages so that they together form a coherent picture. All of them can be solved, I have argued, by watching the sky in the turning of the year at the autumn equinox. This is the time when the twelve changes of moon phases are completed (the solution of the first riddle), when the sun rises again in the east nine months after midwinter (the solution of the second riddle), when the threatening wolf appears in the early night as a group of stars in the eastern part of the starry sky (the solution of the third riddle, cf. Figure 6) and kings with the mission to fight the wolf later appear as yet other stars at the Grove of Sparks (the solution of the fourth riddle). In this way the riddles of the main passages and their answers synchronize the solar calendar with the lunar and stellar calendars. Thus, the cosmological stability that appears to have been affected by the death of Vāmōðʀ, is secured.

In this study, I have pushed an analysis of cohesion and coherence of passages B and C to its limits. The results should be evaluated taking into account how the other parts of the Rök inscription can be reinterpreted in the same way (see Holmberg 2021b). Hopefully, the study can challenge scholars in different disciplinary fields and thus contribute to new knowledge about Old Norse calendric rites, time reckoning and ethno-astronomic beliefs. However, it may in this process be necessary to establish a new understanding of some of the other rune monuments of the early Viking Age.

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