

Creating knowledge and knowing creation in theological and scientific writing in late antique western Christendom

Abstract: Scholars in late antique western Christendom relied both on ‘scientific’ knowledge and on the theological interpretation of Scripture to understand and explain the natural world. Previous scholarship discussing the process of seeking knowledge in general, and the investigation of science and theology in particular, has often centred on the issues of innovation and derivativeness. For centuries, following ideas developed during the Renaissance and the ‘Enlightenment’, it was held that the fall of the western Roman Empire heralded a ‘Dark Age’ in which there was little intellectual development and scholarship was almost entirely derivative; more recently scholars have argued instead that there was innovation in this period, at least to some degree. This essay offers a preliminary examination of the methods and processes of enquiry used by late antique scholars in their attempts to uncover knowledge, focusing on the topic of creation.

Keywords: theology, science, knowledge, scholarship, nature

In the second half of the eighth century, a scribe in Freising compiled a volume bringing together scriptural commentaries and writing on the natural world. The book, now Munich, clm 6302, opens with a copy of *De ordine creaturarum*, a seventh-century cosmological text by an Irish author (though long attributed to Isidore), and includes commentaries on Mark and parts of Genesis as well as exegetical dialogues.¹ As a collection, the volume may have been intended at least partly for the study of creation, since the natural world, both visible and invisible, is the subject of a substantial proportion of the material it contains. Late antique authors relied both on ‘scientific’ knowledge and on theological interpretation of Scripture to understand and explain the natural world: the Freising manuscript could be thus considered as a kind of microcosm of contemporary scholarly investigation into creation. This essay offers a preliminary examination of the methods and processes of enquiry used by late antique scholars in their attempts to uncover knowledge, focusing on the topic of creation.

For studying the created world, an important facet of the process was the combination of aspects of what are now two different disciplines, science and theology. Late antique writers did not distinguish these as separate disciplines, as modern scholars do; indeed, in late antiquity there was no fixed terminology for referring to either of the subjects that would now be termed theology and science.² Previous scholarship discussing the process of seeking knowledge in general, and the investigation of science and theology in particular, has often centred on the issues of innovation and derivativeness. For centuries, following ideas developed during the

¹ Bernhard Bischoff, ‘Wendepunkte in der Geschichte der lateinischen Exegese im Frühmittelalter’, in *Mittelalterliche Studien* (Stuttgart: Hiersemann, 1966-81, 3 vols): I.205-73; Michael Gorman, ‘A Critique of Bischoff’s Theory of Irish Exegesis. The Commentary on Genesis in Munich clm 6302 (Wendepunkte 2)’, *Journal of Medieval Latin* 7 (1997): 179-81.

² See e.g. Faith Wallis, ‘Si naturam quaeras: reframing Bede’s “science”’, in *Innovation and tradition in the writings of the venerable Bede*, ed. Scott De Gregorio (Morgantown: West Virginia University Press, 2006), 61-94; Stavros Lazaris, ‘Introduction’, in *A Companion to Byzantine Science*, ed. Stavros Lazaris (Leiden: Brill, 2020), 3-9; Johannes Zachhuber, ‘Philosophy and theology in late antiquity: some reflections on concepts and terminologies’, in *Eastern Christianity and Late Antique Philosophy*, ed. Eva Agnostou-Laoutides and Ken Parry (Leiden: Brill, 2020), 52-77.

Renaissance and the ‘Enlightenment’, it was held that the fall of the western Roman Empire heralded a ‘Dark Age’ in which there was little intellectual development and scholarship was almost entirely derivative; more recently scholars have argued instead that there was innovation in this period, at least to some degree.

Both for the history of science and for the history of theology, modern studies which take a long view from the ancient world to modernity still sometimes present the period from about the fifth century to about the eleventh as one of limited interest.³ Such overviews may suggest that in this period there was a lack of innovation, particularly with regard to scientific and theological thinking, so that modes of knowledge, thinking and enquiring were primarily derivative; even in many (otherwise good) works which aim to explore how science or theology (or aspects of them) changed over the longue durée the period is either barely mentioned or is treated only in a limited way.⁴ Late antiquity and the early middle ages, perhaps as a result of being transitional periods between ‘antiquity’ and the ‘(later) middle ages’, often simply get short shrift.⁵ Scholarship focusing on the history of science or theology from the twelfth century onwards relatively often retains a perception of the period from the fifth century to the eleventh as one of little interest.⁶ Unsurprisingly, scholars of late antiquity and the early middle ages are much less dismissive of the scientific and theological endeavours of late antique and early medieval writers, and an increasing body of work demonstrates the vibrance and interest of scientific and theological writing in this period.⁷

³ The boundaries of the periods of late antiquity and the early middle ages overlap to some extent but they are unfixed and dependent to some degree on geography (and they are in any case Euro-centric). Late antiquity is often defined as starting in c. 300 or c. 400 CE and ending in c. 700 or c. 800 CE; the early middle ages can begin as early as c. 400 CE and may end as early as c. 950 CE or as late as c. 1100 CE.

⁴ See for example: David C. Lindberg, *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious and Institutional Context, Prehistory to AD 1450* (Chicago: University of Chicago Press, 2010, 2nd ed.), who argues in the section on the early middle ages that this was a period of the transmission of knowledge but that new knowledge was not created (155-8). In contrast, Derek Johnston, *A Brief History of Theology: From the New Testament to Feminist Theology* (London: Continuum, 2009), jumps straight from Augustine to Aquinas, giving the impression that no theology of note occurred in the intervening centuries. Alister E. McGrath, *Historical Theology: An Introduction to the History of Christian Thought* (Chichester: Wiley-Blackwell, 2012, 2nd ed.), includes virtually nothing about early medieval theology and again jumps from Augustine to the high/late middle ages.

⁵ In the Cambridge History of Science, for example, the period 400-800 CE falls uneasily between Ancient Science (volume 1) and Medieval Science (volume 2); there is one chapter (out of thirty) on late antiquity in volume 1, and in volume 2 there are three (out of twenty-seven) chapters which discuss the early middle ages, in whole or in part: David C. Lindberg and Michael H. Shank, ed., *The Cambridge History of Science: Volume 2. Medieval Science* (Cambridge: Cambridge University Press, 2013); Alexander Jones and Lisa Taub, ed., *The Cambridge History of Science: Volume 1. Ancient Science* (Cambridge: Cambridge University Press, 2018).

⁶ This too is perhaps sometimes an issue of periodisation, though not always. In his otherwise excellent *An Introduction to Medieval Theology* (Cambridge: Cambridge University Press, 2012) Rik van Nieuwenhove discusses only two theologians in the section on the early middle ages and then leaps from the ninth century to the eleventh: by far the bulk of the book (64-284) is focused on the high and late middle ages. An egregious example in relation to the study of one theological concept is Caroline Walker Bynum, *The Resurrection of the Body in Western Christianity, 200-1336* (New York: Columbia University Press, 2017, 2nd ed.), which claims to cover over a millennium of thought but in fact has one section on ‘The Patristic Background’ (200-c.400) before leaping straight to the twelfth century.

⁷ A few examples include: Owen Phelan, *The Formation of Christian Europe: Baptism, the Carolingians and the Imperium Christianium* (Oxford: Oxford University Press, 2014); Eric Ramirez-Weaver, *A Saving Science: Capturing the Heavens in Carolingian Manuscripts* (Philadelphia: Penn State University Press, 2017); Faith Wallis, ‘Bede’s “Science”’ in *The Cambridge Companion to Bede*, ed. Scott DeGregorio (Cambridge: Cambridge University Press, 2010), 113-26; Faith Wallis, ‘Isidore of Seville and Science’, in Andrew Fear and Jamie Wood (eds), *A Companion to Isidore of Seville* (Leiden: Brill, 2020), 182-221.

One of the issues is the concept of authority: theological writers of late antiquity and the early middle ages often introduced their works by noting their indebtedness to past authorities and stress that they have not introduced anything new in relation to theology. There was good reason for this, since sometimes the accusation of novelty could lead to charges of heresy or heterodoxy: the Carolingian scholar Amalarius of Metz (d.850) was condemned at the Council of Quierzy (839) because, in answer to the question of what he had read to produce his substantial exposition of the liturgy, he had replied that he had read it in the spirit.⁸ Even the Northumbrian monk Bede (d. 735), who was himself accepted as an authority in his own lifetime, was accused of heresy when he recalculated the date of the world as part of his work on time.⁹ These examples demonstrate in themselves both that innovation existed and that it was not always prized: originality certainly did occur even within an intellectual milieu in which novelty was not usually as highly valued as authority. However, it is also clear from contemporary writers that even if originality was not important, creativity was, and that scholars were concerned to use their creative abilities to further knowledge.

Recent work has demonstrated that even where late antique authors relied heavily on earlier works they exercised choice, agency and creativity in the process; it has also been shown that some late antique and early medieval writers were genuinely innovative, at least for a certain value of innovation.¹⁰ This work has been hugely important for disrupting traditional narratives, but this essay seeks to disrupt that narrative further by shifting the focus away from the dichotomy between innovation and tradition: instead, I investigate what late antique authors thought they were doing, and how they did it. My argument is that seeing late antique writers as either derivative or innovative, or even somewhere in between, is fundamentally unhelpful since these are modern categories which make little sense in relation to the way that these authors saw themselves and understood their tasks as Christian scholars in their own times. It is well known that late antique writers did not value innovation and originality in the way that modern academics do. It is certainly important to note that authors in the period c. 400-800CE did not simply pass on information without questioning it, and that scholars in late antiquity and the early middle ages did not have such respect for earlier authorities that they only attempted to address questions which had already been asked and answered. But searching for evidence that late antique authors were innovative simply because that is what modernity prizes, and because it enables these authors to be rescued from the label of derivative, is problematic since it is abundantly clear that neither of these terms would be meaningful for the way that those authors themselves thought.

Instead, I suggest, late antique authors must be viewed as engaging both individually and collectively in an endeavour to advance knowledge: contemporary scholars affirmed what was

⁸ *Flori relatio de concilio Carisiacensi*, III-VI, MGH, *Leges. Concilia* 2.2, 57C; Celia Chazelle, *The crucified God in the Carolingian era: theology and art of Christ's passion* (Cambridge: Cambridge University Press, 2001), 158-9.

⁹ Faith Wallis, *Bede. The Reckoning of Time*, Translated Texts for Historians 29 (Liverpool: Liverpool University Press, 1988), xxx-xxxi, 253-4, 358, 361 (with translation of Bede's *Letter to Plegwin*, in which he defends himself against the accusation of heresy, at Appendix 3.1).

¹⁰ See e.g. the articles in Scott DeGregorio ed., *Innovation and tradition in the writings of the venerable Bede* (Morgantown: West Virginia University Press, 2006); Ana Belén Sánchez Prieto, 'Authority and authorship, tradition and invention, reading and writing in early medieval compilation genres: the case of Hrabanus Maurus' *De institutione clericorum*, *De Medio Aevo* 10, no. 2 (2016): 179-240; Richard Sowerby, *Angels in Early Medieval England* (Oxford: Oxford University Press, 2016), 20-34.

already known about God and creation, but also sought to uncover more information and to address questions that arose in their own times. The changing contexts of study in late antiquity are significant: the premise that God is rational – which underpinned Christian study of the created world – is quite different from many ancient Mediterranean or Near Eastern beliefs in which gods were not believed to behave rationally even though the natural world itself was understood to operate along rational lines. Late antique Christians studying creation relied on a rational approach requiring proofs and assumed that information about creation could be reasoned out by careful thought with appropriate use of evidence and with established methodological approaches. Sometimes it was enough to record and note what previous authorities had said, but late antique scholars also asked and addressed new questions which arose in their own times. Sometimes writers offered original solutions and sometimes they didn't, but originality was not central to the task: more importantly, their aim as part of a Christian mission of learning was that of advancing knowledge of God and his ordered creation through a series of rational approaches. I examine how late antique writers approached and analysed their evidence in their attempts to further knowledge, and centre the creative process and the aims and interests of the authors rather than evaluating the innovative (or otherwise) nature of the finished product. I do not argue that the authors considered here were not derivative, or that they were necessarily innovative: examples of both derivativeness and innovation are discussed here. But by moving away from this dichotomy and focusing instead on the *process* of scholarly enquiry it is possible to understand these writers and their texts on their own terms, and to see a more nuanced and more interesting picture of western late antique scientific and theological writing and modes of knowing.

Knowing creation

Although Scripture provided an account of creation and discussion of the created world, writers could also make observations and judgements based on experience. For both of these modes of thinking, scholars – i.e. those who were involved in academic study of theology, science or other matters – undertook an investigative study via an evidence-based approach.¹¹ The resources for understanding creation in western Christendom between the fifth century and the eighth were primarily classical authorities and exegetical commentary. Classical scientific works drawing on ancient Greek and Roman learning were significant, though the availability of these was variable depending on chronology and geography: library resources in eighth-century Britain or Ireland, for example, were substantially different from those available to Augustine in early fifth-century North Africa or Italy.¹² In his multiple discussions of Genesis, Augustine refers to the opinions of the 'philosophers', seeking to reconcile their statements with Scripture.¹³ Even by the early seventh century, when Isidore of Seville wrote the first known Christian treatise on the natural world, earlier works of natural philosophy were much less easily obtainable and the Roman educational curriculum had been transformed into a system which was focused on learning for

¹¹ Occasionally wisdom was reported to have been granted to the unlearned directly by way of revelation, but this was not (though this hardly needs saying) the normal way by which late antique Christians expected to find answers to their questions. In Cassian's *De institutis coenobiorum* (5.33), written c. 420, Abbot Theodore received an answer to a tricky question not by reading and learning, since he was uneducated, but after constant prayer for seven days and seven nights.

¹² Michael Lapidge, *The Anglo-Saxon Library* (Oxford: Oxford University Press, 2006); John J. Contreni, 'Learning for God: Education in the Carolingian Age', *Journal of Medieval Latin* 24 (2014): 90-100.

¹³ E.g. *De Genesi ad litteram*, VII:13-15; *Confessiones* V.3.

Christian religious purposes.¹⁴ Some Roman works, such as Pliny's *Historia naturalis*, were available and influential throughout late antiquity, but other ancient scientific knowledge gradually became more difficult to obtain. Exegetical texts became increasingly important for the study of creation and the created world, especially commentaries on Genesis.

As a result of these developments, the study of the natural world which had once been the realm of philosophers became the province of Christian scholars, who could present their discussions either 'scientifically' or 'theologically'. Different genres could be used depending on the kind of enquiry undertaken, and information was presented and analysed according to each genre and its purposes: more 'scientific' inquiry might occur through treatises on nature or the created world, while more 'theological' study of creation often involved scriptural exegesis, particularly of Genesis. This meant that 'scientific' and 'theological' modes of thinking were not completely distinct, but they were distinguishable, even though the lines between the approaches and evidence used in these were often blurred. Bede composed 'scientific' treatises on time and nature but also wrote a commentary on Genesis: across these texts he uses much of the same information but the way that he presents his material and the specific details that he identifies for discussion vary, often significantly, because his purposes for each type of text were substantially different.¹⁵

Late antique guides to exegesis explained how to approach the process of studying and explaining Scripture, and outline a number of investigative methods. The most influential was Augustine's *De doctrina christiana*: Augustine stresses the importance of knowledge of Scripture, but also argues that scriptural study requires understanding, including searching for the full meanings in the text.¹⁶ Augustine's text is particularly significant because attitudes to novelty in theological texts changed over the course of late antiquity: although Augustine aimed to build on earlier authorities, he does not seem to have felt that originality was a danger in quite the way that writers from around the mid sixth century and later often did. The Christian-focused educational system which developed from about the sixth century onwards influenced how writers approached the task of scholarship and, as a result, both the purposes and processes of study were altered to some degree. However, Augustine's *De doctrina christiana* recommended methods originating from the secular classical curriculum which were maintained in a Christian context. He advocated that teachers who want to clarify doubtful points must do so using both reasoning and proof, and his approach highlights the perceived importance of uncovering what was currently unknown, as a way to increase knowledge of God and his purposes.¹⁷ Augustine often included multiple possible interpretations, allowing the reader to choose what seems most fitting; he recommended that if better interpretations were found in future they should be accepted.¹⁸ In avoiding making dogmatic pronouncements on every line of Scripture, and instead allowing multiple interpretations and the potential for new ones, Augustine set an important precedent for subsequent writers. This was also one way that late antique authors visible engaged

¹⁴ Hervé Inglebert, *Interpretatio Christiana: Les mutations des savoirs (cosmographie, géographie, ethnographie, histoire) dans l'Antiquité chrétienne (30–630 après J.-C.)* (Paris: Institut d'Etudes Augustiniennes, 2001); Faith Wallis, 'Isidore of Seville and Science'; see also John McGee's chapter in this volume.

¹⁵ Wallis, 'Bede's "science"'.
¹⁶ *De doctrina christiana*, 1.1; 2.7, 9; 4.8-9.

¹⁷ *De doctrina christiana*, 2.18, 27-42, and esp. 4.4.

¹⁸ *De doctrina christiana*, 2.12-13.

in the process of advancing knowledge and with a community of both past and future readers who made their own choices about what constituted the best interpretation.

Two other Latin exegetical guides were produced in the mid sixth century, both of which demonstrate the changes in education which had occurred since Augustine's time. In Constantinople, the Quaestor of the Sacred Palace, Junillus, produced his *Instituta regularia divinae legis* probably during the 540s; in southern Italy, Cassiodorus began putting together some form of his *Institutiones divinarum et humanarum lectionum* perhaps in the 550s, and recommended both Augustine and Junillus as guides to the practice of exegesis.¹⁹ Junillus' *Instituta* follows the principle of introducing students first to the literal meaning of the Scripture and then to more advanced study, in order to understand the purpose and arrangement of the principles of Divine Law.²⁰ The *Instituta* are arranged in the form of a dialogue between teacher and pupil, posing and asking questions about how the Scriptures are presented, and how to study them; the work was influential and widely used by later authors.²¹ Cassiodorus' *Institutiones* take a different approach, offering a kind of handbook of the most useful reference works for explaining and interpreting Scripture. Cassiodorus noted that secular teaching was still available but that he aimed to remedy the lack of teaching of Scripture: he suggests that through these introductory books the reader may come to know more both about the salvation of the soul and also about secular learning.²² He emphasized that Latin learning of all kinds could be brought to bear on biblical study, recommending a range of different authors on topics such as geography and medicine.²³ Assessments of the influence of the *Institutiones* have been somewhat mixed, and it is worth noting that later users tended to separate the first book, on divine learning, from the second, on the liberal arts.²⁴ Importantly, all these guides indicate that the work of interpreting Scripture was perceived to be incomplete: students needed to be trained both as future teachers and as scholars who could uncover the still hidden meanings of the biblical text. Christians were supposed to be continually engaged in the process of growing closer to God through knowing him. For learned Christians, that meant study of Scripture and God's ordered creation, as well as careful scrutiny of the works of earlier authorities.²⁵

As classical authorities became increasingly less available, and as Christianity flourished in places far from its original homeland, the principle of combining sacred and secular disciplines to study Scripture became more significant. Later authors can be found employing precisely the kind of dialogue between sacred and secular learning that Cassiodorus expounds in his *Institutiones* and demonstrates in his *Expositio in Psalmos*, in which the psalter is presented as containing all aspects

¹⁹ Michael Maas, *Exegesis and Empire in the early Byzantine Mediterranean: Junillus Africanus and the Instituta regularia divinae legis* (Tübingen: Mohr Siebeck, 2003), 13-15; Mark Vessey, 'Introduction', in James W. Halporn and Mark Vessey, *Cassiodorus: Institutions of Divine and Secular Learning and On the Soul*, Translated Texts for Historians 42 (Liverpool: Liverpool University Press, 2004), 4, 15, 23-42.

²⁰ Junillus, Preface, ed. and trans. in Maas, *Exegesis and Empire*, at 118-12; Michael Maas, 'Junillus Africanus' "Instituta Regularia Divinae Legis" in its Justinianic Context', in Pauline Allen and Elizabeth M. Jeffreys (eds), *The Sixth Century: End or Beginning?* (Brisbane: Australian Association for Byzantine Studies, 1996), 131-44.

²¹ M.L.W. Laistner, 'Antiochene exegesis in western Europe during the Middle Ages', *Harvard Theological Review* 40:1 (1947): 24-6.

²² Cassiodorus, *Institutiones* I.1.

²³ Cassiodorus, *Institutiones* I.25, 31; Peter Brown, *The Rise of Western Christendom: Triumph and Diversity, A.D. 200-100* (Chichester: Wiley-Blackwell, 2013, 10th anniversary revised edition), 150.

²⁴ Vessey, 'Introduction', 94-5.

²⁵ See Paul Blowers' chapter in this volume.

of the liberal arts. One example is in discussions of flora and fauna mentioned in Scripture which were unfamiliar to writers in northern Europe. Bede notes in the introduction to his commentary on the *Song of Songs* that he will explain the nature of trees and plants mentioned in the text, in accordance with what he has learned in the books of the ancients, because for him and his readers in Britain, places like Arabia and India, Judaea and Egypt, are unknown except through written works.²⁶ For example, he drew on texts like Pliny's *Historia Naturalis* and Isidore's *Origines* to explain the significance of plants, such as cane and cinnamon, interpreting them allegorically on the basis of the physical descriptions he found in his sources.²⁷ Explanation of the physical environments described in Scripture was a particular issue as Christianity moved west and north: writers needed to explain the natural world not only in relation to cosmology and the origins of the universe, but also descriptions of nature rooted in the unknown and unfamiliar environment of the Near East. Seventh- and eighth-century northern European writers could not always find relevant explanatory information in earlier authorities on Scripture, such as Augustine or Gregory the Great, who were themselves products of Mediterranean environments and for whom many, even if not all, of the plants and animals described in biblical texts were more familiar. The continuing spread of Christianity throughout Europe was thus one means through which modes of knowing and the means of understanding Scripture started to change.

Creating knowledge

Throughout late antiquity and the early middle ages new works relating to creation and cosmology were produced, indicating that the available works which they had inherited from earlier generations of scholars did not always meet contemporaries' needs. The question of why and how new works were created is significant in understanding the purposes and aims of late antique scholars, and relates closely to the methods which they used to advance knowledge and to discover new information. Although late antique writers of theological and scientific texts often claimed to be simply handing on the wisdom of ancient authorities, it is also clear that they did not see this as their only task, even if that did form part of their efforts. A common method of producing new texts was by abbreviating and excerpting the opinions of earlier scholars, with variable amounts of additional material joining these together, to create a kind of focused florilegium. This could in some cases lead to the production of new texts based substantially on earlier writers, a kind of patchwork of quotations; but, as recent scholars have pointed out, this process required creativity and intelligence in the selection and arrangement of material. Moreover, the decision to create such new texts rather than to rely on copies of earlier authoritative texts demonstrates a perceived need for something different.

An interesting example of a new work based heavily on those of earlier writers is the commentary on Genesis by Wigbod, part of his commentary on the Octateuch, which composed for Charlemagne probably between 775 and 800, perhaps at Lorsch.²⁸ While the other commentaries closely reproduce Isidore's allegorical exegesis, Wigbod's commentary on Genesis

²⁶ Bede, *In cantica canticorum allegorica expositio*, prologus, l. 508-10, ed. D. Hurst, *Beda Venerabilis. Opera exegetica 2B. In Tobiam. In Proverbia. In Cantica canticorum. In Habacuc*, CCSL 119B (Turnhout: Brepols, 1983).

²⁷ See also *Libri quattuor in principium Genesis*, 2.12b, ed. Charles W. Jones, *Beda Venerabilis opera. Opera exegetica 1. Libri quattuor in principium Genesis usque ad nativitatem Isaac et electionem Ismaelis adnotationum*, CCSL118A (Turnhout, Brepols, 1967).

²⁸ Michael Gorman, 'The Encyclopedic Commentary on Genesis prepared for Charlemagne by Wigbod', *Recherches Augustiniennes* 17 (1982): 175, 192-5.

combines excerpts from Isidore, Augustine and Augustinian florilegia, Junillus, Jerome and Prudentius as well as from Paterius' commentary on the Bible compiled from Gregory I's writings.²⁹ The effort which Wigbod evidently put into compiling and adapting excerpts from earlier authorities for the commentary on Genesis indicates that Wigbod's initial intention was to produce a work synthesizing current knowledge; it is likely that his original aim was to provide a comprehensive commentary on the Pentateuch at least and perhaps even on the whole Bible, but that when it became clear that this ambition was simply unrealisable he edited Isidore's texts lightly instead to create his own commentary.³⁰ Nonetheless it seems that Wigbod's commentaries were produced in response to a particular need: existing texts, either as whole works or as passages scattered across multiple texts and manuscripts, were felt to be inadequate.

The availability and accessibility of material was an important consideration in the production of new works. Bede noted in the letter to Bishop Acca of Hexham (d. 740) which prefaces his commentary on Genesis, written perhaps between 717 and 720, that he produced a new commentary because so many volumes treat Genesis that they cannot be acquired except by those who are very wealthy, and the subject-matter of Genesis is so profound that it is difficult for those who are not already extremely learned to study it.³¹ Therefore, Bede explained, he selected and arranged passages from earlier texts to instruct readers who are still inexperienced, and also by which scholars might advance to more complex readings.³² (Interestingly, Wigbod seems not to use Bede's commentary on Genesis and may not have had access to it, an important reminder that both the availability of earlier writings and the lack of them could result in a perceived need for a new work.³³) Bede's comments should at some level be understood both as part of a conventional modesty topos and as an appeal to authority, since his commentary on Genesis is much more than a simple selection and arrangement of material; he also often paraphrased and abbreviated earlier authorities (as indeed he noted in his prefatory letter), and he included his own opinions at times.³⁴ Other authors too noted that Genesis was the territory of relatively advanced scholars rather than beginners: Cassiodorus remarked that the Psalms are the entry-point of Scripture for novices rather than Genesis or the Gospels; Augustine also noted the difficulty of interpreting Genesis, especially in a literal sense.³⁵ Bede's commentary is genuinely relatively accessible and clearly filled a perceived need for a new work on the topic, which brought together the best opinions that Bede could find in order to advance knowledge of God and his creation.

By the time Isidore of Seville (d. 636) was writing in the early seventh century, the classical Roman system of schooling in the west had transformed into a Christian educational programme centred around monastic needs and interests. An important effect of this transformation was

²⁹ Gorman, 'Encyclopedic Commentary', 178-9.

³⁰ Gorman, 'Encyclopedic Commentary', 180-1, 187.

³¹ Bede, *Libri quattuor in principium Genesis*, preface, ll. 18-24, ed. C.W. Jones, *Beda Venerabilis. Opera exegetica. 1. Libri quattuor in principium Genesis usque ad nativitatem Isaac et electionum Israhel adnotationum*, CCSL 118A (Turnhout: Brepols, 1967); see also the discussion in Calvin Kendall, *Bede. On Genesis*, Translated Texts for Historians 48 (Liverpool: Liverpool University Press, 2008), 40-53.

³² Bede, *Libri quattuor in principium Genesis*, preface, ll. 24-32, ed. Jones, *Opera exegetica*.

³³ Gorman, 'Encyclopedic Commentary', 179-192.

³⁴ Bede, *Libri quattuor in principium Genesis*, preface, ll. 24-32, ed. Jones, *Opera exegetica*.

³⁵ Cassiodorus, *Explanation of the Psalms*, preface, c. 16, ll. 38-41, ed. M. Adriaen, *Magni Aurelii Cassiodori Expositio Psalmorum*, CCSL 97-98 (Turnhout: Brepols, 1958); Augustine, *De Genesi ad litteram*, I.38-41; *Retractiones*, I.18.

what counted as evidence and how it was used. Earlier authors who had discussed the natural world in exegetical contexts, such as Augustine or his teacher Ambrose in the west, or Basil of Caesarea in the east, had referred to contemporary scientific knowledge taught as secular learning and generally tried to present this as concordant with information drawn from Scripture, so far as possible. Scripture was thus used as a form of evidence which complemented other evidence and information drawn from natural philosophy. Isidore read earlier works discussing the natural world such as Lucretius, Vegetius and Pliny, but he also accessed older scientific knowledge indirectly through the works of patristic commentators, a process which has been described as ‘reverse engineering’.³⁶ For Isidore, patristic commentaries themselves became a form of evidence as well as interpretation. Where he felt it appropriate Isidore also borrowed material from poets such as Vergil, and so brought all kinds of inherited learning together with Scripture, as Cassiodorus (for example) had advised. Isidore’s methods and modes of enquiry were widely available as models for later authors because his texts were transmitted and became influential rapidly. Significantly, although appeals to earlier authorities were once seen as confirming that late antique authors were unimaginative, their reliance on older works stemmed partly from a desire to demonstrate that their assertions were based on evidence as an essential part of rational enquiry.

The changing circumstances of Christian education and learning led Isidore to create a new genre, the Christian treatise on the natural world. He composed his *De natura rerum* (perhaps c. 613) and dedicated it to King Sisebut, stating that his aim was to provide a treatise suitable for the king to learn about ‘the nature and causes of things’, since no such appropriate single work then existed.³⁷ Isidore modelled his treatise on earlier cosmological works but drew on Christian Scripture and exegesis as well as on scientific traditions for its explanations: he stated that he relied on ‘scholars of antiquity’ and especially ‘catholic authors’, but emphasized that the study of nature is not ‘superstitious’, suggesting instead that it had an important place within a Christian context.³⁸ Isidore set the pattern for one line of enquiry into the natural world and his text was hugely influential: not only was it widely copied, but it also served as a model for subsequent texts, such as Bede’s works on cosmology and time-reckoning (*De natura rerum*, *De temporibus*, *De temporis ratione*).³⁹ Like Isidore, Bede was not content to rely on the copies of earlier authors but compiled his own treatises which were more appropriate for his own purposes, and which also included updated information.

Late antique scholars studying creation and the created world were often faced with different bodies of evidence which did not agree. Discord between Scripture and ancient non-Christian authors was often resolved by the assumption that the ancient authors were wrong. Isidore notes that ‘most authorities assert that Sancus, king of the Sabines, first divided the year into months’, and counters this by noting that Scripture shows that ‘the twelve months of the year existed even

³⁶ Calvin B. Kendall and Faith Wallis, *Isidore of Seville. On the Nature of Things*, Translated Texts for Historians 66 (Liverpool: Liverpool University Press, 2016), 12.

³⁷ Isidore, *De natura rerum*, preface, 1, ed. J. Fontaine, *Traité de la nature* (Bordeaux: Féret, 1960); for the date see Fontaine, *Traité*, 3-6.

³⁸ Isidore, *De natura rerum*, preface, 2, ed. J. Fontaine, *Traité*, see also Kendall and Wallis, *Isidore. On the nature of things*, 13-14.

³⁹ Wallis, *Bede. The Reckoning of Time*, xxii-xxiv; Calvin B. Kendall and Faith Wallis, *Bede. On the Nature of Things and On Times*, Translated Texts for Historians 56 (Liverpool: Liverpool University Press, 2010), 12-20; Kendall and Wallis, *Isidore. On the nature of things*, 56-7.

before the Flood'.⁴⁰ Less often, disagreement could be explained through allegorical interpretation of Scripture. Often where patristic works offered multiple opinions the situation was considered uncertain: importantly, however, late antique scholars did not simply acknowledge that something was unknown, but saw this as an invitation to future scholars to seek out more certain interpretations and, in so doing, to further knowledge. As already noted, Augustine often included multiple interpretations and encouraged the reader to choose among them: the anonymous seventh-century Irish author of *De ordine creaturarum* built on this, advising that first the reader should examine what was best supported by Scripture and, if this was inconclusive, the reader should follow the opinion expressed by most catholic believers.⁴¹ He advised too that where different catholic writers presented views which were conflicting but potentially acceptable, the matter should be left undecided.⁴² Still other subjects, particularly those which were more complex (such as paradise), led some authors to declare that they were unable to offer a definite opinion.⁴³ A slightly earlier seventh-century Irish author, known now as Augustinus Hibernicus (the 'Irish Augustine'), explained in his work on the miracles within Scripture that he did not know enough to offer a definite opinion on the origins of the waters of the Flood, and so he offered multiple interpretations from 'masters', presenting them as of equal authority and leaving the reader to choose between them.⁴⁴ Bede, whose approach to exegesis is profoundly Augustinian, indicates clearly how he intended readers to treat multiple authoritative opinions recorded in his works. Probably in about 715, he replied to a series of questions about the Book of Kings which had been sent to him by Nothhelm, a priest in London who subsequently became archbishop of Canterbury: in his prefatory letter Bede stated that it 'could very easily happen' that Nothhelm might find better explanations to answer his questions and, if so, that he should send them quickly to him.⁴⁵ Bede quickly became established as an authority on Scripture, like Augustine he assumed that scriptural study required constant searching for better interpretations and the discovery of new knowledge; he clearly believed that he and his contemporaries were engaged in this task both individually and collectively.

As a methodological enterprise, the most well-known work to encourage the resolution of contradictory statements was Abelard's *Sic et Non*, written long after late antiquity in the early twelfth century.⁴⁶ Abelard posed a series of theological questions and included conflicting opinions from the Church Fathers which related to them, although the contradictions were left for the reader to resolve. This method is often seen as characteristic of new scholastic

⁴⁰ Isidore, *De natura rerum*, 4.5, ed. J. Fontaine, *Traité*.

⁴¹ *De ordine creaturarum*, V.11, ed. Manuel C. Díaz y Díaz, *Liber De ordine creaturarum. Un anónimo irlandés del siglo VII* (Santiago de Compostela: Universidad de Santiago de Compostela, 1972).

⁴² *De ordine creaturarum*, V.11, ed. Díaz y Díaz, *Liber De ordine creaturarum*.

⁴³ Some authors considered certain topics problematic for detailed scrutiny: see for example Julian Pomerius, who suggests that the nature of the future life is a topic that one should believe in rather than discuss (*De vita contemplativa*, 1.2); see also Augustine, *De doctrina christiana*, 4.9.

⁴⁴ *De mirabilibus sacrae scripturae*, vi, ed. Gerard MacGinty, 'The treatise *De mirabilibus sacrae Scripturae*: critical edition, with introduction, English translation of the long recension and some notes' (PhD diss., National University of Ireland, 1971, 2 vols), 2.23-28.

⁴⁵ Bede, *In regum librum xxx quaestiones*, prolog., ed. D. Hurst, *Beda's Venerabilis opera exegetica. 2. In primam partem Samuelis libri III in Regum librum xxx quaestiones*, CCSL119 (Turnhout: Brepols, 1962); Paul Meyvaert, "'In the footsteps of the fathers?': The date of Bede's *Thirty Questions on the Books of Kings* to Nothhelm", in *The Limits of Ancient Christianity: Essays in Late Antique Thought and Culture in Honor of R. A. Markus*, ed. M. Vessey and W. Klingshirn (Ann Arbor: University of Michigan Press, 1999), 267-86.

⁴⁶ Constance Brittain Bouchard, "*Every valley shall be exalted*": the discourse of opposites in twelfth-century thought (Ithaca, NY: Cornell University Press, 2003), 36-40.

approaches used by theologians from the late eleventh century onwards, but in fact occurs frequently in late antique texts. The author of *De ordine creaturarum* asserted that he could not determine which was the best explanation of the firmament, but presented several opinions and invited readers to make their own judgements on the matter. In his *De natura rerum*, Bede's discussion of the heavenly waters resolves the conflict between an interpretation drawn from *De ordine creaturarum* with the opinions of Ambrose and Jerome.⁴⁷ At times earlier authorities could be corrected without being named, or their opinions presented as commonly held, to avoid the embarrassment of having to identify an authority as holding an incorrect opinion: states in his treatise on nature that the Milky Way is commonly and erroneously said to shine because of the sun, though he seems in fact to be referring to a statement in Isidore's *Etymologies* rather than genuinely to popular opinion.⁴⁸

The extent of the reasoning that such resolution of contradictory opinions might involve is visible in the *Reference Bible*, written probably in the first half of the eighth century, perhaps by an Irish (or Irish-influenced) author.⁴⁹ This text examines passages from Scripture and addresses problems by excerpting from authorities such as Jerome, Augustine, Junillus and Isidore.⁵⁰ In treating the statement that God made man 'in his own image' ('ad imaginem'; Gen. 1:26), the author cites passages which lead him to consider the origin of the soul, concluding with his own opinion: 'we do not believe that souls, as Isidore and Ambrose and Augustine say, we do not believe souls are created before the body is created.'⁵¹ He follows this with a quotation attributed to Augustine (though seemingly not from Augustine's works) which seems to contradict this – 'the souls of men play in heaven before they receive their bodies' – but he resolves this with reference to a different time-frame, noting that 'this is not contrary, because he is speaking about the souls of the saints, who are in heaven before they receive their body in the resurrection'.⁵² Abelard's decision to present conflicting opinions as an exercise for students may have been new as a type of text in its own right, but as a method for approaching theology this was long-established and was used frequently by late antique and early medieval authors.

Most importantly, the efforts of late antique authors to uncover knowledge about the created world are visible in the questions that they posed and attempted to answer. Sometimes the answers (and sometimes the questions too) included material excerpted from earlier texts, but this was often not the case. As the world which had produced the ancient scientific knowledge of antiquity slipped further into the past, and as Christianity spread into different geographical areas, successive generations of scholars posed and encountered new questions which had not

⁴⁷ Bede, *De natura rerum*, 8, ed. C.W. Jones, *Beda Venerabilis. Opera didascalica, 1. De orthographia; De arte metrica et de schematibus et tropis; De natura rerum*, CCSL123A (Turnhout: Brepols, 1975).

⁴⁸ Bede, *De natura rerum*, 18, ed. Jones, *Opera didascalica 1*; see also William D. McCready, 'Bede and the Isidorian Legacy', *Mediaeval Studies* 57 (1995): 52.

⁴⁹ Bernhard Bischoff, 'Wendepunkte in der Geschichte der lateinischen Exegese im Frühmittelalter', in *Mittelalterliche Studien* (Stuttgart: Hiersemann, 1966-81, 3 vols): I.88, 97-102; Gerard MacGinty, 'Introduction', in *Pauca problemsmata de enigmatis ex tomis canonicis*, CCCM 173 (Turnhout: Brepols, 2000), x-xi.

⁵⁰ Gerard MacGinty, 'The Pentateuch of the *Reference Bible*: The problem concerning its sources', in *The Scriptures and Early Medieval Ireland*, ed. Thomas O'Loughlin (Turnhout: Brepols, 1999), 163-77.

⁵¹ *Pauca problemsmata*, 151, ll. 5-7: 'Tamen nos credimus animas, ut Isidorus et Ambrosius et Agustinus dicunt, animas non credimus creari antequam corpus creatur' ed. MacGinty, *Pauca problemsmata*.

⁵² *Pauca problemsmata*, 151, ll. 7-10: 'Agustinus dicit: Anime hominum ludunt in caelo antequam caelo recipient; sed tamen non est contrarium, quia de animabus sanctorum dicit, que sunt in caelo antequam corpus in resurrectione suscipiant', ed. MacGinty, *Pauca problemsmata*.

been addressed by previous authorities. The practice of raising and answering questions was a routine and important part of late antique efforts to further knowledge in multiple contexts, and questions were addressed through a range of methodologies, including reasoning. Sometimes questions were posed and answered in the context of treatises or exegesis; sometimes writers shaped their work using the dialogue form, which had a long history in philosophical and scientific works from antiquity which extended into late antiquity and the early Middle Ages before ultimately becoming a key part of the scholastic method.⁵³ Late antique questions and answers about creation are significant because they reveal the ways that contemporary authors investigated the topic, and they also demonstrate the intellectual curiosity and creativity which formed part of a collective and individual effort to advance knowledge and to find out information which was not previously known. Since (as university tutors and students know) it is usually much more difficult to ask interesting questions than to answer them, late antique questions about creation particularly important for understanding how and why contemporary authors approached the topic as they did, and how they perceived their intellectual task.

The purposes and contexts of late antique works affected how precisely questions were posed and addressed. Works written for publication, such as complete commentaries, usually assert interpretations more certainly than works which were not intended for wide circulation. Bede's commentary on Genesis, intended for students and to prepare readers for further study, raises questions throughout. Some are clearly rhetorical, but many of the questions he raises or addresses (even without posing them directly) relate to passages of Scripture which leave something unsaid or unclear. Bede notes in his discussion of Adam's naming of the animals and birds that Scripture says nothing about the fish brought to Adam; he reasons that as different types of fish became known, they received a variety of names in accordance with the variety of peoples.⁵⁴ Elsewhere he raises the question of how humankind was made immortal but still took earthly nourishment like mortal animals.⁵⁵ His answer draws on Augustine to note the difference between the immortality of God's first creation and the immortality of resurrected souls, and he reasons based on evidence from Scripture that souls will ultimately be like angels and so not require corporeal food, which will not exist anyway in the spiritual life. Bede's efforts to find out more certain knowledge about the created world and how it came to be, as well as what this means for future salvation, were intrinsic to his purposes as a scholar.

Interesting questions could prompt whole works, particularly those which were not intended as systematic scriptural commentaries. A particularly good example is the seventh-century *De mirabilibus sacrae scripturae*, long thought to be by Augustine of Hippo, now attributed to 'Augustinus Hibernicus' ('the Irish Augustine').⁵⁶ *De mirabilibus* centres around the question of how to explain scriptural miracles which apparently involved the creation of new matter, and

⁵³ On Christian use of dialogue forms see Ulrich G. Leinsle, *Die Einführung in die scholastische Theologie* (Paderborn: Schöningh, 1995), 9-15; Kate Cooper and Matthew Dal Santo, 'Boethius, Gregory the Great and the Christian 'afterlife' of classical dialogue', in *The End of Dialogue in Antiquity*, ed. Simon Goldhill (Cambridge, Cambridge University Press, 2008), 173-90; Alberto Rigolio, *Christians in conversation: a guide to late antique dialogues in Greek and Syriac* (Oxford: Oxford University Press, 2019).

⁵⁴ Bede, *Libri quattuor in principium Genesis*, I.2, ll. 1749-1765, ed. Jones, *Opera exegetica*.

⁵⁵ Bede, *Libri quattuor in principium Genesis*, I.1, ll. 907-909, ed. Jones, *Opera exegetica*.

⁵⁶ See MacGinty, 'The treatise *De mirabilibus sacrae Scripturae*'; Gerard MacGinty, 'The Irish Augustine: *De mirabilibus Sacrae Scripturae*', in *Ireland and Christendom: The Bible and the Missions*, ed. Próinséas Ní Chatháin and Michael Richter (Stuttgart: Klett-Cotta, 1987), 70-83.

aims to show that it is always possible to demonstrate that God did not create anything new after the first six days of creation. The author argues instead that even when something seemingly required the creation of new matter, in fact God simply ordered in a particular way the universe which he created in the first six days.⁵⁷ Augustinus Hibernicus was clearly conscious that his work was different from previous writings, even though he relies at times on earlier interpretations: throughout the work his aim is to relate the visible world of his 'now' to the historic creation of the universe and to reason through the implications of the text of Scripture.⁵⁸ Like other writers, Augustinus Hibernicus clearly saw himself engaging individually and collectively in an attempt to further knowledge and to clarify the unknown: the answers and interpretations given in response to his scrutiny of the Bible, as well as the questions he raised, show the effort put into explaining the created world with critical reasoning based on evidence.

Works intended for circulation were, at least in some sense, intended to be authoritative in themselves, and their authors may therefore have been sensitive to the possibility of accusations of impropriety. Relatively few surviving texts offer insight into the informal exposition of Scripture in the context of classroom teaching, but those that do offer an important insight into how contemporary scholars undertook exegesis.⁵⁹ The scriptural commentaries connected with the late seventh-century Canterbury school, where the teachers were Archbishop Theodore (from Tarsus) and Abbot Hadrian (from North Africa), seem to have originated as student notes.⁶⁰ The interpretations show clear knowledge of patristic works and include references to earlier authorities, particularly those of the Greek tradition such as Basil of Caesarea and John Chrysostom, but their words do not dominate: unlike commentaries intended for written circulation, these notes do not include substantial extracts from earlier writers, and instead present something close to *ex tempore* discussion. Instead they show a combination of the citation of authorities, reasoning and observation, and offer both figurative and literal interpretations; sometimes they include scientific knowledge or observation, or grammatical and linguistic comments. These texts offer an important and rare glimpse into the process by which students learned to explore Scripture and to interpret its words.

Throughout the commentary on Genesis, the question of whether there was rain before the Flood appears. It is unclear whether this was particularly interesting to the student note-taker or to Theodore or Hadrian, but the question arose because after the statement that 'God had not yet rained upon the earth' (Gen. 2:5), there is no mention of rain until the description of the Flood. In explanation, the commentary first mentions scientific knowledge, stating that without the sun there could be no rain, and concludes by noting that 'Scripture does not say whether

⁵⁷ *De mirabilibus sacrae scripturae*, i, ed. Gerard MacGinty, 'The treatise *De mirabilibus sacrae Scripturae*', 6-10.

⁵⁸ *De mirabilibus sacrae scripturae*, prologue, ed. Gerard MacGinty, 'The treatise *De mirabilibus sacrae Scripturae*', 1-4.

⁵⁹ A much later example is some of the commentaries included in the *Glossa Ordinaria* which may be derived from the teaching of Anselm of Laon (d. 1117): see Beryl Smalley, *The Study of the Bible in the Middle Ages* (Oxford: Blackwell, 1983, 3rd ed.), 49-51; Lesley Smith, *The "Glossa Ordinaria": The Making of a Medieval Bible Commentary* (Brill: Leiden, 2009), 17-38; Michael Clanchy and Lesley Smith, 'Abelard's description of the school of Laon: what might it tell us about early scholastic teaching?', *Nottingham Medieval Studies* 54 (2010): 14; Alexander Andr e, 'Anselm of Laon unveiled: the Glosae super Iohannem and the origins of the Glossa Ordinaria on the Bible', *Mediaeval Studies* 73: 217-60.

⁶⁰ Bernhard Bischoff and Michael Lapidge, *Biblical commentaries from the Canterbury School of Theodore and Hadrian* (Cambridge: Cambridge University Press, 1994), 1-5, 243-74.

there was rain before the Flood or not'.⁶¹ In the interpretation of Gen 5:29, 'on the earth which God has cursed', the text discusses the earth's barrenness, noting again that Scripture reveals little about rain before the Flood, but it also observes that rain is certainly attested after the Flood in the announcement of the rainbow.⁶² Commenting on the rainbow in Gen 9:14, the text states that 'the rainbow signifies the mercy of rain, which previously was sparse if there was any at all'; where Noah is described tilling the earth and planting a vineyard (Gen. 9:20), the same information reappears.⁶³ It is tempting to assume that this issue particularly bothered two scholars from hot, arid climates working in the damp atmosphere of south-east England but, whatever prompted this interest, someone evidently devoted considerable thought to it. These statements are scattered through the commentary rather than brought together because of the text's form and context of production, but they show how interpreters of Scripture might focus in on particular issues and offer an insight into the process of learning and thinking which could precede the composition of a more formal commentary. Additionally, they demonstrate the role that discussion and 'live' interpretation played in transmitting information and advancing knowledge.

The process of reasoning is often difficult to see but some texts – particularly those which are less formal – offer insight here. The commentary on Genesis in Munich, clm 6302, probably written in the late seventh or early eighth century in an Irish milieu, includes an extended discussion of the appearance of the rainbow.⁶⁴ Like 'Augustinus Hibernicus', this author was concerned by the possibility of creation occurring outwith the first six days. He notes that: 'It should be considered if there was a (rain)bow in the sky before the Flood. On the one hand, if it was there, how is it called "a sign", when it was there before? But on the other hand, if it was not there before the Flood, and it was a new thing, that is difficult, because it says "The Lord rested from all his works", and [the rainbow] not only was not there in the first week, but it was not before the Flood.'⁶⁵ This section draws on no known source, and shows the author reasoning through the problem occasioned by apparently contradictory evidence. He attempted to address the problem both through reasoning and through contemporary scientific knowledge, stating his argument first: the rainbow 'did not exist before and is not a new thing: they did not exist not much previously before the Flood, but afterwards they existed in abundance'.⁶⁶ This leads him to discuss the formation of the rainbow, and he explains that 'with wind driving water from the earth into clouds, when rain threatens, if the sun begins to shine over the earth and a cloud repels [it], the outer part of the sun which is not repelled ...' – at which point there is a lacuna in

⁶¹ *First Commentary on the Pentateuch*, 33, ed. Bischoff and Lapidge, *Biblical commentaries*, 308: 'Non dicit scriptura pluuiam ante diluuium si esset an non?'

⁶² *First Commentary on the Pentateuch*, 65, ed. Bischoff and Lapidge, *Biblical commentaries*, 316. Unusually, this section also suggests that the rainbow is a sign that rain will come, a point which is not raised in the editors' commentary to the text.

⁶³ *First Commentary on the Pentateuch*, 83-4, ed. Bischoff and Lapidge, *Biblical commentaries*, 318-20.

⁶⁴ For the date, see Michael Gorman, 'A Critique of Bischoff's Theory of Irish Exegesis', 206-7; on the Irish milieu of the commentary Charles D. Wright, 'Bischoff's Theory of Irish Exegesis and the Genesis Commentary in Munich clm 6302: A Critique of a Critique', *Journal of Medieval Latin* 10 (2000): 145-73.

⁶⁵ Munich, clm 6302, f. 58v: 'interrogandum est si arcus in caelo ante diluuium fuit. Si autem fuit quomodo dicitur signum dum primus fuit. Si autem non fuit ante diluuium res noua quod deficile est. Quia dicitur requieuit dominus ab omnibus operibus suis et non solum non fuit in prima ebdomata sed ante diluuium non fuit'. An edition of the text is printed in Gorman, 'A Critique', 212-33, but unfortunately this contains numerous errors and problems.

⁶⁶ Munich, clm 6302, f. 58v: 'Respondimus non fuit prius et non res noua ideo quia nuper non multe fuerunt ante diluuium sed postea habundabant'.

the text.⁶⁷ It looks like the author was trying to explain the relationship between the watery clouds and the sun, and that the shape of the rainbow is formed by the outer part of the (round) sun in relation to the clouds. This is similar in some ways to explanations of the rainbow in earlier works, such as Isidore's *De natura rerum*,⁶⁸ but the author has framed it in a way which is entirely his own, and it is likely that this part of the commentary is the author's own original explanation, since there is no obvious source. Although he draws on established learning, for example in stating that the rainbow only occurs before sun, and in the allegorical explanation of the rainbow's colours, he does not simply repeat earlier scholars in attempting to explain the appearance of the rainbow. This is particularly striking since substantial chunks of the commentary are excerpted from the works of earlier scholars. His resolution of the problem is reminiscent of 'Augustinus Hibernicus' (who neither comments on the sudden appearance of the rainbow nor questions whether it was a new creation), since he concludes ultimately that 'the rainbow does not appear except before rain; it is for this reason that it is said that there was no rainbow before the Flood, and it is not a new thing and not created: the sun and the rains were separate in the works of the six days': his reasoning seems to be that the rainbow must have existed *in potentia* but the appropriate conditions for creating a rainbow simply did not occur before the Flood, since sun and rain did not appear together.⁶⁹ This explanation resolves a problem of apparent contradiction within Scripture but also created knowledge which was then available for future readers to accept or improve it as they saw fit. This passage is significant because it shows how an author perceived a problem and attempted to address it to advance knowledge and to reconcile contradictory evidence; he may not have tried to be innovative, even if his answer was original, but evidently he did care to explain what was unknown or uncertain, and to reason through the questions which occurred to him in his reading of Scripture.

Alongside reasoning, late antique authors wove observations into discussions of the created world as one of multiple types of evidence.⁷⁰ Late antique authors were certainly capable of making detailed and accurate observations of natural phenomena. The observations of the stars in a text known now as *De cursu stellarum* were precise enough, for example, that it is possible to identify that they were made in northern Gaul near the end of the sixth century, and so have enabled the identification of the author of the treatise as Gregory of Tours, even though the text is ascribed to him in only one of the eight surviving manuscripts.⁷¹ An anonymous Genesis commentary preserved uniquely in St Gallen, Stiftsbibliothek, MS 908, includes observation as one of multiple types of evidence used in the explanation of the day on which the discs, or

⁶⁷ Munich, clm 6302, f. 58v-59r: 'Vento cogente aquam de terra in nubes. cum autem inminet pluuia. super terram si sol luciserit. et nubes defenderit; / medium eius extrema pars solis quae non defenditur. [...]'. Gorman has not apparently noticed the lacuna.

⁶⁸ Isidore, *De natura rerum*, 31, ed. Fontaine, *Traité*.

⁶⁹ Munich, clm 6302, 59r: 'Arcus non ostenditur nisi ante pluuia; Ideo autem dicitur arcus ante diluuium non fuit et non res noua et non creatura. Seorsum sol et pluuia in operibus sex dierum fuerunt'. A vague reference to this idea but without the full explanation is found also in *De mirabilibus sacrae scripturae*, vi, ed. MacGinty, 'The treatise De mirabilibus Sacrae Scripturae', 23-8.

⁷⁰ Again, this is sometimes suggested to be a feature which appears (or reappears from classical writings) in the context of scholastic learning: see for example Katharine Park, 'Observation in the Margins, 500-1500', in *Histories of Scientific Observation*, ed. Lorraine Daston and Elizabeth Lunbeck (Chicago: University of Chicago Press, 2011), 15-44.

⁷¹ Edward James, 'A sense of wonder: Gregory of Tours, Medicine and Science', in *The Culture of Christendom. Essays in Medieval History in Commemoration of Denis L. T. Bethell*, ed. Marc A. Meyer (London: Bloomsbury, 1993), 47; Stephen C. McCluskey, 'Gregory of Tours, Monastic Time-Keeping, and Early Christian Attitudes to Astronomy', *Isis* 81:1 (1990): 18.

wheels ('rotae') of the sun, moon and stars were made. The manuscript was written probably in northern Italy, perhaps in the late eighth century, but it seems likely that the commentary on the first three chapters of Genesis was composed in an earlier eighth-century Insular milieu.⁷² The discussion of the discs of the sun, moon and stars is puzzling from a modern scientific perspective, because the author distinguishes between the discs of the heavenly bodies, and the heavenly bodies themselves. He explains that for the sun and stars the light comes from their discs, but that the moon is lit up by the sun and, as a result, he states the question of which day saw the creation of the sun, moon and stars has a two-part answer. He notes that some scholars suggest that the discs were created on the second day with the firmament and left ready for the creation of the heavenly bodies themselves to be inserted into them on the fourth day, at which point they were illuminated. He likens this to when goldsmiths leave spaces for gems in their works, and then put the gems themselves in only afterwards when they are ready. However, he critiques this explanation by observing that this cannot be correct since, if the sun and moon were fixed, the day and night would always be of equal length: he notes that 'because we see unequal days and nights, and the sun and moon do their setting and rising variably, we do not believe that they are fixed in heaven'.⁷³ This may be at least partly drawn from other texts, such as Isidore's *De natura rerum* which also (following Hyginus) comments on the unequal lengths of days; much of the evidence used to discuss the heavenly bodies and to reason through the questions can be found in some form in earlier scientific and other works.⁷⁴ Nonetheless, the author has made this discussion his own and it is difficult to read the passage as one where the information comes *only* from earlier sources: that is, the author surely observed the unequal lengths of days and nights, and the rising and setting of the sun and moon, even if he also found this information confirmed by book-learning.

Differences in climate and environment between northern Europe and the Mediterranean are important in making visible other instances of observation relating to local environmental information. When 'Augustinus Hibernicus' considered what happened at the Flood to animals which lived both in the water and on land, he mentioned otters and seals, commenting – most probably from his own experiential knowledge – that they find food in the waters, but breed and

⁷² Charles D. Wright, 'Apocryphal Lore and Insular Tradition in St Gall, Stiftsbibliothek MS 908', in *Ireland and Christendom: The Bible and the Missions*, ed. Próinséas Ní Chatháin and Michael Richter (Stuttgart: Klett-Cotta, 1987): 124-45.

⁷³ St Gallen 908, 18-20: 'Diximus quod de aqua fecit deus rotam solis et lune et stillarum. unde sol lumen acciperit et luna. contentio est alii dicunt ex claritate diuinitatis. alii de splendore angelorum et non est conueniens. non enim legimus deum. nisi in ade specie spiritum inflasse. nec legimus angelos habere consortium cum alia creatura nisi [19] cum anima. Inde aptius credimus solem et stillas igne rote caelestis inluminatos. luna uero a sole inluminari sanctissimi christiani fideliter confirmant in figuram ecclesie a christo inluminata. Sed quali die creatae sunt rote solis et lune et siderum bipertitae est. Hic intellegentia sapientium. quidam autem adfirmant quod secunda feria cum firmamento simul create fuissent. Fixas rota[s] solis et lune et stillarum. quomodo aurifices locum gemmarum praeeparant In operibus suis et postea quando uolunt in locis preparatis mittunt gemmas sic et deus ut ipsi dicunt rotas cum firmamento naturaliter fixas et preparatas in secunda feria. quando uero dixit in quarta feria fiant luminaria inluminari tantum tunc rotas fecit. Sed hoc ex parte possibile est et ex parte non. Nam si ita esset ut essent fixas consequens essent dies et noctes omnes semper aequales esse. Necesse enim esset ut sol semper in eodem loco occidere et in unum locum semper omni tempore orire. Sed quia inaequales aspicimus dies et noctes et diuersos ortus et occasus faciunt. sol et luna fixas esse in caelo non credimus. quanta de stillis credimus possibile esse nec hoc de omnibus stillis fatemur stille enim septem. [20] quae greci planete latinae uero erraticae nominantur hieronimus dicit non quod ipse errant sed quod nos errare faciunt iste septem stille sua natura negat fixas esse in caelo. hoc autem aptius credimus esse rotas istas non fixas sed liberas cursus suos per se domino obediendo perficiunt ut dicit salomon girans girando. perguit spiritus et in circulos suos regreditur.'

⁷⁴ Isidore, *De natura rerum*, 17, ed. Fontaine, *Truité*.

sleep on land.⁷⁵ He probably also drew on his own observations to assert that rainbows can sometimes be seen in the brightness of the moon: the lunar rainbow is not well attested in earlier scientific writings, but where it is mentioned its existence is often denied, for example by both Pliny and Ambrose.⁷⁶ Since monks were often awake during the night for prayers, moving between the dormitory and the church, it is quite possible, as Marina Smyth notes, that ‘Augustinus Hibernicus’ saw the lunar rainbow and used this observation to refute earlier scholars.⁷⁷ Perhaps most famously, Bede’s works relatively often contain his own observations and, interestingly, he also includes thought-experiments which relate the visible to the theoretical. Like the author of the St Gallen 908 commentary, Bede discusses the inequality of the days, but he also makes specific reference to his situation – ‘we who are placed in the north’ – explaining that northern regions see much less daylight in the winter than the southern regions do, and vice versa in the summer.⁷⁸ He notes too that not only in Britain but also in Italy it is not possible to see the brightest star, Canopus, explaining that this is not because the light of the stars is withdrawn by fading gradually, but because the mass of the earth is in the way and prevents it being visible: he says that ‘all these things can be proved easily by any especially large mountain surrounded by settlements’.⁷⁹ His most famous thought experiment relates to the question of why the moon sometimes appears to be above the sun, even though it is actually beneath it. In order to give an example of how view-point affects the way that objects in different places are perceived, he invites his reader to imagine that:

at night-time, you go into a very large hall, or better, a church, immense in its length, breadth and height, and ablaze with countless lamps burning in honour of a martyr’s feast-day. Amongst these are two very large lamps of marvellous workmanship, hanging by chains from the ceiling, but the one which is nearer to you when you enter is also closer to the floor. However the hall is so vast, and the height of these distant lamps so great, that with your night vision you can make out the light and rays of flame more than you can the vessel itself which contains the fire. Now indeed, as you start to advance towards the lamps, looking straight at them, and beyond them towards the ceiling or opposite walls, the lamp which is nearer appears higher to you. The closer you approach, the higher up will be the one which is lower appear to you, until, by a more evident truth, you see where they are all positioned. So likewise we, situated beneath the two great luminaries of heaven, see them both at the meridian in such a way that the one which is lower, in rising further and further to the north, seems ever higher and higher, and as we train our eyes upon them and through them to the heavens, the one which, by obvious reason, is patently riding lower down appears to be higher than the other.⁸⁰

Bede’s explanation suggests that he had made detailed observations of the heavenly bodies, and that he had thought long and hard about how these moved and existed within the ordered universe. But even though Bede is remarkable in many ways, and his scientific acumen and

⁷⁵ *De mirabilibus sacrae scripturae*, v, ed. MacGinty, ‘The treatise *De mirabilibus sacrae Scripturae*’, 22-3.

⁷⁶ *De mirabilibus sacrae scripturae*, vi, ed. MacGinty, ‘The treatise *De mirabilibus sacrae Scripturae*’, 27; Marina Smyth, *Understanding the Universe in Seventh-Century Ireland* (Woodbridge: Boydell, 1996), 204.

⁷⁷ Smyth, *Understanding the Universe*, 206-7.

⁷⁸ Bede, *De temporum ratione*, 32, ed. Jones, *Opera didascalica 2*: ‘nos qui ad septentrionem positi’.

⁷⁹ Bede, *De temporum ratione*, 32, ed. Jones, *Opera didascalica 2*: ‘Quae cuncta de monte quolibet pergrandi undique circum habitato ualent facillime probari.’

⁸⁰ Bede, *De temporum ratione*, 28, ed. Jones, *Opera didascalica 2*; trans. Wallis, *Bede. The Reckoning of Time*, 78.

perceptive comments bear witness to his extraordinary learning and intelligence, it is also clear that he was not the only late antique writer to make and record observations and to bring observational evidence into his interpretation of the created world. Most importantly of all, it is clear that Bede was not alone in his attempt to further knowledge of the natural world, but that he saw himself as part of a scholarly community engaged in the task of continually considering anew how they understood God's creation, and pushing at the boundaries of knowledge.

Conclusion

Many of the questions posed in late antique theological and scientific texts can look arcane to modern readers, and this is partly why it is essential that these writings are not judged primarily in terms of innovation or derivativeness, or in relation to a narrative of progress which presents a straightforward linear development from the ancient world to the present day. For late antique Christian writers, investigation of God's created world was focused on understanding the rationality of God's intentions and how these related to his (soteriological and other) purposes for humankind. This makes sense in a world where much was unknown and where the intellectual context required that learning was often directed towards growing closer to God. Questions might therefore focus on the details of why certain things happened as they did, according to the Scriptures. For example, in his questions relating to the Flood, 'Augustinus Hibernicus' asks why land animals rather than water animals were wiped out when their sins were no more numerous; why God did not curse the waters when he cursed Adam and the earth after the Fall; and (as already noted) what happened to animals which live both in the water and on the land.⁸¹ The anonymous author of the Genesis commentary in St Gallen 908 asked why waters were placed above the firmament where there was no human need for them, such as drinking or washing; the question about rain before the Flood which was raised repeatedly in seventh-century Canterbury appears also – surely independently – in *De mirabilibus sacrae scripturae*.⁸² Several scholars considered how Moses, traditionally held to be the author of the Pentateuch, knew of the events described in Genesis, but the answers were variable. The *Commemoratio Geneseos*, a seventh- or eighth-century commentary on Genesis (up to 9:7) whose two surviving manuscripts were both copied in northern Italy, notes simply that 'it is asked how Moses knew all this', and answers that this was 'certainly through the Holy Spirit by which the three types of prophecy are generated', thus drawing on a stock of patristic learning.⁸³ The author of the Genesis commentary in Munich, clm 6302, asks more specifically, 'how did Moses know what happened before writing?', thus highlighting the importance of written texts in establishing knowledge of former times.⁸⁴ His answer also asserts spiritual revelation but in a way which differs from standard treatments of the subject: he suggests that the knowledge came from 'the spirit about which it is said, "and the spirit of God came upon the waters"', thus implying that Moses received the direct witness of the spirit.⁸⁵ The examples considered here and above show

⁸¹ *De mirabilibus sacrae scripturae*, iv, v, ed. MacGinty, 'The treatise De mirabilibus sacrae Scripturae', 19-23.

⁸² St Gallen, 908, 16: 'pro quali utilitate posuit deus aquas supra firmamentum. ubi non est humanus usus nec ad bibendum neque ad lauandum'; *De mirabilibus sacrae scripturae*, vi, ed. MacGinty, 'The treatise De mirabilibus sacrae Scripturae', 23-8.

⁸³ The text is found in two manuscripts probably written in Verona: Paris, Bibliothèque nationale de France, lat. 10457, ff. 2r-159 (dated c. 800) and Verona, Biblioteca capitolare, XXVII, ff. 99r-138v (s. ix²). Paris, lat. 10457, f. 3r: 'Sed queritur unde moyses hoc nouerit. certe per spiritum sanctum a quo trea prophetiae genera fiunt'. For the three types of prophecy see for example Augustine, *De civitate dei*, 17.3.

⁸⁴ Munich, clm 6302, f. 49r: 'unde scit Moysin quod factum est ante littera[m]'.
⁸⁵ Munich, clm 6302, f. 49r: 'id [est] spiritum de quo dictum est et spiritus dei superferebatur super aquas'.

intellectual curiosity and a sense of wonder at the created world: late antique authors posed questions and tried to address them to find out what was not known, to refine how the created world was understood, and to consider the nature of contemporary knowledge about creation and how this knowledge was established.

Late antique scholars themselves were also aware of the limitations of their knowledge and recognized that many questions had uncertain answers, or could not be answered effectively. They negotiated the tension between authority and the advancement of knowledge in multiple ways, acknowledging the existence of previous opinions and deferring to past authorities at times, but this did not mean that they did not question received opinions, or the workings of the created universe in which they lived. Authors like Augustine sought to apply the perceived rationality of the created world which they inherited from antiquity to God himself and to his nature, and also to his creation. Investigations of the created world utilised recognised and established approaches which were rational and evidence-based, even if the parameters of those investigations and the premises on which the discussion was based are not those of modern, or even ancient or later medieval, thinking. Ultimately modern scholars must find ways to reconcile late antique authors' assertions of reliance on authority with their demonstrable intention to find new information about creation, and these must make sense in relation to late antique writers' aims and purposes. It is clear that late antique scholars writing about creation aimed neither to be innovative and so to contradict authority, nor to be derivative and simply repeat established opinions, since the purpose of writing new works was to fulfil the perceived needs of their own times and circumstances, and to ascertain the most accurate information available to them about the created world. Viewing their works as either derivative or innovative, with the implicit value judgements that these terms entail, is hugely unhelpful: for one thing, in simple terms, most of these works are both, in that they sometimes borrow directly from earlier scholars and sometimes present new ideas and interpretations. Instead it is much more important to recognise the ways in which Christian scholars, even working as individuals, were drawn into a collective attempt to uncover the mysteries of the created world, in which scholars past, present and future were linked by their desire to uncover the unknown. Despite their professed reliance on authority, late antique scholars certainly did create knowledge, but more significant for those authors themselves was that in their attention to exploring the natural world they as individuals, and the intellectual community of Christians collectively, might ultimately come to know creation and, through it, God himself.