

The Bible, Science & Creation¹

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It may seem strange, but there is one thing on which both the ‘new atheists’ and fundamentalist Christians are agreed. This is that Genesis 1–3 should be read as a scientific account of the origin of the cosmos and of humans. When read this way it is clearly at odds with modern science. This leads the new atheists to reject the biblical account as a piece of outmoded pre-scientific speculation. It leads the fundamentalist Christians to reject modern scientific theories of origins, claiming that they are the result of atheistic, materialistic presuppositions which distort the understanding of the evidence.

My contention in this paper is that both sides of this stand-off are wrong because they misunderstand the nature and purpose of the biblical account. I think they do this because both are trapped in a particularly blinkered version of the Enlightenment view of truth and how truth has to be expressed. This prevents them seeing that there are different kinds of truth and that truth can be expressed in a number of different ways besides literal prose. However, I’m not going to argue that point here.

A Basic Proposition

My basic proposition is that Genesis 1–3 should not be read as a quasi-scientific, chronological account of the origins of the cosmos and humans but as a figurative theological account of the nature and purpose of God’s creation.

This is not a new approach forced on us by modern science. Jewish scholars say that in the time of Jesus most rabbis understood creation to have been a single act, which Genesis 1 presents in terms of a symbolic scheme.² This is how the Jewish scholar Philo of Alexandria, an older contemporary of Jesus (ca. 20 BC – AD 50), understood Genesis 1, and he also read Genesis 2 – 3 in an allegorical way.³ The Jewish writer Josephus, who lived a little while after Jesus (AD 37 – c. 100), says that in Genesis 2 – 3 Moses wrote ‘philosophically’, by which he is generally understood to mean that this is not to be taken as an historical account of what happened.⁴ Given this apparently quite widespread view among the Jews of the time, we should be wary of simply assuming that Jesus and the Apostle Paul ‘must’ have understood Genesis 1 – 3 in a non-figurative way.

Since at least Origen in the early third century AD some Christian scholars have read these chapters figuratively. In Origen’s case the motivation for this was due largely to what he saw as literary ‘clues’ within the text. With regard to Genesis 1 he says,

¹ This paper is based on a lecture sponsored by the Faraday Institute for Science and Religion, St Edmund’s College, Cambridge and delivered in Cambridge on 28 May 2014.

² N. Samuelson, *Judaism and the Doctrine of Creation*, Cambridge: CUP, 1994, 115.

³ Philo, *De Opificio Mundi*, in *The Works of Philo: New Updated Edition*, (trans. C. D. Yonge), Peabody: Hendrickson, 1993, 4; *Legum Allegoriae I & II*, in *The Works of Philo: New Updated Edition*, (trans. C. D. Yonge), Peabody: Hendrickson, 1993, 25 – 49.

⁴ Josephus, *Antiquities of the Jews*, Preface sect. 4 & Book 1.2.

‘What person of intelligence, I ask, will consider as a reasonable statement that the first and the second and the third day, in which there are said to be both morning and evening, existed without sun and moon and stars, while the first day was even without a heaven? ... I do not think anyone will doubt that these are figurative expressions which indicate certain mysteries through a semblance of history.’

Here he is arguing that the fact that a literal, chronological reading of the text leads to an obvious absurdity is an indication that it is to be read in a figurative way for its theological message. Commenting on Genesis 2 – 3 he says,

‘Who could be found so silly as to believe that God, after the manner of a farmer ‘planted trees in a paradise eastward in Eden’ ... And when God is said to ‘walk in the paradise in the evening’ ... I do not think anyone will doubt that these are figurative expressions which indicate certain mysteries through a semblance of history.’⁵

In this case it is the anthropomorphic depiction of God that leads him to read the whole text in a figurative way as a text with a theological, but not an historical, meaning.

In his commentary on Genesis, written in AD 1554, and so some seventy years before Galileo got into trouble with the Roman Catholic Church and the ‘Bible and science’ debate began to get heated, the great Protestant reformer and biblical scholar John Calvin wrote concerning Genesis 1, ‘He who would learn astronomy and other recondite arts, let him go elsewhere’.⁶ In Calvin’s day ‘recondite arts’ included science and technology. He is saying, ‘Do not go the Bible to get answers to scientific questions’. He bases this on the nature of the language in Genesis 1 and also its purpose, arguing that the language used in Genesis 1 is that of ‘the ordinary person’ and not that of the scholar. As a consequence, it is also what might be called ‘the language of appearance’, which refers to the world as it seems to be, which may be different from the way it actually is.

What this means can be illustrated in modern terms with reference to the particular verses which prompted Calvin’s comments. Genesis 1:8 refers to a *rāqîa*, which God made to separate the waters above the heavens from those beneath the heavens. The translators of the King James Authorised Version of the Bible (AD 1611) rightly translated this Hebrew word as ‘firmament’, meaning something firm or solid. The Hebrew word does denote something solid, probably made of beaten-out metal. The Jewish scholars who first translated Genesis into Greek around 250 BCE understood it that way, since they translated it into Greek as *stereōma*, a word meaning ‘something solid’. It is clear from the Old Testament that the Hebrews visualised the heavens as a metal dome. For example, Elihu says to Job, ‘Can you, like him [God], spread out the skies, hard as a molten mirror?’⁷ In the ancient Near East mirrors were made of polished copper or bronze.

In Genesis 1:16 the Moon is described in the same way as the Sun as ‘a great light’, using a word that is used of a self-luminous entity such as an oil lamp. However, we know that this is not the case. The Moon is not self-luminous but reflects the Sun’s light. A somewhat more

⁵ Origen, *First Principles*, (trans. G. Butterworth; London: SPCK, 1936) Book 4, ch. 3, sect. 1.

⁶ J. Calvin, *Commentary on Genesis*, 1554, on Gen. 1:8, trans. Revd. King, Grand Rapids: Eerdmans, 1948.

⁷ Job 37:18, cf. references to the heavens being ‘as brass’ in Lev. 26:19; Deut. 28:23.

‘scientific’ description would have said that the Sun is a ‘great light’ and the Moon a ‘great mirror’. But that is not how it appeared to the ancient Hebrews.

When Galileo was first charged with contradicting the Bible by teaching Copernicanism he wrote a letter to the Grand Duchess Christina in AD 1615 defending his position. In it is the much-quoted sentence concerning the purpose of the Bible, ‘The intention of the Holy Ghost is to teach us how one goes to heaven, not how heaven goes.’⁸ In fact these were not his own words. He attributes them to Cardinal Baronius. Clearly, in the early seventeenth century, there were those in the leadership of the Roman Catholic Church who, like Calvin, argued that the purpose of the Bible was not to answer what we would now call scientific questions. In fact these words come at the end of a passage in which Galileo quotes St Augustine of Hippo as saying in his *De Genesi ad literam* ii. 9 that the question of whether or not the heavens revolve around some axis, as they appear to, is not to be settled by appeal to the Bible but by ‘subtle and profound reasoning’. Rather, says, Augustine, the Bible is to be used ‘to instruct [people] in essential matters more directly conducing to their salvation.’

In their commentaries on Genesis both St Augustine and Calvin accept that biblical scholars need to take into account information from outside the Bible as they do their interpretation. Calvin expresses the theological basis for this in his *Institutes of the Christian Religion*. He says, ‘If we hold the Spirit of God to be the only source of truth, we will neither reject nor despise the truth, wherever it may reveal itself, less we offend the Spirit of God’.⁹

Interpreting Genesis 1 – 3

A good deal of confusion and debate arise with regard to Genesis 1 – 3 because many people today simply assume that it is legitimate to turn to these chapters in search of answers to chronological and scientific questions about human origins. Little thought is given to the necessity of first asking such hermeneutically important questions as, ‘What kind of language is being used here?’, ‘What kind of literature is this?’, ‘What is the expected audience?’, ‘What is the purpose of these chapters?’, ‘What relevant extra-biblical knowledge is there?’. It is only when such questions have been answered that we can decide what kind of questions it is legitimate to ask of a text and expect to get sensible answers.

From a Christian perspective these questions are relevant and important when reading the Bible because in the Bible God’s message is revealed using what one might call ‘the principle of incarnation’. This is, of course, supremely true of the revelation of God in Jesus, the Divine Word (Message) made flesh (John 1:14). Jesus came as a human being with a specific gender and ethnicity, embedded in a specific culture, speaking a specific language, at a specific point in history. All this shapes how the revelation of God is expressed in Jesus. The more we know about Jesus’ specific circumstances, the better able we are to understand that revelation. The same is true of Paul’s letters to specific churches, each with their own context; of the preaching of the OT prophets, each in their own particular historical situation; of the OT Laws, related to the needs of an ANE agricultural economy; and of Genesis 1-3. God’s revelation in the Bible always comes in ‘incarnated’ form, shaped by the linguistic, literary, cultural and historical contexts in which it was given.

⁸ Galileo Galilei, *Letter to the Grand Duchess Christina*, translated in: *Science and Religious Belief 1600 – 1900: A Selection of Primary Sources*, D. C. Goodman (ed.), Dorchester: John Wright & Sons for The Open University Press, 1973, 34.

⁹ J. Calvin, *Institutes of the Christian Religion*, 1559, 5th edition, 2.2.15. Translated by H. Beveridge, London: James Clarke & Co., 1962.

Although, thanks to archaeological discoveries, it has become increasingly clear over the past century or so that Genesis 1 – 3 fits into a context of ancient Near Eastern literature and thought about creation this is often not taken seriously by people who read these chapters seeking information about cosmic and human origins. Some assume that it can be read as if it shares and addresses our post-enlightenment scientific concerns, when it does not. Clifford and Collins list four major differences between ancient Near Eastern (ANE) and scientific ways of approaching the topic of creation.¹⁰

1. ANE writers imagine and present divine action in creation on the model of human making or natural activity. Scientists regard creation as the impersonal action of physical forces.
2. The focus of ANE accounts is the emergence of human society. They are primarily concerned about the origins of community and culture. Scientists are primarily concerned about the emergence of the physical world.
3. ANE texts present creation as a drama, a story. The story is usually selective and incomplete because it has a limited purpose. Science offers an account of the unfolding of an impersonal process governed by the laws of nature and seeks to be as comprehensive as possible.
4. The criterion of truth in the ANE accounts is functional, ‘Does the story enable me to cope satisfactorily with some aspect of life now?’ For scientists the criterion is, ‘Does it explain all the scientific data satisfactorily?’

Now, the OT comes from this ANE world, *not* from the scientific culture of the modern Western world. We must therefore read it in the context of ANE culture and its interest in creation, not ours. If we don’t do that we are not really listening to the Bible, but simply hearing our own voice echoing off its pages. As Pinnock and Callen put it,

‘Unless we pay due attention to the form in which God’s word comes to us, we will not be able to grasp what that Word is. Instead we will tend to twist the text and make it say what our context wants to hear. If we replace the original sense by superimposing upon the text our modern set of assumptions, we will abuse the Bible as surely as if we had denied its authority.’¹¹

If we are to take the ANE context of Genesis 1 – 3 seriously we must not read it as if it were a quasi-scientific, chronological account of creation, but as a story, indeed as two stories. **Genesis 1:1 – 2:4a** is the story of the creation of planet earth and its creatures by a worker who does a planned and ordered week’s work. At the start ‘the heavens and the earth’ are ‘shapeless and empty’. The first three days are spent shaping them by acts of separation: separating light from darkness, the waters above the firmament from those below it, the dry land with plants on it from the waters. On each of the next three days these ‘shapes’ are each filled with appropriate creatures. This is why the Sun, Moon and stars do not appear until Day Four to fill the ‘shape’ of ‘light and darkness’ made on Day One. On Day Five the birds are made to fly across the face of the firmament and the fish are made to fill and swim in the waters below it. The animals and humans are made on Day Six to fill the land and eat the vegetation that grows on it. On the seventh day the worker rests, so setting a pattern for human work and leisure. The scheme is figurative and logical, not historical and

¹⁰ R. J. Clifford & J. J. Collins, ‘Introduction: The Theology of Creation Traditions’, in R. J. Clifford & J. J. Collins, *Creation in the Biblical Traditions, CBQMS 24*, Washington D.C.: Catholic Biblical Association of America, (1992), 1 – 15.

¹¹ C. H. Pinnock & B. L. Callen, *The Scripture Principle*, Grand Rapids: Baker, 2006, 114.

chronological. As with other ANE creation stories the focus is the creation of humans and their nature and purpose.

Walton argues that in ANE creation stories something is thought of as created, not when it exists as a material entity, but when it is given a function relative to human beings, ‘People in the ancient world believed that something existed not by virtue of its material properties, *but by virtue of its having a function in an ordered system* .. That is, in relation to society and culture.’¹² On the first three days God brings into being three functional systems that are crucial for human life: the time system, the weather system and the food system. When God’s acts of creation are described as ‘good’ the Hebrew word used, *tôb*, is best understood in its commonest sense as ‘fit for purpose’. These three systems were fit for the purpose of making human society and culture possible on earth.

Genesis 2:4b – 25 is primarily about the creation of human beings and uses the model of human making of a potter or sculptor. It, too, should be read as a figurative narrative which conveys theological truths about God and the nature and purpose of God’s creation. It uses motifs that are found in other ANE creation stories: a well-watered paradise, humans made from clay and a divine element, the institution of marriage.¹³ The focus of the account of the creation of humans in Genesis 2 is the bringing into being of the functional system which was seen as the basis of society in the ANE, namely marriage. A misunderstanding of the significance of the theme of ‘naming’ in the story sometimes overshadows this. It is often assumed that the naming of the animals by Adam in Genesis 2 is about his exertion of authority or power over them. However, in a careful study of naming incidents in the Old Testament Ramsey has shown that this is not the meaning of such acts.¹⁴ Indeed, in some notable cases a naming follows the *loss* of authority or power over what is named.¹⁵ Ramsey argues that name-giving in the Old Testament is not an act of domination but of discernment of a situation. Through naming the animals Adam discerns, as God has already, that none of them is a suitable companion for him. After the woman’s creation his naming of her is not an act of domination but shows that he has discerned that she is that suitable companion, and the marriage relationship is described.

The story in Genesis 3 has no exact parallel in extant ANE literature. It does, however, have a number of motifs in common with other ANE literature: the desire of humans to become like God through acquiring wisdom and immortality, the tree of life, being deprived of the tree of life by a serpent, the loss of harmony with the non-human creatures.¹⁶ This story provides a profound theologically based analysis of the human condition. Because the relationship between humans and their Creator has been ruptured by disobedience, three other vital relationships have been affected. The individual human being is no longer at ease with her/himself: Adam and Eve felt shame. This is the root of our psychological problems. Secondly, the relationship between humans has gone wrong: Adam blamed Eve. Here we see

¹² J. H. Walton, *The Lost World of Genesis 1*, Downers Grove: IVP Academic, 2009, 26. For more detail on this see, J. H. Walton, *Genesis 1 as Ancient Cosmology*, Winona Lake: Eisenbrauns, 2011, 119 – 121.

¹³ See, for example, the stories of *Atrahasis* and *Enuma Elish* in: S. Dalley, *Myths from Mesopotamia*, Oxford: OUP, 2008 (rev. ed.).

¹⁴ G. Ramsey, “Is Name-Giving an Act of Domination in Genesis 2:23 and Elsewhere?”, *Catholic Bible Quarterly* 50(1988), pp. 24 – 35.

¹⁵ For example: Gen. 26:17 – 21; 1 Sam. 4:19 – 22.

¹⁶ See, for example, the stories of *Adapa* and *Gilgamesh* in: S. Dalley, *Myths from Mesopotamia*, Oxford: OUP, 2008 (rev. ed.).

the root of our social problems. Thirdly, humans are out of harmony with the non-human creation: the ground is cursed. This is the root of our ecological problems.

The Purpose of Genesis 1 – 3

When Genesis 1 – 3 is seen in its ANE context it is clear that the purpose of these chapters is not to provide what we would regard as scientific information but to provide the ancient Hebrews with an understanding of the nature and purpose creation, and of the place of humans in it, which stood in contrast with the ideas of the cultures around them. This has been the view of most Old Testament scholars for several decades.¹⁷ I will indicate briefly three examples of such polemic against ideas widely held in the ANE.

We have already noted that in Genesis 1:16 the Sun and the Moon are referred to as ‘great lights’, using a common word that could be used of any self-luminous entity, such as an oil lamp. Why didn’t the writer use the normal Hebrew words for ‘Sun’ and ‘Moon’? Very probably the reason is that in the cultures around them these words are the names of important gods, since the Sun, Moon and planets were regarded as the manifestations of major deities. It is notable that in the Babylonian creation story *Enuma Elish* Marduk does not create the Sun and Moon, because they already exist as gods, but simply assigns them their ‘stands’ or places in the heavens he creates.¹⁸ In Genesis 1 these heavenly bodies ‘rule’ the day and the night simply in the sense of being calendar markers. In the other cultures they ruled people’s lives by determining what happened to them. Hence they needed to be worshipped. By describing them as simply great oil lamps in the sky Genesis is attacking polytheism in general and astrology in particular. Several times in the Old Testament the Hebrews are told not to worship or bow down to the Sun and Moon and stars, a prohibition which was sometimes broken, ‘When you look up to the heavens and see the sun, the moon, and the stars, all the host of heaven, do not be led astray and bow down to them and serve them.’¹⁹

In Genesis 1 two verbs are used of God’s activity: *bārā* (‘to create’) and *‘āśāh* (‘to make’). In the OT the first is only used with God as subject when used in the active form. The second is used of human making. The use of it in Genesis 1 is one reason for seeing it as a figurative account using the model of human making of God’s creative activity. The fact that *bārā* is used of the creation of humans in v. 27 is sometimes taken to indicate that there was something special about the way humans were created. This, however, ignores its use in v. 1. Here ‘the heavens and the earth’ is probably a figure of speech called a ‘merism’ which refers to two extremes to express the idea of ‘everything’. Its use is very common in Hebrew. So, everything, not just humans, is ‘created’. The same point is made at the end of the story in 2:3. Even more significantly, the only other use of *bārā* in the story is in v. 21, ‘And God created the great sea monsters’. Why is it used there? Not because there was anything special about the way these monsters were created, but because these monsters had a special theological significance in ANE thought. In Mesopotamian, and possibly Canaanite, thinking about creation the creator god had to defeat the forces of chaos before being able to create an ordered world. These forces are depicted as hideous monsters in raging waters.²⁰ The

¹⁷ See, for example, G. F. Hasel, ‘The Polemic Nature of the Genesis Cosmology’, *EvQ*, 46 (1974), 8 – 102.

¹⁸ S. Dalley, *Myths from Mesopotamia*, Oxford: OUP, 2008 (rev. ed.), 255.

¹⁹ For example: Deut. 4:19; 17:3; 2 Kgs 17:16; 21:3; 23:5.

²⁰ S. Dalley, *Myths from Mesopotamia*, Oxford: OUP, 2008 (rev. ed.), 237.

Hebrews were aware of this imagery because their poets and prophets make use of it when referring to Yahweh as Creator.²¹ They even name one of the monsters as Leviathan, the name of a monster in Canaanite texts which date from before 1200 BC, centuries before the Hebrew poets use it.²² So, Genesis 1 does not use *bārā* to indicate acts of creation that are special because of ‘how’ God made things but to make a polemical point by indicating acts that have a special theological significance. The God the Hebrews worshipped created everything. Yahweh did not have to battle with chaos monsters, any monsters there are were made by Yahweh. Yahweh has a special purpose for humans.

Genesis 1:26 – 28 makes clear that humans have a special place and function in God’s world. Only they are made in God’s image and likeness and they are given dominion over the rest of creation. In Genesis 3 Adam and Eve, before their disobedience, had an intimate relationship with God. This is a very different picture of the nature and function of humans from that found in the Babylonian texts. In these texts humans are created to be the slaves of the gods, having ‘the work of the gods’ imposed on them.²³ It is their role to ‘bear the yoke’, to ‘bear the load of the gods’, by providing them with what they need: houses (temples), food and drink (sacrifices).²⁴ It has also been noted that in the cultures around ancient Israel it is only kings who are sometimes spoken of as being the image of the national deity. In Genesis 1 it is every human being, male and female, who is made in the image of God.

Down the centuries there has been much debate about what it means for humans to be made in ‘the image and likeness of God’. There is general agreement among Old Testament scholars today that ‘image’ and ‘likeness’ do not refer to two different things but are used in typical Hebraic parallelism as two ways of referring to the same thing. There is also now a wide consensus that what being made in ‘the image and likeness of God’ means is indicated by v. 26b and v. 28 in which humans are given dominion over the other creatures. The terms ‘image’ and ‘likeness’ can be used of statues. In the ANE rulers set up statues of themselves in various parts of their domain so that their subjects would know who ruled them.²⁵ Humans were intended to be the representatives of God on earth, ruling it on God’s behalf. This implies that the human personality can express, in a finite way, something of the nature of God. It is only because this is so that the incarnation of the Word was possible. God is spirit (John 4:24) and the qualities by which humans can reflect the nature of God, such as the ‘fruit of the Spirit’ that the Apostle Paul lists in Galatians 5:22, are not going to result in any physical change that could be seen in the fossil remains of ancient hominins.

Genesis 1 and Science

If we follow Calvin’s advice and do not try to glean scientific information from the Genesis 1 – 3, can we learn anything from them that is relevant to science? History indicates that we can. For example, we learn the following vital theological truths from Genesis 1:

1. There is one, self-existent, Creator God.
2. This Creator is rational (the biblical term would be ‘wise’).

²¹ Pss.74:12 – 17; 89:8 – 12; Job 26:10 – 13; Isa. 51:9 – 10.

²² N. Wyatt, *Religious Texts from Ugarit*, Sheffield: Sheffield Academic Press, 1998, 115, n.4.

²³ S. Dalley, *Myths from Mesopotamia*, Oxford: OUP, 2008, 261.

²⁴ S. Dalley, *Myths from Mesopotamia*, Oxford: OUP, 2008, 15.

²⁵ See, for example, A. R. Millard & P. Bordreuil, ‘A Statue from Syria with Assyrian and Aramaic Inscription’, *Biblical Archaeologist*, 45 (1982), 124 – 43.

3. This is evident in the fact that the creation is ordered and planned.
4. Humans are created in the image and likeness of the Creator.
5. Creation was a free act of God.

The significance of these truths is that in light of the first three of them the early modern scientists concluded that there ought to be regularities, ‘laws of nature’, in the world. The fourth gave them the confidence that humans ought to be able to discern and understand these regularities, and the fifth indicated that humans cannot ‘second guess’ what God has done but must go out and observe and experiment in order to discover these regularities. Some philosophers and historians of science argue that the fact that these truths were part of the thought-world of late medieval Europe was a significant factor in the rise of modern science in Western Europe.²⁶

In the second part of this lecture I want to argue that two key theological assertions of the biblical creation stories are consonant with the modern scientific accounts of the origins of the cosmos and of humans.

The Bible and Cosmic Origins

In *A Brief History of Time* Stephen Hawking tells of an audience which a group of cosmologists had with the Pope in 1981. The Pope told them that the Roman Catholic Church had no problem with the Big Bang Cosmology, but that they ‘should not enquire into the big bang itself because that was the moment of Creation and therefore the work of God.’

Hawking comments, ‘I was glad then that he did not know the subject of the talk I had just given at the conference – the possibility that space-time was finite but had no boundary, which means it had no beginning, no moment of Creation. I had no desire to share the fate of Galileo.’²⁷ I think that both the Pope and Hawking were wrong in thinking that the question of the physical nature of the origin of our cosmos and whether or not it has a discernible date is of any relevance biblically and theologically. The fundamental issue in the Christian theology of creation has never been chronological but ontological. The roots of this, I suggest, are to be found in Genesis 1:1.

It must be said, first of all, that in Hebrew this verse is ambiguous. English versions have traditionally translated it in the way the KJAV does, ‘In the beginning God created the heaven and the earth (full stop)’. This has then been taken to refer to the ultimate origin of the material cosmos. However, some more recent translations, such as the GNB and the NRSV, adopt a different, but grammatically equally valid, translation, ‘In the beginning, when God created the heavens and the earth, the earth was a formless void’. This can be taken to mean that the story begins with the existence of an unformed and empty earth and is all about how it is given form and content. Such a reading would fit with Walton’s contention referred to above that in the ANE creation is not about the origins of material entities but about the origins of functional systems relating to human society. Whichever way one takes it, there is a point about Genesis 1:1 which is obscured in all our English translations. The standard

²⁶ R. G. Collingwood, *An Essay on Metaphysics*, Oxford: OUP, 1947, 127; I.G. Barbour, *Issues in Science and Religion*, Englewood Cliffs: Prentice-Hall, 1966, 45; R. Trigg, ‘The Christian roots of scientific reasoning’, in: *Can we be sure about anything?*, D. Alexander (ed.), Leicester: Apollos, 2005, 30 – 48; E. C. Lucas, ‘A biblical basis for the scientific enterprise’ in: *Can we be sure about anything?*, D. Alexander (ed.), Leicester: Apollos, 2005, 49 – 68.

²⁷ S. Hawking, *A Brief History of Time*, London: Bantam Press, 1988, 116.

Hebrew text, what is called the Massoretic Text, does not say ‘In the beginning’ but ‘In beginning’.

Let me explain this in some detail. In Hebrew the ‘definite article’, the word ‘the’, is not a separate word, as it is in English, but a prefix added to a noun to make it definite. There are rules about the vowel which must follow it. In English transliteration it is represented as the consonant ‘h’. There is, however, a complicating factor. Some Hebrew prepositions are not separate words, as they are in English, but are prefixes. This is true of the preposition ‘in’, which is a prefixed ‘b’, which takes its own particular vowel. When added to a definite noun the prefixed preposition replaces the ‘h’ of the prefixed definite article but, and this is the key point, the vowel that went with the definite article is kept, so indicating the presence of the ‘hidden’ definite article. The opening word of Genesis 1:1 has the prefixed ‘b’ with its own vowel (*b^erē’sîth*), not that of the definite article (*bārē’sîth*). Hence, it should be translated as ‘In beginning’. Now, the earliest Hebrew manuscripts do not have the vowel signs which are found in the Massoretic Text. They began to be used around about AD 700. However, we do know that the practice of reading Genesis 1:1 as ‘In beginning ...’ goes back a long way before this. It was read in this way by the Jewish scholars who first translated Genesis into Greek in about 250 BC. In Greek both the word ‘the’ and the proposition ‘in’ are separate words. The Greek translation of Genesis 1:1 is clearly ‘In beginning ...’, without the word ‘the’. Interestingly, this is also how John begins his Gospel, written in Greek, ‘In beginning was the word ...’. Again, our English translations hide that fact. No doubt John was deliberately echoing the Greek translation of Genesis 1:1.

What is the significance of this? I suggest that it shows that from an early period the Jews understood that the key thing about creation is not that it had any datable beginning, its chronology, but that the creation is dependent for its nature and existence on the Creator God, its ontology. This has always been the main point of the Judeo-Christian doctrine of *creatio ex nihilo*, ‘creation out of nothing’. It is debatable whether or not this can be legitimately read out of Genesis 1:1, but it is certainly a legitimate way of expressing the overall understanding of creation as expressed in the Hebrew Bible, even though it is not expressed in those terms until we find it in 2 Maccabees 7:28, ‘God made them [the heaven and the earth] out of things that did not exist.’ This probably dates from about 100 BC. It is echoed in the New Testament in Hebrews 11:3, ‘By faith we understand that the worlds were prepared by the word of God, so that what is seen was made from things that are not visible.’

In biblical times there were basically three ways of thinking about the relationship of the material world to God or the gods. One was dualism: the belief that both God and matter have always existed. All that God can do is shape matter, and it may resist God’s attempts to do this, as in Plato’s creation myth *Timaeus*. This makes matter an eternal evil principle over against the good God. A second approach is pantheism: the belief that God and the material world are intimately bound together, that in some way ‘all is God’. This was the view of the Stoics, who thought of God as the ‘soul of the universe’. Jews and Christians rejected both of these views. They were monotheists: believing that there is only one eternal, self-existent entity, God. All else that exists does so only because God brought it into being and continues to sustain its existence. It is a ‘creation out of nothing’ because it is not some kind of emanation from God and because ‘there was when it was not’, which cannot be said of God who is eternally self-existent. Note the absence of the word ‘time’ from that phrase, ‘there

was when it was not'. St Augustine of Hippo had the insight to realise that time is a property of the created order and did not exist before it was created. As he famously put it, God 'created the world *with* time not *in* time'.²⁸ There is a foreshadowing of Einstein's concept of the space-time continuum in this.

I have already made the point that the biblical story of creation makes clear that God was free to create whatever God wanted to in whatever way God wanted to do it. For this reason the debate about whether the cosmos has a datable beginning, as in the basic form of the Big Bang theory, or does not, as in Hawking's version of it and in the Steady State theory which for a while rivalled the big bang theory, is a debate that does not make any difference theologically. God was free to create any one of these types of universe, or maybe we have not yet really understood what type of universe it is! What we do need to be clear about is that science itself cannot address the question of whether or not this is a created universe. This is because it cannot address the question of the ultimate origin of energy and matter which, as Einstein showed, are two sides of the same coin. It simply presupposes their existence, and with its methodology energy and matter are all that it can investigate. All that scientific cosmology can ever do is take us back to some state of energy and matter. In the Big Bang theory this is a quantum vacuum. A quantum vacuum is not 'nothing', it is a special kind of energy field with an average energy of zero but the strange property that in it there are random fluctuations such that a 'big bang' can happen. There are scientists who are not religious believers who recognise this limitation of science. Prof. Martin Rees, who is the current Astronomer Royal and Professor of Astrophysics and Cosmology at Cambridge University, and says he is not a Christian believer, has written:

'The pre-eminent mystery is why anything exists at all. What breathes life into the equations of physics, and actualized them in a real cosmos? Such questions lie beyond science, however; they are the province of philosophers and theologians.'²⁹

It is this question, and not the questions asked by modern science, that is addressed by the story in Genesis 1.

The Bible and Human Origins

The other theological assertion I want to consider is that humans are special, being made in the image and likeness of God. I will argue that this does *not* require us to believe that at some point God intervened in a special way in the process of biological evolution to bring humans into existence.

Some people think that the way the creation of Adam is described in Genesis 2:7 suggests a special process, different from that used for other living creatures because, having 'formed man from the dust of the ground', God 'breathed into his nostrils *nishmath chayyîm* ('the breath of life') and the man became a *nephesh chayyāh* ('a living soul/being'). However, this is not the case. What some English translations hide is that the phrase *nephesh chayyāh* is used a few verses later to describe all the other creatures that God also created out of the ground (v. 19). Moreover, *nishmath chayyîm* is something possessed by all the creatures which Noah took into the Ark (Genesis 7:22). So, Genesis 2 does not imply a different mode

²⁸ St Augustine, *City of God*, Bk XI ch. 6. See: Augustine, *City of God*, trans. H. Bettenson, ed. D. Knowles, Harmondsworth: Pelican, 1981, 436. There is a lengthy discussion of the nature of time in Augustine's *Confessions*, Bk XI.

²⁹ M. Rees, *Our Cosmic Habitat*, Princeton: Princeton UP, 2003, xi.

of creation for humans from that for other living creatures. We've seen that the same is true of the use of *bārā*' of the creation of humans in Genesis 1:27. In these stories human specialness does not rest in *how* God created them but in the relationship which God chooses to have with them and the task God gives them.

Can we say anything about how this might come about through a seamless evolutionary process? Here I want to invoke two ideas that are being increasingly discussed in biology but are still somewhat controversial. The first, and less controversial, is the concept of 'emergent properties'. This is a concept which arises from the work done by Ilya Prigogine on what he called 'dissipative structures', for which he was awarded the Nobel Prize for Chemistry in 1977. What Prigogine and his collaborators have shown is that in some 'open' systems, that is, systems which can exchange energy or matter with their environment (which is true of biological systems), order and organisation can actually arise 'spontaneously' through a process of 'self-organisation'.³⁰ This new state of organisation is sometimes an 'emergent property', the existence of which could not have been predicted beforehand on the basis of the bottom-up reductionist view of cause and effect which is commonly used in science. An example of this is the organisation of electrons into 'Cooper pairs' that underlies the phenomenon of superconductivity. In his 1998 Nobel Prize lecture Robert Laughlin emphasised that this emergent property arises from the nature of certain metallic lattice structures as a whole and could not have been predicted in a bottom-up way.³¹ Emergent properties become more likely as a system increases in complexity. Peacocke argued that the genetic code is such a property.³² Its existence and nature depends on the physics and chemistry of DNA and the bases of which is made, but is not a necessary consequence of them nor could it have been predicted from them in a bottom-up way. It exists as a property of the networks of interrelations which constitute the living cell.

A concept that is related to emergent properties is 'top-down' or 'downward' causation. Since an emergent property is a property of a system as a whole at a certain level of complexity, it exerts constraints on the 'parts' of which the system is made, so that they behave differently than they would in isolation.³³

The nature of human self-consciousness is very poorly understood and hotly debated, but some researchers in the field have argued that it should be seen as an emergent property.³⁴ In a recent article entitled 'The New Century of the Brain' Yuste and Church say, 'the brain, too, probably exhibits emergent properties that are wholly unintelligible from the inspection of single neurons or even a coarse, low-resolution picture of the activity of large groups of neurons'.³⁵ In fact the idea of human consciousness as an emergent property was put forward by Alexander in the Gifford Lectures of 1916 – 18, but without the scientific backing it can now be given.³⁶ The philosopher Klapwijk argues for it in more modern terms as part of an

³⁰ I. Prigogine & I. Stenger, *Order out of Chaos*, London: Flamingo, 1988, xv.

³¹ Quoted by G. Ellis in 'View from the top', *New Scientist*, 17 August 2013, 28 – 29.

³² A. Peacocke, *God and the New Biology*, London: J. M. Dent & Sons, 1986, 25 – 26.

³³ A. Peacocke, *Theology for a Scientific Age*, London: SCM, 1993 (Enlarged Edition), 53 – 55.

³⁴ A. Peacocke, *Theology for a Scientific Age*, London: SCM, 1993 (Enlarged Edition), 60 – 61.

³⁵ R. Yuste & G. M. Church, 'The New Century of the Brain' *Scientific American*, 310.3 (March 2014), 22 – 29. The quote is from p. 25.

³⁶ S. Alexander, *Space, Time and Deity: The Gifford Lectures at Glasgow 1916 – 1918*, London: Macmillan, 1920. His ideas were developed further by C. L. Morgan in the Gifford lectures of 1921 – 1922, published as, *Emergent Evolution*, London: Williams and Norgate, 1923.

overall understanding of ‘emergent evolution’ developed within a Christian, Augustinian theological perspective.³⁷ Maybe self-consciousness arose when the central nervous system of hominins reached a critical degree of complexity. One could go on to argue that the same could apply to god-consciousness, an awareness that there might be a ‘higher being’ different in kind from humans. This is not to say that humans evolved to a point where they ‘discovered God’, but that the seamless process of biological evolution led to beings capable of communion with God and of reflecting something of God’s nature. At that point God took the initiative to offer to them a relationship with God. That would then be what the figurative story in Gen. 2&3 is about.

Most biologists would probably agree with a comment made by Maynard Smith that, ‘If one was able to re-play the whole evolution of animals ... there is no guarantee – indeed no likelihood – that the result would be the same. There might be no conquest of the land, no emergence of mammals, and certainly no human beings.’³⁸ This leads me to my second, more controversial, idea under this proposition. It is the argument of some biologists, notably Conway Morris, that while what Maynard Smith said is true in the strict sense that one could not guarantee the appearance of *Homo sapiens*, it is false in the very important sense that the appearance of a complex, intelligent life-form somewhat like *Homo sapiens* would be a near inevitability from a re-play of evolution on planet Earth.

Conway Morris, argues that there is good evidence that evolution was not a totally random process, but one that was quite constrained by the laws of nature, properties of matter and requirements of life on planet Earth. He draws four conclusions from an extensive survey of the history of evolution in general and the phenomenon of convergence in particular. An example of convergence is the fact that the camera-eye, such as we have, has arisen independently through the process of evolution in at least eight different creatures. He says,

‘First, what we regard as complex is usually inherent in simpler systems: the real and in part unanswered question in evolution is not novelty *per se*, but how it is that things are put together. Second, the number of evolutionary end-points is limited: by no means everything is possible. Third, what is possible has usually been arrived at multiple times, meaning that the emergence of the various biological properties is effectively inevitable. Finally, all this takes time. What was impossible billions of years ago becomes increasingly inevitable: evolution has trajectories (trends, if you prefer) and progress is not some noxious by-product of the terminally optimistic, but simply part of our reality.’³⁹

This leads him to the conclusion that ‘the constraints of evolution and the ubiquity of convergence make the emergence of something like ourselves a near-inevitability.’⁴⁰ From a specifically Christian perspective one might suggest that maybe this is because that is the way God the Creator planned things from before the foundation of the earth with regard to the laws of nature, the properties of matter and conditions on planet Earth.

³⁷ J. Klapwijk, *Purpose in the Living World? Creation and Emergent Evolution*, Cambridge: CUP, 2008, 94 – 95 & 164 – 72. He defines emergent evolution as ‘the coming to the fore of a new arrangement of being in such a way that new functions and properties arise, based on the functions and properties that were already present at preceding levels of being but not reducible to them, because they respond to laws of their own’, 104.

³⁸ J. Maynard Smith, ‘Taking a chance on evolution’, *New York Review of Books*, 14 May 1992, 34 – 36. The quote is on page 34, column 4.

³⁹ S. Conway Morris, *Life’s Solution: Inevitable Humans in a Lonely Universe*, Cambridge: CUP, 2003, xii – xiii.

⁴⁰ S. Conway Morris, *Life’s Solution: Inevitable Humans in a Lonely Universe*, Cambridge: CUP, 2003, 328.

Conclusion

To summarise. I have argued that Genesis 1 – 3 is not a text to which we can bring our modern scientific questions and expect to get sensible answers. To do that is to ignore its literary genre, the kind of language it uses, the audience for which it was written, and its purpose. It is an ANE text which expresses in figurative ways theological beliefs about God, the created order, and humans in particular. I have suggested that two of its key theological assertions, that we live in a created universe and that humans are made in the image and likeness of God, are compatible with the Big Bang Theory of the origin of the cosmos and an evolutionary understanding of human origins. This is because the scientific cosmology cannot address the question of the ontological status of the universe, and the theological assertion that humans are made in the image and likeness of God does not require that God intervened in a special way in the process of the biological evolution of humans.

Abstract

This paper argues that Genesis 1 – 3 should not be read for scientific information but as an ancient Near Eastern figurative story which conveys theological truth about the nature of God, the created order, and humans and of the role of humans in the created order. It goes on to argue that two of the key theological assertions in these chapters, that we live in a created universe and that humans are made in the image and likeness of God, are compatible with the Big Bang Theory of the origin of the cosmos and an evolutionary understanding of human origins.