'The Face of the World was Wretched, Horrifying, Black, Remarkable...' Solar Eclipses in the Middle Ages[*]

'Facies mundi miserabilis, horribilis, nigra, mirabilis – the face of the world was wretched, horrifying, black, remarkable'.[1]

These words, written in 1133, recorded a solar eclipse. They appear in a set of annals compiled probably by Magnus of Reichersberg, one of a community of priests following the Augustinian rule in the diocese of twelfth-century Salzburg. The note of trepidation does not obscure the wonder at the event. The annals go on to state that some took the eclipse as a sign and portent, although of exactly what, is left unclear. In what follows something of the ways in which medieval authors recorded and interpreted total solar eclipses will be explored using evidence from across medieval Europe. The evidence is varied, reflecting the different responses to solar eclipses.[2] Most of it appears in the context of chronicles and annals, for reasons which will be outlined below, but histories of human society and of the natural world include description of and deliberation on solar eclipses, as do, more rarely, hagiographies (descriptions of the lives of the Saints). The cultural focus will be placed on sources from the Christian traditions moving over a wide geographical range from the lands of the medieval Rus' to the Atlantic archipelago in the west, crossing linguistic, political, and religious boundaries. By comparing the responses of the Catholic (and in some cases only recently converted) communities of Latin Christendom and those of Eastern Orthodoxy, as well as those of authors from different institutional backgrounds, monastic and non-monastic, differences and similarities in the interpretation of solar eclipses can be indicated.

The chronological span is centred on the twelfth century, a period in which source material survives in sufficient measure to allow more detailed comparisons to be made across Christian cultures. The level of detail also allows consideration of mode of record, the sources of information, and the connection between written text and observation. Whose observation is being recorded is a question easy to ask but more difficult to establish. The relationship between event and record is crucial to the assessment of why and how medieval accounts were made, but it is not always easy to distinguish a medieval chronicler's own experiences from those of their sources. How medieval authors understood the physical effects of the solar eclipse, how they related it to other similar phenomena, and how they attributed metaphorical and prophetic meaning to these events are central to the discussion. The combination of awe, curiosity, dread, and astonishment provoked by solar eclipses is common across human cultures and finds a particular expression in the works and writers of the period and places below.

Solar eclipses in the period were understood as events rare and marvellous whatever else was attributed to them. This cultural inflection is captured well by the Anglo-Welsh scholar Gerald of Wales who noted, in around 1185-7 in his *The History and Topography of Ireland*, that:

> ...human nature is so made that only what is unusual and infrequent excites wonder or is regarded of value. We make no wonder of the rising and the setting of the sun which we see

[*] The author would like to acknowledge the generous advice and comments received from Professor Brian K. Tanner and Dr Sigbjørn O. Sønnesyn in the course of the research and writing for this chapter.

[1] Magnus of Reichersperg, *Annales* (921-1167), s.a. 1133, ed. W. Wattenbach, Monumenta Germaniae Historica, Scriptores 17 (Hanover: Impensis Bibliopolii Hahniani 1861), p. 454.

[2] See Roos and Steele in this volume.

> every day; and yet there is nothing in the universe more beautiful or more worthy of wonder. When, however, an eclipse of the sun takes place, everyone is amazed – because it happens rarely.[3]

Gerald's remarks form part of a distinctive reflection about the notion of prodigy and the ordinary across his writings on the conquest Ireland including the *Expugnatio Hibernica*. Discussion of natural marvels finds place, though not extensively, in his *Lives* of St Remigius of Lincoln, St Hugh of Lincoln, and St Ethelbert of Hereford, some aspects of which will be discussed below. Whether frequently experienced or not, solar eclipses are in some decades relatively common, in others not.[4]

The rarity of the solar eclipse stands alongside the significance of the sun in medieval understanding and practice of astronomy and astrology. These two disciplines were closely related. Hugh of St Victor defines astronomy as the law of the stars and astrology as the discourse concerning the stars respectively in his *Didascalicon* (c.1129). Astronomy was 'the discipline which examines the spaces, movements, and circuit of the heavenly bodies at determined intervals'; astrology was partly natural, as it concerns the temper of complexion of physical things, health, illness, storm, calm, productiveness, unproductiveness, and mostly superstitious, as pertaining to freedom of choice. A significant influx of newly translated texts from Greek and Arabic over the twelfth century increased substantially the store of learning available to Latin Christian scholars in both areas.[5] These range from the translations of Ptolemy of Alexandria's compendia of astronomy and astrology, the *Almagest* and *Tetrabiblos* Latinised as the *Quadripartitus*, by Gerard of Cremona, Plato of Tivoli, and others, to the Persian scholar Abu Ma'shar's *Kitāb al-madkhal al-kabīr ilá ʿilm aḥkām al-nujūm* (Latinised as the *Introductorium in astronomiam* or *Introduction to Astronomy*), written in the late ninth century in Baghdad, which was translated into Latin twice in full versions in the 1130s and 1140s, by John of Seville and Hermann of Carinthia, with an epitome by Adelard of Bath from the same period.[6]

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[3] Gerald of Wales, *Topographica Hibernica*, Distinctio I, cap. XV, ed. J. S. Brewer, *Giraldi Cambrensis Opera*, vol. 5 of 8 (London: Longman, Green, Longman, & Roberts, 1861), p. 49: 'Sic enim composita est humana natura, ut nihil praeter inusitatum,et raro contingens, vel pretiosum ducat vel admirandum. Solis ortum et occasum, quo nihil in mundo pulchrius, nihil stupore dignius, quia quotidie videmus, sine omni admiratione praeterimus. Eclipsim vero
solis, quia raro accidit, totus orbis obstupescit'. English translation from Gerald of Wales, *The History and Topography of Ireland*, trans. John J. O'Meara (London: Penguin, 1982), §11, p. 42.

[4] See the catalogue maintained by NASA: https://eclipse.gsfc.nasa.gov/eclipse.html (viewed 1/6/22).

[5] Charles Burnett and David Juste, 'A New Catalogue of Medieval Translations into Latin of Texts on Astronomy and Astrology', in Faith Wallis and Robert Wisnovsky (eds.), *Medieval Textual Cultures: Agents of Transmission, Translation and Transformation* (Berlin: de Gruyter, 2016), pp. 63–76.

[6] David Juste, 'Ptolemy, Almagesti (tr. Sicily c. 1150)' (update: 04.03.2021), *Ptolemaeus Arabus et Latinus. Works*, URL = http://ptolemaeus.badw.de/work/21, and his, 'Ptolemy, Almagesti (tr. Gerard of Cremona)' (update: 07.05.2021), *Ptolemaeus Arabus et Latinus. Works*: http://ptolemaeus.badw.de/work/3 (accessed 13 July 2021). On Abu Ma'shar see *Kitāb al-madkhal al-kabīr ilá ʿilm aḥkām al-nuju —Liber introductorii maioris ad scientiam judiciorum astrorum*, ed. Richard Lemay, 9 vols. (Naples: Istituto Universitario Orientale, 1995–6), and his *Abu Ma'shar and Latin Aristotelianism in the Twelfth Century: The Recovery of Aristotle's Natural Philosophy through Arabic Astrology* (Beirut: American University of Beirut, 1962); Abū Ma'shar, *On Historical Astrology (On the Great Conjunctions),* ed. and trans. Keiji Yamamoto and Charles Burnett, 2 vols. (Leiden, Brill, 2000); Charles Burnett, 'John of Seville and John of Spain: A *Mise au Point*', in his *Arabic into Latin in the Middle Ages in the Middle Ages*, Variorum Collected Studies Series (Farnham: Ashgate, 2009), 59–78. An abbreviated version containing only the technical information, leaving out the philosophical justification, had already been translated by Adelard of Bath in the 1120s: Abu Ma'shar, *The Abbreviation of the Introduction to Astrology: Together with the Medieval Latin Translation of Adelard of Bath*, ed. and trans. Charles Burnett, Keiji Yamamoto, and Michio Yano (Leiden: Brill, 1994).

Both astronomy and astrology flourished and evolved in the Latin West over the course of the twelfth century. Despite the reservations of many churchmen such as Hugh of St Victor, on the dangers to a faithful Christian life posed by astrology in its contradiction of human free will, it is clear that others in society, including some clerics, held fewer concerns.[7] The monastic chronicler William of Malmesbury noted Gerard, Archbishop of York's (1100-1108), fascination with the writings of Julius Firmicus, a source for ancient astrology well-known to scholars of the twelfth century and earlier.[8] Personal horoscopes were commonly produced across high medieval society in this period.[9] Astrological prediction in connection to natural events also underwent considerable development, not least in the field of medical prognostication.[10] Robert Grosseteste in his treatise *On the Liberal Arts* (c.1195) devoted the greater part of his discussion of astronomy and its service to natural philosophy to three exemplary areas: when plants should be planted, when alchemy should be attempted, and when medicine should be prepared.[11] The influence of that which is above, in this case the planets and stars, on that which is below, including the human body and the spheres of the four elements which compose this sensible world, was a central tenet of the way in which Grosseteste and his contemporaries understood their universe.

The shifts in astronomical and astrological knowledge are essential background for understanding how solar eclipses were interpreted. The mechanism of the solar eclipse, as the conical shadow of the moon falling on the Earth, was perfectly well understood by the twelfth-century. What other meaning it was deemed to hold is a different question. Linking celestial to earthly events was a natural instinct within a system of knowledge rationally conceived and long-studied. How the linkage between events was made by individual authors is more open to individual interpretation.

Recording Celestial Phenomena

Solar eclipses are mentioned in a wide variety of sources. Who recorded them and in what form, are key questions to consider. Within the twelfth century the majority of these sources emerge from a religious context, by dint of education and by the needs and priorities of monastic communities. Changes across modes and institutions of higher learning are part of the wider developments of intellectual life in the period.[12] These are the decades in which the Cathedral Schools, and the first universities, emerge in response to the needs of the church, clergy and congregations, in its provision of pastoral care.[13] To support the Christian community its people needed leaders with education to explain the teachings of the church, to navigate the system of penance and forgiveness for sin, to forge, question, and apply the law of the church, and to

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[7] David Runciman, 'Bishop Bartholomew of Exeter (d. 1184) and the Heresy of Astrology', *The Journal of Ecclesiastical History*, 70 (2019), pp. 265 – 282: DOI: https://doi.org/10.1017/S0022046918001306.

[8] William of Malmesbury, *Gesta pontificum anglorum*, ed. and trans. R. M. Thomson and M. Winterbottom (Oxford: Oxford University Press, 2007), 118.2.

[9] John North, *Horoscopes and History* (London: Warburg Institute, 1986), and his 'Some Anglo-Norman Horoscopes' in Charles Burnett (ed.), *Adelard of Bath: An English Scientist and Arabist of the Early Twelfth Century* (London: Warburg Institute, 1987), pp. 147-61.

[10] Roger French, 'Foretelling the Future: Arabic Astrology and English Medicine in the Late Twelfth Century,' *Isis*, 87 (1996), pp. 453–80.

[11] Robert Grosseteste, De artibus liberalibus, §11-13, ed. and trans. Sigbjørn O. Sønnesyn, in Gasper et al, Knowing and Speaking, Robert Grosseteste's De artibus liberalibus 'On the Liberal Arts' and De generatione sonorum 'On the Generation of Sounds' (Oxford: Oxford University Press, 2019), pp. 89-95, see also pp. 166-195.

[12] Amongst a significant literature see R. W. Southern, Scholastic Humanism and the Unification of Europe, Vol. 1 Foundations (Oxford: Blackwell, 1995); Stephen Jaeger, Envy of Angels: Cathedral Schools and Social Ideals in Medieval Europe, 950-1200 (Philadelphia: University of Pennsylvania Press, 1994).

[13] Another significant area of modern research, a classic account remains that of Leonard Boyle, *Pastoral Care, Clerical Education, and Canon Law, 1200-1400* (London: Variorum, 1981); see also, Ronald Stansbury (ed.), *A Companion to Pastoral Care in the Late Middle Ages (1200-1500)*, (Leiden: Brill, 2010), and A. Firey (ed.), *A New History of Penance* (Leiden: Brill, 2008).

construct its annual calendar. Calendrical science was a subject of consistent interest and importance across the medieval period, not without its controversies, and essential for the calculation of the primary Christian feast, namely Easter, which required a familiarity with both lunar and solar calendars.[14] Knowledge of astronomy was therefore a practical requirement for medieval clergy. Grosseteste in his guide for priests, *On the Temple of God*, written c.1220, insists that they should have 'a book of compotus [calendrical science] so that they may know the moveable and immovable feasts'.[15]

The need for educated clergy to serve the church led to the development of educational institutions, the graduates of which served equally the needs of secular government. These well-trained men populate the courts and other locations of royal and comital power. Clerical interest in, and domination of, the levers of social order, meant that clerical, Latin learning, including in astronomy and astrology, was far from absent within secular circles. Nevertheless, monastic houses retained, certainly for the twelfth century and, in different modes for the rest of the medieval period, an important role in higher learning. The library collections of older and generally richer Benedictine houses in western Christendom were complemented by those of the new orders which emerged from the late eleventh century onwards: the Cistercians (reformed Benedictines) and the Carthusians above all. With the same liturgical needs as the rest of the church, male and female monastic communities were active users of computistical and astronomical learning. Monasteries were far from passive organisations in the pursuit of new knowledge, whether culled from authorities or contemporary experience, and many orders gradually built up presence at universities.[16] In the regions of Orthodox Christianity monastic communities continued to play an important role in the provision of education, including in Byzantium where higher education came more directly under imperial administrators.[17] Amongst the Rus', clerical learning was largely the preserve of monasteries or episcopal courts.[18] Astronomy, as for western scholars, remained a popular subject.[19]

Chronicles provide a fundamental source for the record of solar eclipses in both eastern and western Christianity. One of the most common genres of historical writing for the Middle Ages across cultures, chronicles are organised in an annalistic style, that is around the events of a single year.[20] The length and level of detail range from very short to highly specific entries. Chronicles were often associated with a specific community but equally often were composite documents incorporating records from many different authors from earlier periods. A useful contemporary twelfth-century assessment of the work of the chronicler is given by Gervase, monk of Christ Church Cathedral Priory, Canterbury, in the opening of his own chronicle. This was framed around the years 1135, the year in which Henry I of England died, and 1199, the death of Richard I. Up to the late 1170s Gervase is dependent on earlier sources, the writings of William of Malmesbury, for instance, and Henry of Huntingdon. Of his distinctive task as chronicler Gervase states that:

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[14] C. E. Philipp Nothaft, *Scandalous Error* (Oxford: Oxford University Press, 2019)
[15] Robert Grosseteste, *Templum Dei*, X.3, ed. J. W. Goering (Toronto: Pontifical Institute of Mediaeval Studies, 198), p. 50.
[16] J. G. Clark, 'Monks and the Universities, c. 1200–1500', in Alison I Beach and Isabelle Cochelin (eds), *The Cambridge History of Medieval Monasticism in the Latin West* (Cambridge: Cambridge University Press 2020), pp. 1074-92.
[17] Athanasios Markopoulos, 'Education', in Robin Cormack, John F. Haldon, and Elizabeth Jeffreys (eds), *The Oxford Handbook of Byzantine Studies* (Oxford: Oxford University Press), pp. 785-95.
[18] T. Guimon, Historical Writing of Early Rus (c.1000-c.1400) in a Comparative Perspective (Leiden: Brill, 2021).
[19] Anne Tihon, 'Numeracy and Science', *Oxford Handbook to Byzantine* Studies, pp. 803-19, esp. 805-10.
[20] D. N. Dumville, 'What is a Chronicle?', in E. Kooper (ed.), The Medieval Chronicle II: Proceedings of the Second International Conference on the Medieval Chronicle Drieberger/Utrecht, 16–21 July 1999, Costerus n.s. 144 (Amsterdam: Rodopi, 2002), pp. 1–27.

> To some extent the historian and the chronicles have the same aim and subject matter, but their way of dealing with it is different, as is the form. They share a common aim, since both strive for truth. The form of their work is different, because the historian proceeds at length and in an elegant way, while the chronicler in a simple and brief manner.[21]

A chronicle, he goes on to underline, deals with the computation of time as well as with the deeds of kings and princes and the record of miracles and portents, and it does so succinctly.[22] As the passage by Magnus of Reichersberg quoted above suggests, associated with the final category of the miraculous and auspicious are the records of celestial phenomena, including eclipses. Chroniclers did not always set out to provide a comprehensive record of such events, as compilations they are limited to the information in the sources they include. And chroniclers made mistakes, in the case of eclipses on date and location. For all of that, and in some ways because of it, chronicle record offers longitudinal evidence for the continuities and subtleties of interest in the solar eclipse.

Understanding the Solar Eclipse

While solar eclipses were wondrous and could be taken as signs or portents, they were also understood as natural phenomena and as rationally explicable, at least for those who recorded them. By the twelfth century, this was the inheritance not only of ancient authorities like Lucretius and Seneca, but also Christian writers like Isidore of Seville and Bede. The task of demystifying natural phenomena through reason was undertaken by both classical and Christian authors to counter superstitious interpretation of nature and to emphasise the order and beauty of the universe and its operations, and in the case of the Christians to underline that this was ordained by the Creator.[23] Although Bede was wrong in the details of how the solar eclipse occurs (his contention, following Pliny the Elder, was that the moon must be larger than the earth, based on the mistaken assumption that solar eclipses are visible everywhere), the instinct to explain the phenomenon is paramount, as well as the trust placed in authority.[24] Later glosses to Bede's work from the tenth century, drawing on the methods of Carolingian commentators from the previous century, excise the mistake, probably, as Wallis and Kendall point out because of access to the different, and in this case, more accurate traditions of Martianus Capella and Chalcidius.[25]

An episode from three centuries later illustrates well the mixture of reason and wonder provoked by solar eclipses. It appears in an unusual crime report, namely the account left by Galbert of Bruges of the murder of Count Charles of Flanders in 1127. As part of the background for his description of the startlingly violent end of Count Charles and its social and political ramifications, Galbert includes a portentous note on events in 1124.

> In the year 1124 from the incarnation of our Lord, in the month of August, an eclipse in the body of the sun appeared to all the inhabitants of the lands around the ninth hour of the day,

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[21] Gervase of Canterbury, *Chronica*, in *Opera Historica*, ed. W. Stubbs (Longman p. 87: 'Historici autem et cronici secundum aliquid una est intentio et materia sed diversus tractandi modus est et forma varia. Utriusque una est intentio, quia uterque veritati intendit. Forma tractandi varia, quia historicus diffuse et eleganter incedit, cronicus vero simpliciter, graditur et breviter'.

[22] For a summary of Gervase's works see, Michael Staunton, *The Historians of Angevin England*, (Oxford: Oxford University Press, 2017), pp. 51, 53, 108.

[23] The phrase is that of Faith Wallis and Calvin B. Kendall in their translation and commentary: Bede, *On the Nature of Things* and *On Times* (Liverpool: Liverpool University Press, 2010), p. 2.

[24] Bede, *De natura rerum*, c. 22, ed. Charles W. Jones, Corpus Christianorum series latina, 123A (Turnhout: Brepols, 1975), pp. 189-234; see also *On the Nature of Things*, Wallis and Kendall, p. 154.

[25] Bede, *On the Nature of Things*, Wallis and Kendall, pp. 40 and 153.

> and an unnatural lack of light so that the eastern part of the circle of the sun was obscured and sent little by little into the other parts strange clouds, which did not, however, obscure the entire sun all at once but in part, and this same cloud wandered similarly over the whole circle of the sun, traveling all the way from the east to the west but only in the circle of the solar essence. As a result, those who kept an eye on the state of the peace and the wrongs in law courts threatened everyone with the danger of coming famine and death.
> When men were not corrected in this way, neither lords nor serfs, the starvation of unexpected famine arrived, and the lashes of death followed hard upon its heels. Whence the Psalm: *He summoned a famine on the land, and broke every staff of bread.*[26]

Whether Galbert's reference to the visibility of the eclipse to all the inhabitants 'of the lands' might imply that the ideas of Seneca and Bede were not so quite so easily abandoned is an intriguing question. However, it might simply indicate the extent of Galbert's network of correspondents, as in this instance, a partial or total eclipse was indeed visible throughout the whole of the lands in Europe, Asia and Africa then known to Europeans.[27] There are oddities nevertheless in the account. While Galbert includes, as is common in an annalistic style the year, month, and hour of the eclipse, he does not include the day, which was 11 August. Nor does the moon, the cloud crossing the circle of the sun in Galbert's narrative, move east to west in a solar eclipse but in the opposite direction. All of which suggests that Galbert, a notary and not necessarily a priest, although possible a cleric in minor orders, was not especially knowledgeable of celestial matters. Moreover, this is the only mention of an eclipse, solar or lunar, in the whole narrative. Other portents such as fires, famine, floods, and bloody water are repeated at intervals, punctuating the record of events playing out amongst the protagonists in the uprisings associated with the killing of the count. The account of the eclipse has a clear function in the structure of Galbert's work unaffected by his omissions and inaccuracies.

By the time Galbert was writing, different sources for astronomical learning were becoming available to scholars of Latin Christendom in translations from Greek and Arabic. A notable figure in this process was Petrus Alfonsi, a convert from Judaism to Christianity from south-western al-Andalus (Muslim Iberia) trained in the Judaeo-Arabic intellectual traditions with a particular focus on astronomy.[28] After his conversion in 1106 he moved to northern Europe to Henry I's England, and at a later point to northern France. Petrus translated the astronomical tables, the *Zîj al-Sindhind*, of al-Khwārizmī (d. 850) into Latin, an important component in the

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[26] Galbert of Bruges, *De multro, traditione et occisione Karoli comitis Flandriarum*, c. 2, ed. J. Rider (Turnhout: Brepols, 1994): 'Inmisit ergo flagella famis et postmodum mortalitatis omnibus qui in regno degebant nostro, sed prius terrore signorum revocare dignabatur ad penitendum quos pronos praeviderat ad malum. Anno ab incarnatione Domini milleno centeno vicesimo quarto, in Augusto mense, universis terrarum habitatoribus in corpore solari circa nonam diei horam apparuit eclipsis, et luminis non naturalis defectus ita ut solis orbis orientalis obfuscatus paulatim reliquis partibus ingereret nebulas alienas, non simul tamen totum solem obfuscantes, sed in parte, et tamen eadem nebula totum pererravit solis circulum, pertransiens ab oriente usque ad occidentem tantummodo in circulo solaris essentiae. Unde qui statum pacis et placitorum injurias notabant, futurae famis et mortis periculum minabantur universis. Cum que neque sic correcti sunt homines, tam domini quam servi, venit repentinae famis inedia et subsequenter mortalitatis irruerunt flagella. Unde in psalmo: Et vocavit famem super terram et omne firmamentum panis contrivit'. English translation from *The Murder, Betrayal, and Slaughter of the Glorious Charles Count of Flanders*, trans. Jeff Rider (Newhaven: Yale University Press, 2013), pp. 6-7.

[27] X.M. Jubier, F. Espenak, and J. Meeus, 'Five Millenium Canon of Solar Eclipses -1999 to +3000', http://xjubier.free.fr/en/site_pages/solar_eclipses/5MCSE/xSE_Five_Millennium_Canon.html (accessed 3/08/2022)

[28] On Petrus see John Tolan, *Petrus Alfonsi and his Medieval Readers* (Gainsville, FL: University of Florida Press, 1993) and the essays collected in Carmen Cardelle de Hartmann and Philip Roelli (ed.), Petrus Alfonsi and his Dialogus: Background, Context, Reception (Florence: SISMEL, 2014). For general context see, Brian Catlos, *Kingdoms of Faith: A New History of Islamic Spain* (London: Hurst & Company, 2018).

transformation of Latin astronomy.[29] Petrus's influence over one of his known pupils, Walcher, prior of Malvern, near Worcester, provides an illustration in small of the larger effect of the new knowledge, albeit with respect to lunar rather than solar eclipses.[30] Walcher produced a remarkable early work on lunar computation developing a co-ordinate system to track the sun and moon across the zodiac and predict their eclipses. The system was not successful empirically, and the observation of the moon's variable motion lay at odds with the contemporary orthodox theory which stressed the non-irregular motion of sun and moon. After encountering Petrus in c.1120 Walcher was able to deploy knowledge of the moon's orbital nodes in his treatise *On the Dragon* to give a fuller, if still rudimentary, account of the moon's motion, in turn allowing a higher degree of accuracy in the prediction of its courses.

Petrus was responsible also for an assertion of the inherent rationality of the universe and the benefits of astronomical knowledge in his *Dialogue Against the Jews*. This was a work of unprecedented polemic for Latin Christendom, and which would go on to be a much-copied work as Christian attitudes towards and relations with Jewish communities worsened over the later Middle Ages.[31] The first part of the dialogue involves showing the irrationality of his Jewish opponent in a discussion of the sphericity of the world, centred on arguments about the relative location of east and west to latitude. As an example Petrus uses the Indian city of Arim, frequently advanced in Islamicate calendrical science as located at the centre of the world.[32] The difference in time between the observation of a solar eclipse at Arim and other cities to its east and west is deployed in this connection.[33] Knowledge of the observation of a solar eclipse in different places underpins Petrus's arguments here.

The extent of the transformation of Latin astronomical knowledge and the motions of the sun and moon is shown in the appearance at the beginning of the thirteenth century of *On the Sphere* by John of Sacrobosco. Even less is known about Sacrobosco than Petrus Alfonsi, which stands in contrast to the huge success of *On the Sphere*, an introduction to astronomy, in the later medieval and into the Early Modern period.[34] Sacrobosco's work was informed by the complex inheritance of Ptolemy which inspired a considerable body of Arabic commentary and critique from the eighth century onwards, and this was, mutatis mutandis, mirrored in Latin Christendom with numerous epitomes and attendant texts, translated from Arabic and created in Latin.[35] Sacrobosco, for example, made heavy use of the *Compilation on the Science of the Stars* by al-Farghānī (d. 861 CE) (Latinised as Alfraganus), a summary and revision of Ptolemy.[36] *On the Sphere* includes an account of the causes of eclipses in its final sections (for a diagram of the solar eclipse see Plate 1). These combine understanding of the sun and moon's motions known to Petrus and then Walcher:

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[29] Tolan, *Petrus Alfonsi*, 55-61 and 66-8; Otto Neugebauer, *The Astronomical Tables of al-Khwarizmi* (Copenhagen: I kommission hos Munksgaard, 1962).

[30] C. Philipp E. Nothaft, *Scandalous Error: Calendar Reform and Calendrical Astronomy in Medieval Europe* (Oxford: Oxford University Press, 2018), pp. 80-5, for a useful summary. For Walcher's treatises see Walcher of Malvern, *De lunationibus and De Dracone*, ed. C. Philipp E. Nothaft (Turnhout: Brepols, 2017).

[31] Petrus Alfonsi, *Dialogus*, ed. and trans (German), Peter Stotz (Florence: SISMEL, 2018). English translation: *Dialogue Against the Jews*, trans. Irven Resnick (Washington, D.C.: Catholic University of America Press, 2006).

[32] Petrus Alfonsi, *Dialogue Against the Jews*, 55, n.22.

[33] Petrus Alfonsi, *Dialogus*, I. 69-70, pp. 38-9. And see discussion in Giles E. M. Gasper, et al, *Mapping the Universe: Robert Grosseteste's De sphera - On the Sphere* (Oxford: Oxford University Press, in press 2023).

[34] See summary in *Mapping the Universe*, chapter 1.

[35] George Saliba, Islamic Science and the Making of the European Renaissance (Cambridge, Mass.: MIT Press, 2007).

[36] Alfraganus, *Compilatio Astronomica* (Ferrara: Andrea Gallus, 1493) and also al-Farghani, *Differentie*, trans. John of Seville, ed. Francis J. Carmody (Berkeley: University of California Press, 1943); Gerard of Cremona's translation is found in Alfraganus, Il 'libro dell'aggregazione delle stelle', ed. Romeo Campani (Città di Castello, 1910).

> When the moon is in the head or tail of the dragon or nearly within the limits and in conjunction with the sun, then the body of the moon is interposed between our sight and the body of the sun. Hence it will obscure the brightness of the sun for us and so the sun will suffer eclipse – not that it ceases to shine but that it fails us because of the interposition of the moon between our sight and the sun.[37]

Sacrobosco notes that a solar eclipse should occur therefore at the conjunction of the two celestial bodies or at the new moon. And that, unlike an eclipse of the moon, which is visible everywhere, that of the sun is not. This flows into the final reflection of the treatise, on the nature of the solar eclipse that took place during the final stages of the crucifixion of Jesus Christ. The Gospel of Luke (23.44-45) records darkness over all the earth from the sixth to the ninth hour and that the sun was darkened. Sacrobosco points out that combined with the fact that the passion took place at full moon this would mean that what he took to be a solar eclipse was miraculous, in this instance, rather than natural.

That *On the Sphere* should end with this discussion is a reminder of the fundamental purpose of knowledge of natural phenomena for Christian scholars of the period. Not only was the created world an expression of divine rationality, allowing the work of the creator to be understood, the sinful state of humanity notwithstanding, but the bible, since it too mentions natural phenomena, provoked their fuller explanation. And, as Sacrobosco's lays out in detail, the solar eclipse at the crucifixion, which took place at full moon, serves to underline the importance of astronomy to calendrical study and the cardinal place of the calculation of Easter, dependent on both solar and lunar cycles, within medieval Christendom.

The Eclipse of Kings and Colourful Observation

The miraculous solar eclipse associated with the death of Christ in the medieval period offered a framework for Christian writers for a similar association of the cosmic phenomenon with earthly rulership. As the example from Galbert of Bruges's account of the murder of the Count of Flanders illustrates, solar eclipses and what they portended could play an important function in the author's narrative. How the eclipse is described is also significant. The wider knowledge of the phenomenon acquired by individual chroniclers across the twelfth century, as well as care for the accuracy of their record, emerges in sometimes very detailed description of a celestial event.[38] None of this is to suggest that solar eclipses were associated exclusively with rulers or that this was a cultural phenomenon tied to twelfth-century Christendom. The association was cross-cultural, as examples from the lands of the Rus' explored below indicate, and cross-chronological. The ninth century biographer of Charlemagne, Einhard, included a catalogue of celestial and temporal signs preceding the death of the emperor which started with solar and lunar eclipses in the last three years of his life and a black spot on the sun that remained for a week.[39] Nevertheless, the combination of narrative association, technical knowledge, and

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[37] John Sacrobosco, *On the Sphere*, Bk. 4, ed. and trans. LynnThorndike, *The Sphere of Sacrobosco and Its Commentators* (Chicago: University of Chicago Press, 1949), p. 116: 'Cum autem luna fuerit in capite vel in cauda draconis vel prope infra metas et in coniunctione cum sole, tunc corpus lunare interponetur inter aspectum nostrum et corpus solare,unde obumbrabit nobis claritatem solis. Et ita sol patietur eclipsim, non quia deficitsia a lumine sed quia deficit nobis propter interpositionem lune inter aspectum nostrum et solem.' English Translation at p. 149.

[38] A good example of the careful record of an unusual phenomenon is Gervase of Canterbury on the moon apparently splitting in two, see Giles E. M. Gasper and Brian K. Tanner, "The Moon Quivered Like a Snake' A Medieval Chronicler, Lunar Explosions, and a Puzzle for Modern Interpretation', *Endeavour*, 44 (2021): 100750 (and with editorial correction) 46 (2022): 100813

[39] Einhard, *Vita Karoli Magni*, Bk. IV, c.32, ed. G. Waitz, Monumenta Germaniae Historica, Scriptores rerum Germanicarum, 25 (Hannover: Impensis Bibliopolii Hahniani, 1911), p. 36. Together with reports from 807 (B.

historical context makes twelfth-century chroniclers' descriptions particularly interesting as cultural responses.

A good example is the narrative response to the death of Henry I of England, especially in the aftermath of the succession crisis that followed. Henry, who died without a male heir, was succeeded as King of England and Duke of Normandy by his nephew Stephen (whose tenure of the throne was contested by Henry I's daughter Matilda and her supporters).[40] What followed was a reign of nineteen years of instability which induced high levels of anxiety amongst contemporary chroniclers especially those in areas most affected by the disruption of royal governance or on the borderlands between the rival parties. The Anglo-Saxon Chronicle, maintained at the abbey of Peterborough up to the end of Stephen's reign memorably described the period as one in which in which people 'said openly that Christ and His Saints slept'.[41] A cluster of monastic chronicle entries from England and Wales, in Latin, Old English, and Welsh use solar eclipses to frame their concerns on the change of regime. Although annalistic in spirit, the chronicles were carefully curated by their composers and compilers making their narrative choices all the more intriguing.

John, a monk of Worcester (d. c. 1140), made a clear connection between a solar eclipse on August 2, 1133 and Henry I's death two years later and the subsequent political turmoil. At the outset he was keen to emphasise that the eclipse took place on the same day in the annual cycle when his brother and predecessor, William Rufus, had been killed in the New Forest, leaving nothing of the implication to be misunderstood or missed by the reader. John went on to describe the celestial event itself, which took place as Henry, surrounded by his guards, was about to cross the English Channel to Normandy, probably from Dover, at about noon.

> Suddenly a cloud appeared in the sky, which was visible throughout England, though of varying size. In some places indeed the day only appeared darkened, but in others it was so dark that men needed the guidance of candlelight to do anything. The king and his followers and many others walked about, marvelling greatly, raised their eyes to heaven, and saw the sun shining as though it were a new moon, though it did not keep the same appearance for long. One moment it was broader, the next it was narrower, now curved, now straight, now steady as usual, now moving, and seemed quivering and liquid like quicksilver. Some claim that an eclipse of the sun had taken place. If this was the case, then the sun was in the head of *Draco* and the moon in the tail or the sun was in the tail and the moon in the head of the fifth sign, *leo*, in the seventeenth degree of that sign. The moon was twenty-seven days old. At the same day and hour many stars appeared.[42]

Hetherington, *A chronicle of pre-telescopic astronomy*, (Chichester: Wiley, 1996), p. 90) the description of a sunspot is one of the earliest convincing European reports of the phenomenon; there is some debate concerning Classical Greek sightings (J. M. Vaquero, 'Sunspot observations by Theophrastus revisited', *Journal of the British Astronomical Association*, 117 (2007), p. 346). Visibility for a week is consistent with the 807 reports and represents a quarter of the rotation period of the sun about its axis. A quarter of the sphere is the area within which a sunspot might be clearly visible from Earth. The years 811-814 corresponds to the early part of a maximum in solar activity (R. Arlt and J. M. Vaquero, 'Historical sunspot records' *Living Reviews in Solar Physics*, 17 (2020), Article 1, https://doi.org/10.1007/s41116-020-0023-y) that peaked about 850.

[40] Amongst an extensive literature see Edmund King, *King Stephen* (Newhaven: Yale University Press, 2010).

[41] *The Anglo-Saxon Chronicle, A Collaborative Edition*, Vol. 7, *MS. E*, ed. Susan Irvine, s.a 1137 (Cambridge: D. S. Brewer, 2004), p. 135: '*7* Hi saeden openlice ðat Crist slep *7* his halechen'.

[42] John of Worcester, *Chronicle*, s. a. 1133, ed. and trans. P. McGurk, vol. 3 of 3 (Oxford: Oxford University Press, 1998), vol. 3, pp. 208-211: '...subito in aeres nubes apparuit, que tamen unius eiusdem quantitatis per universam Angliam non comparuit. In quibusdam enim locis quasi dies obscurus uidebatur, in quibusdam uero tante obscuritatis erat, ut lumine candele ad quodlibet agendum ipsa protecti homines indigerent. Vnde rex latusque regium ambientes et alii complures mirantes, et in celum oculos leuantes, solem ad instar noue lune lucere

Several features might be noted here, which suggest that John had read Walcher of Malvern's *On the Dragon* but had not fully understood its content. First, John is equivocal about the nature of the event reporting only a claim, by some, that an eclipse had taken place. Modern computation indicates that the eclipse would have been of magnitude 0.95 at Worcester, so even with cloud cover and assuming he was in Worcester, John would have been able to experience personally visible dimming of light level, albeit the reason for it not being fully understood. Secondly and importantly, the mechanics are wrong: what John presented as a solar eclipse was confused with the conditions for a lunar eclipse.[43] Although he reports that the moon was in the twenty-seventh day of the lunar cycle, he does not appear to have realised what this implies for the relative positions of sun and moon. A reasonable conclusion would be that John was not present at the events he describes in detail, and that he was not totally expert in the subject.

That said, the vividness of the language that he employs is striking. His date and timing are correct; modern computation showing maximum obscuration at Dover at 11:41 UT on 2 August 1133, entirely consistent with John's description of the events occurring about noon.[44] His source, who was presumably with the king at Dover, accurately describes the appearance of the sun as a new moon; computation of the appearance at maximum obscuration at Dover (fig 1) shows the visible part of the sun's disc in that orientation. The appearance of stars is recorded, an observation made frequently by medieval writers on (usually total) solar eclipses. With maximum magnitude of 0.96 and obscuration of 96.4% at Dover, Venus, Jupiter, Sirius, Canopus, Mercury and possibly alpha Centauri, Arcturus and Vega could have been visible.[45]

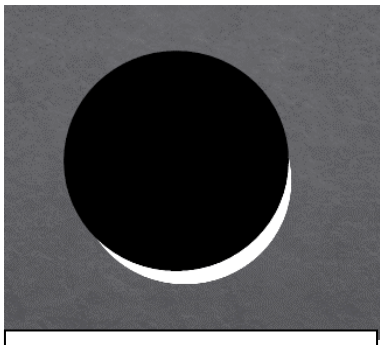

Fig 1. Reconstruction of the appearance of the sun at maximum obscuration at Dover in 1133. [Image created by Brian Tanner using X. M. Jubier's interface to data and predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center, from eclipse.gsfc.nasa.gov.]

The description of the changes of shape of the observable part of the sun's disc reflects not only the changing shape but also that these do not proceed uniformly over time. Dramatic changes occur close to maximum obscuration in very short time periods compared with changes near first contact. The likening of the appearance to that of quicksilver may indicate that John had an additional source who observed the total eclipse, perhaps in the north of England or Scotland (the same source might also have reported the visibility of stars). The effect, often referred to as Baily's Beads, arises from the non-uniform shape of the moon when very close to totality and a good recent example of the light appearing to ripple downwards like mercury is from the 2012 total eclipse in Australia[46]. All of this would appear to suggest that John reported accurately what he was told about the eclipse but was using Walcher of Malvern's *On the Dragon* incorrectly as

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conspexerunt, qui tamen non diu se uno modo habebat. Nam aliquando latior, aliquandiu subtilior, quandoque incurior, quandoque erectior, nunc solito modo firmus, modo mouens, et ad instar uiui argenti motus et liquidus uidebatur. Asserunt quidam eclypsim solis factam fuisse. Quod si uerum est, tunc *sol erat in capite draconis, et luna in cauda, uel sol in caude at luna in capite* in .v. signo leonis in .xvii. gradu ipsius signi. Erat autem tunc luna .xxvii. Eodem etiam die et eadem hora, stele quamplurime apparuere'. See also McLeish and Frost, and Nothaft, in this volume.

[43] John of Worcester, *Chronicle*, p. 210, n. 2.

[44] Jubier, Espenak, and Meeus, 'Five Millenium Canon of Solar Eclipses -1999 to +3000'

[45] G. P Können and C. Hinz, 'Visibility of stars, halos and rainbows during solar eclipses', *Applied Optics*, 47 (2008), H14-H24.

[46] https://www.youtube.com/watch?v=2lHb5ruGUyw

a framework for his understanding. As such, it represents a verifiable moment in the transmission of ideas on astronomy from east to west.[47] New knowledge led to different ways in which natural phenomena such as eclipses were explained. The description of the eclipse was followed by other unexplained phenomena: the ship throwing its anchor and moving on a calm sea, earthquakes, a sighting of two moons. Henry, John states, 'was never to return to England or to see it alive'. [48]

The same set of circumstances are recorded by another monastic chronicler, William of Malmesbury (c. 1090–after1142), though with differences in detail, tone, and style, in his *History of New Events*, a continuation of his *Deeds of the Kings of England.* William also made clear that the solar eclipse of 1133, and subsequent earthquake, presaged the death of the king. Henry's channel-crossing took place, according to William on Wednesday August 5 (the dates are not quite accurate), on the day of the eclipse, at the sixth hour. The sun he described with a quotation from Virgil's *Georgics*, 'covered its shining head with gloomy rust'.[49] Where William seems to have accepted, at least poetically, Virgil's phrase as a description of a solar eclipse, this was to follow the fourth century grammarian Servius, the first to make that identification.[50] No eclipse actually accompanied Caesar's demise. That of 1133, however, put fear into the minds of those who experienced it as William recounts and was followed by an earthquake two days later with violent shaking and a dreadful noise. To these events William was an eye-witness: 'In the eclipse I saw myself the stars around the sun, and in the earthquake the wall of the house in which I sat lifted up by two shocks and settling down at a third'.[51] The section ends with William foreshortening the next two years, remarking that Henry never returned to England, and died in 1135, after falling ill while hunting in the forest of Lyons some twenty miles to the west of Rouen, the capital of the duchy of Normandy.

Although the basic elements of the narrative are similar, William's account includes none of the new astronomical learning shown by John of Worcester. The claim to eye-witness by William is of interest particularly in the insistence on the stars appearing around the sun and the definite statement that the event experienced was an eclipse of the sun. As the magnitude of the eclipse was 0.94 at Malmesbury, a few stars and planets should have been discernible. The *Anglo-Saxon Chronicle* records many of the same elements, although its compiler seems to have conflated the year of Henry's passing with the report of the solar eclipse. The eclipse is, once more, seen in close connection to the king's death.

> In this year, the king Henry went over sea at Lammas [1st August]. And the second day when he lay asleep on (his) ship, then the day darkened over all lands and the sun became such as if it were a three-nights old moon, and stars about it at midday. Men were greatly astonished and afraid, and said that a great matter ought to follow hereafter: so it did, for that same year the king died the second day after Saint Andrew's mass-day in Normandy. Then at once these lands darkened, for every man who could at once ravaged another.[52]

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[47] See Anne E. Lawrence-Mathers, 'John of Worcester and the science of history', *Journal of Medieval History*, 39 (2013), pp. 255-274; Kathy Bader, 'A Culture of Inquiry: Scientific Thought and its Transmission in the Severn Valley, c. 1090–c. 1150', unpubl. PhD. Thesis, Durham University, 2022.

[48] John of Worcester, *Chronicle*, s.a. 1133, p. 211: 'non ulterius uita comite rediturus uel uisurus Angliam'.

[49] William of Malmesbury, *Historia novella*, Bk. 1, §457, ed. K. R. Potter (Edinburgh: Nelson, 1955), pp. 11-12: 'tetra ferrugine'. Virgil, *Georgics*, I.467, ed. R. A. B. Mynors (Oxford: Oxford University Press, 1990), p. 34: 'cum caput obscura nitidum ferrugine texit'.

[50] Virgil, *Georgics*, I.467, ed. Mynors, p. 34, notes to ll. 466-8.

[51] William of Malmesbury, *Historia Novella,* Bk 1, §457, p. 12: 'Vidi ego et in eclipsi stellas circa solem; et in terre motu parietem domus in qua sedebam, bifario impetus eleuatum, tertio resedisse'.

[52] *The Anglo-Saxon Chronicle, A Collaborative Edition*, Vol. 7, *MS. E*, ed. Susan Irvine, s.a 1135 (Cambridge: D. S. Brewer, 2004), p. 133: 'On þis gære for se king Henri ouer sæ æt te Lammase. And Đat oþer dei þa he lai an slep in scip, þa þestrede þe dæi ouer al landes and uuard þe sunne suilc als it uuare thre niht ald mone, an sterres

Although this account lacks the depth of description in terms of the colour and movement of the sun, the comparison of the latter to a three-day old moon is noteworthy (fig 1). The mention of stars at midday also coheres with the other two chronicles. So does the report of intense darkness. The laconic style of the *Anglo-Saxon Chronicle* makes the clear and unambiguous association of the eclipse with the death of Henry and its consequences all the more powerful. A metaphorical darkness preceded by the eclipse of the sun.

The association of solar eclipses with the deeds of those who would be king, or queen, after Henry's death is continued in the Welsh *Brut y Tywysogyon* (*Chronicle of the Princes*). Covering 682-1282 and compiled in the thirteenth century at the Cistercian house of Strata Florida, its twelfth century material drew on sources from Llanbardan Fawr, a Benedictine house briefly between 1111-35, and a Welsh parish until the later medieval period. The entrance of Henry's daughter Matilda is mentioned in immediate proximity to an eclipse of the sun:

> In the following year [1136/7] the empress came to England to subdue the kingdom of England for Henry, her son; for she was a daughter of Henry the First, son of William the Bastard. And then there was an eclipse of the sun on the twelfth day from the Calends of April.[53]

The entry here contains a more typical chronicle listing of month and day in annalistic style, with far less description of the phenomenon itself. It is also inaccurate in terms of date as there was no solar eclipse on 21 March in either 1136 or 1137. There was a partial eclipse visible from London on 1 June 1136 to which the entry may refer, but if so, its timing has been adjusted to suit the narrative. Even within the spare style usually adopted, more detail is sometimes included in other references. For instance, a notice under the years 1184-5 highlights the visit of the Patriarch of Jerusalem to Henry II of England. These were the final years before the ejection of the Latin Christian kings from the Holy City by Salah al-Din, and the occasion of increased diplomatic contact with leading figures and allies in Christendom. Not only is the solar eclipse recorded with a royal connection, it also opens up resonance with the deeper spiritual lordship of the Kingdom of Jerusalem, and with the universal lordship of Christ. Any portent of the eclipse is left implicit but given the expected attack on the city and its fall in 1187, recorded in the *Brut* under 1186-88, an association is not hard to make. While no horror on the part of those witnessing the event is recorded, the shifting colour of the sun is emphasised: 'In that year on the day of the Calends of May the sun changed its colour; and some said that it was under an eclipse'.[54] A very similar description of the same eclipse was offered in Annals of the Cistercian abbey of Margam, some eighty miles to the south 'with the sun after the eclipse a blood-like colour reddened in a marvellous manner'.[55] However gathered the material presented by later

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abuten him at middæi. Wurþen men suiðe ofuundred and ofdred, and sæden ðat micel þing sculde cumen herefter: sua dide, for þat ilc gær warth þe king ded ðat oþer dæi efter Sancte Andreas massedæi on Normandi. Þa þestreden sona þas landes, for æuric man sone ræuede oþer þe mihte'.

[53] *Brut y Tywysogyon*, s.a. 1137-38, ed. and trans. Thomas Jones (Cardiff: University of Wales Press, 1955), s, pp. 116-17: 'Yn y ulwydyn racwyneb y doeth yr amherodres y Loegyr yr darestwg brenhinyaeth Loegyr y Henri, y mab; kanys merch oed hi y Henri Gyntaf vab Gwilim Bastartt. Ac yna y bu diffic ar yr heul y deudecuetyd o Galan Ebrill.'

[54] Ibid. s.a. 1184-5, pp. 168-9: 'Yn y ulwydyn honno dyw Calen Mei y sumudawd yr heul y lliw; ac y dywat rei uot arnei diffyc'.

[55] *Annales de Margan*, in *Annales monastici*, ed. Henry Richards Luard, vol. 1 (London: Longman, Green, Longman, Roberts and Green, 1864), p. 17; 'sole post eclipsim colore sanguineo quodam mirabili modo rubente'. On the annals themselves see Robert B Patterson, 'The author of the 'Margam annals': early thirteenth-century Margam abbey's compleat scribe', *Anglo-Norman Studies*, 14 (1991), pp.197-210.

compilers, anonymous in this case, speaks to the importance of particular details for the record of the solar eclipse.

The solar eclipse of 1185 recorded in the *Brut y Twysogion* was also described in a chronicle from the lands of the Rus', the *Laurentian*, written in Old Church Slavonic, where the eclipse was experienced as total. A similar emphasis on colour is evident, although with the sense of wonder, awe, and dread, explicitly included.

> In the year 6694 (1186)[56] on the first day of the month of May, on the feast day of the holy prophet Jeremiah, on Wednesday during vespers there was a sign in the sun. And it was very dark, so that the stars too were visible to people, their eyes saw [things] as if green, and as though a moon was forming in the sun. It was as if hot embers were coming from its horns. It was frightening for people to see a sign of God. In the same year in the same month of May, on the 18th day, on the feast day of the holy martyr Potapius, on Saturday, a son was born to the grand prince Vsevolod.[57]

The episode comes within years of struggle for power amongst the Rurikids, the ruling dynasty of the Kyivan Rus'. The Rus' emerged as rulers of territories from Novgorod in the north to Kyiv in the south from the ninth century onwards. By the twelfth-century, Novgorod was more or less independent of the ruling dynasty in Kyiv; the former survived the incursions of the Mongols in the mid-thirteenth century where the latter did not.[58] Vsevolod, at this point was in the process of building his authority, as prince of Chernigov and ultimately grand prince of Kyiv.

Although representing a different linguistic tradition, and although using the Byzantine dating system (*annus mundi* – from the beginning of the world), the approach of the chroniclers and compilers further east was not dissimilar to those of Latin Christendom.[59] While only two chronicles survive from the medieval period (the *Laurentian* and the *Hypatian*), the same processes of compilation can be identified, and the same interest in celestial phenomena and in what they might portend. The *Laurentian Codex* took its final form in 1377 quite probably at the monastery of Vladimir (near Moscow) with material from Kyiv, Pereyaslavl-on-Dnieper, Rostov, and Tver.[60] The segment from 1185-1188 was probably the responsibility of a scribe attached to Archbishop Luka of Rostov, appointed in 1186[61] The proximity of reference between the solar eclipse and the affairs of the dynasty is to be noted. So too the visibility of the stars, which is common across chronicle accounts of Latin Christendom as mentioned above, and the description of the event as though a moon was forming in the sun, and the hot embers coming

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[56] The year is a mistake for 6693/1185 an issue covered in more detail in Giles E. M. Gasper and Brian K. Tanner, 'Everything seemed as if it were green': Solar Eclipses in the 1180s', *Endeavour* (forthcoming 2023).

[57] The Laurentian Chronicle [Lavrent'evskaia letopis], ed. Evfimii E. Karskii, parts 1-3, Polnoe sobranie russkikh letopisei, 1 (Leningrad, Arkheograficheskaia komissia1926-8); Laurentian Codex, 1377, Digital Edition with transcription and modern Russian translation (http://expositions.nlr.ru/LaurentianCodex/eng/index.php), fol. 134: 'В год 6694 (1186) месяца мая в 1 день, на память святого пророка Иеремии, в среду во время вечерни, было знамение в солнце. И темно было очень, так что и звезды были видны людям, в глазах словно зелено было, и в солнце образовался словно месяц. Из рогов его как уголь жаркий исходил. Страшно было видеть людям знаменье Божье. В том же году того же месяца мая в 18 день, на память святого мученика Потапия, в субботу, родился сын у великого князя Всеволода'.

[58] See, S. Franklin and J. Shepard, *The Emergence of Rus 750-1300* (London: Longman, 1996); J. Martin, *Medieval Russia, 980-1584* (Cambridge: Cambridge University Press, 1995) Cambridge; M. Dimnik, *The Dynasty of Chernigov, 1146-1246* (Cambridge: Cambridge University Press, 2003).

[59] Guimon, *Historical Writing of Early Rus* (Leiden: Brill, 2021).

[60] Ibid. p. 38.

[61] Alan Timberlake, 'Who Wrote the Laurentian Chronicle (1177–1203)?', *Zeitschrift für Slavische Philologie*, 59 (2000), pp. 237-265

from the sun. This latter description has been attributed to the appearance of solar prominences an interpretation that is entirely plausible as, in this total eclipse, solar and lunar disc diameters were almost equal, a requirement for observation of solar prominences.[62] More unusual are the remarks on people seeing things as if green. During an eclipse, beyond about 80% obscuration, the landscape often takes on a metallic blue-grey hue. It may well be this phenomenon that the chronicler was trying to describe.[63]

The eclipse, total in Rostov, is referred to in the *Hypatian Chronicle*, the other chronicle from the region to survive in its medieval form.[64] The eclipse is mentioned in a broader record of a raid by Igor Svyatoslavich, one of the Rurikid princes vying for power in the second half of the twelfth century, and to whom Vsevolod had sent military support.[65] The raid was directed against the Polovsty in the south-east steppe lands. When crossing the river Donets on May 1, Igor saw the sun appearing as a crescent of the moon; the eclipse of 1185 would indeed have been partial over the Donets.[66] The eclipse was recorded in the probably twelfth century poem, *The Lay of Prince Igor* as well: 'Igor looked up at the bright sun, / and saw that his warriors / became enveloped in darkness'.[67] Igor's men, according to the *Hypatian Chronicle* took the eclipse as a sign of misfortune to which their leader replied that God had created the sign, just as he created the world, and that no-one could know the divine purpose. The raid met with disaster; Igor was captured, although he later escaped. The description of the solar eclipse juxtaposes the fear of the warriors with the assertion of divine agency. The vicissitudes of rulership linked, in this context, more closely to the mysteries of the Creator.

Light and the Holy: St Óláfr and St Ethelbert

If the solar eclipse at the crucifixion offered a framework for the association of the phenomenon with earthly rulership, then this was even more so in the particular category of royal saints. As pointed out by Martin Chance, the eclipse, solar or lunar, is a rare feature in the lives of the saints.[68] Three examples that he identified come from the second half of the twelfth-century: an Old Norse life of St Óláfr (c.995-1030) by Einarr Skúlason probably dating from 1153 and two Latin *Lives* of St Ethelbert, one from an early point in the century the other by Gerald of Wales from the 1190s. In both lives the saints are presented as martyrs, a solar eclipse marking their moment of death or its prefigurement, completing the imitation of Christ and drawing on the same understanding of the darkness at the crucifixion in Luke's gospel. All three authors were skilled and practised in their craft; both Einarr and Gerald are known to have been working to commission which may very well have been the case for the earlier text too.

Einarr, an Icelander, probably the most productive poet of the period, found favour at the Norwegian court, and enjoyed the patronage of king Eysteinn (c.1125-1157) who co-ruled with

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[62] A. N. Vyssotsky, 'Astromical Records in the Russian Chronicles from 1000-1600 AD', *Meddelande från Lunds Astronomiska Observatorium*, ser. II no. 126, Historical Notes and Papers 22 (Lund: The Observatory, 1949), p. 11.

[63] F. Espenak, 'What to look for in a total solar eclipse' *Earth Sky* (2017) https://earthsky.org/astronomy-essentials/stages-of-a-total-eclipse-what-to-look-for/

[64] Guimon, *Historical Writing*, p. 40.

[65] Dimnik, *Dynasty of Chernigov*, pp. 163-77.

[66] *The Hypatian Chronicle [Ipat'evskaia letopis']*, s.a. 6693, ed. Aleksei A. Shakhmativ, *Polnoe sobranie russkikh letopisei*, 2, (Saint Petersburg, Tip. M. A. Aleksandrova, 1908), cols. 636-51; Vyssotsky, 'Astromical Records', p. 10. See also Jay Pasachoff in this volume.

[67] *The Lay of Igor's Campaign*, in *Medieval Russia's Epics, Chronicles, and Tales* (trans.) Serge A. Zenkovsky, (Meridian: New York, 1974), p. 170.

[68] Martin Chance, *Einarr Skúlason's Geisli: A Critical Edition* (Toronto: University of Toronto Press, 2005), p. 32. What follows explores the two examples that Chance identifies.

his two brothers, and who commissioned Einarr's life of Óláfr. 1153 marked a significant change in the status of the Norwegian church with the confirmation of Nidaros (Trondheim) as an independent archbishopric, a context important for the poetic presentation of the recent royal martyr, which Einarr recited in the cathedral.[69] This, according to the earliest Icelandic chronicle of the Norwegian kings, *Morkinskinna*, compiled in the mid-twelfth century, was accompanied by miracles intimating approval from St Óláfr and the king.[70]

Óláfr ruled Norway from 1016 until 1028 when he was ousted and exiled to the Kyivan Rus' by local rivalries exploited by Cnut the Great of Denmark and England. Óláfr returned to reclaim his kingship in 1030, where he was defeated and killed at the battle of Stiklestad. Presented in the twelfth century and later as a defining moment in Norwegian identity especially with respect to the widespread adoption of Christianity in the context of relatively recent conversion to the faith, emphasised all the more after Óláfr's canonisation in 1164, the reality was more prosaic. The conversion of the region was a slower process and the battle more to do with rival claims to rule.[71] Einarr's poem, however, was a key part of the presentation of the king as Christian hero and martyr.

Light is present throughout the poem, which bears the title *Geisli*, meaning a ray or a beam. Though a common Christian metaphor Einarr uses light in a striking and structured manner. The opening sections use the metaphor of sun and sun-beam to explain the relationship between God the Father and God the Son.[72] This is re-visited in the description of Óláfr's fall.

> The bright sun was not permitted to shine then, when the desirer of the ringshield lost his life; the guardian of the hall of earth showed his signs. It was previously that the blessing-rich shining of the sun ceased at the death of the king of earth's roof; speech-tools are of use to me.[73]

The solar eclipse took place, in Einarr's narrative, after the death of Óláfr in battle. That martyrdom could be achieved in this manner was a question with sharper interest in the twelfth-century in the wake of Christian crusade to the Holy Land from 1095 and in the Baltic against Slavs, Balts and Finns, identified as pagan from the mid-twelfth century.[74] The connection to the eclipse at the death of Christ 'previously', as Einarr phrased it, is made clear by the juxtaposition of the two events, though left to the listener to fill out. As Chance remarks, Óláfr 'the beam of the Sun of Righteousness' stood in typological relationship to Christ, the martyrdom a post-figuration of the crucifixion with its attendant celestial marker.[75] An intriguing question remains as to whether there was really an eclipse at the battle of Stiklestad.[76] None can be calculated for

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[69] Chance, *Geisli*, pp. 9-10. On the promotion of Nidaros see Anders Bergquist, 'The papal legate: Nicholas Breakspear's Scandinavian mission', in Brenda Bolton and Anne Duggan (ed.), *Adrian IV the English Pope (1154-1159)* (Aldershot: Ashgate, 2003), pp. 41-48.

[70] *Morkinskinna,* trans. Theodore M. Andersson and Kari Ellen Gade (Ithaca: Cornell University Press, 2000), p. 393.

[71] Magnus Rindal Fra hedendom til kristendom : perspektiver pa˚ religionsskiftet i Norge (Oslo: Ad notam Gyldendal, 1996); Anders Winroth, The Conversion of Scandinavia : Vikings, Merchants, and Missionaries in the Remaking of Northern Europe (New Haven : Yale University Press, 2014).

[72] *Geisli*, 1-3, pp. 51-3.

[73] *Geisli*, 19, p. 69: '<Nædit> biartr þa er beidir / baugskiallda lauk alldri / syndi saluordr grundar / sin takn rodull skina. / Fyrr var hitt at harra / haudrtiallda <bra> dauda / happ nytaz mer mætt[u] / mæltol <skini> solar.'

[74] H. E. J. Cowdrey, 'Martyrdom and the First Crusade' in P. W. Edbury (ed.), *Crusade and Settlement* (Cardiff: University of Wales Press, 1985), pp. 46-56; Eric Christiansen, *The Northern Crusades* (London: Penguin, 1997); Alan V. Murray, *Crusade and Conversion on the Baltic Frontier 1150-1500* (London: Routledge, 2017).

[75] Chance, *Geisli*, pp. 35.

[76] See discussion in Chance, *Geisli*, p. 36.

the traditional date 29 July 1030, but one did take place on 31 August which was of magnitude of 0.99, that is almost total, at Stiklestad. Other contemporary evidence would support the 29 July date for the battle; one other early source also mentions the eclipse but its attribution is not entirely secure. It is possible that the whole episode is a literary device, or, perhaps, that the two events, death in battle and eclipse, were elided in short order.

The solar eclipse motif used in the *Lives of St Ethelbert* occurs in a more direct formulation but carries the same typological function. The relationship between the two lives is curious. Gerald's *Life* was a re-working and abbreviation of a mid-twelfth century version by Osbert of Clare (d. in or after 1158), prior of Westminster, which had been composed for Gilbert Foliot bishop of Hereford.[77] This original text no longer survives in a complete form but is represented in a later compilation by another monk of Westminster, Richard of Cirencester (before 1340-1400). Gerald wrote, he states, at the behest of the chapter of the cathedral who had asked for something more succinct.[78] Gerald, sometime archdeacon of Brecon, enjoyed good relations with the chapter of Hereford Cathedral, one of whose number tried at about the same time to get him to settle in their city on account of his reputation for learning. Although the attempt failed the connection was not lost and it is possible that Gerald was in Hereford when he died (see Plate 2, Hereford Cathedral).[79]

The earlier anonymous life is much shorter and there is little to suggest that it was consulted by Gerald. The author was certainly familiar with Hereford, and a date of composition in the first third of the twelfth century would coincide with the heightened interest in the saint in the later eleventh and twelfth centuries. Ethelbert (779/80-794) is an obscure figure, king of the East Angles, whose execution on the orders of King Offa of Mercia is recorded laconically in the Anglo-Saxon Chronicle and for whom there is almost no additional evidence before the mid-eleventh century.[80] The promotion of Ethelbert as a royal martyr is really a phenomenon of the twelfth century with shorter accounts of his life in the chronicles of John of Worcester and William of Malmesbury, and the three *Lives* as mentioned. The cult centre was Hereford whose cathedral was dedicated to Ethelbert and in which, according to the twelfth-century narrative, his relics were deposited (see Plate 3, St Ethelbert).

The *Lives* create the context for the martyrdom, with Ethelbert attending Offa's court, sitting near to Hereford, to marry his daughter. On the journey, according to the anonymous life, an earthquake and then a solar eclipse occurred causing consternation amongst Ethelbert's council:

> To the sign of the earth the sign of heaven soon responded. The sun scattering rays throughout the world had flashed brightly, and mark! the whole council is darkened in mid-journey. The density of the clouds arose suddenly, [amongst] the travellers themselves one prevented from seeing the other. Only by the sound of the voice did anyone know each other. King Ethelbert

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[77] M. R. James, 'Two Lives of St. Ethelbert, King and Martyr', *English Historical Review*, 32 (1917), 214-241, analysis at 214-221.

[78] James, 'Two Lives', p. 216; Frank Barlow, 'Clare, Osbert of (d. in or after 1158), prior of Westminster Abbey and ecclesiastical writer,' *Oxford Dictionary of National Biography*. 23 Sep. 2004; Accessed 2 Aug. 2022. https://www.oxforddnb.com/view/10.1093/ref:odnb/9780198614128.001.0001/odnb-9780198614128-e-5442; Matthew Mesley, 'Depicting the Bishop: Hagiography and Religious Communities in England, c. 1070 – c. 1215', unpubl. PhD. Thesis, University of Exeter (2009), p. 198.

[79] See Gasper et al, *Knowing and Speaking*, pp. 18-20 and 31-5; R. Bartlett, *Gerald of Wales A Voice of the Middle Ages* (Oxford: Oxford University Press, 1982; repr. Stroud, Tempus, 2006).

[80] Andy Todd, '*Æ*thelberht [St *Æ*thelberht, Ethelbert] (779/80–794), king of the East Angles', *Oxford Dictionary of National Biography*, 23 Sep. 2004; Accessed 2 Aug. 2022. https://www.oxforddnb.com/view/10.1093/ref:odnb/9780198614128.001.0001/odnb-9780198614128-e-8903. *The Anglo-Saxon Chronicle, Collaborative Edition*, Vol. 7, *MS. E*, s.a. 792 [*recte* 794].

> was shocked when the radiant sun thus became darkened. To the stunned council he took it upon himself to exclaim. 'We bend our knees' he said 'we ought to urge the heavens with prayer that the almighty God might have mercy upon is'. What is to be supposed, dearest brothers, prefigured by these signs? The truly glorious King, martyred for the name of Christ, removed from the light of the present time and crowned in heavenly glory.[81]

The terror at the phenomena is turned to interrogation of what they might portend, in this case the king's death for Christ. The association with the crucifixion eclipse is not drawn out explicitly; the text rather addresses the movement from the light of the world to the light of heaven.

The events of Christ's death are explicitly connected to Ethelbert's by Gerald, who goes on to explain the what the earthquake and solar eclipse signify.

> Nor is it an extraordinary thing if the signs which appeared in the death of Christ and before the death of this member of the body of Christ [Ethelbert], and that they foretold the same for Christ's beloved. Seeing as the earth was moved as if shuddering at a sin that now threatened, while the sun, having been darkened, turned away its face as though not to see. Or the earthquake that could clearly signify the agitation and devastation which endured from the birth of Ethelbert for the round of many years under petty kings and tyrants up to the time of King Edmund: moreover, the sun, withdrawing light itself, made clear with an obvious sign that he was to be withdrawn from that light very soon after.[82]

Gerald's emphasis on shifting the interpretation of what is extraordinary to what is explicable can be compared usefully to his remarks on how solar eclipses were perceived: the amazement of the viewer is amplified because of the rarity of the event. That the eclipse foretold the same for Christ and for Ethelbert underlines the holiness of the latter and the multi-layered understanding of the drama of the celestial world.

Where Magnus of Reichersberg recorded the uncertainty amongst the inhabitants of Salzburg as what the eclipse of 1133 might portend, other chroniclers found more coherent narratives to tell in which what happened above was associated to what happened below. All of the narratives considered show the same mixture of wonder and fear, and the ubiquity across different Christian cultures of the features recorded by chroniclers is striking. Nevertheless, it is the variation of description between author-compilers that stands out in sharper relief. The twelfth century saw considerable change to the conceptual frameworks for how the heavens worked and the reasons why solar eclipses occurred. For all of that, the understanding of the phenomenon was cast in a Christian vision, which links, ultimately, its distinctive appearance, to the central moment of the faith, the crucifixion.[83] The solar eclipse was a metaphor for the Creator to creation as well as a

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[81] *Passio sancti Athelberhti regis et mariris*, ed. James 'Two Lives', pp. 236-241, at 238: 'Terre signo celi mox respondit signum. Sol per orbem radios spargens fulserat lucide, et ecce obscuratur toti curie medio in itinere. Densitas nebularum subito oborta itinerantes sese alterutrum uidere negat. Dumtaxat uocis per sonum quislibet alterum nouit. Obstupescit rex Æðelberhtus dum sic radiosus phebus obtenebrescit. Ad stupidam curiam clamare cepit. "Genua," inquit, "flectemus: prece polum pulsemus ut nostri misereatur omnipotens deus." Quid putandum fratres karissimi his signis prefiguratum? Regem sane gloriosum pro Ihesu Christi nomine martyrizandum, presentiarum luci subtrahendum, celestique gloria coronandum.'

[82] Gerald of Wales, *Vita Regis et martiris Æthelberti*, ed. James, 'Two Lives', pp. 222-36 at p. 225: Nec mirum si signa que in morte Christi apparuerunt et ante mortem huius membri Christi eiusque dilecti eandem presagiencia contigerunt. Terra quippe quasi scelus abhorrens quod iam iminebat mota est, sol autem obscuratus tanquam ne uideret faciem auertit. Uel terremotus ille terre regni tocius commocionem et desolacionem que ab ortu Ethelberti multis annorum circulis sub regulis et tirannis usque ad regis Edmundi tempora durauit potuit aperte significare: sol vero lucem subtrahens ipsum ab hac luce in proximo subtrahendum manifesto indicio declarauit.

[83] See Bentley-Hart in this volume.

physical sign, and it is this, perhaps, that ensured its faithful record amongst those charged with chronicling the days and years of their communities.