

Reviews

Hans Schwarz
Vying for Truth – Theology and the Natural Sciences from the 17th Century to the Present

Göttingen: Vandenhoeck & Ruprecht, 2014. 236 pp. pb. 35€. ISBN 978-3-525-54028-2

The modern dialogue of science and theology in the Anglophone world has been significantly shaped, at least until recently, by the agenda set out by Ian Barbour in his seminal writings from the 1960s onwards. But as we are increasingly becoming aware, that dialogue has also been carried out in a variety of other contexts, which have been subject to different shaping influences. This book is to be welcomed not least for the way in which it alerts English-speaking readers to this wider context, and specifically to some of those thinkers who have addressed the relationships between science and theology in the German-speaking world.

Hans Schwarz is Professor of Systematic Theology and Contemporary Theological Issues at the Institute of Protestant Theology at the University of Regensburg. (That complex title itself alerts us to one aspect of the different context in which the dialogue of science and theology is carried out in Germany, since there, as Schwarz puts it, ‘professorships ... are more traditional in focus than in Anglo-Saxon countries where professorships are reoriented much more quickly toward present day issues’ (172).) He has engaged with the natural sciences in the past, notably in his book *Creation* (2002), and he writes in the conviction that science and theology are both ‘indispensable to the human enterprise’ (11).

In the present book, Schwarz charts a story that will be familiar to readers of this journal. He sees theology as having been in retreat in the nineteenth

century, reacting inadequately to the challenges of materialism and evolution (there is some especially interesting material here on German theologians of that period). Separate chapters deal with the rise of British Empiricism, the peculiarly North American response to Darwinism, and the ‘Fortress mentality’ of early twentieth-century Continental theology following in the wake of Karl Barth’s categorical rejection of ‘any contact or dialogue with the natural sciences in his Doctrine of Creation’ (87). The final chapters deal with Barbour and his successors, theological and scientific, in the contemporary ‘dialogue with many voices’.

Schwarz casts a very wide net in addressing this dialogue, encompassing myriad authors from a rich variety of academic disciplines. Some of the names he cites are familiar in contemporary Anglophone science and religion circles (Peacocke, Polkinghorne, McGrath, Moltmann, Pannenberg, Murphy, Clayton, Hefner), others less so (Heim, Benk, Dürr). He also engages with those voices which reject any kind of rapprochement between science and theology (Dawkins, Wuketits, Kutschera) as well as advocates of ‘Intelligent Design’ (Johnson, Dembski, Scherer). This panoramic overview means that Schwarz’s book serves as an excellent ‘primer’ in introducing readers to the thinking of these and many other thinkers. Moreover, Schwarz’s approach covers not only individuals but also various institutions which have channelled their voices (the European Society for the Study of Science and Theology, the International Society for Science and Religion, the Ian Ramsey Centre at Oxford, the Research Institute of the Protestant Study Community at Heidelberg, the Religion and Science Network Germany – and, indeed, the Victoria Institute).

The main problem with Schwarz’s

approach is that in addressing so broad a range of writings on science and religion there is (perhaps inevitably) a sacrificing of depth to breadth. This may be seen in two characteristics of this book. First, whilst what scholars have said is (by and large) admirably summarised, there is little critical engagement with them. The reader is left with no indication of the relative status of the writings of (say) Dawkins, Dembski and Deane-Drummond in scholarly circles. Second, the opening historical chapters have a rather outdated feel: although Schwarz mentions the names of historians such as J. H. Brooke and Peter Harrison in passing (although one of the index entries on the former is in fact a reference to Oxford Brookes University), there is no engagement with the fresh light which thinkers like these have brought to the historical study of the relationships between science and theology – or with the accompanying awareness that perhaps the stories which have been told about those relationships require a fresh, more critical reading. Inevitably, too, when dealing with a lively academic discipline, which is being continuously shaped and re-shaped by the ongoing activities of many individuals and institutions, it is impossible to be fully up-to-date with recent developments; but this is of course a problem faced by any author attempting a survey of this kind.

Schwarz's English (or that of his translator) may occasionally be a little eccentric, but that should in no way discourage anyone from engaging with this wide-ranging book which, in addition to offering a dependable guide through a great deal of contemporary literature, does much to broaden out the context of the science-theology dialogue for English-language readers.

Michael Fuller is a Teaching Fellow at New College, University of Edinburgh; he is also Chair of the Science and Religion Forum, and Vice-President for Publications of ESSSAT.

Roger Pullin

Free Thought, Faith and Science: Finding Unity by Seeking Truth

Parker, CO: Outskirts Press, 2014. pb. £17.95. ISBN-13 1478735700

I still remember the sheer joy of reading Donald Mackay's *The Clockwork Image*. Seventeen years of age, about to study science at university, I had just become a Christian. I hadn't read anything like it. Here was a first-rate scientist writing about his faith and his science as if it was the most natural thing in the world. And it was *his* faith, not just faith – it was personal. The book mirrored and helped me understand the shift taking place in my own life at the time.

Since then, as professional scientist and as someone who wants to communicate to others that science and faith are not necessarily adversaries, I have devoured 'Science & Faith' books, many of them excellent, and certainly with the power to make some people think and even reconsider. That said, in recent years I have begun to wonder how much we've progressed in our discussions. My perception is that while much of what is written is good, somehow we've got stuck. There's lots of old ground and we seem to go over it again and again. Yet the personal touch of Mackay is far from losing its appeal and to my mind has become more popular. And the timeless pull of narrative has become even more important and appealing to the (extra?)ordinary woman or man in the street. My experience is that people are attracted by narrative or story when it means something to someone, even if they do not share, or even agree with it. They're prepared to give it time...to give it a chance. Some agnostic friends who recently read Alister McGrath's *Inventing the Universe* were fascinated by his telling of his own story in the first chapter, and wanted to talk about that more than anything else in the book.

Roger Pullin's first book *Free Thought, Faith and Science*, is his con-

tribution to encourage 'believers who distrust science' and to urge non-believers 'to reassess their positions and consider participation in an expanded faith-science quest for truth'. Interestingly the approach he adopts is personal narrative: 'Writing in the first person singular is generally frowned upon in science, but I had no other option here in order to describe some of my experiences concerning faith and science, my present beliefs and my journey through life so far.' A couple of chapters in, the reader is left in no doubt that the author clearly believes he has something new and important to say. Pullin covers a lot of ground and includes much more than would perhaps come under the banner of 'mere Christianity'. While there are chapters on science, on faith, on truth and morality, he also includes sections on angels, faith healing, homosexuality and one particular view of the events surrounding the second coming (the rapture).

Pullin's central thesis, expounded at length in the first four chapters, is that 'free thought' is, for him (and he suggests for everyone else) the key to understanding and discussing all the aspects of faith and religion which constitutes the second half of the book. Now 'free thought' is a relatively old and established term. The first free thinkers in the seventeenth century inquired into the basis of traditional religious beliefs. Bertrand Russell said in 1957,

What makes a free thinker is not his beliefs but the way in which he holds them. If he holds them because his elders told him they were true when he was young, or if he holds them because if he did not he would be unhappy, this thought is not free; but if he holds them because, after careful thought he finds a balance of evidence in their favour then his thought is free however odd his conclusion may seem.

Traditionally free thought is a philo-

sophical viewpoint which takes a position regarding the truth of something based on logic, reason and empiricism, not dogma or authority. Now what Pullin wants to call 'free thought' has elements of this traditional approach; for example, 'exploring faith requires no compromise in the rigorous methods of science', but it is not the same thing. He places his free thought above what he calls 'basic thought' that deals with the practicalities of life. His model posits a material and a spiritual self working as a whole. His free thought is a way of processing information from the material and spiritual realm about the higher things of life, and covers the 'whole of that interactive and iterative, spiritual and mental process together with responses from the body-mind to the surrounding material realm and from the soul to the spiritual realm'. In this he is looking, as he says in the first chapter, for believers and non-believers to change their minds, in a way that this free thought is shared and allows dialogue. Using free thought, for Pullin, is the key to tackling and thinking about all of the things that matter in science and faith. And that is what he wants to convince his readers of.

Throughout Pullin uses personal testimony and stories – he has succeeded in creating a very personal book. Like myself he is a marine biologist and I found how his faith and his life interacted and why he thought and did what he did fascinating: it certainly challenged me and, most importantly, made me think. I liked the way he tried to find neutral starting points for discussion – even with the notion of 'free thought' which is central he tried to be even handed to believers and non-believers alike. That said, overall I did not find the book easy. True, some of the stuff Pullin covers is fairly difficult to articulate and sometimes I didn't quite follow his arguments, but I see that as my deficiency. Ironically enough it was the personal element that I found did not make it easy, for me at least. I

think Pullin often took too much for granted, for example, the assumptions of the spiritual force for evil, and the 'body-mind plus soul' model, and the 'I believe' statements, while on one hand a strength, I felt brought out in me the thought of 'yes, but do you want to know what I believe?' The redefinition of 'free-thought' I found too much for me, although I applaud what Pullin was trying to do in saying that you can actually think 'freely' about 'spiritual' matters without having to be a slave to tradition or dogma.

Overall I liked what Pullin was trying to do – to find an alternative, a different, a novel way in to thinking about science and faith. For me at least, he did not convince – there were too many things given, taken for granted – but he really did stretch me and make me think. Perhaps that is enough? And when I finished I did feel I knew a little about this fellow marine biologist and the faith which shapes his life, and that left me encouraged.

John Spicer is Professor of Marine Zoology at the University of Plymouth and a member of CiS South-west.

Mike McHargue

Finding God in the Waves: How I Lost My Faith and Found It Again Through Science

New York: Convergent Books, 2016.
274 pp. hb. \$24.00. ISBN 978-1-101-90604-0

The interaction of science and faith in popular culture is often represented by tired caricatures, but this book and its author give cause for optimism. Mike McHargue is neither a professional scientist nor an academic theologian. He is, however, a skilled populariser in both arenas. Better known to the online community as Science Mike, he presents a weekly podcast answering questions about science and faith, as

well as co-hosting *The Liturgists* podcast, a contemplative discussion of art, science and faith.

Finding God in the Waves is an autobiographical account written for people who find themselves wanting to believe, but cannot see how faith could form a credible part of a scientifically informed world-view. It is written in an accessible style and I would be happy to put this book in the hands of an A-level or undergraduate student who is struggling with faith or feels intimidated by science. Equally, I think it would appeal to agnostic or atheist friends who are inquisitive about Christianity, because the author is writing from his experience of those positions.

In the first part of the book McHargue relates the loss of his evangelical Christian faith, brought on by personal crisis and a growing scepticism (fuelled in part by the writings of Richard Dawkins). It is a sad loss. He spends two years in mourning as a 'closet atheist', hiding his beliefs from church and family. Tensions build to a crescendo that culminates in a profound mystical encounter on a California beach that leaves him feeling like he met God. This marks a gradual return to faith, but atheism had taken its toll, leaving him 'an emotional and experiential Christian who was an intellectual atheist'.

The story is interlaced throughout with diversions into the neuroscience of religion and prayer, providing a parallel narrative to the changes going on in McHargue's life. The effect is to clearly illustrate the complimentary relationship between scientific and experiential accounts of his journey. The scientific vignettes are based on a mixture of popular science books (particularly the works of Dr Andrew Newberg), articles and primary literature that are provided as informal notes at the back of the book. Readers might want to consult a wider range of books reviewed in this journal for a more in-depth coverage of the topics.

The atheist period of the book actually provides a refreshing perspective as the author challenges the 'truisms and soundbites' often promulgated in Christian circles, that 'science tells us how and faith tells us why' for instance. 'I don't think you get it', he complains at a Christian retreat led by Rob Bell, 'science can explain beauty... scientists can certainly understand love and beauty and why humans are so compelled by them'. Here he is voicing frustration at the way that atheists and Christians often seem to talk past each other with triumphalist arm waving on both sides.

In the second part of the book McHargue rebuilds his faith on a platform of science that can overcome his own scepticism. With chapters ranging from cosmology and the neuroscience of prayer to the social psychology of church, he constructs a set of scientific pillars to undergird his faith. These two-part 'axioms' are listed at the back of the book (255-256) and articulate key aspects of the Christian faith in minimalist, naturalistic terms coupled with a justification of why they are beneficial. For example, his axiom about God states:

God is *at least* the natural forces that created and sustain the universe, as experienced via a psychosocial model in human brains that naturally emerges from innate biases. *Even if* that is a comprehensive definition of God, the pursuit of this personal, subjective experience can provide meaning, peace and empathy for others. (author's italics)

Such statements clearly fall well short of orthodox Christian doctrine, but they are not intended to replace the creeds. They are crutches to fall back on when doubt creeps in. They provide the impetus for participating in spiritual exercise when faith is on a low ebb or non-existent. One of McHargue's main messages is that the way to faith is through participation, even when you're not sure if it is real: 'If you want

to know God... [here's what] science has to say: pray, read the Bible and go to church!'

This brings me to a minor quibble with the subtitle, which suggests that McHargue found God 'through science'. While this is partly true, science can only take you so far. I think the book is more about how science *allowed* him to believe in something he had already experienced. Yes, the axioms provide compelling reasons to participate, but there must be some experiential aspect (as in McHargue's case) that can only be cultivated through participation.

The autobiographical nature of the book might seem limiting in scope, but this is countered by its undeniable authenticity. This is no mere thought experiment; it is someone's life and McHargue is surely not alone. How many people have walked away from faith because they find themselves part of a church that is intimidated by science and cannot deal with doubt? As McHargue notes, 'My path back to God was paved with grace by those who received my doubt in love.'

Nicholas Higgs is a marine biologist and Deputy Director of the Marine Institute at the University of Plymouth.

Joshua R. Farris and Charles Taliaferro
The Ashgate Research Companion to Theological Anthropology

Farnham: Ashgate, 2015. 384 pp. hb. £90. ISBN 978-1472410931

This handbook examines anthropology from the perspective of Christian theology and philosophy of religion. The authors of the twenty-seven plus chapters, who are competent in their fields, come from various Christian denominations and are often explicitly ecumenical in outlook. The book is committed to a par-

ticular view of the human person, which it develops in a nuanced way. However, it remains unclear why a reader should adopt this particular view of the human person in the first place.

The *Companion's* opening section on methodology makes two points in the chapters by Marc Cortez and John Cooper: Christian anthropology should be Christocentric and dualistic. First off, anthropology cannot be a matter of giving prevailing views about the human person some belated Christian interpretation, according to Cortez. As Barth insisted, the human creature is constituted in Christ, and Cortez sees what being human means more specifically as open for debate within these limits. Cortez is unsure, however, where a Christocentric approach takes us: Are women ontologically inferior since Jesus was a man, or are men and women equal due to Jesus' inclusive practices?

The *Companion* positions itself more clearly when Cooper describes the human body and soul as two separate entities that are integrated in the one human person in relationship to God. In death and resurrection, the enduring soul 'switches' bodies. These views are justified with a few Old Testament proof texts and a distinctly dualistic reading of the New Testament. Unfortunately, the exegetical part is less than persuasive. For example, the assumption of an enduring soul in John 11:25f ignores almost a century of critical scholarship.

Notably, Cooper calls the relationship to God 'spiritual'. In consequence, social dimensions in anthropology (e.g., Paul's notion of the body of Christ) are not discussed and thus appear as irrelevant. This is in keeping with the set-up of this *Companion*, which does not include chapters on political, economic, legal, or wider cultural aspects of being human. In their contribution, Warren Brown and Brad Strawn add to the critique that anthropological dualism blocks out ecclesiology. One chapter on ecclesiol-

ogy and a very short one on feminism do not succeed in remedying this basic problem. As a whole, the *Companion* seems reluctant to embrace a larger view of the human person as a *zoon politikon*.

Brown and Strawn's excellent chapter, which opens the third book section on conceptual 'models', would have been the natural conversation partner with Cooper's chapter. Brown and Strawn see the mind emerge from the complex systemic organisation of the human brain, which co-develops as infants interact with their surroundings, imbuing their environment with meaning rather than merely observing it passively. In fact, the authors focus so strongly on the brain that they might even call humans 'embrained' rather than embodied. To be sure, they highlight language and social relations, but it is organisms – rather than brains – that speak and relate. Neither are other organs simply 'peripheral' to the brain: if our voice box were not suited for articulate language, even our brains would be different, giving rise to different kinds of thought. But Brown and Strawn are right in seeing embodiment as constitutive rather than ontologically secondary. They ask how the soul might influence the body, and I wonder how the body influences the human spirit (e.g., with 'spirits' or in having a human rather than a chimp voice box). Such influence is also overlooked in William Hasker's portrayal of emergentism as a peculiar variation of substance dualism.

At the beginning of the second section on the body and the sciences, Joshua Moritz discusses evolutionary biology and palaeoanthropology, where bodies and minds are intertwined in strange ways. He questions traditional accounts of human privilege over other animals. Since the notion of natural kinds has not survived Darwin, according to Moritz, the human species can only be identified based on descent, no longer on traits. *Homo sapiens* does not differ essentially from Neanderthals.

Finally, science by itself does not suggest human privilege, which, according to Moritz, can only be a judgement of belief in contingent divine election. But whose privilege is it? Descent from humans does not help distinguish humans from animals of other species. Cannot distinctly human capabilities and affinities play a role after all, and is that not implied in Moritz's own account of the *imago dei*?

Aku Visala then gives an informative overview of cognitive science. This paradigm is often understood as materialistic monism, with the computer metaphor describing human thought as information-processing running on hardware. Cognitive science wrestles especially with the difficulties of consciousness and self. Visala points out that we might put consciousness down to 'feeling' our bodily states. But even that involves qualitative perception, a register with a personal hue. How this might be further reduced to the same neutral format as other mental states remains unclear. Some insist on a non-natural soul, as Visala relates. Is this addition necessary to defend spontaneity, self-organisation, feeling, consciousness, and self – things not explained by the computer metaphor? Why then opt for the computer metaphor in the first place? Visala, by contrast, argues for a religion that sheds the 'metaphysical baggage of the supernatural'. It seems to me, however, that cognitive science comes with distinct metaphysical commitments of its own, as it insists on symbols processed by software, in spite of the difficulties this paradigm causes for the common sense view of qualitative perception and a conscious self.

In the following chapter, Daniel Robinson asks what neuroscience can tell us about religious experience. His sober, insightful conclusion is that science cannot decide whether religious experience – in whatever way one may define that – is nothing but misbehaving neurons, mere emotional froth on mundane neural processes, or God's

Spirit dramatically in action.

In the fourth section on the *imago dei*, Farris continues the dualism theme in seeing the *imago* refer primarily to 'the soul (man's core)'. This is juxtaposed with Joel Green's deft biblical argument about why the soul should not be thus singled out. In contrast to other assertions in this book, Green shows that Genesis 2:7 resists a fundamental anthropological differentiation between body and soul. Further contributions engage the concept of the *imago dei*. Oliver Crisp then argues that God created human nature for communion with the creator, who is uniquely represented in the sinless life of Jesus Christ, the archetypal *imago*. The question of how we might then, inspired by this *imago*, live our lives in more humane ways is not broached. Finally, the remaining three parts of the book explore the themes of free will, resurrection and Christology.

In the first chapter of the book, Cortez claimed that this *Companion* takes Christology as its methodological 'starting point'. On the whole, the authors refer often, directly or indirectly, to the eternal kingdom of heaven. God's kingdom as it involves communities in this life remains practically unexplored, however, as most pieces focus on formal categories that describe the human person in a more generic sense. Readers can certainly derive some profit from this, as in the pieces interacting with the sciences, although the quality varies. Finally, in spite of many Christological affirmations, there is also no reference to the kingdom that took shape in the ministry of Jesus Christ.

Alexander Massmann is a postdoctoral research associate in bioethics at The Faraday Institute for Science and Religion in Cambridge.

Robert Brennan

Describing the Hand of God: Divine Agency and Augustinian Obstacles to the Dialogue between Theology and Science

Eugene, OR: Pickwick Publications, 2015. 288 pp. pb. £25. ISBN 978-1-62594-913-3

Coming as it does from the theology side, this book can be welcomed as a contribution to the science and theology dialogue. Its Australian author, Robert Brennan, is conscious of the problem of a lack of common ground between the sides and uses the expression ‘apples and oranges’ to label it. His book is an attempt to address the issue of how God acts in the ‘heart and life of humans and possibly in the world’ (xiii).

By its focus on Augustine, this work recalls a method used in past centuries for formulating a natural theology other than that of describing humanity as an image of God, thus allowing interaction between God and the human on the basis of the analogy of being. Instead, the author shows how the natural theology of such people as Paley was compromised by an implicit – or explicit as in the case of Newton – reliance on Augustine’s theology of inspiration. Paley assumed that the attributes of God as perfect being must be reflected in the natural order, in a created world which had purpose and was the best of all possible worlds. The author notes that this form of divine agency was described independently of Trinitarian theology and also of Christology (25) and really ran contrary to Augustine’s general theology, which never spoke of God’s action in the world without reference to God’s action in Christ.

The title’s reference, then, to Augustinian obstacles comes from a very detailed account of attempts in the modern era to describe God’s action based fundamentally on Augustine’s theology of inspiration, which is summarised in eight points. Central to this description of inspiration is the existence of the

human soul which is displaced by the Holy Spirit in the inspiration process. When this displacement is total (*ekstasis*), ‘divine action dovetails neatly with the seventeenth century understanding of divine perfection’ (83). The author says that this understanding of divine agency was extended to divine agency in the world in general, especially in the writings of Newton. The account of the dependence on inspiration in Newton’s writings draws on recent research and the discovery of hitherto unknown writings; the author adduces the example of *De Gravitatione*, published for the first time in 2004. This is a valuable contribution of over fifty pages to the study of the history of the relations between science and religion.

The negative part of the book’s title obscures the fact that the author’s aim is to make a positive contribution to the theological treatment of divine action in the science and theology dialogue. The contribution is in the form of an assertion that the concepts of *anhypostasia* and *enhypostasia* in relation to Christ’s incarnation are a resource on which a theology of divine action may be built. On the way to articulating his proposal for a Christological and Pneumatological theory of divine action in Chapter 5, the author turns – in quite a long section – to Barth for support, and in doing so accepts Barth’s insistence on restricting knowledge of God and God’s action to his revelation in Christ and on his non-Augustinian theology of inspiration. For Barth, ‘[the God-breathed text] does not have authority deriving from assumptions requiring perfect divine action in its writing’ (233). He also gives an account of Barth’s Pneumatology, noting that he holds that the New Testament deliberately lacks an explanation of how the Holy Spirit acts.

Since ‘this is where Barth stops’ (247) the author goes beyond him by arguing that the concept of *enhypostasia* preserves the full humanity of Christ and is constitutive for the Holy Spirit’s interaction with humanity. He then

asks if it could be that this preservation also extends to ‘the matter constituting Christ’s resurrection body’ (257). In this way, he proposes an extension of the range of divine action to the whole of creation, but this is a tentative proposal at the end of the work and is not pursued in detail.

It prompts the observation that the author’s way of proposing an *enhyposstatic* approach to divine action does not take account of a correlative concept in theological tradition, that of the relation between the *logos ensarkos* of the incarnation and the *logos asarkos*, succinctly described by Athanasius (*De incarnatione* no. 17): ‘The Word was not confined within his body; nor was he there and nowhere else; he did not activate that body and leave the universe emptied of his activity and guidance.’

This hugely detailed work would have benefited from more discussion of its basic thesis and less of themes related to, but less central to, the argument. There is a very comprehensive bibliography but no index and there are too many typographical and syntactical flaws, and even words omitted, in a book that deserves to be taken seriously.

Fintan Lyons OSB is a theologian interested in the science and theology dialogue. His *Luther’s Challenge, Then and Now* is due to appear in summer 2017.

Joel B. Green

Conversion in Luke-Acts: Divine Action, Human Cognition, and the People of God

Grand Rapids: Baker Academic, 2015. 195 pp. pb. \$25.00. ISBN 978-008010-9760-7

Thanks to the work of dedicated biblical scholars fresh understandings of familiar Scriptures continue to enrich our lives and enable us better to fulfil

our calling as Christ’s disciples. For the work of such biblical scholars we are indeed thankful. But the God who inspires Scriptures and guides the dedicated biblical scholars is the same God who guides and motivates the endeavours of Christian scientists through whose work we gain fresh insights into our understanding of the created order of which we ourselves are a part.

At times the discoveries of scientists afford checks and balances to our understanding and interpretation of Scripture. They may thus steer us away from previously incorrect exegesis and prompt new and deeper understandings of what God intends to teach us through his Word written. (For example, the recent paper in this Journal, *The Bible, Science and Human Origins*, S&CB (2016), 27, 74-99.)

Professor Joel Green, Dean of Theology at Fuller Seminary, a well known and highly regarded biblical scholar, is unusual in that in mid-career as a biblical scholar he took time off to undertake intensive studies in cognition and neuroscience. In this book, in a remarkable way, he brings together the scholarship and insights of a biblical scholar and those of contemporary cognitive neuroscience. The result is a feast of fresh insights into the Gospel of Luke and the Acts of the Apostles, two books normally attributed to the authorship of Luke, and in which he specifically focuses on conversion. The agenda is set in the opening sentence of the book when he writes, ‘This work represents a confluence of two streams of research that have long captured my attention, the study of Luke-Acts and the potential of the neurosciences for theological study.’

It is clear from the outset that Green wants us to re-examine some of the understandings of conversion widely circulated in the Christian marketplace. Thus he writes,

What conversion entails, however

– how best to define conversion for Luke-Acts – seems largely to have been assumed. The importance of definition can hardly be exaggerated. After all, what one assumes conversion to be will determine what one looks for in the Lucan narrative and how one knows when one has found it. With the rise of conversion studies in the past few decades, though, how best to understand conversion has become a topic of some controversy. (4,5)

Early in his book Green sets out his agenda. He writes,

Our agenda, then, is not to transform the narrator of Luke-Acts into a cognitive scientist. Nor do we assume that Luke was an ‘anonymous cognitive scientist’, as though he were working with cognitive categories unknowingly. Indeed, a cognitive approach functions as a place to stand in order to survey the landscape of the Lucan narrative, a viewing point that allows vistas unavailable to those whose starting point has been determined by William James. Does a cognitive approach in fact shed new light on conversion in Luke- Acts? (21)

The reader of this book will be left in no doubt that Green’s approach sheds a great deal of new light on familiar topics central to a proper understanding of Christian conversion.

A few quotations give the flavour of the range and depth of this book:

Conversion could never be reduced to an internal realignment of the intellect but rather signified movement from one way of living to another. (62)

Conversion is deeply embedded in the ancient story of God’s dealings with Israel, so that it is to this God that life is directed; (88)

We have found that conversion is embodied religious experience, that

is, an experience that could never be consigned to the ethereal or the ‘spiritual’. (123)

And twenty pages later he writes,

The ease with which we segregate feeling from doing, interior from exterior, and so on would be quite foreign to inhabitants of Luke’s universe. (143)

On the final two pages Green re-emphasises some of his key themes when he writes:

Simply put, if what makes us human are the properties and capacities that have the human brain and body as their anatomical basis, then there can be no transformation that is not fully embodied. (162)

Green returns over and over again to his central theme *that conversion in Scripture is not a one-off event but a journey* and this journey ‘is inescapably tied to our bodies and to the community or (communities) we inhabit.’ (162)

All of this leads to his final paragraph and definition of what he believes is the account of conversion given by Luke in his Gospel and in Acts:

Converts are those who, enabled by God, have undergone a redirectional shift and now persist along the way with the community of those faithfully serving God’s eschatological purpose as this is evident in the life, death, and exaltation of the Lord Jesus Christ, and whose lives are continually being formed through the Spirit at work in and through practices constitutive of this community.

That sounds a bit heavy going but it is unpacked helpfully and in great detail throughout this excellent book which has the potential to be very rewarding and parts of it specifically for personal and group bible study.

Malcolm Jeeves, F.R.S.E., F.Med.Sci., Emeritus Professor,

School of Psychology and Neuroscience, St Andrews University, formerly Editor-in-Chief of *Neuropsychologia*, Past President, Royal Society of Edinburgh.

Stephen M. Barr

The Believing Scientist: Essays on Science and Religion

Grand Rapids: William B. Eerdmans, 2016. 226 pp. pb. £17.99. ISBN 978-0-8028-7370-5

Physicist, and practising Catholic, Stephen Barr is a gifted writer and communicator, and has been thinking deeply about science and religion issues for a long time. *The Believing Scientist: Essays on Science and Religion* is a collection of his book reviews, public lectures and blogs spanning almost twenty years. His first chapter – original to the book – serves to introduce the theme that brings some unity to independent essays. In it, he argues that there is no genuine conflict between religion and science per se. The conflict is between religion and scientific materialism, a philosophical view maintaining that only observable material reality exists (i.e., no God or spiritual realm).

Readers of *Science & Christian Belief* will find this introduction familiar terrain in many respects. Nevertheless, he sometimes writes of the ‘materialist ideology of science’ (4), which seems to confuse scientific inquiry with scientific materialism. While some scientists are enamored of materialism, others recognise that it is a philosophy not to be confused with scientific inquiry and its results. This latter group includes atheists. Barr doesn’t adequately distinguish between scientists who adopt and promote materialism and those who unreflectively fall into a kind of materialist default, but when asked about it immediately recognise that scientific materialism and the sciences share nothing in common.

In contrast to scientific materialism’s inaccurate story that the sciences naturalised nature by kicking supernaturalism out, studies in the history of science and theology have shown that Christian theology was much more important to the naturalisation of nature for the purposes of accurately studying God’s creation. Barr rightly notes that many theists from the seventeenth century forward were quite taken with the idea of creation as a ‘great work of engineering’ (5). However, this same appreciation for the harmony and precision of nature led many to interpret texts, such as Proverbs, as picturing God as an engineer par excellence. The Old Testament language, however, speaks of God as craftsman or artist. The shift away from craft and artistic imagery to engineering had significant negative impacts on understanding redemption and its place in God’s plans and purposes. Barr tends to fall in line with this shift rather than challenge and correct its shortcomings.

As a collection of unrelated writings on science and religion, these essays present some frustrations for the reader. Many chapters in the book cover the same ground because Barr was saying roughly the same thing or making the same argument in multiple book reviews and lectures. Although there are some vague references in the ‘Notes and Sources’ section, some quotations and results are missing, such as a recent survey showing that nearly half of scientists believe in a personal God who answers prayer. Readers will have trouble tracking these down.

These problems aside, readers will find much food for thought: Chapter 11 is a good presentation of quantum mechanics and its implications for mind. This chapter offers Barr’s best case for quantum mechanics undermining materialism in a thought-provoking way. Chapter 14 gives an insightful analysis of the issues arising when scientists use one thing to explain the behaviour of another (e.g., how neurochemistry

explains the experience of colours and choices of careers). Chapter 20 gives a good, accessible discussion of why genetic engineering will likely have less profound effects on humanity than our worst-case scenarios suggest. Readers will find much on offer here to help them recognise and challenge scientific materialism when they confront it.

The most important complaint I have is about Barr's discussion of reductive explanation. He states matter-of-factly that the 'explanatory success of modern science' is 'based on a form of reductionism that explains physical systems by analyzing them in terms of more fundamental constituents and how those constituents are organized and interact with each other' (106). He goes on to claim that 'Most physicists (myself included) think it highly implausible that there is anything about a chunk of iron, say, or a drop of water, or a star, or an atom that is not explicable in this way' (106). Maybe most physicists think this way, maybe not. We really don't know other than anecdotally. Most of the physicists I know – believers and nonbelievers alike – think that the reductionism Barr describes represents an oversimplified view of what actually happens in scientific methodology and explanation.

Barr appears to be saying that physicists – himself included – are committed to the belief that 'Everything that is now known about the physical world can be described by two theoretical structures: Einstein's theory of gravity, and... "the Standard Model", which incorporates everything *except* gravity' (118). That is as hardcore a reductionist view as one can have. The truth of the matter is that there are no such explanations of chunks of iron or water droplets or stars in terms of general relativity or the Standard Model. Vast swaths of work in fluid dynamics, meteorology, tribology (the physics of surfaces), among other fields of physics, are *not* described by either of these theoretical structures, nor do physicists even pretend to

do so. There is a somewhat widespread *belief* that such explanations exist, but no genuine evidence to support that belief. This has been a point of contention between particle and condensed matter physicists since the 1960s.

On the other hand, Barr takes quantum mechanics (which has a nontrivial relationship to the standard model of particle physics) to be the clearest example of a physical theory that *undercuts* scientific materialism. The ideology of scientific materialism is what fuels hardcore reductionism, not the actual explanatory practices of scientists. Barr gives us beautiful, clear, cogent arguments against scientific materialism on scientific grounds in this book. Furthermore, he offers good reasons to be sceptical of the reducibility of consciousness, free will and thought. It's somewhat puzzling, then, to read the kind of ho-hum swallowing of reductive explanation as if this just is what scientific explanations in physics are all about. There is a tension, here, in Barr's writings that feels sharp when reading these essays collected together. Yet I think readers can take away much that is useful from this book for thinking Christianly about scientific materialism.

Robert C. Bishop is Associate Professor of Physics and Philosophy and the McIntyre Professor of Philosophy and History of Science at Wheaton College.

George Ellis
How can Physics underlie the Mind?

Berlin Heidelberg: Springer Nature, 2016. 477 pp. hb. £52.99. ISBN 978-3-662-49807-1

There is no denying the importance of the question that is the title of this book. It is the question that underlies the reductionist philosophy that 'ex-

plains away' spiritual and even mental realities as mere epiphenomena having no meaning or existence apart from the atomic matter of which the universe is made. If this world-view provides a complete explanation, and if 'mind' can be reduced to a by-product of the physics of our brains, then all our thoughts, values, free will and religious experiences are illusions.

The author, Professor George Ellis, is a distinguished theoretical physicist who has contributed significantly to our understanding of the universe. He draws on a wide range of other disciplines, seeking to find a 'key enabling principle' that would explain how complex entities such as the mind could 'emerge' from fundamentally simple states of matter which are described by physics. This is an ambitious aim with potentially profound theological implications. He makes the, perhaps obvious, point that in reducing everything to lower and lower levels of interactions, the reductionist explanation is bound to omit some important aspects and so is incomplete. The missing aspects are then identified with 'emergence', that is, aspects of a system that are not explainable in terms of its constituent parts. In essence, Ellis argues that 'emergent entities exert downward influences on their components, and this is the basis for true complexity'. He identifies such 'influences' as 'Top-down causation' (TDC) and suggests that this type of causation must be included, together with the kind of 'Bottom-up causation' (BUC) that characterises reductionist explanations, if a complete understanding is to be achieved. There is an emerging (sorry!) consensus, amongst scientists from many fields, that reductionism is not the whole story, and so the basic thesis of the book is fairly uncontroversial in both religious and secular communities.

The majority of the book consists of an assemblage of examples, drawn from different sciences, natural and social, that are deemed to demonstrate

TDC and so validate 'emergence' as an explanatory principle. The sweep of Professor Ellis's survey is impressive, backed up by a very extensive bibliography giving evidence of his wide reading and understanding of topics far from his professional field of theoretical physics. The book is a *magnum opus*, in which he presents numerous examples in some detail. This, however, is both a strength and a weakness of the book. On one hand the reader is reassured that each example has not been treated superficially, but on the other, the, often unnecessary, technical detail and mathematical shorthand makes it difficult to see the wood for the trees.

The presentation also suffers from a failure to define important terms. In particular the key concept of 'causation' is left undefined and soon gets used in different ways so that the thrust of the argument is weakened. The distinction is blurred between a direct causal influence, mediated by a physical interaction, and a constraint or boundary condition. Before long, non-physical 'entities' such as 'moral values' or even the 'value of money' come to be seen as causes. In addition, the important concept of 'emergence' is also used in ways that are not always consistent with the basic idea. For example, chapter 2 dealing with computers suggests that 'software' (i.e. a computer program) provides TDC on the 'hardware' of the computer (i.e. the electrical circuits). But, in my understanding, computer programs do not 'emerge' from the electronics and then act downward to control the flow of electrons. Software is not an emergent property of hardware. Both are products of a third entity – the human mind. This apparent example of TDC, although it involves both physical and non-physical entities does little to explain the fundamental problem – how does the mind emerge from the physics of inanimate matter?

The chapter on computers also illustrates a further problem with the book which reminds me of the joke, 'The

world is divided into 10 types of people, those who understand binary and those who don't.' Readers who don't understand this will have serious difficulty with chapter 2 and probably most of the book! (For the non-computer literate, binary is the counting system in which each number is represented by a digital code, a sequence of ones (1) and zeros (0), in which the number 2 is represented by the sequence 10.) Rather too much familiarity with scientific, and rather specialised, disciplines is assumed. The publisher's avowed aim is for the books in the series 'to present their topics in a manner accessible also to the scientifically literate non-specialists' but this volume is not an easy read and is not, in my view, accessible to the ordinary reader. Subsequent chapters continue the theme of showing examples of TDC from other fields including, in chapter 7, neuroscience and brain function. The additional examples, however, do not bring more clarity to the argument and the confusion over 'causality' persists into the final chapter where even 'chance', 'necessity' and 'purpose' are also deemed to be causes even though chance, at the level of quantum mechanics, has previously been identified as involving 'uncaused' events.

Theological implications are not discussed, God appears briefly on page 376 and vanishes just as suddenly never to reappear. To be fair, however, the author restricted himself to considering only how complexity emerges from the simple laws of physics. The book is a heavy-weight counter to reductionism but, since the proposed mechanism is still completely naturalistic, the impact on the Science-Religion interaction remains to be explored.

Paul Ewart is a Professor of Physics at Oxford University.

Eric Priest (ed.)

Reason and Wonder: Why Science and Faith need each other

London: SPCK, 2016. 211pp. pb.
£12.99. ISBN 978-0-281-07524-9

This text is a collection of essays based on contributions to the James Gregory public lectures on science and religion given at St Andrews University. The work of thirteen different authors has been edited into a flowing, coherent and unified account. Each chapter has an inner coherence, but also the way in which the chapters are edited together builds into a most instructive and challenging whole with themes of consciousness, personhood, relationships and purpose threaded throughout.

The distinction between science finding understanding through reason and explanation and religion providing meaning through revelation is made by most of the authors. They collectively observe that the meaning of any system always lies outside of it.

Consciousness and personhood are themes developed by a number of the authors. Keith Ward observes that God as the author of space-time is outside of it, and is the unique consciousness, who chose the universe for its intrinsic value.

Kenneth Miller asserts that evolution tells us that we are part of the grand dynamic of creation; that science is not a rejection of faith, but an exploration of the natural world which can lead us to worship the Creator. David Wilkinson's exploration of the origins of the universe leads him to reflect on the truth of Colossians 1:15-20 affirming that faith has to be in the God of creation and recreation.

Ward takes up a similar theme stating that belief in God is rational, because it is based on our knowledge that consciousness and intentional agency are fundamental features of reality. He concludes that 'a fundamental element of belief in God is that there is intrin-

sic and objective value in such things as beauty, intellectual understanding, creativity, and compassionate and cooperative personal relationships' (50).

A number of the authors focus on purpose in the universe revealed through science. Jennifer Wiseman observes the ways in which our perception of the universe has changed in less than half a century, noting that the most profound revelation of astronomy is that our entire universe has been changing and evolving for about 14 billion years, 'transforming from energy and the first simple matter into complex galaxies and star systems, with at least one environment (Earth!) where diverse life thrives and advanced life contemplates its own existence and purpose' (82). She asks: Why does science need faith? Her response is: to answer the questions of purpose. Yet she returns us to the consideration of relationships; she believes that purpose is understood in relationship exemplified – 'the Word became flesh and dwelt among us' (Jn. 1:14)

Relationships are picked up through the authors who tackle evolution and genetics. Michael Murray and Jeff Schloss see a meaningful directionality in evolution, where cooperation is a primary creative force behind greater levels of complexity and organisation in biology. Pauline Rudd looks at cooperation through our genes, where cells work in partnership. She extends this partnership to God. God's involvement with us is such that 'together we can attain real novelty, contingency and opportunity that preserve the integrity of life in the process' (118-9). She asks: What is it all for? and notes that we are accountable for the way we live, for nature does not need us; we need nature.

Eleonore Stump likewise emphasises relationships in dismissing reductionism in favour of theism, which takes persons to be the ultimate foundation of reality.

John Wyatt considers the neurosci-

entific perspectives of personhood. He also rejects the materialist position, pointing us to the freedom of scientists to create hypotheses and models, to design experiments, to assess evidence and to choose the most consistent interpretation of the data. He observes that the comprehensibility of the universe is a key fact. Here, the Christian understanding of persons is central – we are created in the image of God, and our human identity is derived from the being and person of God – human personhood cannot be self-explanatory.

The personal aspect comes into focus in David Myers' observation that religious people are happier and live longer, while John Swinton explores the connections between religion, science, spirituality and health. He defines spirituality as: 'a kind of personal, existential quest for meaning, purpose, hope, value, love and for some people the divine and the sacred' (156). He records research that shows that adherents of religious communities have better health and are less likely to suffer from such things as depression and anxiety than those who do not belong to such communities. He observes that consciousness is always relational whereas individualism separates us from others and from God.

The concluding chapters move on to a discussion of the New Testament. Mark Harris explores science and the miracles of Jesus. He challenges the reader to understand that to explain away the miracles through science and rational thought leads us to miss the point of the story – the deeper significance is lost. The deeper significance goes beyond the boundaries of science and reaches to the subjective faith component of the miracle which is encapsulated in the theological significance. This leads Tom Wright to ask whether or not a scientist can trust the New Testament. He observes that there are different ways of knowing and compares science and history. History moves beyond a record of what has happened to ask why did it

happen and poses the question: 'Could it be the case that there is after all a God who, having made the world, would come at last to sort it all out, and to do so in this way?' (190)

The book ends with Eric Priest's questions for each of the chapters. These very helpful questions are designed to help the reader to explore further, which is probably best done with others.

In the dialogue between science and faith this text is a comprehensive, up-to-date exposition of the main scientific disciplines and the ways in which religion, in particular the Christian faith, provides a secure foundation for open-ended discussion. I have no hesitation in recommending this collection of essays as a significant contribution to the debate.

John Weaver is a Baptist minister, a retired lecturer in Christianity and Science at Oxford and Cardiff Universities, and is currently Chair of the John Ray Initiative – connecting the Environment, Science and Christianity.

Chris Willmott and Salvador Macip

Where Science and Ethics Meet: Dilemmas at the Frontiers of Medicine and Biology

Santa Barbara, CA: Praeger, 2016.
180pp. hb. £29.00. ISBN-13 978 1 4408 5314 6

Having read some of Willmott's previous work, I was expecting *Where Science and Ethics Meet* to be a good – and useful – read and I was not disappointed. This is a very engaging book and a perfect introduction to the minefield that is bioethics.

Where Science and Ethics Meet tackles moral questions at the frontier of medicine and biology. In nine chap-

ters, the book covers many of the better known medical ethical dilemmas, such as genetic screening, prenatal diagnosis, genetic modification, organ donation, cloning, stem cell research and regenerative medicine – although not abortion and assisted suicide. The authors tackle human enhancement, using examples from track and field to show how gene doping is the next challenge beyond performance-enhancing drugs. They also use the examples of chemical enhancers and cyborgs to illustrate the difficulty with drawing and holding a line between treatment and enhancement.

In the later chapters, they review less well known developments such as DNA profiling and databases, brain imaging in criminal investigations, synthetic biology and lastly, ethical issues associated with scientific research (such as fabrication, plagiarism and conflicts of interest). I found these later chapters particularly interesting and useful, taking me into issues and ethical dilemmas that I have not considered in real depth before.

The book is aimed at the more popular level. Each chapter quickly draws the reader in, using a hypothetical, provocative, story that neatly encapsulates a particular ethical challenge. Although fictitious, the stories are cleverly close to real life situations, making it easier to appreciate that many of the latest developments in science, and their associated consequences, are not just fiction but real life. Each chapter is peppered with plenty of real life examples, useful references and explanatory boxes which all serve to make the scientific and medical detail more accessible.

By the end of each chapter, the authors have set out measured ethical arguments for and against the issue central to that chapter. They deliberately leave readers to come to their own conclusions about the ethical and social consequences of each technology, which is not easy for the reader as there are

rarely easy answers to the ethical problems we face today. Some may find the absence of direction a bit frustrating (I would certainly like to know where the authors themselves would draw lines, and why) but this would counteract their aim of providing the information and the tools for the reader to do some work and reflection for themselves and to come to their own, now better informed, conclusions.

Where Science and Ethics Meet is not written with any religious perspectives at all. So, again, any reader wanting to know how, say, Christianity or Catholicism in particular might direct us to think on an issue or moral dilemma will be disappointed. The book is clearly intended for a secular audience and the writers' personal views do not come through. Both authors are lecturers at Leicester University and this book reflects their experience in teaching and engaging students and, as such, offers ideal material for students from a range of disciplines – science, medicine, ethics, law and sociology. Indeed, the book will also provide me with useful material for talks and discussion starters. I plan to keep it to hand!

With its emphasis on readability and its coverage of a fairly wide range of issues, inevitably this is not a deeply analytical study and is correspondingly light on ethical theories and some of the science. Although it manages to be creditably up-to-date on many key bioethical debates that modern society is encountering, inevitably, in such a fast moving field, the book is already missing useful discussion on newer techniques such as CRISPR (which is only mentioned in passing) and the creation of three parent embryos. However the authors pre-empt this concern to some degree by saying that they have still done their job by equipping the reader with: 'a few more tools to evaluate not only the plausibility of the innovation from a scientific point of view but also the appropriateness for society' (159).

This book turned out to be an enjoyable and stimulating read. But don't let that suggest there is little depth to it – there is enough meat here to satisfy anyone who wants to be better informed and to think seriously about ethics at the frontier of medicine and biology. And for those who know it all already(!) this book would be a great resource to keep to hand for talks, discussions and teaching.

Philippa Taylor is Head of Public Policy at the Christian Medical Fellowship. She has an MA in Bioethics and law and is also a consultant to CARE on bioethics and the family.

Peter Bussey
Signposts to God: How Modern Physics and Astronomy Point the Way to Belief

Downers Grove, IL: IVP Academic, 2017. 223 pp. £17.91. ISBN 978-0830851492

There is no shortage of books on science and religion. Nonetheless, when such a book is written by a well-credentialed physicist, it is bound to carry some authoritative heft. Bussey writes for a fairly broad audience, much like the many popular science books on the market. This one best serves those with a layman's interest, those who start sweating at the first glimpse of an equation, but who still want to know something about the relation between physics and theology.

My overall assessment is positive and I agree with the clear majority of Bussey's conclusions. That said, I have some quibbles, most rooted in the values and expertise that historians and philosophers of physics bring to the table in contrast to physicists themselves. For example, he seems to accept that in order to be a scientific hypothesis, a claim must be testable. Many contemporary

scientists would agree. Philosophers would counter that the history science is not friendly to hard and fast demarcations like this. While testability is a mark of good science, it does not neatly separate science from non-science.

There are two myths Bussey aims to undermine. One is that science and religion are intrinsically in conflict. The second is that science has proved the reductionist philosophy of *physicalism*, which takes the only ultimate truths to be those in physics. He begins with basic scientific concepts and historical notes while working towards relativity, quantum mechanics, and cosmology. Astronomy gets extra attention, including the idea that medievals believed in a flat earth – a lesser myth used to support the conflict model. Bussey says nothing here about the Galileo affair, which is surprising given that most historians no longer see this as a fight between science and religion. The Copernican revolution did have a ‘despiritualizing’ effect, but without the turmoil of the Protestant Reformation and the new mechanistic philosophy, heliocentrism itself would not have led to the Enlightenment.

While the laws of nature play an important role in this story, Bussey goes on to explore the nature of the laws themselves. Are they merely descriptions and summaries of events, or do they in some sense govern the universe? *Nominalism* denies that laws are any sort of capacity or force; there are no laws of nature ‘out there’. Bussey argues that view cannot account for the inferences scientists make nor the faith they have that such inferences will continue to work in the future. While I agree with his realist position about laws, a knowledgeable nominalist will say that the arguments here beg the question.

One unexpected topic for this sort of book is infinity. Many mathematicians and physicists have argued that nothing can be truly infinite in nature. In

fact, the very concept leads to unwieldy paradoxes. One example given is the infinite library. Say that I had an infinite library with each book numbered sequentially. Now remove all the odd numbered books. How many are left? The same. There were infinite books before and an infinite number now, even having removed an infinite number of books! If we don’t want to infect science with these sorts of paradoxes, then only finite quantities can be admitted. Bussey goes on to show how this is relevant to both the size and the age of the universe. Quibble: This discussion could have been better integrated with a later chapter on the Kalam cosmological argument.

There is a two-chapter discussion of the universe’s being fine-tuned for life, which, while no longer news, is still an important topic. Bussey provides an accessible introduction and critique of the different proposed explanations for fine-tuning. This leads to the question of the nature of scientific explanations. While Bussey is explicitly not a reductionist and upholds the legitimacy of all the sciences, he does so on the basis of their practicality and usefulness. This pragmatic approach is a tacit acceptance, however, of part of the physicalist programme that Bussey aims to refute. After all, physicalists like biology too.

They have more difficulty with consciousness, as 200 years of unpaid promissory notes show. One reason for this is that if mental states, such as beliefs, are wholly governed by electrochemical laws at work in the brain, then logic and reason are irrelevant. You believe *x* because your brain is in configuration *y*, end of story. That’s a problem if the physicalist wants you to accept his position *because* of the arguments in its favour. The status of ethical truths is likewise problematic in a purely physical world, as they cannot be reduced to the truths of physics.

Finally, Bussey discusses the mysterious, ineffable experiences of awe had

by both theists and non-theistic scientists. These are, again, somewhat out of place in a universe without purpose. Galaxies, canyons, and flowers exist, but why are they beautiful? The physicalist might demur at these examples in the name of rationalism, but that's really just rhetorical flag-planting: 'I rely solely on reason; you don't.' But as Bussey shows, the gap between reason alone and physicalism is substantial indeed.

Jeffrey Koperski is a philosopher of science and teaches at Saginaw Valley State University, Michigan.

Dennis R. Venema and Scot McKnight
Adam and the Genome: Reading Scripture after Genetic Science
Grand Rapids: Brazos Press, 2017.
240 pp. pb. £ 13.99. ISBN-13 978-1587433948

Genomic evidence for common ancestry of humans and apes is prompting interest in its theological implications. In *Adam and the Genome* Venema describes selected evidence for evolution and McKnight addresses its exegetical implications. Helpfully Venema also explains how predictive power and independent lines of evidence increase confidence in evolutionary theory. McKnight mainly reflects on the historical nature of biblical Adam. These elements are the focuses in this limited review.

Predictive power and the convergence of independent lines of evidence are important for evolutionary theory because it cannot be tested experimentally. Venema shows how evolutionary theory has passed many predictions, but wisely emphasises that a theory cannot be proved.

Confidence in a theory also increases, the more independent lines of evidence converge on the same explanation. Thus

evidence from palaeontology and embryology (17-18) as well as from fossils and DNA (37) converge on the theory of evolution. Overall, Venema offers a balanced sketch of how science works in these cases with some exceptions.

There are two kinds of independence in lines of evidence. Venema uses one of them. Similarities in the anatomy and the DNA of a chimpanzee and a human converge on the conclusion that they have a common ancestor. These lines of evidence are *methodologically independent* because they use anatomical and molecular methods to obtain data. But their convergence is expected because they have a common cause, namely a common ancestor.

Confidence in human evolution would increase if the lines of evidence were *causally independent relative to each other*. Consider the use of growth rings and carbon 14 in dating a tree. If they converge on the same age confidence grows because the causes of annual growth and radioactive decay are mutually independent. Currently, fossil and genetic lines of evidence for human evolution are only independent methodologically. Their convergence offers reasonable support for human evolution. Estimates of minimum effective size of ancient populations (55, 65) are strong because different methods are causally independent. They converge on a lower limit of 10,000.

Another argument for common ancestry as the cause of similarity is the extremely low probability of accidental similarity. Venema compares human, chimp, gorilla and orang-utan DNA coding for a segment of insulin with 9 leucines and 6 codons per leucine. He provides 531,441 as the number of possible combinations of codons that will code for the nine leucines (30). This entails the calculation: given 9 items to choose from and 6 items in an arrangement, there are $9^6 = 531,441$ arrangements that code for 9 leucines. But, should the question not be: in how

many different ways can you arrange 6 codons over 9 leucines? The answer: $6^9 = 10,077,696$ *different* arrangements each with a likelihood of $1 / 6^9$. This strengthens Venema's argument that random arrangement cannot explain the similarity. There must be a cause and this cause is common ancestry.

If, however, this is to be accepted as the present state of knowledge regarding human origins, Christians have reason to ask what this means for the interpretation of Scripture. In his chapters, biblical scholar Scot McKnight offers a respectful and honest reading of Adam and Eve in Genesis (chapter 6), the Jewish world (7) and Paul (8) affirming the primacy of Scripture, but also being sensitive to students of science. In this, he explicitly challenges the view that according to the Bible, two actual persons called Adam and Eve, who existed suddenly as a result of God's creation, have a biological relationship to all human beings, and who by their sin and death passed on sin and death in the world; and that therefore, all who deny this historical Adam, deny the gospel of salvation.

McKnight's alternative reading of the texts in the cognitive environments of the Ancient Near East and Second Temple Judaism mainly highlights their literary and theological meaning. In his view, Genesis 1-3 is entirely focused on the literary, imaging feature of Adam and Eve. Similar, archetypal views of Adam are found in early Jewish literature and in Romans 5. It might have been that some of the authors from early Judaism, and also Paul, treat Adam as a historical human being and humanity's first parent. But this is characterised as a later development and it is through Adam as archetype, denoting humanity, that the Bible expresses the continuity between Adam and his descendants and their sins.

McKnight offers good exegetical arguments for the interpretation of, for instance, creation and the garden as

a temple and inner sanctuary, and for Adam as Everyone, Israel and a representative of humankind.

Nevertheless, the conclusion that therefore, the biblical Adam is literary-genealogical and not historical, does not do justice to the evidence. The description of creation is indeed more concerned with functional than with material origins. But this does not mean that the texts have no material implications at all. In a similar way, the primary literary nature and theological meaning of names, entities, speeches and acts in Gen 1-3 puts the manner in which the story refers to history into perspective. But these chapters are still part of the biblical historical narrative of Genesis to 2 Kings. From Gen 4 on, Adam is also a personal name. Hence, the genealogical substructure of the text, stretching out into the book of Numbers makes it very hard to deny that the ancient Israelites indeed thought of Adam and Eve as the first human beings in a historical way, although not in the modern, scientific sense of an absolute beginning. Like the notes on kingship and urbanism in the Sumerian King List, the remarks in Gen 1-4 on the 'firsts' of humankind, marriage, animal husbandry, agriculture, metalworking, music and cities not only betray antiquarian interest, but also reflect an awareness of a deep historical reality behind the beginnings of civilisation.

Similarly, the early Jewish portraits of Adam from the perspective of Wisdom literature, the observance of Torah or a Jewish-Hellenistic philosophy in themselves do not clarify to what extent their authors saw Adam as a historical person. Moreover, the Septuagint and Josephus offer positive evidence for Jewish readings of Scripture in which the redemptive-historical aspect is very important. Accordingly, Paul's understanding of Adam reflects the historical consciousness of the book of Genesis and its reception in some parts of Second Temple Judaism. This complicates the book's conclusion that

the biological-genetical explanation of human origins by science does not conflict with the literary-genealogical Adam of Scripture. It merely seems that for now Christians reading Scripture after genetic science have to deal with two different types of information. The parallel between Adam and Christ transforms the created world, precisely because it touches the realm of history, although the historical implications are hard to define. However, the results of science and biblical studies are not Truth themselves, but only human reconstructions. Undoubtedly, new research will lead to new results. Moreover, Christian scholars may accept that till the end of times, the flaming sword of the cherubim will prevent them from penetrating into the theological mysteries of pre-Fall humankind.

Exceptions notwithstanding, the book has excellent pedagogy and is easy on the non-specialist.

Jitse van der Meer is emeritus professor of biology and research fellow at The Pascal Centre, Redeemer University College, Ancaster, Ontario.

Koert van Bekkum is assistant professor of Old Testament at the Theological University, Kampen, The Netherlands.

David Hutchings & Tom McLeish
Let There Be Science: Why God Loves Science, and Science Needs God

Oxford: Lion, 2017. 206 pp. pb. £10.99.
ISBN 978-0-7459-6863-6

Andre Geim, a physics professor at Manchester University and 2010 Nobel Prize winner, once poured water into an electromagnet. In his own words, 'Pouring water in one's equipment is certainly not a standard scientific approach. I cannot recall why I behaved so

unprofessionally...[but] as a result we saw balls of levitating water.' Geim had to float a frog in this piece of equipment before his colleagues would pay enough attention to try to replicate his results, but in the end they discovered something very useful about the relationship between magnetism and water.

Stories like this are used throughout Hutchings and McLeish's book, taking the reader relatively effortlessly through the relationship between science and religion while learning a good deal of science (especially physics) on the way. *Let There Be Science* is a popular version of McLeish's *Faith and Wisdom in Science* (OUP, 2014, reviewed in S&CB (2015) 27, 218). The bulk of the writing was done (at McLeish's admission) by Hutchings, who is clearly a very talented physics teacher. The storytelling is excellent, and the essential content of the OUP book has been transmitted for a new audience – though with a stronger emphasis on the positive partnership between science and specifically Christian faith.

Every day of his working week, Hutchings encounters young people who feel they have to choose between science and faith. Whenever his pupils find out that he is a Christian, they exclaim 'But you're a *science* teacher!' Instead of going on the defensive, the central message of this book is that science thrives within the context of Christian faith. Listening to some of the great thinkers over recorded human history who have loved the natural world, as well as delving into parts of the Bible beyond Genesis 1-3, McLeish and Hutchings hope to make a convincing case that Christianity might be the essential ingredient science needs in order to be successful.

The biblical content of *Let There Be Science* focuses primarily on the book of Job, and its descriptions of the natural world. By comparing scientific and biblical stories, the authors show that science is a deeply human activity, not

limited to the last three hundred years of history. The biblical account, in fact, invites us to seek wisdom by exploring the world around us. We learn that Christians are well-equipped to follow the evidence wherever it leads, even when that involves a painful change of mind. They are ready to persevere through the often painful process of discovery, and seek restoration in the world. They are familiar with the wonder of overall order emerging from chaos, and are encouraged by the Bible to keep asking questions and searching for answers.

Stephen Hawking once wrote, 'humans are an adventurous species. We like to explore and are inspired by journeys to the unknown. Science is not only a disciple of reason but, also, one of romance and passion.' Christians know that it can take great love to persevere through a difficult process, and scientists clearly need to bring this sort of love to their work. This sort of emotion might be fuelled by wonder or awe at certain scientific processes, and it is sometimes needed to overrule reason – which might try to reject a theory before it is fully developed.

In the end, Christianity is about the reconciliation of people to God. Science, in its own way, is also about people being reconciled to the world around them, so Christianity can help in that process. We have to ask the question, say the authors, of whether this seemingly positive relationship between science and religion is a spurious correlation – similar to the increased divorce rate in

the state of Maine that almost exactly followed the increase in US margarine-eating over the same period? But unlike the effects of low fat spread on marital relationships, the correlation between science and religion seems to be more direct. The idea that Christian faith can create an environment where science thrives is one that makes sense.

Let There Be Science is an entertaining and easy read that achieves what it sets out to do, showing 'why God loves science, and science needs God'. Both the authors have a strong evangelical faith that comes across very clearly, and the overall story is strongly apologetic. *Let There Be Science* would be an interesting read for anyone who wanted to find out how a scientist who is also a Christian can fit the two together, and especially encouraging for any Christian who is new to the science-faith discussion. This book gives a very optimistic view of the relationship between science and Christian faith, but that isn't a bad thing. There are more than enough publications describing the flare-ups between science and Christianity, and we could probably do with a few more books like Hutchings and McLeish's to balance things out. Debates happen, and are entirely necessary, but conflict need not be the dominant narrative in the story.

Ruth M Bancewicz is a Senior Research Associate at the Faraday Institute for Science and Religion, Cambridge, and a trustee of Christians in Science.