S & CB (2011), **23**, 73–96 0954–4194

Reviews

Jitse M. van der Meer and Scott Mandelbrote (eds.)
Nature and Scripture in the Abrahamic Religions
Leiden: Brill. 2008. 1373 pp. 4 vols. $624.00 (set). ISBN 978 90 04 17191 6 (set)

The topic of this substantial multi-volume work is the history of the interaction between the interpreting of Scripture and the effort to chronicle/understand the natural world. Thirty-nine essays, averaging over thirty pages each, provide a wealth of historical detail and helpful commentary on the variety of ways in which the exegesis of Scripture has developed over the centuries while at the same time our knowledge of nature has progressed and deepened, asking how each of these developments has influenced the other. The essayists are drawn from a variety of fields, as one would expect in such a wide-ranging undertaking: the largest number from the history of science, with smaller and roughly equal numbers from theology/religious studies, history, and philosophy, representing mainly the English-speaking world. Despite the 'Abrahamic' of the title, only four of the essays range outside Western Christian history, directed to Orthodox, Jewish and Islamic concerns. It is impractical in the space of a short review to do justice here to individual essays. On the whole, they give impressive testimony to the range and depth of current research in this hitherto less explored area. Instead, it must suffice to supply an outline.

The books of Scripture contain many texts describing features of the natural world: Genesis in particular provides a review of the varieties of living thing. It was natural, then, that theologians of the early Christian church should draw on these for their own accounts of nature, God's handiwork. In doing so, they would immediately encounter the challenge afforded by the diversity of ways in which the Scripture itself might be interpreted, ways that would come to be described, in several senses of these slippery terms, as literal, allegorical, symbolic or spiritual. This would be of special importance when a tension would appear between a particular reading of the biblical text and some accepted feature of the natural knowledge of the day. Augustine, in particular, saw the importance of responding to this sort of challenge.

The advent of Aristotle's natural philosophy in the West in the twelfth century led to new versions of the challenge. Should his account of nature be privileged or resisted? How should biblical texts be interpreted when there appears to be a discrepancy between them and an Aristotelian claim? How far should one trust the suggestion that the biblical writers would accommodate their text to the capacities of the hearers of their time?

Two things happened together in the sixteenth century: the Reformation and the Copernican claim to move the earth. The former led to a turn to the literal in the interpretation of Scripture generally among Reformers and Catholics alike, complicating matters for the latter. The first major defenders of the sun-centred system, Kepler and Galileo, felt compelled to turn their attention to exegesis since theologians were arguing that biblical passages mentioning the sun's motion or the earth's rest called in question their own efforts. Both defenders called on the principle of accommodation: the texts correctly describe what people would actually see but not the full reality of what they see. Both argued that astronomy is not the concern of Scripture. Galileo's principal opponent, the theologian, Robert Bellarmine, insisted that the lit-

eral sense of the disputed texts had to be maintained unless the Copernican view could be conclusively demonstrated; he was confident that in principle it couldn't be. Galileo himself always maintained that only demonstration could establish something as a truth about nature. Pope Urban VIII permitted him to compose an account of the Copernican system provided he did not claim demonstrative status for it. A disaster in the making…

Two further developments led to a more general exegetical challenge involving natural knowledge. Already in the Renaissance, new efforts were made to establish and translate the original texts of the Bible. As time went on, this focus on the texts led to an increasingly critical study of their contents, of their occasional inconsistencies, of their relationship to the literatures and cultures of the lands in which they took shape, and much more. German 'higher criticism' in the eighteenth century called the literal reading of the Bible more and more directly into question. And it was aided by a new interest in the history of nature, a growing realisation of the earth's antiquity thanks to the study of fossils and rock strata. The books of the Bible, notably Genesis, had long been trusted to provide the elements of such a history. Now those elements were, one after another, being called into question. How was the Bible to be read in the face of this onslaught from two sides? Exegetical issues were to shape much of the theological agenda at this point.

And then came evolution. Darwin's theory was sharply at odds with the first chapters of Genesis, if these were taken literally. By that time the term 'day' in the six day account of the creation was already being widely interpreted as an indefinitely long period. But what about the origin of living things? Here there was strong disagreement. Those who were impressed by the promise of the new theory ('theistic evolutionists') found a variety of ways to interpret the biblical texts in more or less symbolic fashion. They differed among themselves: some rejected an evolutionary origin for humans; some queried the sufficiency of natural selection as explanation and suggested that there was still need for some level of guidance for the evolutionary process. On the other hand, many found it a step much too far. Relying on an inductivist scepticism about scientific hypothesis widely shared at that time, they pointed to the fact that Darwin's account was after all 'only a theory'. The literal-sounding biblical accounts of origins and of the Deluge were not to be set aside in favour of a hypothesis!

The editors wisely decided not to carry this narrative up to the 'creationist' critics of evolution of recent decades: the literature there is already abundant.

The above outline is entirely inadequate to convey the riches of these impressive volumes. The interface between the two different ways of addressing nature has been a busy place indeed, well worth the skilled labours here invested in illuminating it.

Ernan McMullin is the Director emeritus of the Program in History and Philosophy of Science at the University of Notre Dame.

Christopher Southgate

The Groaning of Creation: God, Evolution, and the Problem of Evil

Louisville: Westminster John Knox Press, 2008. xii + 196 pp. pb. £16.99.
ISBN 978-0-664-23090-6

In this short work, Christopher Southgate sets out to tackle the perennial problem of pain and suffering. What sets this volume apart from most other exercises in theodicy is that he focuses on the relatively neglected issue of animal suffering.

The first three chapters are essentially introductory. In chapter 1, he sets the scene by defining the nature and extent of the problem, assuming as his starting

point the evolutionary picture painted by modern science. Chapter 2 is a survey of various approaches that in his view hinder our efforts to address the problem of evolutionary theodicy. He quickly dismisses creationism and intelligent design, both of which question the evolutionary picture of the world from which he is starting. Equally short shrift is given to those who suggest the physical world is in some sense evil, or that its creator is evil, or that sheer creativity somehow takes precedence over the will of God; all these approaches require too great a departure from orthodox Christian theology for his taste. But his real target in this chapter is the notion of a cosmic fall. He simply cannot reconcile the notion of a historical fall of humankind that somehow has cosmic consequences with the scientific record. From there, he turns in Chapter 3 to a survey of the other evolutionary theodicies currently on offer, looking particularly at the work of Rolston, Peacocke, Haught and McDaniel.

Southgate's own proposal for an evolutionary theodicy is to be found largely in chapters 4 and 5. Like the authors surveyed in chapter 3, he accepts that the evolutionary process was the only way (or at least the best way) for God to bring a variety of finite selves into existence, given the constraints imposed by a law-like universe. However, the beauty, diversity and sophistication that have arisen as a result do not cancel out the very real suffering that has occurred as a by-product. On the contrary, the responsibility for such suffering lies firmly with God. Thus, in Chapter 4 he paints a Trinitarian picture of a God who 'suffers in the suffering of every creature' (56) and who creates by self-giving. He envisages a creation in which creatures are called to be themselves (to express their 'thisness') in accordance with the triune God's creative will. However, their response to that call is always ambiguous because expressed by self-assertion at the expense of others rather than by self-giving; thus many (perhaps most) individual creatures never achieve the fulfilment to which God has called them. In his view, it is not enough to say that the overall process or God's final purpose somehow justifies the messy evolutionary means. Thus, at the end of chapter 4 he affirms that the Cross and Resurrection have an objective redemptive effect on the non-human creation. This leads in chapter 5 into a brief discussion of the place of eschatology in evolutionary theodicy. Here he affirms the orthodox Christian view that there is no redemption apart from creation: we are saved as embodied creatures not disembodied spirits. This clearly implies that the non-human is implicated in the eschaton, but does evolutionary theodicy require the redemption of individual non-human creatures? Southgate argues that the answer is 'yes', at least in the case of more complex organisms.

He concludes his book with two chapters exploring our calling to care for creation in light of this theodicy. While rightly warning against the hubris that thinks human action can somehow bring about the eschaton, he argues that we are called to have some part in the redemption of creation. Negatively, he calls us to a self-sacrificial care for our fellow creatures, an ethical kenosis. Positively, he develops our role in terms of contemplation, priesthood and stewardship. And, in the final chapter, he examines two specific proposals, giving a cautious welcome to Andrew Linzey's notion of vegetarianism as a sign of the eschaton and calling us to work for the preservation of other species.

Inevitably such a brief account of such a large topic has its weaknesses. In particular, I would highlight the lack of development of God's action in relation to the non-human – especially in view of the fact that Denis Edwards, one of the key influences on Southgate's own position, takes a strictly non-interventionist approach – and the extreme brevity of his account of the role of Christ's atoning work, in spite of assertion that this is central to his thesis (76). Nevertheless,

this is a thought-provoking and at times moving work, which deserves to be widely read and debated.

Lawrence Osborn is a theologian and editor with a background in astronomy who has written extensively on the interaction between Christianity and contemporary culture.

Victoria F. Nourse

In Reckless Hands: Skinner v. Oklahoma and the Near Triumph of American Eugenics

New York: W.W. Norton, 2008. 173 pp. hb. $24.95. ISBN 978-0-393-06529-9

In *In Reckless Hands*, Victoria Nourse draws timely conclusions about the limits of scientific authority in law-making from her otherwise thin history of a single American legal case, which she stretches into a slender book by the inclusion of tangential material about court-packing. The book says little about religion beyond offhandedly cautioning against its role in law-making. This omission is odd because the American debate over eugenics always involved religion and the book is about *Skinner v. Oklahoma*, the 1942 U.S. Supreme Court decision striking down compulsory eugenic sterilisation for habitual criminals in Oklahoma. Aside from the caution against religious lawmaking, Nourse simply notes in passing that the Roman Catholic Church opposed eugenic sterilisation and that the chief sponsor of the Oklahoma law was a physician at a Methodist hospital. She says nothing about either the natural-law and biblical basis of Catholic opposition to sterilisation or any spiritual motives of the physician even though many Methodists and other mainline Protestants supported eugenics on religious humanitarian grounds.

In providing background for the Oklahoma law and legal challenges to it, Nourse inadequately distinguishes between state eugenics programmes targeting the mentally ill and retarded and ones targeting criminals. After a series of legal setbacks for eugenics in the United States, the 1926 Supreme Court case of *Buck v. Bell* upheld a Virginia programme for sterilising mentally ill and retarded patients in state institutions. This ruling opened a floodgate for eugenic sterilisation in America. Nourse presents the 1942 decision in *Skinner* as repudiating eugenics even though she notes that it neither overruled *Buck* nor lessened the use of eugenic sterilisation in the States.

What she misses is that applying eugenics to criminals was always controversial in America and that most of the early legal setbacks for eugenics involved sterilising criminals. The scientific authority for the inheritance of criminality was never as strong as for the inheritance of certain forms of mental illness and retardation and, by the 1930s, American geneticists generally supported only the later proposition. Further, the Oklahoma statute exempted white-collar criminals. The High Court struck it down as violating the constitutional mandate for equal protection of law without questioning the underlying validity of eugenics. Even the American attorney Clarence Darrow, whom Nourse lauds for opposing the sterilisation of criminals, supported it for persons with severe hereditary defects. Sterilising criminals, while popular during a gangland era in the U.S., inevitably seemed punitive and, as promoters of the Oklahoma statute conceded, was at least in part intended to drive criminals from the state.

From this limited history, however, Nourse draws broad conclusions. Viewing all forms of eugenics legislation as the product of scientific hubris, and noting that scientific support both for treating mental illness and retardation with eugenic remedies, and for genetic determinism generally waned over time, she warns against relying too much on scientific authority for making public policy. In a closing passage, Nourse adds that claims of religious truth are also incom-

mensurable with the claims of governance. Law is lived, she explains, and should be based on lived experience – not on decreed science or revealed religion. In imposing its findings through law, humility befits both science and religion. In reckless hands, Nourse cautions, science and religion are subject to abuse in law-making.

Edward J. Larson is the author of seven books about the relationship of law, science and religion, including the Pulitzer Prize winning *Summer for the Gods: The Scopes Trial and America's Continuing Debate Over Science and Religion.*

Leslie S Jones and Michael J. Reiss (eds.)

Teaching About Scientific Origins – Taking Account of Creationism, Volume 277, Counterpoints series – Studies in the Postmodern Theory of Education

New York, Oxford: Peter Lang, 2007. x + 217 pp. pb. £17.40. ISBN 978-0-8204-7080-1

Imaginatively and sensitively compiled, *Teaching about Scientific Origins* is a book that intrigues in the plurality of its different perspectives and approaches. It is true to the postmodern tendency of engaging with a diversity of viewpoints, but, because of the discrete nature of the subject headings and the different authorship of its chapters, it does not fall into the horrible philosophical incoherence of some debates.

It is likely that the reader will find that some of the views expressed are controversial and even unpalatable. Readers may be concerned by this, but they need not be. It could be considered a central strength of the book: by giving space to this plurality, greater insight is given into the real world and issues of classroom and university teaching.

Many authors demonstrate considerable focus and energy explaining context and scientific points, and these are often related to curricula in the US and the UK. Leslie Jones makes a compelling case, in Chapter 12, for the engagement with belief structures when teaching biological evolution. I would strongly recommend anyone suspicious of such an approach to the teaching of science to read this chapter.

When discussing the teaching of origins, a number of authors seek to make points about language and the grammar of transient conflation of cultural and rational influences. As expected from experienced communicators and teachers, there are therefore numerous attempts to explain points of confusion; these are often also helpfully illustrated by consideration of the development of thought. Wolff-Michael Roff in Chapter 8 considers the questioning of a seventeen year old as he struggles to make sense of faith and scientific views of origins. This student focus pervades much of the book and that reveals much about the sensitivity, thought and compassion of a number of the writers.

Chapter 7, written by Shaik Adbul Mabud, will stand out due to the author's suspicions of some aspects of evolutionary science. Abdul Mabud is a strong advocate of students' using critical analysis when evaluating evidence. His suspicion of evolutionary theory is interesting and punctuated by a stated concern to seek the truth; it is therefore most unfortunate that, in contrast to many other of the authors, his scientific source material appears a little dated. This chapter does, however, enrich the plurality of expression in the book as a whole and give voice to a particular representative viewpoint.

Overall, the book is a collection of useful chapters of different perspectives about issues that have stirred up much heat and controversy. It is unlikely that many school students would be able to grapple with the cross-disciplinary interplay found in the book. I would, however, recommend it without hesitation to teachers of Biology and Science, to those

interested in the academic study of Science and Religion debates, anyone involved in the planning of syllabuses or curricula, ministers or leaders of faith communities and anyone involved in the training of teachers of Science. The major benefit in reading the book is likely to be a quick, but informed, insight into many of the major issues surrounding the teaching of topics related to origins from a scientific point of view. The title is apt!

John Ling is Education Secretary of Christians in Science and Head of Science at St Joseph's College, Ipswich.

Ian S. Markham

Against Atheism. Why Dawkins, Hitchens and Harris Are Fundamentally Wrong

Chichester: Wiley. 2010. x+162 pp. pb £14.99. ISBN 978-1-4051-8963-7

There are now many books available that challenge the message put out by modern atheist authors. For a new one to succeed, it should have new arguments to offer, or express existing arguments especially well. The author of the present work, Ian Markham, is in charge of a seminary in Virginia, and an Anglo-Catholic Episcopalian of liberal inclination. He is rather sniffy about other Christian traditions. A principal theme of his book is that modern atheists do not understand the full implications of their position. To launch this he brings to the front of the stage a 'real' atheist, Friedrich Nietzsche, compared with whom he feels that modern atheism is cosy and 'middle-class'.

Is this a good approach? In English-speaking countries, despite being a fairly well- known name, Nietzsche is not read much except in academia. Markham devotes a chapter to this rather difficult writer, stressing two major points: without Transcendence there is no absolute morality, and there is also an undermining of the concept of Truth. The morality issue has often been raised, of course, with or without reference to Nietzsche; however the discussion of Truth was extremely hard to follow. The assertion being made is that rational human knowledge requires God's existence. This is a highly important claim, clearly, but I found its treatment here very inadequate. It may be better, in the end, to discuss these things without involving Nietzsche.

There is a very positive chapter on modern physics, with the familiar and crucial Anthropic message that the universe is physically tuned to provide a home for beings such as ourselves, and that God provides a more satisfactory explanation for this than multiple universes do. The chapter relies strongly on material from other writers, but Markham himself is too often careless. Newton was not a 'devout Christian', but held Unitarian beliefs. Although a thorough determinist, Laplace was not a materialist but a Cartesian dualist, and it is hardly fair to call him the 'Richard Dawkins of physics'. He was certainly no Christian believer, but according to his biographer he usually presented an agnostic position in public. Everett's 'Many Worlds' interpretation of quantum mechanics is stated erroneously, and it is anyway not the right approach to multiple universes. Later in the book, the question of quantum randomness assisting divine action and human freedom is raised and is interesting, but it needs deeper treatment than it is given.

Modern atheists tend to object in particular to the Old Testament. Markham responds with a reasonable discussion of the Genesis creation story, followed by an exposition of Deuteronomy 7:1-7, another problem passage. Remarkably, he argues that God did *not* order the wholesale destruction of the original tribes in the land of Israel. I found this unconvincing; the rest of Deuteronomy 7 and the book of Joshua indicate the opposite (see also Ps. 106:34), and it seems to me we have to accept that those were very different times from our own. The questions to put to modern atheists in this connection, I suggest, are: *why* in fact do they hold

that ancient morality should be the same as ours? Or even that moral qualities exist at all? And if the Hebrews by their conquests displayed a good instance of 'survival of the fittest', why should this principle be admired in animal species but not in our own? Why should humans be different? Nietzsche loved the idea of the strong coming out on top.

Other topics include a nice discussion of the spiritual depth to life, a brief overview of Christianity, and a concise but well-expressed consideration of suffering. Markham writes very irenically in support of Islam. Indeed, he seems to have more positive things to say about Islam than about other Christian traditions than his own. Downplaying the negative side of the Koran, he presents al-Qaeda as a kind of logical development, laying a lot of blame on the USA for supporting the Taliban against the Soviet Union in Afghanistan.

It seems to me that the proclaimed aim of attacking atheism is weakened by the author's exclusive pushing of his own churchmanship, and by a tendency to present arguments in a somewhat diffuse and academic way, as if addressed to theology students. He offers a mind-centred view of religion: '[T]he purpose of the traditions that we all occupy…is to make sense of the complexity of the world.' (138) Many would consider this insufficient. Some good material is presented in these pages, and very reasonable points are made against the atheists. But overall, in a strong market, I feel this book is too uneven to give it a high recommendation.

Peter Bussey is emeritus Reader in Physics and Senior Research Fellow at Glasgow University.

Joseph Silk

Horizons of Cosmology: Exploring Worlds Seen and Unseen

West Conshohocken, Pennsylvania: Templeton Press, 2009. 205 pp. pb. £12.99. ISBN 978-1-59947-341-3

I approached this book with keen anticipation of an exposition of cosmology and its wider significance from someone actively involved over the past momentous fifty years, and who has published a number of significant books, both popular and professional, on cosmology. I was hugely disappointed.

The book is supposed to be for a general readership, with material included of interest to advanced students and professionals. However it would prove confusing and misleading for a general reader, partly because of a number of glaring errors, such as that electrons are baryons (27), that protons are bosons (111), and that the proton is heavier than the neutron (169); one hopes that these are misprints not picked up by poor editing, rather than misunderstandings by the author! In general the exposition of admittedly difficult concepts is repetitive and unclear, though it gives some insight into problems that are engaging astronomers and cosmologists today, such as the details of the way in which initial fluctuations in density have developed into the stars and galaxies that we see today, influenced by the pervasive but elusive dark matter. I found it frustrating to read an exposition by someone involved in and familiar with this burgeoning field of research, which is being illuminated by a growing flood of data from the wonderful new observing instruments that have come into use in recent years, only to conclude feeling that I was not much wiser! Someone familiar with the field may well discover interesting personal recollections, but I would check any fact first before passing it on! There were, in my view, no useful theological or philosophical reflections.

Templeton Press must do better than

this if they are to make a significant contribution to the interface between science and faith. The rather good bibliography at the end of this book would be a guide to the competition – there are some excellent books in this area already. Not recommended.

Paul Wraight has retired from teaching physics and electronics at Aberdeen University and is thinking and writing about design.

Stephen Hawking and Leonard Mlodinow

The Grand Design: New Answers to the Ultimate Questions of Life

London: Bantam Press, 2010. 200 pp. hb. £18.99. ISBN-13 978-0593058299

This book was notoriously heralded by a front page splash in *The Times* headlined 'Hawking: God did not create Universe'. The book does indeed make some startling claims, for example: philosophy is dead and has been superseded by science; M-theory is the ultimate theory of everything; the universe creates itself out of nothing – hence God is not needed; and a multiverse explains the fine-tuning.

The claim that philosophy is dead is on the first page of text (5). Yet most of the subject matter of the book is philosophical! Only a couple of pages later Hawking says he adopts 'model-dependent realism', a philosophical position if ever there was one! Hawking defines his concept by saying 'it is pointless to ask whether a model is real, only whether it agrees with observations. If there are two models that both agree with observation… then one cannot say that one is more real than another.' (46). This deceptively innocuous formulation leads to quite bizarre statements in practice.

Hawking is not the most reliable guide to theology and history. For example, he rightly states that St Augustine believed that time is 'a property of the world that God created and that time did not exist before the creation' (50). However, then he says, 'That is a possible model, which is favoured by those who maintain that the account given in Genesis is literally true', but the big bang theory is 'more useful', even though neither model is 'more real than the other' (50-51). This is deeply confusing not least because (a) Augustine himself did not take Genesis literally, and (b) Augustine's view is entirely compatible with the big bang theory! However, notwithstanding what comes later, Hawking admits at this point that it is not clear that we can take time back beyond the big bang because the present laws of physics may break down (51).

Hawking informs us that the 219 heresies condemned by Bishop Tempier of Paris in 1277 included the idea that nature follows laws, because this would conflict with God's omnipotence (24-25). It is true that a prime consideration was God's absolute power to do whatever he wills (and so not to be *bound* by 'natural laws' – if that is even an appropriate term in this period). However, Hawking omits to tell us that also condemned were the notions that God could not create several universes or more than 3 dimensions – significant in view of Hawking's espousal of these ideas! Pierre Duhem and other philosophers have considered the condemnations as liberating for science.

Among other philosophical positions Hawking adopts are determinism, which renders miracles impossible, and reductionism. Echoing Dawkins he writes that 'it seems that we are no more than biological machines and that free will is just an illusion' (32). Even more significantly, Hawking has bought into Wheeler's 'it-from-bit' interpretation of quantum theory, namely that we create the history of the universe by observing it (82, 140). He also interprets the Feynman sum-over-histories approach to quantum theory in a realist way, so that all possible histories of the universe are real, and we 'select' a set of histories, no matter how improba-

ble, which are compatible with our own existence. Add into this heady mix the no-boundary proposal whereby time becomes imaginary (space-like) in the earliest epoch, which Hawking developed with Jim Hartle, and which appeared in popular form first in *A Brief History of Time*, and you end up, he says, with a universe that has no beginning in time. Hence you avoid the need to invoke God to light the blue touch paper to set it going (134, 180) – again, repeating what he said in the earlier book.

Regarding this last point, if time has become space-like (i.e. a fourth space dimension) it is very difficult to see how time can 'flow' and the universe evolve from the 4-space at all. Of course, even if we accept Hawking's mathematics, we do not have to accept his philosophy: we can perfectly well accept only real time in the mathematical sense as ontologically real, and the universe beginning at the point where (real) 3-space and real time intersect the 4-space where time becomes imaginary; and nor do we have to ontologise all the histories in the Feynman sum, merely regard them as a useful calculating device.

Another claim is that 'M-theory predicts that a great many universes were created out of nothing. Their creation does not require the intervention of a supernatural being or god. Rather, these multiple universes arise naturally from physical law.' (8-9). There is no mention here of the speculative nature of M-theory, the overarching generalisation of string theory, and that serious questions have been raised over its lack of predictions and observational or experimental support. That goes particularly for the claim about many universes. More significantly, the idea that the universe can create itself out of nothing, as Hawking expresses it later, is inherently self-contradictory. Apparently gravity can do the trick because its negative energy balances the positive energy needed to create matter (180). Contra Hawking, this sleight of hand does not mean that the universe creates itself out of nothing, and if gravity and the laws of nature were responsible, one really would be entitled to ask where these come from in the first place and the quantum vacuum on which they act. As Hawking himself put it so eloquently in *A Brief History of Time*, 'What is it that breathes fire into the equations and makes a universe for them to describe?'

Hawking describes how our existence imposes constraints on the form and content of the laws of nature (155). These include Fred Hoyle's discovery of the constraint on the strong nuclear force necessary for carbon and oxygen, essential for life, to be manufactured inside stars, and the remarkable fine-tuning, to 1 part in 10^{120}, of the cosmological constant. Whereas this might lead in the direction of a new argument from design, Hawking assures us 'That is not the answer of modern science.' (164, though he confuses such an argument with the modern Intelligent Design phenomenon in the US.) Hawking's answer is the multiverse, though it is not at all clear either that he has established this or why, even if he had, that the question would not simply shift from 'Why this universe?' to 'Why this multiverse?' Given that M-theory scarcely qualifies as a theory at all, the claim that it is the unique logical possibility is highly problematic.

This is a book readers of this journal should read. It is beautifully produced and written in a deceptively easy style, considering the esoteric subjects with which it deals, and it is laced with Hawking's quirky humour. But be prepared to take its exaggerated claims with a large pinch of salt.

Rodney Holder is Course Director of the Faraday Institute for Science and Religion, St Edmund's College, Cambridge.

David Sedley

Creationism and its Critics in Antiquity

London: University of California Press Ltd, 2008. 286 pp. £27.95. hb. ISBN 978-0-520-25364-3

This book arises from the author's Satler Lectures 2004 delivered at the University of California, Berkeley. The concept of creationism in its present form attracts little academic interest outside the US, where the continuing debate remains a potent symbol of deep divisions between faith communities and scientists. Some polls suggest that half the adult population of the US believes in a literal interpretation of the Bible. Anti-scientific creation science has a large following among fundamentalists. This is the contemporary background in which David Sedley delivered his lectures.

Sedley reviews the history of creationist thought in the ancient world to bring new perspectives to the modern debate, by marshalling the arguments employed by pagan philosophers for and against creationism. It is well known that the philosophers of antiquity were trying to settle the issue of divine creation, and this task was implicit in their quest to understand mankind's correct relationship with the gods, and hence the pursuit of human happiness.

Much later, Grosseteste, Copernicus, Brahe, Kepler and Newton adopted a similar approach in trying to reconcile the observed celestial phenomena with the presumed intentions of a creator. Newton, indeed, was so impressed by the exquisite precision of the mechanical solar system that he drew a parallel with the skill required of a clockmaker. In 1802 the natural theologian William Paley (one of Sedley's predecessors at Christ's College) also remarked on the similarities between the creator and the artificer who constructs a watch. A famous modern cosmologist, the late Thomas Gold, described cosmology as 'taking the back off the watch'.

As an astrophysicist with no training in the classics, I found Sedley's book of compelling interest because my professional work is now undertaken in the history of modern astronomy and cosmology. We meet the usual suspects: Anaxagoras, Empedocles, Socrates, Plato, Democritus and the Atomists, Aristotle, and the Stoics. My colleagues who write textbooks on astronomy would notice the absence of Pythagoras, Euclid, Hipparchus and Ptolemy, omitted because they have left no record of their views on the divine nature of creation.

I applaud Sedley's approach to a remarkably rich assembly of material that he uses to explain 'how the major thinkers of antiquity developed their ideas on our world's origin and causal structures in the context of open-ended debate'. He shows that what we can learn of creationism in antiquity is a complex web of thought processes interacting, rather than a sum of discrete episodes. These stellar thinkers were not trying to distinguish between right answers and wrong answers. It was more subtle than that.

At the risk of irritating some of my colleagues in the observatory or trapped in the multi-dimensional maze of M-theory, I believe that contemporary cosmologists (and string theorists) could learn from the thinking styles developed by brilliant minds in antiquity. That at least is an important lesson I draw from this impressive work of scholarship. I am thinking, for example, of astronomy's Great Debates on: the origin of the universe; the growth of structure in the universe; the origin of life and the meaning of intelligence. I consider that the modern debate relies too much on mathematical technique of a kind that is extremely complicated. Have we forgotten how Einstein praised beauty? In David Sedley we are fortunate to have such a distinguished scholar in our midst who is a reliable guide to the first creationists and their first critics.

Simon Mitton is a Fellow of St Edmund's College, Cambridge, an

affiliated research scholar at the Department of the History and Philosophy of Science, Cambridge, and biographer of the cosmologist Fred Hoyle.

Graeme Finlay, Stephen Lloyd, Stephen Pattemore and David Swift

Debating Darwin. Two Debates: Is Darwinism True & Does it Matter?

Milton Keynes: Paternoster, 2009. 197 pp. ISBN-13 978-1-84227-619-8

The evolution debate is ubiquitous within the Evangelical church and frustratingly difficult to escape. Part of the reason for this is the widespread availability of creationist literature written in a popular and accessible fashion aimed specifically at those in the pew. Having lost the academic and intellectual debate the creationist lobby is now trying to broaden their argument by questioning the philosophical motivation of the scientific community. In one sense such a critique can be helpful by reminding us that scientific reasoning does contain an important subjective element. However, when such a reminder is coupled with woefully poor technical detail the creationist argument becomes more problematic to the Christian witness. For instance, as modern science is made up of a wide variety of interconnected disciplines, modifications in one field may often have difficult-to-predict knock-on effects in other areas. For this reason it is very difficult to raise legitimate concerns, or indeed a legitimate critique, without a considerable educational background and practical experience in both the technical details of a discipline and the way this discipline fits together with science as a whole. The creationist suggestion that in-depth experience and education brainwashes scientists so that they cannot help but adopt an elitist, naturalistic philosophy, and cannot be self-reflective is insulting. Unfortunately part of the blame for this problem rests squarely on the shoulders of scientists who seem remarkably capable of alienating Christians through their outspoken endorsement of atheism. It is therefore vital that all of us who are professional scientists (or educators) and Christians overcome our frustration with this topic and engage in the debate, on one hand to counter the intellectual laziness of some Christians, but on the other to temper the often over enthusiastic response from our peers. It is worth reading at least one book a year just to stay up to date as, although it can sometimes be tempting to think the evolution debate is circular, it is important to realise that certain topics do seem to adopt greater prominence at different times.

Debating Darwin: Is Darwinism True & Does it Matter? contains essays by creationists raising two topics that seem to be causing particular concern at this moment. Stephen Lloyd, formerly a Royal Society University Research Fellow in Materials Research and now a speaker and writer for Biblical Creation Research Ministries, outlines a theological objection to evolutionary theory by stressing the need for a literal Adam (and Noah) from whom all humans are descended in order for Jesus' resurrection to be effective. He extends this theological position by arguing that the literal occurrence of both a global flood and the absence of suffering or death in the animal kingdom prior to the fall are necessary for Christian belief. The second creationist essay is written by David Swift, originally a Materials Scientist (Water Resources Technology) but now a freelance researcher in bioethics, whose main argument is that molecular biology poses fundamental challenges to evolution (99). Swift's argument is based on the complexity of proteins and their transcription/translation machinery, and draws heavily on Michael Behe's arguments regarding the 'edge of evolution' and the 'design argument'. Whereas the first essay by Lloyd outlines a distinctly 'Young Earth' creationist position, the essay by Swift argues for the somewhat incompatible 'Intelligent Design' creationist position.

Following both creationist essays are arguments from the 'Theistic evolution' position by Graeme Finlay, an immunologist and senior lecturer in General Pathology at the University of Auckland, and Stephen Pattemore, a theologian with the United Bible Societies who joins Finlay in the theological response to Lloyd. Both responses are comprehensive, written to a high standard and accompanied by a number of helpful tables and figures. One potential criticism is that they range far more widely than the original creationist essays and sometimes even fail to address some of the earlier points; however, a nice touch is the inclusion of a response from the creationist authors who seem very happy to point out such omissions that are then answered more adequately by a second response from Finlay/Pattemore.

After a complete reading of this volume one cannot help but get the impression that rather than presenting an equal debate its purpose is to present a response from the 'Theistic evolution' position to a) Young Earth theological arguments and b) Intelligent Design scientific arguments. This it does extremely well and comprehensively even if the longer chapters and responses by Finlay and Pattemore might seem unfair to some. Although it is sometimes quite easy to get tired of this discussion and see this as 'yet another book on evolution', this volume is relatively short, up to date and easy to read. I would definitely recommend it for anyone seeking a quick update to the current issues being raised by contemporary creationists in the Darwin debate.

Simon Kolstoe is a structural biologist at University College London Medical School.

John H. Walton

The Lost World of Genesis One: Ancient Cosmology and the Origins Debate

Downers Grove, IL: IVP Academic, 2009. 192pp. pb. $16.00/£9.99. ISBN 978-0-8303-3704-5

This is a book which all those interested in the creation-evolution debate should read. For a few decades a number of Old Testament scholars, this reviewer included, have argued that the debate is bedevilled by a failure to take seriously the fact that Genesis 1-3 is ancient Near Eastern (ANE) literature not a modern, western quasi-scientific text. They have sought to expound some of the implications of this for understanding these chapters. Walton, Professor of Old Testament at Wheaton College, is an expert in ANE thought and literature and so is able to write about it in detail and with an authority that few others can. In this book he does so at an accessible, popular level.

In his 'Introduction' Walton makes the common sense case that Genesis 1 should be read as ANE literature because it was God's revelation written to ancient *Israel* and not to *us*. This is a valid argument, but it can be strengthened by the theological argument that God's revelation has always been incarnational in nature and so always 'clothed' in a particular cultural form (see, briefly, Ernest Lucas, 'Interpreting Genesis in the 21st Century', Faraday Paper No. 11). Walton develops his argument through a series of eighteen 'propositions'. The first twelve concern the interpretation of Genesis 1 in the context of ANE thought. We will not attempt to go through them in sequence, but just pick out some key points. To begin with, Gen. 1 must be read as ANE cosmology, and such cosmologies do not deal with the origins of the cosmos as a material structure but as a functioning system. Scholars have long recognised that the Hebrew verb for 'create' *(bārā')* is used only with God as the subject or implied subject, and that there is never a

'material' out of which God creates something. This, Walton argues, is because the verb is used of God establishing *functions*. To support this he argues that there is no case where what God creates is indisputably a material entity, but in most cases 'creation' can be understood as establishing a function or functioning system. Of course a functioning system involves material elements, but his argument is that these are not the focus of what is being referred to when God's creative activity is being talked about. That God has created the material world is simply assumed by the biblical writers. That is not their primary concern. So, Genesis 1:1 states that what follows is about the establishment of the cosmos as a functioning system. He points out that the Hebrew word 'beginning' can refer to a *period* of time (the seven days) not a *point* in time.

Walton argues that Genesis 1:2 speaks of an initial non-functional state. His argument that *tōhû* here must mean 'unproductive' is questionable. As he says, words must be interpreted in context, and the following context of the first three days suggests a meaning such as 'non-functional form' with the following *bōhû* meaning 'empty' in the light of what happens on last three days. Walton then argues that the first three days are about establishing the functions of time, weather and food production. In passing he notes that the Hebrew word usually translated as 'firmament' clearly means a solid surface, and is an example of God speaking to the Hebrews through their cosmic geography without seeking to revise it. The point is not *how* weather systems work (which is what modern science is about) but the fact that God has established this function. On days four to six God establishes functionaries relating to the functional spaces he has created. Humans have a special function because they are created in God's image. When God declares that what he has created is 'good' he means that it is functioning properly, not that it is morally good.

Some ANE creation texts end with the building of a temple for the creator God. In the ANE deities rest in a temple, and so Walton takes what is said of the seventh day in Genesis to indicate that the functioning cosmos is seen as God's temple. This leads him to conclude that Genesis 1 is to be read as a 'temple inauguration' text. He points out that when Solomon inaugurated the temple he had built there were seven days of religious ceremonies followed by a seven-day feast. He tentatively suggests that Genesis 1:1 – 2 :4 might be the liturgy for an annual celebration of the inauguration of the Jerusalem temple.

Walton rejects Young and Old Earth Creationist approaches, and other 'concordist' approaches, to Genesis 1 because they assume that it is about material origins and can be read scientifically. This, he says, 'imposes modern thinking on an ancient text, an anachronism that by its very nature cannot possibly represent the ideas of the inspired human author' (109). He accepts the validity of what he calls 'the framework hypothesis', namely those approaches which use the literary structure of the text as a guide to its theological meaning, but says what he offers adds value to these approaches. Indeed it does. In Faraday Paper No. 11 it is suggested that the text presents God as a worker doing a week's work to produce an ordered cosmos. Walton's approach defines this work as producing order not in the sense of a material structure but of a functioning system.

In propositions thirteen to eighteen Walton relates his view of Genesis 1 to the broader issues of science and society. Here he deals with issues which are well-trodden ground to readers of this journal, such as the complementary nature of scientific and theological explanations, the 'God-of-the-gaps' trap (he sees Intelligent Design falling into it), the need to understand God's roles as Creator and Sustainer as closely linked, the need to distinguish 'evolution' as a scientific theory from 'evolutionism' as a metaphysical

stance, and that Christians must resist claims that science 'proves' a materialistic and purposeless view of the cosmos. Proposition eighteen concerns science education in public schools in the USA.

To sum up the implications of Walton's position in his own words, 'Genesis 1 does not offer a descriptive model for material origins. In the absence of such a model, Christians would be free to believe whatever descriptive model for origins makes the most sense. The major limitation is that any view eventually has to give God full control of the mechanisms if it claims to be biblical' (140).

The Revd Dr Ernest Lucas is Vice-Principal and Tutor in Biblical Studies, Bristol Baptist College, and Honorary Research Fellow in Theology and Religious Studies, Bristol University.

Denis Lamoureux

I Love Jesus & I Accept Evolution

Eugene: Wipf & Stock, 2009. 184 pp. pb. £10.68. ISBN 13: 978-1-55635-886-9

The relationship between God's sovereign act of creation and the process of biological evolution remains damagingly controversial. The forced resignation of leading OT scholar Bruce Waltke (April 2010, USA) illustrates how Creationism marginalises biblical scholarship. Denis Lamoureux (with doctorates in dentistry, biology and theology) is admirably placed to address this confusion.

Lamoureux exposes the simplistic origins dichotomy between the act of creation and the process of evolution. He warns of *eisegesis* (reading into Scripture what we want it to say) and *scientific concordism* (mining Scripture for scientific data). He explains the principle of accommodation: God limits himself to communicate in ways that we may understand. Christians have espoused several positions (ch 2), but the real choice is between teleological (planned, purposive, goal-directed, designed) and dysteleological interpretations of evolution (3). To Lamoureux, the concept of *evolutionary creation* fully embraces biblical Christian faith and scientific evolutionary theory (8, 26f). The key word, *creation*, indicates that the world is absolutely dependent for its every instant of existence on the will and grace of its Creator. The adjective *evolutionary* merely characterises the nature of that creation.

For me, his most original and illuminating contribution is to show how Scripture reflects an ancient cosmology such as a three-tier universe (ch 3). These ideas are simply the historically contingent incidentals in which the story of God's revelation is presented. Some expressions might have been improved. The author states that God created the world through evolutionary processes (8, 39, 149). But evolutionary process is *itself part* of space-time created reality. As the historical dimension of creation it does not mediate creation. Evolution is created history.

Lamoureux discusses the biblical account of creation, the incompatibility of literalistic readings with the scientific data (ch 4), and evidence for an old world and for evolution (ch 5). There are a few places where the text is dated. The earliest modern human remains are from Africa, not South-East Asia (131). The closest living relatives of whales are indeed hippos (117f). And (if I may update a dentist!), birds cannot make teeth but their genomes retain multiple degenerated tooth-forming genes (116; see *Mol Biol Evol* 27*, 2078; BMC Evol Biol* 8*, 246*).

The book concludes with New Testament perspectives. Paul wrote of what he *knew* of the death and resurrection of the historical figure of Jesus. He compared it with what he *understood* of the literary figure of Adam, embedded in the medium of ancient cosmological story (Rom. 5; 1 Cor. 15). There is no incongruity in that. The book graciously and persuasively describes the pilgrimage of the author. It

is attractively illustrated, accessible to laypeople, consistently helpful, and should be widely read by Christians, especially by students and those who teach them.

Graeme Finlay teaches scientific pathology at the University of Auckland.

Nick Spencer

Darwin and God

London: SPCK, 2009. 146pp. pb. £9.99.
ISBN 978-0-281-06082-5

'Of making many books there is no end', although not seemingly when it comes to books on Darwin's religious beliefs. This is only the second. Strange really when we have had just had a year of Darwin being held up as the champion of thinking atheism. 'Rescuing Darwin' might indeed be an appropriate commentary on the state of play on the bicentenary of Darwin's birth. And it is one of the co-authors of a small booklet by the same name, *Rescuing Darwin*, who has written of Darwin's spiritual journey, in *Darwin and God*. Given the intense interest, one might expect such a book to fly off the shelves. And this one thoroughly deserves to do so.

A slim book, of just four chapters, it promises much. And it delivers much – and more. Spencer sets out to uncover Darwin's spiritual journey and thoughts, and test the popular view that he started off a 'sort of Christian', passed through intellectual struggles where in his own words his 'theology is a simple muddle', and finally ended in agnosticism. And in his attempt to do so I think Spencer, in large part, succeeds. *Darwin and God* puts living flesh on the bones of Darwin's autobiography, drawing as it does on a wealth of carefully researched and considered primary sources (mainly correspondence) – and yet this is a book that can be read in a relatively short period of time by just about anyone with some interest.

Chapter one covers Darwin's early life. Spencer argues that Darwin's 'faith had been… a type that smoothed the path for its subsequent loss' (31), based more on natural, not revealed, theology. In the next chapter the case is put that 'by [Darwin's] own account, the Christian faith he lost was a series of arguments, rather than an experience of God' (43), and that, 'the last remnants of his belief in the good, personal, just, loving God of Christianity died, at Easter 1851, with his dearly beloved daughter' (71). The style is good, and easy to read. Others may want to put the problem of suffering as emerging much earlier in Darwin's thought but Spencer's reasoning here I think is convincing.

'The problem insoluble' deals with Darwin's beliefs later in life. The first two chapters are good but for me the third was a real highlight of the book. There is such an attention to detail, and some quite potentially difficult passages are made interesting and accessible by Spencer's lively and crystal clear expression. Negotiating (and stepping carefully and deliberately as he goes) Darwin's doubts about design and purpose in the universe, perplexities with suffering, and questions like '[c]an the mind of man… developed from a mind as low… as the lowest animal, be trusted' (98), Spencer concludes that, 'The traditional picture of Darwin's religious journey… from Christianity… to agnosticism… is, to a large extent, accurate' (100) but that 'loss of his religious faith made precious little difference to him' (101). He perceptively observes that, '[i]ronically, given the number of crises of faith for which he was indirectly responsible, Darwin never had a crisis of faith himself' (101). One is left in no doubt at the end of this chapter that John Hedley Brooke's comment (quoted in the introduction by Spencer), 'we need to be very careful about trying to pigeon-hole the man who wouldn't pigeon-hole pigeons' (xi), is absolutely correct. And yet one still leaves the chapter feeling that you know Darwin, and his struggles, just a little better than you

did before you started it.

Throughout this chapter there are numerous little epiphanies even for those who think they 'know their Darwin'. For example, Spencer shows the complexity of Darwin's thoughts on suffering, marshalling evidence (letter to Asa Gray on the American War of Independence and the 'crusade against Slavery – In the long run a million horrid deaths would be amply repaid in the cause of humanity') that to Darwin '[s]ometimes, when the outcome was sufficiently good, extensive pain and suffering were, apparently, justifiable' (87).

My only real quibble with this book is in the final chapter. To be sure there's some great stuff here. Rounding off discussions from the preceding chapters Spencer explodes two myths. First that Darwin was an atheist. Second, that he lost his faith because of his theory. 'Natural selection… highlighted the problem of suffering… but it was his *experience* of suffering… that finally extinguished his faith' (118), argues Spencer. He concludes, '[h]is Christianity was true primarily because the natural world pointed to structure, harmony and happiness. When he first recognised that the natural world was not as ordered, purposive or benign as had been thought, the Christian structure… toppled. There is a valuable lesson in this today, not least because several scientific ideas have tempted the resurrection of the kind of natural theology from which Darwin emerged' (115). And here lies my quibble. Having presented this 'valuable lesson' Spencer *appears* to muddy the waters a little in by what could be construed as teasing the reader with the possibility that there may be a more satisfying version of the old natural theology waiting in the wings, based on deep patterns in evolution and biological convergence. But it is ambiguous. That said, the statement, 'Darwin's story reminds us, forcefully, that to base religious faith on such observations is a serious mistake, inviting collapse when the next scientific revolution comes' (117), seems to be the death knell of such ambiguity. In the end I was left wondering if there were mixed messages here or not.

So what is Spencer's take home message? I think it is, 'Darwin died doubting whether it was even possible to trust one's own mind… Not only did he not know, but he didn't know whether it was possible to know' (120). I came away from this book thinking if atheism is looking for a patron saint then it needs to look for someone other than Darwin. He may have lost his faith but he is no paragon of atheism. As for Spencer's book, less would have been more in my opinion with regard to the potentially ambiguous natural theology 'debate' in the final chapter, but overall what a great achievement of scholarship and popular writing, a rescue mission, which, I think, comes together nicely to make a compelling and thought-provoking read.

John Spicer is Professor of Marine Zoology at the University of Plymouth and an elder at Mutley Baptist Church.

Denis Alexander and Ronald Numbers (eds.)

Biology and Ideology from Descartes to Dawkins

Chicago and London: University of Chicago Press, 2010. 453 pp. pb. £22.50. ISBN-10 0-226-60841-7

In this volume the editors, Denis Alexander and Ronald Numbers, bring together articles by thirteen scholars of international standing who describe the interactions between Biology and Ideology from the European Renaissance to the present day. The style is similar to that of major articles in this journal; each chapter is about twenty-five pages in length (with quite small print!) and covers a distinct time period and/or ideological issue that represents the speciality of the author. There are also about five or six pages of referenced additional notes per chapter for those who wish to take things further.

Perhaps the easiest way to give some indication of the material covered is to list the title of each chapter, which I do below. This also serves to highlight the rather specialised and detailed nature of the content which probably makes the book inappropriate for the average reader of this journal. The thirteen chapters are:

- 'The cultural authority of natural history in early modern Europe' by Peter Harrison
- 'Biology, atheism and politics in eighteenth-century France' by Shirley A. Roe
- 'Eighteenth-century uses of vitalism in constructing the human sciences' by Peter Hans Reill
- 'Biology, Darwin, and the Bridgewater Treatises' by Jonathan R. Topham
- 'Race, empire, and biology before Darwinism' by Sujit Sivasundaram
- 'Darwin's choice' by Nicolaas Rupke
- 'Biology and the emergence of the Anglo-American eugenics movement' by Edward J. Larson
- 'Genetics, eugenics, and the Holocaust' by Paul Weindling
- 'Darwinism, Marxism, and genetics in the Soviet Union' by Nikolai Krementsov
- 'Evolution and the idea of social progress' by Michael Ruse
- 'Beauty and the beast? Conceptualizing sex in evolutionary narratives' by Erika Lorraine Milam
- 'Creationism, intelligent design, and modern biology' by Ronald L. Numbers'
- 'The ideological uses of evolutionary biology in recent atheist apologetics' by Alister E. McGrath

The overall message that comes across from this collection of essays is well summarised by the Editors in their Introduction 'The essays in this volume illustrate the many and varied ways in which biology has been utilized for a wide range of political, religious, and social purposes from 1600 to the present day. The purposes may be beneficial, benign in the broadest sense of not being intrinsic to biology itself.' Certainly, as I read the book one thing that struck me forcefully was how there is no such thing as value free science, and how biological concepts are applied ideologically in a way that is shaped by the historical context. So over time a biological theory, proposed for good scientific reasons, becomes applied to non-biological situations in ways far removed from the original intentions of the scientist. Thus we see Darwinism being used or abused to justify eugenics, racism, sexual ethics, political ideologies and atheist apologetics. The last chapter brings the argument to the present day when, to quote the Editors' Introduction, 'Universal Darwinism is no longer just a highly successful biological theory but, to use Daniel Dennett's evocative phrase, a "universal acid" destined to eat away at those values and aspirations that many people find make life worth living'.

Would I recommend this book? I do not have the academic credentials to offer a critique of the factual content of each chapter, so I restrict my comments to overall impressions. I did not find the book an easy read, and certainly not bedtime reading, although some chapters are more accessible than others. Whilst there are undoubtedly many insights to be gleaned by the persevering reader I would not advise the average subscriber to this journal to purchase this book. Perhaps those who have a particular interest in the history of science would enjoy it more than me and would appreciate the detail provided. Nevertheless, I am pleased to have a copy of the book on my shelves and would not be surprised to find myself referring to it in the future.

Andrew Halestrap is a Professor of Biochemistry at the University of Bristol.

Michael S. Northcott and R.J. Berry (eds.)
Theology After Darwin
Milton Keynes: Paternoster, 2010. 288 pp. £14.99. ISBN 978-1-84227-646-4

After the frenzied activities of 2009 celebrating the publication of the *Origin of Species*, some might suppose that there is not much more to be said about Darwin, or his impact and significance for theology. This book proves that such a supposition is mistaken, offering as it does a genuine interdisciplinary conversation between established scientists and theologians.

There are, of course, some essays that articulate what has been discussed in more detail by their authors in other works, but presented here in a way that fits this particular volume. These are more akin to pedagogical works, challenging the general reader to stay informed about (mostly) evolutionary science and its significance for understanding the human condition. Chapters by R. J. Berry on debates within biology, Denis R. Alexander on intelligent design and Francisco J. Ayala on human evolution all fall broadly into this general category. All these chapters share the same qualities of being clear, concise, well-argued and somewhat confident expositions of the science since Darwin's time and its theological implications as perceived by the authors concerned. Other chapters seem to be more akin to a tentative probing of the issues raised by Darwin's ideas in specific ways – Amy Laura Hall focuses on historical issues in Charles Kingsley's influence on Victorian culture, David Fergusson on the particular significance of debates around Providence, and Michael Northcott on social Darwinism's relationship to ethics. Neil Messer and John Bimson, on the other hand, tackle the thorny questions around sin and the Fall from different perspectives, though stop short of a full discussion of theories of atonement. Ellen Davis and David Grummett press for issues that relate to what might very loosely be termed natural theology, though Grummett's chapter is far more focused on historical issues after Darwin, and Davis finds it harder to appropriate specifically evolutionary thinking into her reading of Scripture, grounded as it is in a focus on land and ecology. Denis Edwards' chapter takes up themes he has discussed elsewhere, but with a different spin. All these different perspectives serve to illustrate the breadth of issues raised in this book, and the questions that come to mind in relation to a whole host of issues. It is, as it were, a book of books, and if it does anything it shows that more work remains to be done in bringing into critical engagement Darwinian thought and theological and ethical reflection. It is a pity that there is no integrating chapter here to show areas of overlap and dissonance between authors – the reader is left to do that alone.

Although the expressed intention of the book in the introduction is to be 'Scripturally based' such a desire is not really followed through, with the exception of chapters by John Bimsom and Ellen Davis, though the latter was more, in my reading at least, about ecological issues – important those these are – rather than evolutionary theories as such. Bimson presents a convincing case that there might be ways of thinking about the Genesis text that retain the idea that there is some historical basis for the Fall of humanity, without falling into the trap of reading a literal Adam or Eve or attempting to match the Genesis account with the activity of Neolithic farmers. He also remains unconvinced by the prospect of a 'cosmic Fall' from his reading of Genesis, though Messer argues that some way of considering wider implications of evil through Barthian 'nothingness' may be appropriate – though I have my suspicion that Barth is not as novel here as Messer implies. The discussion of these issues could have benefited from a closer consideration of New Testament texts that appear to express forms of cosmic ill – but that is one of the questions that this

book raises, even from within the particular evangelical tradition that it aims to situate itself. There is also relatively little philosophical analysis here, apart from glancing comments by Fergusson and Grummett; mostly it is historical problems and issues that are brought to the surface of the agenda in these diverse chapters. Both of these chapters, in their turn, raise more questions ripe for theological and philosophical discussion.

Overall this is a stimulating book to read and one that will benefit courses and programmes that engage in science and religion. If this book spawns research questions, then it will have served its purpose: to show that theological engagement with Darwin's thought is a rich and rewarding, if difficult, exercise to undertake.

Celia Deane-Drummond is Professor of Theology and the Biosciences in the Department of Theology and Religious Studies at the University of Chester.

Mark Bratton (ed.)

God, ethics and the human genome

London: Church House Publishing, 2009. xxxi + 154pp. pb. £16.99. ISBN 978 0 7151 4139 7

Here is book in which a group of Christians have presented their views on the Human Genome Project and its ramifications. It is by no means the first – for example, *Brave New World*, edited by Celia Deane-Drummond and containing contributions from some of the authors who have also written for *God, ethics and the human genome* was published in 2003 – and it is unlikely to be the last. What is unusual about this book is its evolution (if I may use an overtly biological word). It started as a motion on gene patenting sent to and debated at the Church of England's Guildford Diocesan Synod in 2004. The motion was sent 'upstairs' to the General Synod which, in 2006, asked the Church of England's Mission and Public Affairs Council to carry the matter forward. This resulted in the setting up of the Human Genome Review Group (with a wider remit than just gene patenting), the deliberations of which are presented by the group's members in this book. It is claimed that it is the first book on the human genome in which all the writers are Anglican Christians (although the list of authors' affiliations does not give me confidence in that claim). It is possibly this claim that led the publishers (in their 'blurb' on the back cover) to call it a 'ground-breaking book'. It is certainly not ground-breaking in terms of the material it discusses. However, that need not matter: if the authors are able to bring us fresh insights into the material, then such a book can be useful.

So, is *God, ethics and the human genome* useful? The young curate in the famous *Punch* cartoon might have replied to his bishop 'Parts of it, my Lord'. It is indeed a book on which it is very difficult to give an overall opinion and thus writing a succinct review is equally difficult. So, let me start by dealing with some of the annoying and in some cases misleading errors that could have been avoided by more careful proof-reading or better coordination amongst authors. Firstly, the Human Genome Project is consistently described as a genome *mapping* project whereas it was primarily a project to *sequence* the human genome (although some mapping was also necessarily involved). Another consistent error is that the terms *genetic screening* and *genetic testing* are often used interchangeably, as if they were the same thing: they are not. Another consistent source of misunderstanding is the fact that we 'share' so many genes with 'lower' organisms. This was not a 'startling' discovery, as is stated (20): we already suspected that this would turn out to be the case. (The *startling* discovery was that mammals have fewer than 25,000 genes, rather than the 100,000 we expected. That certainly has made us think hard about how genes work.) However, we must understand that sharing 70% of our genes with the banana does

not mean that our *DNA sequences* are '70% identical to bananas' (22). Allow me to illustrate this from my own work on a gene that is present in all organisms except bacteria and which has the same function in all those organisms. We determined its sequence in the pea plant: the sequence is 80% identical to that of the same gene in humans: humans 'share' the gene with the pea plant but the sequences are not identical. Understanding this would help to avoid the misunderstanding: 'I share some of [my genes] with the entire human race and a lot more with my close family' (53). Actually, we all share (nearly) all our genes with the whole human race. What we share extensively with our close family is our genetic variation – the differences in DNA sequence that give each of us our genetic uniqueness. This also means that the various writers who talk about our genetic similarity to the chimpanzee need to define more carefully what they mean. Different writers in this book give different figures here; my understanding is that we share 98% of our genes with the chimpanzee but that does *not* mean a 98% sequence identity.

Turning to some more specific points, we should note that the human genome does *not* consist of a single DNA molecule (8). Each of our chromosomes contains one DNA molecule and so there are actually twenty-four separate DNA molecules (twenty-two 'autosomes' and two types of sex chromosome) in the human genome. It is stated (22) that genes 'make up less than 2% of the genome' but in the very next paragraph that 'genes… only make up about 5% of our DNA'. The former is actually correct. Further into the book (105) Down syndrome is included as a genetic condition whereas it is actually a chromosomal trisomy. I also note that while many cancers are indeed associated with environmental and social factors (110) there are some that are definitely 'heritable and genetic'. Finally I note that one author describes one of his own books as 'influential' (without, of course, informing us of his role in its production) – somewhat ironic in a volume where the hubris of genetic scientists is roundly criticised.

The book starts with a brief Forward by Philip Giddings who reminds us of David Sheppard's call to 'shed the light of the Gospel' on the issues of the day. The book is specifically located in this context and its evolution, aims and objectives are introduced. Then follows Malcolm Brown's very long Preface (at fifteen pages it is longer than some of the main chapters), entitled 'An Anglican gene? The lineage of this book'. The title is very contrived and the text is very wordy: the key points could have been made in far fewer pages. In fact, the first 'proper' chapter – 'Introduction: autonomy, solidarity and the human genome' – is far more useful in setting the scene (although I wish that the author, Mark Bratton, had left the science to Annette Cashmore). In this chapter, the seven main themes that occur through the book are listed: 'playing God', naturalness, genetic determinism and reductionism, relationships between the human, the animal and the non-living world, commodification, solidarity, and the relationship between medical therapies and social justice. The author then deals briefly with each in turn, highlighting the main points that are made about them later in the book. Chapter 2, by Annette Cashmore, 'Applications of human genome information – case studies', is a clear, readable and useful chapter. It shows the sort of applications that are now possible, including a short scientific commentary and analysis of each study. It points out the social and ethical questions raised by each case study, stating quite rightly that these questions lie outside the remit of science and medicine. That leads me to move straight to Chapter 4, 'The human genome and philosophical issues'. The author, Sue Chetwynd, has partly used Annette Cashmore's case studies as a jumping-off point to develop her themes and in doing so has produced what is for me one of the best chapters in the book: beautifully

written, clear, informative and thought-provoking.

I will group together the three main theological chapters, Chapter 3, 'The Bible and human genetics' (Robert Song); Chapter 5, 'The human genome and theological issues' (Peter Manley Scott); and Chapter 8, 'The Church and the genomic project to secure the human future' (Michael Northcott). None of these three are particularly easy reading (although Scott's contribution is better than the other two in this respect) but some common themes may be discerned. One is social justice, with concern that genetic knowledge is one more thing that puts power into the hands of the already powerful. We scientists may argue that this is not the fault of the science but nevertheless we acknowledge that a fraction of what is spent on genetic medicine in developed countries would go a long way to improving significantly the health of millions of people in the less-developed countries. Another major theme is the entirely justified rejection of genetic reductionism/determinism. With it is associated the futility of seeking (genetic) perfection and/or 'perfect' health, or, as Scott puts it, of thinking that we are capable of 'transcending human boundedness' while Song writes of the 'idolatry of cure'. Perfection for humans, carrying the image of God, is only to be found in God. However, can we really ask non-believers to base their view of health on this? In any case, as Christians, we believe that we have a God-given mandate to try to bring about healing for anyone, albeit within realistic expectations. Nevertheless, I did not feel in reading any of these chapters that the authors had made any attempt to empathise with or 'walk with', for example, a young couple who, having already struggled with the very early and uncomfortable death of a baby from a recessive genetic condition, were now having a further struggle about whether they should go in for pre-implantation genetic diagnosis if they wanted another child. At one end of the scale, I suspect that Robert Song would actually support this idea while Michael Northcott would oppose it vigorously. Indeed, those who are familiar with Northcott's output would expect him to take a negative stance on the human genome project and those expectations are thoroughly fulfilled here. His chapter is a *very* negative (and in places very alarmist) discussion of the project, of its possible applications, of its possible effects on human society and of the motivations, both personal and philosophical, of scientists involved in this work. There is no mention at all of the benefits that are already occurring or are 'on-stream', nor of the wider value of achieving a better understanding of our genetic make-up, nor of the higher motivations of many men and women, including a good sprinkling of Christians, working on human genetics and/or its applications. In my view then, this chapter is very misleading for any reader with little or no knowledge of this field.

This brings me to two contributions on patenting. In Chapter 6, 'A brief legal interlude: intellectual property and patent protection', John Overton explains what patents are and informs us of the changes that led to gene sequences being patentable. I am especially glad that he dismisses as entirely false the view that a patent confers ownership, a view that I have encountered too often amongst anti-GM campaigners and even in our 'serious' newspapers. In Chapter 7, 'Biotechnology patenting, ethics and theology', Donald Bruce does exactly what his chapter title implies and after a clearly set-out discussion leads us to the conclusion that patenting gene sequences is wrong. This for me is the equal-best chapter in the book (along with Sue Chetwynd's chapter). It is very clearly written, logical, thoughtful and readable – and I am not saying this just because I agree with him!

Readers with stamina (this book, despite the highlights I have mentioned, is not an easy read) will now arrive at Chapter 9, 'A methodological interlude: a

case for rapprochement between moral theology and moral philosophy' by Nigel Biggar. This sets out the case for moral theologians being at the table with secular ethicists on discussions of issues such as human genetics. Whatever those secular ethicists might think, moral theologians have a contribution to make, provided they 'do their homework' properly. The chapter is relatively short, is clearly written and makes it point well. I found it quite inspirational, coming at this point in the book.

Finally, the editor, Mark Bratton gives a brief overview in Chapter 10, 'God, the whole person and the human genome'. This is followed by a glossary, very useful for non-scientists, some suggestions for further reading and the end-notes listing the literature cited in the chapters. There is also a general index and an index of Bible references.

Overall then, does the book fulfil its 'explicit purpose… to equip lay (in the non-ecclesiastical sense) people to engage with the issues and particularly to enable Christian people to do so' (xiii)? Well maybe, but I think there are better books out there. Having read *God, ethics and the human genome* in order to review it I am not suggesting that readers of *Science and Christian Belief* rush out to buy it.

John Bryant is Professor Emeritus of Cell and Molecular Biology, University of Exeter.

Julian Chela-Flores

A Second Genesis: Stepping-stones Towards the Intelligibility of Nature

New Jersey: World Scientific, 2009. xviii+227pp. hb. £40. ISBN-13: 978-981-283-503-1

Essentially this is an expansion to book form of the arguments presented by Chela-Flores in an article in *Science and Christian Belief* 2005, 17(2), 187-197. The questions addressed are 'Are we alone in the universe?' and, if not, what are the implications of this for the relationships between science, philosophy and religion. The emergence of biological complexity (life) elsewhere in the universe is the so-called 'second Genesis' (1), and the subject of the science of astrobiology (aka exobiology). From the preface it is clear that the author wants to communicate his own excitement at the possible implications of the discovery of a second Genesis within his own lifetime, and I think that he succeeds in this.

The writing is discursive and the arrangement of material in the chapters 'heterogeneous', to use the author's own terminology (118). This inevitably leads to repetition of some arguments in different parts of the book, but also means that the reader stumbles across interesting bits of information almost at random. The book contains an extensive glossary, short biographies of key scientists, philosophers and theologians through history, and suggestions for supplementary reading (these total 50 of the 227 pages). The last mentioned allows the reader to follow up ideas that may only be briefly touched on in the book.

The discussion ranges widely. For example, Chela-Flores considers the science of discovering life elsewhere in the universe, including possible space missions to Europa (satellite of Jupiter), and Titan and Enceladus (satellites of Saturn); locations within our solar system where conditions for the development of life are thought to be favourable. At the other extreme, he discusses whether the incarnation of Christ here on Earth is sufficient for the redemption of all life in the universe. However, in general he tends to lump together the Abrahamic religions (Judaism, Christianity and Islam) in his discussion, not always helpfully given the significant differences among them.

The key argument that runs through the book is that of the dominance of convergent evolution – whether at the stellar, biochemical molecular, or biological level – as compared to contingent evolu-

tion. At the stellar level, for example, he discusses convergence in the formation of interstellar gas and solar evolution. At the biochemical molecular level, he gives examples, such as the convergence in the evolution of antifreeze proteins independently in various fish and visual pigments in humans and fish. In examining the question 'What would be conserved if the tape of evolution were played twice?', Chela-Flores argues that natural selection is powerful enough for organisms living in similar environments to be shaped to similar ends – and this would apply both on the Earth and elsewhere. On this basis, he argues for the existence of life elsewhere in the universe and clearly expects that in the not too distant future we will find evidence of a second Genesis. Whether the reader will be convinced by these arguments is unclear, as the dominance of convergent evolution is far from generally accepted.

One issue not addressed is the question of a second Genesis on Earth – did life start here independently more than once? This issue is raised in Paul Davies' recent book *An eerie silence: are we alone in the universe?*. From an experimental viewpoint this may be an easier question to answer than whether a second Genesis has occurred elsewhere in the solar system or on a planet orbiting another star. Given the lack of any positive outcome from SETI (Search for Extra-Terrestrial Intelligence), the question of how to determine whether there is life (intelligent or otherwise) beyond the solar system seems particularly problematic.

The book raises many questions and issues but comes to no clear conclusions, for two reasons: first, the lack of any solid scientific evidence to-date regarding the existence of life elsewhere in the universe; second, because the author does not interact with the scriptures or beliefs of any particular religion in much depth. The overall message is that there need be no conflict between the discoveries of science, including a possible second Genesis, and religious belief. In fact, Chela-Flores thinks that a second Genesis may be a stimulus for fruitful dialogue between science, philosophy and religion but, despite finding much of interest in the book, I remain unconvinced on this point.

Meric Srokosz is an oceanographer at the National Oceanography Centre, Southampton, UK.

Philip Hefner

Religion-And-Science as Spiritual Quest for Meaning

Ontario: Pandora Press, 2008. 127 pp. $17.50 ($CDN). ISBN 978-1-894710-84-8.

This book publishes the three lectures delivered by Philip Hefner in the Sixth Goshen Conference on Religion and Science, together with the ensuing discussion. Although the conference proceedings reported here are necessarily succinct, the book represents an excellent broad summary of Hefner's position presented in an engaging and thought-provoking way.

Hefner (who recently retired as the editor of *Zygon*) uses the hyphenated term 'Religion-and-Science' to represent the integration of these disciplines in the human endeavour to forge meaning in the world and to answer what are fundamentally ethical questions about our present and our future. His lectures propose that Religion-and-Science at its deepest level is a spiritual enterprise and is about meaning; a meaning which he defines as a link or 'fit' between what is important to us on the one hand, and the world in which we live on the other (13). He does a good job of arguing that much of our experience of the world – and our ideas of nature (in the West at least) – are mediated through science (15). Although he envisages that science, in some respects, is independent of religion, he argues that it immediately takes on a spiritual aspect when it attempts to discern what is of most value in our lives. The quest then becomes one of Religion-

and-Science, which has at its heart the discernment of meaning and the exploration of the possibilities of human life: 'visions of what the empirical present can become' (17). A distinctly future-orientated conception of the imagination is the means by which he proposes we envisage these possibilities and encounter transcendence.

Central to Hefner's approach is the image, taken from Teilhard de Chardin, of the telescope, employed as a response to problems of relating descriptions of the impersonal and non-sentient (proposed mainly by physics and chemistry) with descriptions of the 'subjective' or personal (that is, our minds, consciousness and moral experience). Just as a telescope allows the user two different perspectives on the world (depending on which end is looked through), the two descriptions might be considered equally important descriptions of reality. Of particular interest is Hefner's development of this image and his suggestion that rather than trying to account for the evolution of mind out of matter (an approach that prioritises matter as primary and which has led to the exclusion of moral experience in our understanding of nature), we should turn our perspectives around and make our moral experience the starting point (32). This distinguishes Hefner from the prevalent approach taken by those working in the field of science and religion. He sees the human mind, together with moral questions regarding our purpose and future, as primary but this does not, he insists, neglect the material; mind and experience are 'the most urgent forms in which our naturalness is presented to us' (36). Evoking the telescope image, while taking what might be described loosely as a Kantian starting point, enables Hefner to present an account of human experience that asserts the importance and irreducibility of our subjective experience (so often neglected by eliminative materialism) while taking our evolved nature seriously (and thus avoiding any substantive dualisms). Hefner's approach also makes for an attractive alternative to contemporary naturalist thinkers and the book contains a useful discussion of naturalisms that appeal to emergence theories and top-down causality: the fact that such theories have a mixed reception among scientists, and may ultimately be rejected by them, exposes these approaches to an inherent vulnerability.

For Hefner, a crucial part of our moral experience is that we are created co-creators, not least with the capability of genetic manipulation. It is the practical application of his theories that takes up much of the discussion in the latter part of the book. As can be expected with a report of conference questions, the answers here are brief and would benefit from more elaboration. Hefner needs to offer more justification for the ways in which he envisages science as value-free: is developing the capability for genetic modification morally neutral (94) if it diverts resources away from other medical or scientific endeavours? Science itself is often shaped by our conceptions of nature, and by values, to a greater extent than he acknowledges here. It also seems a significant leap to claim that if God is creator of all, and if we have evolved the technology to co-create, then it is part of our God-given nature to do so (40). Despite the brevity of the book, however, it is a stimulating and informative read.

Louise Hickman is Lecturer in Philosophy and Ethics at Newman University College, Birmingham.