University of
St Andrews

St Andrews Encyclopaedia of Theology

Biblical Criticism and Modern Science

Mark Harris

First published: 14 March 2024

https://www.saet.ac.uk/Christianity/BiblicalCriticismandModernScience

Citation

Harris, Mark. 2024. 'Biblical Criticism and Modern Science', *St Andrews Encyclopaedia of Theology*. Edited by Brendan N. Wolfe et al. https://www.saet.ac.uk/Christianity/BiblicalCriticismandModernScience Accessed: 3 October 2024

Copyright information

ISSN 2753-3492

Biblical Criticism and Modern Science

Mark Harris

It is no accident that the birth and growth of the modern sciences took place in tandem with the birth and growth of modern biblical criticism within the context of (largely European and North American) Christian societies from the sixteenth to the twentieth centuries. Both kinds of enterprise – science and biblical criticism – were made possible by (and contributed to) the changes in attitude towards religious authority and Christian theological tradition that flowed from the European Reformations and Enlightenment into what we characterize today as modernity. Each enterprise has developed its own specialized and distinctive methods for 'reading' its core subject matter (whether the natural world or ancient scriptural texts), but it is common to find these methods conflated when it comes to biblical texts which tell of the natural world. For instance, the creation story of Genesis 1 is frequently read at a popular level in light of Big Bang theory (and vice versa), while many creationists rely upon the Genesis texts to inform their own 'creation science', thus diverging from mainstream scientific views on the age of the earth and the status of evolution. Critical biblical scholars, for their part, have resisted naïve identifications between biblical narratives and scientific theories, pointing out that ancient texts require sensitive and historically-minded handling. This article explores ways in which the core biblical texts of creation and miracle have been understood and interpreted by fundamentalists, scientists, and critical biblical scholars in modern times.

Keywords: Hermeneutics, Biblical criticism, Scientific interpretation, Naturalistic interpretation, Creation, Miracles, Resurrection, Divine judgment

Table of contents

1 Introduction

It is widely assumed in modern secular society that science and religion are entirely incompatible, if not in open warfare with each other. The infamous creation-evolution debate on the Genesis creation stories is emblematic of this 'conflict thesis'. While one extreme sees the Genesis texts as primitive and mythological – evidence that Judeo-Christian doctrines have been superseded by modern evolutionary science – the other insists that the texts form the basis of an entire 'creationist' worldview, which should be served by a faithful 'creation science'. But there are many other ways of understanding these texts – just as there are many other ways of understanding the relationship between science and religion – most of which see a more subtle relationship between the Bible and modern science than one of outright conflict. In fact, some approaches make positive use of the mainstream sciences to explore and interpret biblical texts, perhaps even using scientific thought as an apologetic tool to promote the text's theological legitimacy. Quite simply, there is a rich variety of interaction between the sciences and biblical study in modern times, a variety which the conflict thesis does little to illuminate. Equally, the emergence of these areas (the sciences and biblical scholarship) as academic disciplines in their own right has been marked by a complex history of interaction.

1.1 The genesis of modern science and the evolution of biblical criticism

Historical study indicates that the sciences developed in close tandem with modern biblical criticism, to the extent that both kinds of discipline owe a great deal to each other. A well-known argument by Harrison (1998) makes precisely this point, that the 'Scientific Revolution' of the seventeenth century was made possible by the Protestant Reformation of the previous century, which in turn was made possible by crucial changes in the dominant biblical hermeneutic. The 'two books' metaphor of medieval Christianity – where God is said to be revealed both in 'the book of God's words' (the Bible) and in 'the book of God's works' (nature) – is important here, since the pre-Reformation Church's fondness for applying symbolic and allegorical interpretations of scripture was also carried over to the natural world, which was seen as a source of signs pointing to a deeper, spiritual reality. Hence, when the Reformers instead insisted upon the *plain* sense of scripture, and simultaneously opened-up the (Latin) Bible to ordinary believers in their own vernacular, views of the cosmos became similarly transformed into a literal physical reality which could be interpreted in its own terms. All this is not to say that there was no empirical study of the natural world before the Reformation, but the Reformation's hermeneutical and theological shift of emphasis allowed for new modes of study of both the Bible and the natural world to emerge, modes which eventually became the contemporary academic disciplines of the natural sciences and biblical studies.

In the meantime, it was centuries before there was a clear and irrevocable parting of the ways between the sciences and theological scholarship (roughly second half of the nineteenth century). In the intervening years it was commonplace for scientific innovations to be given theological glosses. The development of 'physico-theology' is one of the clearest examples of this period, where mathematical and physical principles were applied to the understanding of natural causes which were simultaneously identified with divine causes, to the extent that there was no clear distinction between physics and providence. Isaac Newton's (1642–1727) law of universal gravitation, for one, represents an important scientific leap forward which Newton and his supporters justified to its detractors on theological grounds. Newton's voluminous work on biblical interpretation shows that he by no means accepted that his professional expertise should be limited to natural philosophy alone. Indeed, some of Newton's followers such as Samuel Clarke (1675–1729) and William Whiston (1667–1752) were notable in using the new scientific wisdom to explore and support biblical stories. Whiston, for example, suggested that Noah's flood had been precipitated by Halley's comet passing very close to the Earth thousands of years earlier, while Clarke argued that biblical miracles are plausible (if unusual) natural events, thus lending credibility to the historical authenticity of the Bible. Some modern scientific studies of both the flood and biblical miracles take much the same approach, as shall be seen in section 3 and 4.

While such synthetic work was important in providing religious (and therefore cultural) justification for the burgeoning sciences of early modern times, the methodologies of biblical criticism as they are known today owe at least as much to the European Enlightenment of the eighteenth century, and especially to the philosophical developments of thinkers such as René Descartes, Benedict Spinoza, David Hume, and Immanuel Kant. The Enlightenment emphasis on the search for objectivity by the application of critical rationality led to the distinctive 'historical-critical method' of biblical study, aimed at determining the authentic scope and meaning of the biblical texts without (in principle) being unduly influenced by modern theological agendas, nor by the traditional concerns of church authorities.

1.2 Hermeneutics, criticism, and naturalism

The term 'hermeneutics' is commonly used to capture the philosophical, ideological, or theological decisions (principles) that one might bring to the reading of a text, while 'criticism' is the act of applying those decisions to the text in order to establish its meaning in their light. These key terms were linked inextricably by Friedrich Schleiermacher (1768–1834) in the early development of modern biblical scholarship, but his view is more subtle than common usage might suggest:

> Hermeneutics and criticism […] belong together, because the practice of one presupposes the other. The former is generally the art of understanding particularly the written discourse of another person correctly, the latter the art of judging correctly and establishing the authenticity of texts and parts of texts from adequate experience and data. Because criticism can only recognize the weight to be attached to evidence in its relationship to the piece of writing or the part of the text in question after an appropriate correct understanding of the latter, the practice of criticism presupposes hermeneutics […] the practice of hermeneutics presupposes criticism. (Schleiermacher 1998: 3–4)

Hermeneutics is 'the art of understanding', Schleiermacher tells us, but it can only proceed in tandem with criticism, which in turn can only proceed with a developing and progressive hermeneutics. Hermeneutics presupposes the criticism that is to be performed, and vice versa; the two are not so neatly distinguishable (in spite of common usage), but are interdependent. Thus, the well-known idea of the 'hermeneutical circle' arises: the act of understanding and judging a text is a circular and self-referential movement, which is continually provisional even if one may hope that it is also progressive.

Nevertheless, the fact remains that external considerations are brought to the text, which is why Schleiermacher speaks of understanding the author's meaning 'correctly', and of judging 'correctly' the authenticity of the text. Schleiermacher apparently has in mind a particular kind of hermeneutics, what is usually termed the 'historical-critical method' of biblical interpretation. There, the aim is to understand what the original authors meant to say to their times and places. The critic hopes to reconstruct and explain ('correctly') the original authors' genuine meaning by a combination of reading and re-reading in light of 'adequate experience and data'. Schleiermacher includes in this exercise considerations about the functions and constraints of human language: that all human communication is geographically and historically bounded, and must be understood in light of the author's whole life and influence and of our own changing context. Moreover, there is a psychological aspect to reading, both in terms of how the author conceived meaning in their own context and of how we come to understand the author's mind. All of this is determined provisionally by the reader, open to revision and refinement in a progressively circular nature.

Schleiermacher's hermeneutics has had an incalculable influence on theology, on biblical criticism, and on the philosophy of interpretation, to such an extent that he is still widely cited today (see Mambrol 2017 for a more detailed analysis). However, while Schleiermacher's thought was decisive in laying down the philosophical/hermeneutical principles of criticism, many other scholars of the eighteenth through the twentieth centuries were significant in defining the special aspirations and limitations of the historical-critical method for study of the Bible (see Morgan and Barton 1988 for a helpful overview). A key area of debate concerned the relationship between the eternal doctrinal truths taught by the church and the shifting historical contingencies unearthed

by biblical criticism. To what extent was the biblical critic constrained by prior theological commitments, or could she be free to go where the (historically-bound) evidence of the biblical texts led? And what exactly was the nature of the evidence, given that the texts had been assembled by ancient authors to serve theological commitments of their own? In answering these questions, an inescapable degree of naturalism began to emerge in the aims and scope of biblical criticism, that is, a conviction that the biblical texts should first be examined as human products in human history before traditional theological claims of divine revelation were admitted. Among key figures such as H. S. Reimarus (1694–1768), F. C. Baur (1792–1860), David Strauss (1809–1874), Wilhelm Wrede (1859–1906) and Albert Schweitzer (1875–1965) – all of whom made sizeable contributions to this debate – three names stand out for bringing the implicit naturalism of the historical method into the open: Gotthold Lessing (1729–1781), Ernst Troeltsch (1865–1923), and Rudolf Bultmann (1884–1976).

Lessing has come to be seen as especially incisive in the way that he articulated the divergence between theology and history, a divergence that has come to be known as ‘Lessing’s ditch’ (Lessing 2005: 84–87). Lessing pointed out that, insofar as the Christian revelation is dependent upon fulfilled prophecy and reports of miracles, it is open to historical enquiry which, by definition, must be able to raise questions and doubts about those reports. ‘[The biblical] proof of the spirit and of power no longer has either spirit or power’, he pointed out, ‘but has sunk to the level of human testimonies of spirit and of power […] because reports of miracles are not miracles’ (Lessing 2005: 84–87). Lessing’s widely quoted conclusion is apt: ‘contingent truths of history can never become the proof of necessary truths of reason’; the two are separated by a ‘broad and ugly ditch’ which Lessing could not cross, no matter how earnestly he tried to make the leap. In short, Lessing argued that faith can never rely on a historical record alone for its grounding, even if it is the normative historical record of the Bible.

Troeltsch sharpened the dilemma between faith and history further, identifying three principles to historical enquiry: criticism, analogy, and correlation (Dawes 1999: 28). In the first, criticism, the scholar acknowledges that every claim made in a text from the historical past must be subjected to a critical judgement. Since nothing in historical enquiry can be taken for granted, all conclusions drawn from a text are probabilistic in nature. In the second, the historical critic realizes that she reconstructs the past by drawing upon analogy with her own experience; the historian can identify with the biblical author only because of presumed similarities between past and present existence. In the third, every event is seen as correlated with other events, such that no event can be treated in isolation but must be taken carefully in context. As a consequence of these three principles, historical enquiry embraces and interrelates all ‘activities of the human spirit’, Troeltsch tells us (Dawes 1999: 34); nothing escapes its penetrating eye. Troeltsch sums

this point up with a memorable quotation which makes a parallel with the natural sciences and their troublesome relation to theology:

> Give the historical method an inch and it will take a mile. From a strictly orthodox standpoint, therefore, it seems to bear a certain similarity to the devil. Like the modern natural sciences, it represents a complete revolution in our patterns of thought vis-à-vis antiquity and the Middle Ages. As these sciences imply a new attitude toward nature, so history implies a new attitude toward the human spirit and its productions in the realm of ideas. (Dawes 1999: 35)

Like the natural sciences then, historical-critical enquiry of the Bible does not serve traditional theology; it revolutionizes our attitude to reality, whether we are thinking of nature, human history, or the human spirit. Together with the sciences, historical enquiry draws everything into the sphere of a naturalistic worldview.

A further significant move that reveals the implicit naturalism of biblical criticism was made by Bultmann, especially in his 'demythologization' programme. In the face of scientific advances which could not possibly have been anticipated by ancient minds, Bultmann asserted, modern people can no longer accept the Christian gospel message cloaked in outdated myths of gods and demons; the message must be 'demythologized':

> It is impossible to use electric light and the wireless and to avail ourselves of modern medical and surgical discoveries, and at the same time to believe in the New Testament world of spirits and miracles. We may think we can manage it in our own lives, but to expect others to do so is to make the Christian faith unintelligible and unacceptable to the modern world. (Bultmann 1961: 5)

The mention of 'electric light and wireless' may sound quaintly outdated to contemporary readers, but Bultmann's point is that the full force of Christ's *kerygma* (message) cannot be felt by the modern human when that *kerygma* comes packaged in a worldview that is ancient (or 'obsolete'; Bultmann 1961: 3). Hence, according to Bultmann (1961: 16), biblical criticism must operate existentially, interpreting and exposing the mythology of the New Testament so that the modern human can apprehend the impact of the *kerygma* upon her own faith in her own time. In this it is modern science which demonstrates above all for Bultmann that such a process of demythologization by biblical criticism is vital and urgent.

The message to draw from these three thinkers is that modern science is not diametrically opposed to biblical criticism, as though the two were in conflict (as 'science' and 'religion' are often supposed to be in conflict). Quite the opposite: both modern science and biblical criticism (in its historical-critical mode) are embedded in the naturalistic worldview. In other words, both science and biblical criticism stand together, on the same side of Lessing's ditch as it were, while theology and faith remain on the opposite bank. However, as shall be seen in section 3 and section 4, there are ways for faith to make affirmatory use of both

modern science and biblical criticism, especially when it comes to the major miracle stories of the Hebrew Bible.

1.3 Methods of historical biblical criticism

The historical-critical method has dominated academic study of the Bible since Enlightenment times. True to the nature of the hermeneutical circle, it has gone through a continual process of methodological refinement during the course of its history. Early work (eighteenth and nineteenth centuries) focused on 'source criticism', attempting to discern the literary sources that the ancient biblical editors (presumably) used to piece together the larger narratives such as the Pentateuch and the Gospels. By determining the scope and nature of these hypothetical sources it was thought possible to reconstruct something of the genesis and literary history of the biblical text itself. In turn, the source-critical method was supplemented in the late nineteenth century by 'form criticism', a concern for the precise form (genre) of each source. The idea was that the form might allow for the pre-literary setting-in-life (*Sitz im Leben*) of the source to be determined, along with some indication of the history of the text in oral (pre-written) tradition. Twentieth-century work developed 'redaction criticism', where the editorial work of those ancient editors who compiled the biblical texts was reconstructed and analysed, based on their supposed theological predilections as these might be reconstructed from the text. This last method has been particularly significant in study of the four gospels, since contemporary New Testament scholars routinely compare and contrast how one evangelist has presented the story of Jesus according to that evangelist's theological scruples as compared with another evangelist.

A more recent notable type of historical-critical method is 'social-scientific' criticism, which since around the 1980s has become important as a way of building up an idea of the biblical authors' socio-political and geographical context through the application of sociological models. Along related lines, human sciences such as linguistics and psychology have very recently been brought to bear in biblical criticism. In biblical scholarship, the emerging area of cognitive linguistics incorporates literary-critical methods with cognitive science in order to gain psychological insight into how the biblical authors constructed their narratives and characters, and how their readers envision, reflect on, and are transformed mentally by them (Rüggemeier and Shively 2021; see also Theology and the Cognitive Science of Religion).

In spite of this massive industry in developing the historical-critical method, other kinds of biblical criticism have proliferated since around the 1970s, influenced at least partly by postmodernism, along with a decreased confidence in the ability of historical criticism to obtain 'objectivity'. These alternative methodologies are often quite deliberate in foregrounding the interpreter's context over those of the (supposed) original authors,

or in taking a hermeneutical stance informed by a contemporary theological or political agenda. Thus, one hears of many kinds of biblical criticism, including canonical, rhetorical, narrative, feminist, queer, liberation, or post-colonial criticism, to name some examples.

Biblical interpretations that prioritize contributions from the natural sciences represent a further alternative to the classic methodologies of historical criticism. Like historical criticism, these interpretations are grounded in the worldview of naturalism (section 1.2), but there is a further focus on 'nature' itself as an active agent in the biblical world. In such instances the contrasts between modern science and historical criticism become most clear, and the rest of this article explores these contrasts in key biblical texts. It will refer to biblical interpretations that prioritize contributions from the sciences as 'naturalistic' or 'scientific' interpretations. Although such interpretations are often made in the spirit of uncovering the historical reality behind the text, an inevitable degree of anachronism is introduced – since the biblical text is read in terms of contemporary scientific thought instead of relevant ancient perspectives – along with a degree of selectivity over which passages should be selected for interpretation – since the role of the natural world is emphasized over other critical considerations. For these reasons, many historical-critical scholars approach naturalistic interpretations with caution, in spite of the enduring popularity among scientists and the biblically literate public of such readings. The following sections outline the main biblical texts of interest in naturalistic interpretations, along with ongoing debates.

2 Creation texts and scientific origins

The Bible's creation traditions are a central point of focus for science-and-religion discussions, and as such their interpretation is similarly convoluted. It is commonly supposed that modern scientific developments (such as evolutionary theory) challenge the legitimacy of these traditions, but it is also important to note that the creation traditions have influenced scientific developments. Early modern scientists, for instance, took encouragement from the basic picture developed in the biblical creation texts that the physical world did not arise through necessary (*a priori*) principles but is entirely contingent upon its creator and is thereby intelligible. Since all is dependent upon the fiat of the divine lawmaker – who imposes rational order upon the world – science can be justified theologically as the empirical search for the Creator's laws of nature (Barbour 1997: 90; Harrison 2008). More recent scientific work (nineteenth century onwards) on the origins of the entire universe, and on the origin of biological species (and especially humans) has taken place in conjunction with protracted discussions about the interpretation of Genesis 1 and 2, respectively.

2.1 Genesis 1 and the Big Bang

To what degree does the authority of the Bible's first creation story depend on its similarity to contemporary scientific views of origins? The question may not often be asked in so many words, but it dominates modern attitudes to Genesis 1, especially since intriguing parallels are often recognized between the biblical text and the science.

The initial moment of creation in Genesis 1, where God calls light into being from a state of incipient chaos (1:3) is frequently likened to Big Bang theory, where the universe originated in a tremendous flash of energy. Similarly, it is often assumed that the opening verses of Genesis 1 relate to the Christian doctrine of *creatio ex nihilo* (creation from nothing). Indeed, in the early years of the Big Bang theory (first half of the twentieth century), there was scientific disquiet on the grounds that the theory resembled the Christian doctrine and Genesis 1 too closely to be fully credible on scientific grounds. It was not until strong observational evidence (of the cosmic microwave background) came to light in the 1960s that the theory took firm empirical hold and became a household term.

The fact that all three – the opening verses of Genesis 1, Big Bang cosmology, and the doctrine of creation from nothing – indicate an absolute beginning to all things is too much of a coincidence for many modern Christians, who take these as complementary accounts of the same divinely-caused originating event. Copan and Craig (2004: 18), for instance, argue that Big Bang theory is not only complementary to creation from nothing and Genesis 1, but is effectively a scientific way of saying the same thing. Others however are not convinced that the three can be equated so easily. Promoting an atheist view, Krauss (2012) has argued that Big Bang theory is so successful that we no longer need to maintain theistic accounts of origins alongside it; the science has replaced any need to invoke either the Bible or Christian theology. On the other hand, scholars writing in the science-theology field have pointed out that the doctrine of creation from nothing does not necessarily teach the temporal beginnings of the universe so much as its ontological beginnings; the doctrine is therefore unassailable by modern science, since the latter is not equipped (by definition) to adjudicate on purely metaphysical schemes. To add yet more complexity, biblical scholars have criticized attempts to read Genesis 1 in terms of creation from nothing. Not only is there an enormous cultural, historical, and intellectual distance between the text and the doctrine, there are also interpretative questions surrounding the opening verses of Genesis 1 (along with its ANE context) which suggest that the text does not teach creation from nothing in any case (Harris 2013: 120–124).

The result is that, tempting as it might be to read the opening of Genesis 1 in terms of more modern ideas, there are good reasons for caution. When we look at the rest of Genesis 1, the reasons multiply.

2.2 The seven days of creation

Parallels are also frequently drawn between the later order of creation in Genesis 1 – with the sea and dry land appearing first, followed by plants, sea creatures, land animals, and finally humans – with the broad pattern of evolution revealed in the fossil record. Some take the similarities here between the Bible and science as evidence of divine revelation to the ancient authors, who could not possibly have otherwise known about modern scientific thinking. On the other hand, it is worth reflecting on this reading's unashamed anachronism – as well as its selective literalism – all of which raise questions concerning its respect for the historical, literary, and theological integrity of Genesis 1. Selectively literal readings tend to downplay those features of the text that do not fit into their hermeneutical scheme. There are several such features. To begin with, Genesis 1 tells us that the entire universe beyond the firmament around the earth is made up of cosmic waters (1:6), while the sun, moon, and stars were created on day four, after the creation of day and night (1:5) and even after the earth and vegetation on day three (1:11–12). All of these features contradict the scientific picture of origins.

The most notorious difficulty which a modern scientific reading of Genesis 1 must overcome is the problem of the seven days of creation. The text echoes an earthly week of seven twenty-four-hour days. There are various hermeneutical strategies for reading the seven days in terms of the modern scientific picture of cosmic evolution (over billions of years), but the analogy with the human working week is then lost, as is the point about the holy seventh day (2:2–3), where God's rest after the completion of creation parallels the weekly practice of Sabbath (Exod 20:10–11). Moreover, such strategies must treat each verse in an ad hoc way – taking some literally while others are assumed to be entirely figurative – in order to squeeze the text into the scientific framework. The inevitable result is that the scientific worldview is read into the text rather than the text's own worldview being read out of it.

At first sight, young-earth creationism appears to take precisely the opposite stratagem regarding the days of creation, insisting that each day is a literal twenty-four-hour period (e.g. Whitcomb and Morris 1961: 228). However, since the cosmology of Genesis 1 is still treated in thoroughly modern terms, the overall effect is much the same as in the mainstream scientific readings, where the text is read in a selectively literal way determined by modern scientific attitudes instead of ancient cosmological thinking (Harris 2013: 43–44). In other words, creationist readings – as much as readings influenced by mainstream science – tend to rely on the assumption that Genesis 1 describes the origins of the natural world as we apprehend it today, without considering alternative layers of reality and significance in the text, especially layers which rely on the ancient scientific, mythological, and theological views of the original authors and audience.

Making a clear break with readings influenced by the modern scientific worldview, biblical critics generally seek to unearth those alternative layers, bringing the historical-critical

method to bear. Theologically, for instance, it is important to note that the text is at least as much a portrayal of God the creator as it is of the physical universe and its creatures, a portrayal which likens God to a human craftsman, whose working week is the same as the human working week, crowned by the Jewish holy practice of resting on the seventh day, the Sabbath. Cosmologically, the text should be seen in its ancient Near Eastern (ANE) context. Important elements in the text – such as the cosmic waters, the firmament/dome structure (Gen 1:6–8) which separates the waters in order to provide a solid and impermeable boundary to protect the earth, and the celestial luminaries set within the dome (1:17) – bear no clear relationship with a contemporary scientific worldview but relate closely to ANE mythologies and cosmologies.

Recent work by some biblical critics (e.g. Creation in the Old Testament) has even raised the question of whether Genesis 1 concerns the making of the universe in the first place, or should rather be seen as God's ordering and consecrating of what is already there into God's cosmic temple. Similarly, Walton (2009) maintains that the text constructs a functional, not a material, view of the world's origins: God was not making the material world *ex nihilo* but instead took seven days to constitute what was already there into networks of functional relationships.

There are other critical approaches to Genesis 1 altogether. Collins (2018: 18), for instance, develops a 'critically rigorous' reading of the text which is also 'intuitive'. By drawing from C. S. Lewis' pragmatic approach to literary and linguistic analysis, Collins evaluates both how the story might have functioned for its ancient readers, and how it might be told today. Correspondingly, Collins finds ways of foregrounding the story's historical and theological truths without needing to negotiate the vexed scientific questions of origins that have continuously swirled around Genesis 1 in modern times.

Analysis of Genesis 1 in the historical-critical mode thus introduces very different kinds of questions from how well the text tallies with a modern scientific worldview. Once we take a more historically-minded view of the story, the problems surrounding the seven days fall into perspective alongside other theological, historical, and literary questions.

2.3 Made in the image of God

A further potential challenge from modern science to the interpretation of Genesis 1 concerns God's famous statement that humans are made 'in our image, according to our likeness' (1:26).

The importance of this passage for Christian anthropology can hardly be overstated, but exactly what it means for humans to be made in the image of God (*imago Dei*) is controverted, and various interpretations have been advanced over the centuries. The majority view has tended to follow the 'substantive' interpretation. Here, the image is said

to reside in that which is unique in the human substance or human nature compared to all other creatures, which is commonly identified with the human soul or mind. However, evolutionary theory, which indicates that humans have evolved from other creatures – and are closely related to other modern apes in biological, cognitive, social, and behavioural ways – undermines the substantive interpretation's reliance on human uniqueness. Other interpretations are not so reliant, and the 'functional' interpretation in particular has gained ground in modern times, suggesting that the *imago Dei* resides not in anything special about what humans are in substantive terms so much as their divinely-allotted function on earth, their vocation. Evolutionary science is therefore less of a challenge to this interpretation. The question arises, however, as to what this special function is. Since the crucial verse (1:26) continues with God exhorting humans to exercise 'dominion' over all living things in earth, sky, and sea (1:26), the special function is often interpreted in terms of humankind representing God's royal rule over creation. The rise in popularity of 'stewardship' theologies (in the face of the climate crisis) provides further impetus for such a view of the *imago Dei*.

These hermeneutical arguments for the *imago Dei* are influenced by modern scientific concerns, so it is worth asking how critical biblical scholars approach the problem. For their part, the consensus is clear. The *imago Dei* passage in Genesis 1 should be read in terms of the functional interpretation, since there is strong support from the ANE historical context that the human king was viewed as the 'image' of the deity. The Genesis 1 text 'democratizes' that idea so that all humans are the visible representatives of God's dominion over creation (Middleton 2005: 121). This consensus has been reached entirely by historical-critical research, so it is convenient that the consensus also evades the challenge from evolutionary biology. However, there are complexities, since in practice most versions of the functional interpretation include a substantive tinge (Harris 2018b), and many scholars in the science-theology field continue to investigate substantive readings of the *imago Dei* because of that interpretation's relevance for debates around transhumanism and artificial intelligence.

2.4 Genesis 2–3 and the fall

If readers are commonly tempted to draw parallels between the Bible's first creation story (Gen 1) and the sciences, the second (Gen 2–3) offers few such opportunities. The latter's account of the creation of a single adult male before all plants and all other animals (and of the woman, who comes last) flies completely in the face of the evolutionary history of life. Similarly, the story has a fairytale feel to it, with many fantastical elements; consequently, critical biblical scholars consider the story to be mythological, without any clear basis in history. The story is more of a fable or a paradigm, processing theological convictions about innocence, failure, and mortality in the human condition. Nevertheless, many Christians maintain that, however remote and elusive it may be, yet there must be a basic

historicity to the story of Adam and Eve's disobedience in the Garden (Gen 3), what is commonly referred to as the fall.

Maintaining this historicity of the fall mitigates two theological problems. First, if the fall did not happen in real time and space, then we would be forced to conclude that sin and evil (and the death that results from sin, according to Paul in Rom 5) were built into the original creation by God, who must be the source of evil. This conclusion causes obvious difficulties for theists. Second, without the fall, Christ's historical act of salvation for sinful humans loses much of its traditional purpose and coherence (again, Paul's explanation of Christ's atoning work in Rom 5 is crucial).

For some of the most theologically conservative Christians – such as young-earth creationists – these two problems are of sufficient magnitude that mainstream evolutionary science must be rejected in favour of the historical Adam and Eve, who are supposed to have lived a few thousand years ago. However, there are other mediating solutions available.

In the Roman Catholic Church's definitive *Humani Generis* (1950), Pope Pius XII declared that while evolutionary theory might be of value in understanding the physical origins of humans, it should not be considered as impinging upon belief in the spiritual soul, nor upon doctrinal considerations such as the primacy of Adam as the first human and the source of original sin. A line was thus effectively drawn between scientific research and theology which, while creating tension among Catholic theologians at the time (O'Leary 2007: 149–159), allowed for the Church's tradition to be affirmed without denying the science. This has remained the Church's official stance, although some recent Catholic theologians (and some popes) have been ready to explore the positive implications of the science for theological views of human and non-human origins (e.g. Johnson 2014).

Popular among evangelical Christians are solutions that re-envision the historicity of the fall in order to retain an evolutionary view of life. Generally speaking, these solutions relax the traditional requirement that Adam and Eve were literally the first humans, and see them as representing a significant stage in the growth of the human population, or of our spiritual evolution in pre-recorded human history. The well-known model by Alexander (2008), for instance, proposes that the historical Adam was a neolithic farmer some 6,000 years ago; by no means the first human, but the first to be gifted by God with the Holy Spirit and therefore the first to possess the divine image. From this man's disobedience, original sin emerged to infect all later humans. Since Adam's primacy in this model lies in the spiritual dimension, there is no impact on human biology or evolutionary history. A more recent solution to the problem of the historical Adam (Loke 2022) uses population genetics to suggest that Adam is the common ancestor of all modern humans even though he was certainly not the first anatomical *Homo sapiens*.

Although these approaches make few points of contact with the text of Genesis 2–3 itself – and can only be considered very loose interpretations; indeed, Loke (2022) argues that his own approach is a 'model' rather than an 'interpretation' – they tend to be popular in evangelical circles, where there is a real concern to maintain the historicity of the fall because of the influence of theologies of substitutionary atonement. However, there are many other Christians who show few such concerns to safeguard the traditional doctrines. Some prominent scholars in the science-theology field have deconstructed the Christian traditions of sin, death, and atonement to their roots, and are exploring new theologies of evolution, and evolutionary theodicies, without heavy reliance upon an historical fall (e.g. Sollereder 2019). The biblical text of Genesis 2–3 stands in the background to such work, but largely as a theological myth of origins. The biblical story is not therefore considered as having significant impact on the scientific history of human origins, nor vice versa, while the story nevertheless warrants deep theological reflection on the reality of the human condition.

2.5 Creation in the Hebrew Bible

The creation stories of Genesis 1–3 win the lion's share of attention, but there is extensive creation material elsewhere in the Hebrew Bible (see Creation in the Old Testament). Key collections of such creation passages appear especially in the psalms (e.g. Ps 8; 104), the prophets (e.g. much of Second Isaiah, Isa 40–55), and the wisdom literature (e.g. Job 38–41). Although some of this material appears similar to the creation traditions that appear in the Genesis texts (e.g. creation by God's word, Ps 33:6), much of it develops in different ways, for instance citing mythological motifs known in other ANE texts (such as the divine warrior theophany in Ps 29, and God's battle with the sea at creation; Ps 89:9–11 in English translations), or making rich theological connections between creation, exodus, redemption, and second exodus/new creation (e.g. Isa 51:9–11), or even developing the theme of the natural world's praise of its creator (e.g. Isa 55:12).

Taken overall, the creation material of the Hebrew Bible is extremely diverse in both content and genre, and it defies easy systematization. Consequently, there have been few attempts to interpret it in modern scientific terms in the way that Genesis 1 has been treated. Note, however, the pioneering work of Brown (2010), and McLeish (2014), who make imaginative allusions between these creation texts and modern scientific ideas. Brown (2010) categorizes all of the Hebrew Bible's creation texts into seven groups or 'pillars', and uses each group as an imaginative springboard to introduce many diverse scientific stories that relate to the various themes in the texts. For instance, Brown develops a parallel between the cosmic pessimism of Ecclesiastes and the cycles of struggle and competition in natural selection (Brown 2010: 186). McLeish (2014) concentrates on the book of Job, and likens the modern scientist's deep curiosity about the natural world to Job's search for wisdom in the face of trial, wisdom that God explores

in the speech from the whirlwind by questioning Job on the many wonders of the natural world (Job 38–41).

These last two examples show how the wisdom literature in particular contains many resources for developing creation themes. One in particular stands out. In some hymn-like passages, wisdom is personified as a female being who has a special role to play at the original creation. In the most famous such passage (Prov 8:22–31), Wisdom describes how YHWH created her at the beginning, God's first work, before the beginning of the heavens and earth. She then accompanies God through the making of the rest of creation, acting as God's 'architect' or 'master builder', God's 'delight' (8:30). Later texts develop the personification of Wisdom even further, and describe her in such transcendent terms that it becomes difficult to disentangle her from God (Wisdom 7–9; Sirach 24).

From a modern perspective, these portraits of Wisdom bear an obvious relation to the ways that the laws of nature are seen by scientists (Harris 2013: 69–70). Wisdom works as the ubiquitous organizing power behind all creative and natural processes, and it is not too much of a stretch to compare her with the Platonist's idea of forms, which has been so influential in the physical sciences for informing a view of the laws as the universal ordering principles of the cosmos. It is possible that attractive theologies of science could be fashioned which draw upon the hymns of Wisdom to provide biblical support and colour for the physicist's view of natural law. Such theologies could draw upon the Genesis creation texts, but the Wisdom texts are rich and independent resources for creation thought in their own right.

2.6 Creation in the New Testament

Like the Hebrew Bible creation texts outwith Genesis, the New Testament is widely overlooked as a resource for creation theology, but it contains important theological developments around the role of Christ in creation. Best known is the prologue to John's Gospel (1:1–18), which declares that Christ is the pre-existent Logos who was with God in the beginning, and through whom all things came into being long before he became flesh (see also 1 Cor 8:6; Col 1:15–20; Heb 1:2–3). Strong allusions are being made here to the Wisdom hymns discussed in the previous section; much that was said of Wisdom is now being said of the Logos/Christ. Hence it is clear that the Wisdom hymns provided the springboard for the New Testament writers to make theological sense of the profound but shocking claim that the all-too human teacher from Nazareth was simultaneously instrumental in the bringing about of worlds in the beginning, reflecting God perfectly. The Jewish Wisdom hymns – along with the eschatological conviction that Christ's resurrection had inaugurated a new creation – made this amazing theological move possible (Harris 2013: 70–73).

In trying to make modern sense of the New Testament claims of Christ's pre-existence, some theologians have brought discoveries in scientific cosmology to bear. Since the New Testament tells us that Christ the Logos is embedded in creation – he is its pattern/blueprint – then the incarnation is theologically parallel to scientific cosmology (Murphy 1994: 101–102). In which case, the intriguing idea of 'fine-tuning' becomes relevant in interpreting the texts. The point here is that the current physical structure of the universe is extraordinarily sensitive to the values of certain of the physical constants. If some of these constants had been even minutely different (less than one percent) then there may have been no galaxies, stars, or planets, let alone biological life on earth. A tortuous philosophical debate has ensued about whether fine-tuning constitutes scientific evidence for a divine 'fine tuner', or can be explained in non-theistic ways (such as by multiple universes). The christological argument suggests that fine-tuning is a scientific articulation of Christ's pre-existence. The human Jesus of Nazareth was pre-existent insofar as the physical conditions for the evolution of our universe made his appearance as a human being inevitable in the fulness of time (Macquarrie 1990: 391–392; Murphy 1994). Thus, fine-tuning is a way of defending both the incarnation and the pre-existence of Christ, goes the argument, an argument made possible and cogent by the Wisdom hymns of the Hebrew Bible and the christological texts of the New Testament. Since this hermeneutical move is overtly anachronistic, it is as vulnerable to critique as other kinds of scientific readings of creation texts, but in the science-theology dialogue the fine-tuning reading offers an imaginative way of exploring the deep meaning that underpins the physical sciences.

2.7 Ecological hermeneutics

Ecotheology responds to the urgency of the environmental crisis, developing theological and ethical perspectives of the non-human natural world. The Bible's creation texts are rich resources, but other biblical texts have proved invaluable for their ecological wisdom. The recent *Oxford Handbook of the Bible and Ecology* (Marlow and Harris 2022) illustrates the breadth of the area, as well as the particular hermeneutical questions raised.

One of the earliest – and most famous – publications in this area was hermeneutical in nature: Lynn White Jr.'s (1967) proposal that the modern exploitation of nature in the industrial revolution was legitimated by Western Christian anthropocentrism. To White, the Genesis creation stories were taken as free licence for humankind to dominate and exploit the natural world, since creation had been made for the benefit and rule of humankind. Although there have been many critical responses to White since, his argument still stands as a foil in ecological hermeneutics. An important lesson learnt from those responses is that – in spite of White's essentially negative view of the creation texts – the Bible contains many texts that encourage a positive ecological stance towards the natural world (Horrell 2010: 8). For instance, the Hebrew prophets are saturated with natural imagery

and with references to the natural world (e.g. Isa 24:3–6), giving a clear sense of nature's independence in creation from humans.

One of the legacies of White's proposal is that scholars in this area have taken great care to foreground methodological discussion, hence the development of ecological hermeneutics as a specialist field for the treatment of key texts. While many scholars in this area rely on the historical-critical method – essentially discerning a view of the original authors' ancient ecological wisdom – others have built their own bespoke hermeneutical schemes to reflect the fact that modern ecological interpretation is influenced by (and influences in its turn) issues of sociopolitical, gender, and postcolonial justice.

Best known among these schemes is the Earth Bible. This project has produced a number of volumes of eco-commentary, originally set within the context of six foundational ecojustice principles: intrinsic worth, interconnectedness, voice, purpose, mutual custodianship, and resistance (Habel 2000; Earth Bible Team 2000). These principles were constructed so that 'Earth' should emerge as a character in the biblical narrative in its own right. In this view, Earth represents the entire living population of the planet, and stands for their mutual dependence upon each other. Earth has its own voice, which can be raised in celebration or in resistance to injustice at the hands of humans. Earth therefore resembles a living and dynamic organism, a self-regulating entity which is simultaneously constituted of interlocking networks of creatures (Earth Bible Team 2000: 46). Significantly, the Earth Bible principles do not use the terms 'God' or 'creation', in order that dialogue with scientists can be facilitated as much as with non-theistic religious traditions, and in order that Earth can be seen as the primary object of enquiry rather than secondarily, as part of God's property (Earth Bible Team 2000: 38).

The Earth Bible rationale departs radically from the conventions of historical criticism, and as such is vulnerable to the potential drawbacks of anachronism and selective literalism outlined earlier, drawbacks which dog many scientific/naturalistic interpretations of the Bible. A defence of this particular rationale, however, might point out that the Bible is not a museum exhibit, but has a normative status for many millions of modern Christians today. Ecojustice is of such urgency that the Bible's ethical advice must be translated into stark modern terms for modern people. However, ecological hermeneutics cannot of itself develop the pros and the cons further: this is a task for modern theologians and ethicists.

3 Divine judgement and miracle in the Hebrew Bible

Alongside the Genesis creation stories, the Hebrew Bible's major stories of divine judgement and miracle have long attracted popular attention as candidates for scientific/naturalistic interpretations. The flood (Gen 6–9), together with the plagues of Egypt and

sea crossing (Exod 7–15), have dominated. The usual modern understanding of a miracle (following the Scottish philosopher David Hume), as a divinely-caused transgression of a law of nature, is misleading in the context of these particular stories, since many believers accredit the events as miraculous – believing that the events were ultimately caused by God – while accepting that there are also naturalistic explanations at hand. In the context of a strong belief in providence, a natural event that precipitates an unlikely deliverance can be affirmed as a miracle, without any sense that the natural and supernatural are in conflict. Section 3.2 explores this point further.

3.1 The flood (Gen 6–9)

The biblical flood is the prototypical story of divine judgement in the Bible, describing a catastrophe of such proportions as to reverse the original creation back to its state of watery chaos (as in Gen 1:2), in preparation for an effective new creation (Gen 9).

As with the story of Adam and Eve in the Garden, and as with the other primeval stories of the ANE (which include several flood stories), the flood of Genesis 6–9 is believed by biblical critics to be largely mythological. There is no geological evidence of a worldwide flood in human history, and the realization that what evidence there is could be better interpreted in terms of a widespread ice age was one of the defining moments of nineteenth-century geology. However, some contemporary Christian believers uphold a basic historicity to the biblical story, nowhere more strongly than in young-earth creationism, where the flood is held responsible for having produced much of what we see today of the earth's geology. Professional geologists – like critical biblical scholars – interpret the evidence (whether that evidence is the rocks or the biblical text) very differently from the creationists. However, this is not to say that there is no chance of some kind of genuine historical happenstance standing behind the story. Specifically, scholars often wonder whether the biblical story might reflect a distant memory of historical devastation due to the annual floods of the Tigris and Euphrates rivers in Mesopotamia, where the ANE flood traditions are supposed to have originated. Moreover, some scientists have maintained that, although there may be no geological evidence known for a worldwide flood currently, this does not rule out the possibility that there was such a global catastrophe in human history. Several kinds of scientific model have been proposed for a global flood, some of which have been important in the history of science.

3.1.1 Global flood models

Thomas Burnet's (c. 1636?–1715) *Sacred Theory of the Earth* (1681–1690) stands out as one of the first treatments of whole earth history in mechanistic/naturalistic terms. The Bible provides the narrative, and the biblical flood is centre stage. Burnet proposes that before the flood the earth's surface was perfectly spherical – smooth and uniform, with no seas – but, over time, heat from the sun caused it to fracture, releasing huge volumes of

water from the earth's interior, Noah's flood. The waters soon subsided, and the newly-formed continents and oceans settled into the positions we see now. Although Burnet's suggestion (that the flood provides the main explanation for the present shape of the earth's surface) has no support from mainstream science, it is at the heart of contemporary young-earth creationism.

Burnet's model relies upon forces internal to the earth; soon after, William Whiston (1667–1752) provided an external explanation in his *A New Theory of the Earth* (1696), relying upon recent observations of Halley's Comet. Whiston calculates that the comet had come close to the earth on many occasions, including 2349 BCE, the famous date for the flood in Archbishop Ussher's chronology of the world. In Whiston's view, the comet must have passed so close to the earth on that occasion as to cause immense tides, and to deposit vast quantities of water onto the earth from its head and tail. The earth's crust also cracked from stress, allowing more water to come up from the deeps. Thus, Whiston introduces the idea of global catastrophe due to extraterrestial impact, an idea which has gained traction in recent times as a precipitating factor in the mass extinction which spelled the demise of the dinosaurs at the end of the Cretaceous period (sixty-five million years ago). As with Burnet, Whiston's model had a long-lasting impact on later scientific debates.

Contemporary scientists have also further refined Whiston's model for the flood. Since there is no physical evidence for a global flood in human history, these models have drawn upon the literary testimony of ancient myths, specifically myths of destruction by flood and heavenly objects, of which there are many worldwide, including the biblical flood. One such model has been proposed by Masse (2007), who has unearthed 175 myths which, he thinks, derive from a single historical flood of global proportions. By comparing various symbolic motifs in the myths with real lunar and astrological events, Masse connects the myths to a massive comet impact in the Indian Ocean, which he dates to around 10 May 2807 BCE, but which has left no evidence besides the widespread flood myths. Masse suggests that the energy of the impact would have produced six or seven days of torrential rain, intense darkness, and huge tsunamis worldwide. Little would survive of human civilization: Masse estimates that perhaps between fifty and seventy-five percent of the human population died in the catastrophe.

Approaches like Masse's are highly speculative, if nothing else because of the ahistorical nature of the many myths that he draws upon. There is no way of knowing if (a) the myths refer to an historical flood impact, nor if (b) the myths refer to the same flood impact. Masse's model relies upon both (a) and (b) being answered in the affirmative. The high degree of speculation and coincidence here introduces a plausibility problem which is common to scientific interpretations of spectacular biblical stories, as we shall see in later sections.

More mundane scientific proposals for a global flood have also been made, which employ sea-level rises at the end of the most recent Ice Age. These sea-level rises are uncontroversial in scientific terms, since there is an enormous amount of physical evidence to support them, but their value as interpretations of the flood story is highly questionable. Not only did these sea-level rises occur in the very distant human past, many thousands of years before our earliest flood texts, but there is also the problem that the rises were so gradual (no more than a few centimetres per year at most) that it is hard to see them precipitating a worldwide human catastrophe. If the previous kind of explanation – reliant on extraterrestrial impact – was implausible because of a lack of scientific evidence, this kind is implausible because it is so far removed from the story described in the text.

3.1.2 Local flood models

An important half-way house between the above approaches was proposed by Ryan and Pitman in their book, *Noah's Flood* (1999), based on oceanographical work in the Black Sea. Ryan and Pitman uncovered evidence that the Black Sea was once a large freshwater lake separated from the Mediterranean by a thin bridge of land across the Bosporus. In their model, at about 5600 BCE, the Mediterranean rose high enough to overcome the narrow land bridge and to rush into the lake, which at this stage was more than one hundred metres lower in level. They estimate that the enormous rush of seawater over the Bosporus would have caused the lake to rise by about one metre per week, and the gentle slope of the lakeshore would have been rapidly inundated, forcing the people living there to retreat rapidly. These people spread out into Eastern Europe, Asia, and the Middle East, taking stories of a catastrophic flood with them. Over the next several thousands of years, this story largely disappeared, except in Mesopotamia where it was dramatically reinforced by the seasonal floods of the Tigris and Euphrates. Ultimately, the story developed into the biblical and Mesopotamian traditions.

Ryan and Pitman's model won a great deal of attention, even inspiring many further scientific studies of historic Black Sea flooding. However, these studies found evidence to question Ryan and Pitman's model, or at least to moderate the scale of the flooding significantly. The model also came in for criticism from biblical scholars and ANE experts, who doubted that the tradition would have travelled so widely and for so long (3,500 years) before eventually settling down as the ANE and biblical stories. The model is reliant (again) on a high degree of speculation as to how myths are generated and circulate. In any case, there are simpler explanations for the ANE flood traditions.

The simplest historical model for the ANE and biblical flood traditions is that these are distant cultural memories of the violent and regular floods of the Tigris and Euphrates. The archaeologist Leonard Woolley caused a sensation through his excavations at Ur in 1928–1929 when he found a thick layer of silt from a large flood around 3500 BCE,

which could have been evidence for Noah's flood. Other sites were quickly investigated for corroboration, but it became clear that although there was plentiful evidence of flooding in the Tigris-Euphrates flood plain, it was varied in date and extent. The general contemporary conclusion is that this is strong evidence for violent Mesopotamian floods in ancient times – including the periods of the early written flood texts – but not for one single unparalleled flood like Noah's, and certainly not for a global flood. Hence, to emphasize, many critical biblical scholars believe that the biblical flood is largely mythological. If there is some kind of historical kernel, it may as well derive from the local flooding of the Tigris and Euphrates as any other possibility, but there is no room for confidence. In any case, because of the story's place in the primeval story of Genesis 1–11 – which explores universal motifs of creation and de-creation, judgement and redemption – any supposed historicity to the story is regarded by many critical scholars as of secondary theological importance. Two critical scholars who do insist on historicity, on the other hand, are Longman and Walton (2018), who argue that the flood story arose from a real local flooding event whose historical details have been lost over time, but which was told and re-told over the generations in hyperbolic fashion for emphasis. According to these authors, such hyperbole is a rhetorical device known in other biblical texts; in reading the flood story the ancient Israelites would not have assumed that the flood was truly universal in its geographical extent, but would nevertheless have understood its theological force as such.

3.2 The exodus

The book of Exodus contains many stories of divine action and miracle, most famously the plagues of Egypt (Exod 7–12) and the sea crossing (Exod 14–15). The Exodus text makes it abundantly clear that these were divine acts, but in modern times there have been many scientific/naturalistic interpretations, which work by assuming that the text provides eyewitness data (observations) for the construction of scientific models. Whether or not such interpretations 'explain away' God's supposed role in the story is a complex theological question beyond the scope of this article. There are many answers to this question – both positive and negative – depending upon one's understanding of the distinction between 'nature' and 'supernature', and upon whether one accepts the widespread Humean view of miracle. These are largely modern concerns which the biblical texts do not address.

3.2.1 The plagues of Egypt

The best-known naturalistic explanation of the plagues arises from the monumental Minoan eruption of Thera, the volcanic caldera (now known as Santorini) in the Aegean Sea. The Minoan eruption was one of the largest eruptions in human history, occurring probably in the late 1600s BCE. The effects were far and wide, as testified to by tsunami deposits on Crete, and layers of volcanic ash at various locations in the Eastern Mediterranean. In the so-called 'Thera theories' (Harris 2015), the eruption caused

meteorological storms, earthquakes, and ash falls across Egypt. The first nine plagues – where water is turned into blood, followed by a plague of frogs, lice, flies, a deadly sickness of cattle, boils, hail, locusts, and darkness – are all explained by the Thera theories as environmental consequences of the eruption. The Thera theories have been so malleable that they are invoked as explanations for a wide number of ancient legends and mysteries beyond Exodus, including the flood legends, the destruction of Atlantis, and the mysterious disappearance of several civilizations in the Bronze Age. Such is the level of popular and scientific interest in the Thera theories that they have featured in numerous TV documentaries in recent decades (Harris 2020).

Critical biblical scholars, however, appear to show little interest in such interpretations, rarely even mentioning them in their own biblical commentary, or else being openly dismissive on the grounds that explanations like the Thera theories raise more plausibility problems than they solve. Miller and Hayes, for example, writing in their textbook study of biblical history, completely dismiss such naturalistic approaches:

> Theories of this sort attempt to give naturalistic and scientifically acceptable explanations for the more fantastic and miraculous biblical claims. In our opinion, however, these theories presuppose such hypothetical scenarios, such a catastrophic view of history, and such marvellous correlations of coincidental factors that they create more credibility problems of their own than the ones they are intended to solve. (Miller and Hayes 1986: 65)

Instead, biblical scholars tend to show a little more (but still cautious) interest in models such as Petrie's or Hort's, where the plagues are naturalistic amplifications of relatively mundane and regular environmental happenings in and around the Nile area, such as the *khamsin* desert sandstorm to explain the plague of darkness (e.g. Hoffmeier 1996: 146–153). Even these interpretations have been critiqued for their selective literalism, and for the way they downplay the biblical theology of divine action. For their part, biblical scholars tend to foreground the ancient mythological and theological motifs in the story over modern naturalistic speculations, preferring to address the question of 'what did it really mean?' over 'what really happened?' (Harris 2018a).

3.2.2 The sea crossing

Much the same analysis can be applied to the sea crossing of Exodus 14, since it has had even more attention from scientific interpreters than the plagues, while professional biblical critics have continued to show little interest in naturalistic approaches or are openly sceptical. The sea crossing is further complicated by uncertainty surrounding the location of the 'sea'. The Hebrew term *yam suph* (Exod 13:18) could refer to the deep Red Sea (as is common in Bible translations), or to a shallow 'sea of reeds' in the Isthmus of Suez (as many modern scholars argue), or it could be understood as a mythological/eschatological reference to the cosmic sea (as some scholars prefer). The debate is

finely balanced in linguistic, geographical, and theological terms, and much revolves around what interpreters think actually happened in the crossing, including whether it even happened as reported in the first place (Harris 2007).

Many naturalistic interpretations assume that *yam suph* refers to a shallow lake or lagoon – a 'sea of reeds' – since such a small, shallow body of water would seem more likely (in naturalistic terms) to dry up or shift depending on circumstances. The Thera theories provide a dramatic version of this way of thinking. Here, the 'sea' is a lagoon on the Mediterranean coast of Egypt or Sinai (e.g. Galanopoulos and Bacon 1969: 192–198). The ongoing eruption of Thera – which triggered the plagues a matter of days earlier – provides Moses and the Israelites with the ideal opportunity to cross the lagoon to escape Pharaoh's army. The eruption has just reached its final, explosive stage. The now-empty magma chamber is filling with seawater, causing the shoreline to retreat all around the Eastern Mediterranean before a tsunami is generated shortly after. The lagoon empties, and the Israelites cross; just as they reach higher ground the tsunami appears, sweeping away the pursuing Egyptians. Weaknesses in this explanation include the fact that the text itself precludes the Mediterranean coastal route (Exod 13:17), and a significant problem with dating: Thera erupted some 400 years before the timeframe preferred by biblical scholars for the exodus (roughly 1200 BCE).

Another problem with the Thera theories is that they overlook what the text itself says about the drying-up of the sea: 'YHWH drove the sea back by a strong east wind all night, and turned the sea into dry land' (Exod 14:21). Thus, many other naturalistic explanations call upon the action of strong winds on seas and lakes in the area (e.g. Kitchen 2003: 556). A well-known study by Humphreys (2003: 244–260) uses 'wind setdown', a meteorological phenomenon whereby large, shallow bodies of water can be shifted around by very strong winds, depending on the topography of the seabed and surrounding land. In Humphrey's reconstruction, the Israelites are heading for an erupting volcano in Saudi Arabia (the 'pillar of fire and 'cloud'; Exod 13:21), when they come to the seashore at the head of the Gulf of Aqaba. A hurricane-force wind blows up at this point. Humphreys calculates that the wind could expose the (gently-shelving) seabed here by hundreds of metres, producing a wall of water out to sea. The Israelites cross this part of the shore while the wind blows; they reach safety just as the wind abates, and the returning sea drowns the chasing Egyptians. In this solution, Humphreys attempts to combine the two common meanings for *yam suph*: sea of reeds, and the Red Sea.

Many similar explanations have been proposed for a crossing over a potential 'sea' in the area, all relying on the twin conditions of (a) a very strong wind blowing over a suitable body of water and (b) coincidence that this happened in the nick of time for Moses. Indeed, coincidence features heavily in the Thera theories too, but Humphreys turns the coincidence into a theological virtue: the miracles of Exodus do not reside in the natural

details of the event but in the timing, since ‘God worked in, with, and through natural events’ (Humphreys 2003: 5). In other words, thanks to divine providence, Moses was in the right place at the right time, while the Egyptians were not.

Critical biblical scholars, while sometimes mentioning the wind setdown explanation in their own commentary, rarely make much of it. As with the plagues, so the naturalistic models of the sea crossing present plausibility problems. Propp, for instance, writing of such naturalistic approaches in his commentary on Exodus, is scathing:

> Rationalistic explanations for miracles […] are anachronistic today. To believe that the Bible faithfully records a concatenation of improbable events, as interpreted by a prescientific society, demands a perverse fundamentalism that blindly accepts the antiquity and accuracy of biblical tradition while denying its theory of supernatural intervention. (Propp 1999: 347–48)

For many biblical scholars, the naturalistic models of Exodus are overly reliant on coincidence and spectacle, applying an inappropriate selective literalism in order to fit the modern science into the picture, thereby overlooking the theological depths of the tradition. Hence, such scholars usually prefer to highlight mythological, literary, and theological components of the sea crossing, components that were important to the ancient tellers and re-tellers of the story as it evolved into the complex tradition that was eventually recorded in the written text. For instance, scholars who argue for the mythological/eschatological understanding of *yam suph* see the story as a narrative re-working of the ANE creation myth of God’s battle with the sea. Although the sea crossing might appear to modern people like an amazingly propitious historical event in the nick of time, in ANE cultures it would have evoked a foundational creation myth in the name of God’s redemption of the Israelites from Egypt.

Biblical scholars working in the historical-critical paradigm thus invariably tend to emphasize the significance of the story for those ancient people who told the story, listened to it and recorded it, over those (yet more ancient people) who might have experienced the original happening (including its naturalistic details, whatever they might have been), the eyewitnesses, as it were. While not necessarily denying that there might have been an original happening witnessed by human observers in historical time and space, the critical method all too often places secure knowledge of that happening beyond reach. Hence, the question of whether anything actually happened in the first place becomes moot. Modernity has placed theists in a difficult bind, Lessing’s ‘ugly ditch’ between faith and history. It is not enough for a theist to maintain that God must be able to act in real time and space – in history – without the theist also needing to consider what that conviction might mean in terms of modern scientific enquiry and modern historical enquiry, two kinds of expertise which (in this case at least) appear to be pulling in opposite directions. While scientific readings of the sea crossing support the theist in

maintaining that something really happened to real Israelites in real time and space, critical biblical scholarship introduces many qualifications, effectively appearing to be agnostic or disinterested in such convictions. The divergent hermeneutical stances here cannot be united by the theist without considering more complex theological questions about the modern distinctions between nature and supernature, and between science and history. These problems are exacerbated when we turn to the traditions surrounding Jesus.

4 The miracles of Jesus

Jesus' activity as a miracle worker is presented with great richness in the four New Testament Gospels, with many different miracle stories appearing (Twelftree 1999; Blackburn 2011). The Gospels present Jesus' miracle-working as essential to his identity and mission as prophet and messiah; the miracles are not an optional extra, as it were, but a vital part of each Gospel's theological presentation.

Historical biblical scholarship adds further depth to the gospel accounts of Jesus' miracles. Some of the miracle traditions are similar to those of other miracle workers known from this time in the Jewish and Greco-Roman worlds (e.g. Hanina ben Dosa), and some are similar to the stories of legendary figures in the Hebrew Bible (especially Elijah and Elisha). Other Jesus miracle traditions are unique. It seems that Jesus was distinctive in his time for having more stories told about his abilities as a healer and an exorcist than any other contemporary miracle worker. Historical enquiry is methodologically limited in commenting on the authenticity of a miracle in and of itself, but it can certainly comment on what ancient people thought on the matter. Hence, in spite of their (no doubt varying) personal predilections on the possibility or impossibility of miracles, there is a widespread consensus among scholars that Jesus was well-known in his time as a healer and exorcist.

The complexity of Jesus' miracles can be simplified somewhat by grouping them into three main categories: nature miracles (e.g. the feeding of the 5,000 in Mark 6; the miraculous catch of fish in John 21); healings and exorcisms; and miraculous life events (e.g. virgin birth; transfiguration; resurrection; ascension). Even these categories do not capture everything (such as instances when Jesus displays miraculous foreknowledge), and it is important to note that the evangelists do not apply these distinctions themselves but see all the miracles alike as stemming from Jesus' identity and purpose.

Attempts to habilitate Jesus to a modern rationalist perspective – often by emphasizing his wisdom while overlooking the miracles – tend to extract a rather limited picture from the Gospels. Arguably, naturalistic interpretations introduce similar limitations.

Some of Jesus' nature miracles are prime candidates for naturalistic interpretation, especially at a popular level. Here, a kind of 'common sense' rationalization can be

applied. For instance, the stilling of the storm (Mark 4:35–41) might be explained naturalistically as (in effect) a coincidence: the storm was about to abate when Jesus commanded it to be still. The miracle (if there can be said to be one in this view) lies in Jesus' discernment of the changing weather conditions. Similar rationalizations can be made for others of Jesus' nature miracles. Jesus might have appeared to be walking on the water, for instance (Mark 6:47–52), but perhaps he was really on a sandbank. The feeding of the 5,000, for instance, can be explained as an unexpected act of communal sharing: the crowd was encouraged by Jesus to share what food they had brought among themselves; to everyone's surprise there was enough to go around. These rationalizations do not need to call upon scientific models since the nature miracles in question do not involve natural phenomena that are incredible in and of themselves. Other nature miracles (e.g. the Wedding at Cana in John 2) cannot be so easily rationalized, unless we call upon sleight-of-hand on Jesus' part, or some bizarre and phenomenally unlikely quantum transformation which might, in principle, be possible where common sense judges the miraculous event impossible.

As one might expect, commentary by biblical scholars sees much greater depth to the nature miracle stories than questions of modernist rationalization. There may well be an original kernel to each story, but the evangelists have elaborated upon it and illuminated it by layers of theological interpretation built into the very story itself. Scholars point out that the story of the stilling of the storm, for instance, is built around ANE motifs relating to creation and the cosmic waters – an echo of the sea crossing – while the feeding of the 5,000 is dense with messianic and eucharistic motifs. Hence, while acknowledging the limitations of the historical-critical method when the miraculous is in view, biblical scholars are able to expose a great deal of each evangelist's portrayal of Jesus through the nature miracles.

This means that, as with the miracles of Exodus, naturalistic/scientific/rationalistic approaches to the nature miracles of Jesus have not been judged by contemporary biblical scholars to be especially illuminating of the depth of the traditions, while such approaches cannot be altogether neglected (see, for instance the collection of essays in Twelftree 2017 for a thorough overview). However, it is potentially a different matter when we turn to Jesus' healings and exorcisms. Historical-critical scholarship holds it almost certain from our sources that Jesus was known in his day as a healer-exorcist, which introduces comparison with other well-attested faith healers and exorcists. Intriguing parallels have been discovered between Jesus' activity and that of modern figures, as captured by anthropological studies of faith healing and spirit possession (Eve 2009: 51–69). Needless to say, these figures operate within traditional/folk settings appropriate to their own cultures rather than Western scientific medicine. At any rate, the parallels illustrate that it is possible to create social-scientific models of Jesus' work – plausibly naturalistic therefore – without broaching the vexed question of whether this work counts

as miraculous or not in itself. It is important to note that, as well as parallels, there are also many points of difference between the Jesus traditions and modern accounts, so it is not as though the traditions are being 'explained away', more that the models establish a kind of plausibility case. Among the many points of difference would be the Gospels' emphasis on Jesus' work as uniquely revelatory and prophetic. Any social scientific account of his healing and exorcism ministry is unlikely to capture the full extent of this emphasis; theological, literary, and historical scholarship is required for a more complete picture.

5 The resurrection of Jesus

The miraculous life events of Jesus – the virgin birth, transfiguration, resurrection, and ascension – introduce further considerations to those in the previous section, and so deserve a section of their own.

The virgin birth has been a particular site of contention in critical scholarship; it is an understated element of the New Testament presentation of Jesus, appearing only briefly, and in only two out of the four gospels. Doubts are therefore often raised about the historical veracity of this story, as well as its christological significance and relevance for modern Christian faith. Some wonder if perhaps a merely symbolic interpretation is preferable, especially since, as with other miracle traditions, the scientific implausibility raises further issues for modern people. There have been attempts to make the story more credible by finding naturalistic solutions – usually by explaining Mary's virginal conception in terms of other mammalian species known for their ability to reproduce asexually – but these introduce plausibility problems of their own, and (again) are not especially illuminating of the depths of the theological tradition. It can hardly be forgotten that the virginal conception of Mary is a core element of traditional Christian belief, appearing in the Nicene Creed, for instance, and it is upheld by the Roman Catholic magisterium (see Brown 1993: 697–712 for a comprehensive review). In other words, the story is highly significant in Christian orthodoxy, even if many modern Christians prefer a gentle agnosticism, perhaps explaining the virgin birth (and other miraculous life events of Jesus) as later legendary accretions to the earliest Jesus stories.

Agnosticism and denial are not so straightforward when it comes to the resurrection of Jesus, since it is fundamental to Christian faith at every level. Therefore, those who wish to rationalize the resurrection – while still affirming Christian faith – must usually find an alternative to straight denial or scepticism. Modern science may provide naturalistic/rationalistic ways of affirming some of the major miracle stories of the Hebrew Bible such as the sea crossing, but it offers no assistance here. Some fantastical naturalistic interpretations have been offered whereby (for instance) a nuclear reaction occurred which transformed Jesus' body into neutrinos, allowing him to dematerialize out of the tomb and materialize elsewhere again (Tipler 2007). Such amazingly speculative scenarios seem

more like sci-fi than science, and they shed no light on the biology of resurrection, still less the gospel texts.

More accessible rationalizations tend to doubt the New Testament traditions of bodily resurrection while still affirming some kind of spiritual or symbolic transformation in Jesus. Perhaps Jesus' resurrection was 'spiritual' but not bodily – the disciples were effectively witnessing a 'ghost' – or perhaps the resurrection should be seen as a metaphor for a surprising feeling of new purpose experienced by the disciples soon after Jesus' death. While such rationalizations may offer a crumb of comfort in the modern sceptical age, they arguably introduce more problems than they solve, since Christian soteriology and eschatology lose much of their content and force if the bodily reality of Jesus' risen state is denied. In any case, such rationalizations face a host of hermeneutical problems when considered as plausible interpretations of the Gospel resurrection texts (McGrew and McGrew 2009).

Biblical scholars have not been immune to such rationalizations of the resurrection, for instance Lüdemann (1994) who famously explained the Gospel resurrection appearances as corporate hallucinations by Jesus' disciples. However, the questions and doubts here are more often put to one side while the theological rationales of the New Testament resurrection texts are explored in their historical context. There, resurrection is seen not so much as another miracle to be explained to a sceptical modern audience, but as the eschatological token of God's new creation. The questions surrounding resurrection are therefore more to do with the reality of the next world than the science of this. The plausibility issues raised by the modern age are thereby displaced to some degree: faith in the historical and bodily resurrection of Jesus is as much about God's creative abilities to forge a new world out of this one as it is about God's wonder-working abilities in this world.

6 Conclusions

It is important to reflect on the shortcomings of an article such as this. The binary nomenclature of 'modern science' and 'biblical criticism' in its title is slightly unfortunate, but wholly inevitable. Unfortunate because the binary implies the standoff between science and religion that is captured in the myth of conflict, a binary which science-and-religion scholars have thoroughly discredited (see Science-Engaged Theology). Unfortunate also because modern science and biblical criticism are enormously diverse sets of disciplines in themselves, and therefore relate in much more complex ways than a simplistic binary might suggest. Yet the binary is also inevitable, precisely because of the myth of conflict: modern secular society assumes that each of these two entities will treat the Bible differently from the other, even though both are embedded in the modern worldview of naturalism (section 1.2). This article has argued that these two entities do treat the Bible differently, but not because of the myth of conflict. Instead, their differences

in treatment arise because these two kinds of discipline – which hold so many scholarly values in common, and which have evolved in parallel ways – bring very different kinds of specialist approaches to bear to the same data (the text of the Bible). While the sciences focus especially on naturalistic readings – an approach which tends to foreground those passages and motifs that seem to align with modern scientific thought – historical-critical biblical scholarship usually sees more interest in the historical development of the human thought that stands behind the text. Deciding upon the question of which approach is 'right' or 'best' is a different kind of task from the act of reading, a question that pitches different hermeneutics against each other. Schleiermacher pointed out that such a question will evolve as reading proceeds, but it is ultimately one for a third kind of expert beyond the scientist and the biblical scholar: the theologian.

Attributions

Bibliography

Further reading

- Harris, Mark. 2013. *The Nature of Creation: Examining the Bible and Science*. Durham: Acumen.
- Johnson, Luke Timothy. 2018. *Miracles: God's Presence and Power in Creation*. Louisville: Westminster John Knox Press.
- Keener, Craig S. 2011. *Miracles: The Credibility of the New Testament Accounts*. Grand Rapids: Baker Academic.
- Marlow, Hilary, and Mark Harris (eds). 2022. *The Oxford Handbook of the Bible and Ecology*. New York: Oxford University Press.
- Middleton, J. Richard. 2005. *The Liberating Image: The Imago Dei in Genesis 1*. Grand Rapids: Brazos.
- Morgan, Robert, and John Barton. 1988. *Biblical Interpretation*. Oxford: Oxford University Press.
- Twelftree, Graham H. (ed.). 2017. *The Nature Miracles of Jesus: Problems, Perspectives and Prospects*. Eugene: Cascade.

Works cited

- Alexander, Denis. 2008. *Creation or Evolution: Do We Have To Choose?* Oxford: Monarch.
- Barbour, Ian G. 1997. *Religion and Science: Historical and Contemporary Issues*. New York: HarperCollins.
- Blackburn, Barry L. 2011. 'The Miracles of Jesus', in *The Cambridge Companion to Miracles*. Edited by Graham Twelftree. Cambridge: Cambridge University Press, 113–130.
- Brown, Raymond E. 1993. *The Birth of the Messiah: A Commentary on the Infancy Narratives in the Gospels of Matthew and Luke*. The Anchor Bible Reference Library. New York: Doubleday.
- Brown, William P. 2010. *The Seven Pillars of Creation: The Bible, Science, and the Ecology of Wonder*. New York: Oxford University Press.
- Bultmann, Rudolf. 1961. *Kerygma and Myth: A Theological Debate*. Edited by Hans Werner Bartsch. New York: Harper & Row.
- Collins, C. John. 2018. *Reading Genesis Well: Navigating History, Poetry, Science, and Truth in Genesis 1-11*. Grand Rapids: Zondervan.
- Copan, Paul, and William Lane Craig. 2004. *Creation Out of Nothing: A Biblical, Philosophical, and Scientific Exploration*. Grand Rapids: Baker Academic and Apollos.
- Dawes, Gregory W. (ed.). 1999. *The Historical Jesus Quest: A Foundational Anthology*. Leiden: Deo.

- Earth Bible Team. 2000. ‘Guiding Ecojustice Principles’, in *Readings from the Perspective of Earth*. Edited by Norman C. Habel. Sheffield: Sheffield Academic Press, 38–53.
- Eve, Eric. 2009. *The Healer From Nazareth: Jesus’ Miracles in Historical Context*. London: SPCK.
- Galanopoulos, A. G., and E. Bacon. 1969. *Atlantis: The Truth Behind the Legend*. London: Nelson.
- Habel, Norman C. 2000. ‘Introducing the Earth Bible’, in *Readings from the Perspective of Earth*. Edited by Norman C. Habel. Sheffield: Sheffield Academic Press, 25–37.
- Harris, Mark. 2007. ‘How Did Moses Part the Red Sea? Science as Salvation in the Exodus Tradition’, in *Moses in Biblical and Extra-Biblical Traditions*. Edited by Axel Graupner and Michael Wolter. Berlin: de Gruyter, 5–31.
- Harris, Mark. 2013. *The Nature of Creation: Examining the Bible and Science*. Durham: Acumen.
- Harris, Mark. 2015. ‘The Thera Theories: Science and the Modern Reception History of the Exodus’, in *Israel’s Exodus in Transdisciplinary Perspective: Text, Archaeology, Culture, and Geoscience,*. Edited by Thomas E. Levy, Thomas Schneider, and William H. C. Propp. Switzerland: Springer, 91–99.
- Harris, Mark. 2018a. ‘Apocalypses Now: Modern Science and Biblical Miracles: The Boyle Lecture 2018’, *Zygon* 53: 1036–1050.
- Harris, Mark. 2018b. ‘The Biblical Text and a Functional Account of the Imago Dei’, in *Finding Ourselves After Darwin: Conversations on the Image of God, Original Sin, and the Problem of Evil*. Edited by Stanley P. Rosenberg. Grand Rapids: Baker Academic, 48–63.
- Harris, Mark. 2020. ‘Plundering Egypt: Exodus Documentaries and the Exploitation of History’, in *The Bible on Television*. Edited by Helen K. Bond and Edward Adams. London: T&T Clark, 189–222.
- Harrison, Peter. 1998. *The Bible, Protestantism, and the Rise of Natural Science*. Cambridge/New York: Cambridge University Press.
- Harrison, Peter. 2008. ‘The Development of the Concept of Laws of Nature’, in *Creation: Law and Probability*. Edited by Fraser Watts. Aldershot: Ashgate, 13–35.
- Hoffmeier, James K. 1996. *Israel in Egypt: The Evidence for the Authenticity of the Exodus Tradition*. New York/Oxford: Oxford University Press.
- Horrell, David G. 2010. *The Bible and the Environment: Towards a Critical Ecological Biblical Theology*. London: Equinox.
- Humphreys, Colin J. 2003. *The Miracles of Exodus: A Scientist’s Discovery of the Extraordinary Natural Causes of the Biblical Stories*. London/New York: Continuum.

- Johnson, Elizabeth A. 2014. *Ask the Beasts: Darwin and the God of Love*. London: Bloomsbury.
- Kitchen, K. A. 2003. *On the Reliability of the Old Testament*. Grand Rapids/ Cambridge: Eerdmans.
- Krauss, Lawrence M. 2012. *A Universe From Nothing: Why There Is Something Rather Than Nothing*. New York: Free Press.
- Lessing, Gotthold Ephraim. 2005. *Philosophical and Theological Writings*. Edited and translated by H. B. Nisbet. Cambridge: Cambridge University Press.
- Loke, Andrew Ter Ern. 2022. *The Origin of Humanity and Evolution: Science and Scripture in Conversation*. London: T&T Clark.
- Longman, Tremper, III, and John H. Walton. 2018. *The Lost World of the Flood: Mythology, Theology, and the Deluge Debate*. Downers Grove: IVP.
- Lüdemann, Gerd. 1994. *The Resurrection of Jesus: History, Experience, Theology*. London: SCM.
- Macquarrie, John. 1990. *Jesus Christ in Modern Thought*. London/Philadelphia: SCM/Trinity Press International.
- Mambrol, Nasrullah. 2017. 'Literary Criticism of Friedrich Schleiermacher', https://literariness.org/2017/12/23/literary-criticism-of-friedrich-schleiermacher/
- Marlow, Hilary, and Mark Harris (eds). 2022. *The Oxford Handbook of the Bible and Ecology*. New York: Oxford University Press.
- Masse, W. Bruce. 2007. 'The Archaeology and Anthropology of Quaternary Period Cosmic Impact', in *Comet/Asteroid Impacts and Human Society: An Interdisciplinary Approach*. Edited by P. Bobrowsky and H. Rickman. Berlin: Springer, 25–70.
- McGrew, Timothy, and Lydia McGrew. 2009. 'The Argument From Miracles: A Cumulative Case for the Resurrection of Jesus', in *The Blackwell Companion to Natural Theology*. Edited by William Lane Craig and J. P. Moreland. New York: Blackwell, 593–662.
- McLeish, Tom. 2014. *Faith and Wisdom in Science*. Oxford: Oxford University Press.
- Middleton, J. Richard. 2005. *The Liberating Image: The Imago Dei in Genesis 1*. Grand Rapids: Brazos.
- Miller, J. Maxwell, and John H. Hayes. 1986. *A History of Ancient Israel and Judah*. London: SCM.
- Morgan, Robert, and John Barton. 1988. *Biblical Interpretation*. Oxford: Oxford University Press.
- Murphy, George L. 1994. 'Cosmology and Christology', *Science & Christian Belief* 6: 101–111.
- O'Leary, Don. 2007. *Roman Catholicism and Modern Science: A History*. New York/London: Continuum.

- Propp, William H. C. 1999. *Exodus 1–18: A New Translation with Introduction and Commentary*. The Anchor Yale Bible Commentaries. New Haven, CT: Yale University Press.
- Rüggemeier, Jan, and Elizabeth E. Shively. 2021. ‘Introduction: Towards a Cognitive Theory of New Testament Characters: Methodology, Problems, and Desiderata’, *Biblical Interpretation* 29: 403–429.
- Ryan, William, and Walter Pitman. 1999. *Noah’s Flood: The New Scientific Discoveries About the Event That Changed History*. New York: Simon & Schuster.
- Schleiermacher, Friedrich. 1998. *Hermeneutics and Criticism and Other Writings*. Cambridge Texts in the History of Philosophy. Edited and translated by Andrew Bowie. Cambridge: Cambridge University Press.
- Sollereder, Bethany N. 2019. *God, Evolution, and Animal Suffering: Theodicy Without a Fall*. London/New York: Routledge.
- Tipler, Frank J. 2007. *The Physics of Christianity*. New York: Doubleday.
- Twelftree, Graham H. 1999. *Jesus the Miracle Worker: A Historical and Theological Study*. Downers Grove: IVP.
- Twelftree, Graham H. (ed.). 2017. *The Nature Miracles of Jesus: Problems, Perspectives and Prospects*. Eugene: Cascade.
- Walton, John H. 2009. *The Lost World of Genesis One: Ancient Cosmology and the Origins Debate*. Downers Grove: IVP.
- Whitcomb, John C., and Henry M. Morris. 1961. *The Genesis Flood: The Biblical Record and Its Scientific Implications*. Phillipsburg, NJ: Presbyterian & Reformed Publishing Company.
- White, Lynn T., Jr. 1967. ‘The Historical Roots of Our Ecologic Crisis’, *Science* 155: 1203–1207. https://doi.org/10.1126/science.155.3767.1203