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NOTES ON CONTRIBUTORS

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EDITORIAL

This edition of our journal marks two particularly notable anniversaries that were celebrated this year. As I am sure you are all aware, one of them was the 40th anniversary of the Science and Religion Forum, celebrated by our conference in Durham in September. This special occasion, as Hilary Martin reminds us below, took the opportunity to reflect not just on the past relationship between science and religion but also on the changes to our understanding of the very nature of these disciplines. Our ways of thinking about them have been continually revised, together with our understanding of ourselves and of nature. The other anniversary, of much wider report, marks 100 years since Albert Einstein submitted his finished theory of General Relativity to the Prussian Royal Academy in November 1915. The series of papers he gave during the course of the month was the culmination of a long process of struggle which involved many serious errors. On completing one of his field equations in 1915 he found something close to the same equation which had been written in his notebook in 1913 but then subsequently abandoned. This makes for just one example of how the process of scientific 'discovery' is often torturous: coming up with an explanation or an answer is not enough if it cannot be recognised for what it is. Something far more profound is going on in the operation of this particular discipline.

Einstein himself spent time speculating on how scientific discovery is possible. He held the view, borrowed from Leibniz, that we are guided by a pre-established harmony. His scientific progress and intellectual curiosity also helped to inspire one of his contemporaries to embark on further reflection on the nature of scientific knowledge. Michael Polanyi (whose son regarded Einstein as instrumental in encouraging his father's scientific career) was fascinated by how it was that Einstein had come to his theory of Relativity.

The two engaged in a lengthy correspondence and it became Polanyi's conviction that Einstein's theories were based on a kind of rational intuition infused with the personal.

Polanyi's account of the indispensable nature of the personal in the scientific enterprise, and in the wider endeavour of human knowing, is taken up by Mark Harris who has chosen Polanyi's *Personal Knowledge* as the 'book that made a difference' to him. Harris' reflections on Polanyi's work are particularly valuable because through them Harris appeals for a wider appreciation of Polanyi's work especially in relation to the New Atheism debate. As Harris shows us, Polanyi reveals how the scientist personally participates in the reality which he or she seeks, and how personal knowledge enables us to know we are 'onto something' in science without fully knowing why. Harris leads us to a deeper appreciation of Polanyi's account of the communal character of science: it is the community in which the scientist participates that provides the necessary consensus and determines what counts as 'science'.

Einstein's own theories resulted in a profound change to our view of nature: one in which space-time could curve, tear, or disappear into a black hole. Grappling with changing conceptions of nature is still central to the science-religion conversation and it does much to determine the future directions of dialogue. John Hedley Brooke's article review of Curtis Johnson's *Darwin's Dice* contributes to this endeavour by examining the complexity of the term chance. According to Johnson, chance variation was a more important concept for Darwin than natural selection. Brooke points out the ambiguity of the idea, however: lack of a cause is not the same thing as an unknown cause or absence of any sort of design. Brooke reminds us that genuine novelty seems to require an element of both chance and design, something that Darwin himself showed some appreciation for, and which means that

we should resist seeing Darwin as sounding any sort of death knell for natural theology.

We have a wide ranging selection of other reviews in this edition. Michael Welker's *The Depth of the Human Person* explores what it is to be human. In his review of this volume, Ernst Conradie highlights the various different ways of perceiving human distinctiveness including excellence – dignity, language, brain, mind – capacity for virtue, functionality or relationality, while also pointing us away from focussing too much on concepts like excellence at the expense of others. Juuso Loikkanen reviews William Dembski's latest book *Being as Communion* and explores the nature of matter, its relationship to information and the nature of teleology in nature. Helpfully, Loikkanen teases out the ways in which Dembski isn't actually that far removed from more mainstream theologies.

Richard Goode offers a rigorous engagement with John Walton's *The Lost World of Adam and Eve*. Goode makes an interesting contrast between the UK and the US which sheds some light on the evolution/creation debate in North America. His review incorporates the scope of Ancient Near East texts, while drawing attention to the need for a less anthropocentric teleology. Fraser Watts and Léon Turner's edited volume on the cognitive science of religion is reviewed by Michael Fuller. We are reminded that CSR is not necessarily reductionist: commitment to methodological naturalism is not a commitment to other – ontological – forms of naturalism. Fuller explores further the ways in which CSR might be fully interdisciplinary. It might dialogue with the humanities and social sciences but it needs to remember that there are different levels of analysis: CSR shouldn't exclude sociocultural explanations or it will indeed be in danger of reductionism. Geoffrey Cantor reviews David Knight's account of the rise of modern science in his *Voyaging in Strange Seas*, which spans the time from before Copernicus to the nineteenth century. Cantor

highlights the value of Knight's book for its contextualising of science presented as a political, religious and cultural activity and for its illustration of how this cultural situatedness shaped the modern view of nature and of ourselves as knowers. All this adds weight to Polanyi's insistence that the scientific positivist account of knowledge just will not wash.

Three reviews are reprinted from elsewhere in this edition of *Reviews*. Francisco Ayala appraises David Livingstone's *Dealing with Darwin*, which investigates how Darwin's contemporaries received the theory of evolution especially those writing from a religious – and specifically Calvinist – standpoint. Livingstone's project is one of contextualisation in terms of place, politics and rhetoric, and it is important for pointing us, as Ayala shows, to a new facet of the evolution-religion interface. Robin Gill reviews John Bryant's *Beyond Human?*, a book that engages with the developments in science that aim to change human nature, including genetic modification and digital implants. The theme of social justice is touched on, something that Bryant reminds us should be much nearer to the centre of our ethical considerations than it usually is. Finally, Sam Berry's review of Paul Thompson and Denis Walsh's *Evolutionary Biology* highlights some important contributions that have shaped evolutionary theory, particularly in relation to the important contribution made to science and religion by Michael Ruse.

Grateful thanks to all who contributed to this edition of *Reviews*. The varied scope of the pieces here illustrate the breadth and vigour of the science-religion interface. With this year's celebrations ringing in our ears we know we can look forward with confidence to a stimulating and exhilarating future.

SRF Conference: Science and Religion: Celebrating the Dialogue and Exploring the Future, St. John's College Durham, 2nd-5th September 2015.

REPORT BY HILARY MARTIN

The 40th anniversary conference of the Science and Religion Forum was both a celebration and a review of past achievements and milestones in what has proved to be a dynamic and fruitful relationship. Our indebtedness was acknowledged to the late Dr Jeffrey Robinson who was instrumental in bringing together a wealth of eminent speakers whose contributions made this a landmark conference in the Forum's history.

Professor Tom McLeish hosted a pre-conference event in which a computer model of creation visually revealed the presence of the elusive dark matter, permeating the interstellar space. Tom then gave a stimulating presentation of the ideas of Robert Grossteste, illustrating how, even in the 13th century, intuition and reason could be used to build an understanding of the cosmos which link with many modern ideas.

The short papers spanned a wide-ranging list of theological, scientific, historical and philosophical themes and their abstracts may be accessed on the Forum's website. Only the plenary papers will be considered here with due acknowledgement of the difficulty in condensing their wealth and richness in a few short paragraphs.

Dr Andrew Davison began the plenary sessions by highlighting the important relationship between scientists and theologians, based upon their respective engagement with the world. Early thinkers such as Aquinas and Jerome were presented as examples of those who embraced the natural world as part of their theological perspectives. It was proposed that a new return to scholastic theology is evident today in the way that doctrinal theology opens up to metaphysics. The

material-spiritual relationship, origins of creation, pneumatology, creaturehood and the Multiverse were cited as issues that point to a need for interaction with other disciplines.

Dr Helen de Cruz gave an interesting account of the way in which ancient DNA can reveal the nature of contemporary hominids and provide evidence of inbreeding between modern humans, Neanderthals and Denisovians. Incompatibility with the scriptural account of creation was discussed as well as questions which persist regarding the purpose of evolution and humans as moral beings. The increase in brain size 1.7 million years ago was linked with evidence of greater levels of compassion and cooperation in human behaviour. Considering the meaning of the Fall, original innocence was said to be a more likely feature of early hominids than original righteousness.

Professor Alister McGrath highlighted the complexity and breadth of the relationship between science and religion, attributable to the wide-ranging subject matter of the sciences, with their differing methods of research, and the many aspects of religion including theology, social morality, ritual and value systems. He considered how this complexity might be respected by approaches to reality which focus upon its multiple perspectives, multiple levels and multiple narratives. He pinpointed the way in which narrow epistemological approaches, often characteristic of scientism, can produce an ontological definition of nature which diminishes its true complexity. Such themes as human significance were presented as requiring multiple narratives beyond biology in order that justice may be done to the richness of both the theme and the methods of enquiry.

Professor Willem Drees gave the annual Gowland lecture which marked how the nature of religious belief had changed over the past few decades. He noted the move from a corporate and authoritative character towards one that was

spiritually broader and more focused upon individual interpretations of what religion means. Decline in church attendance was noted along with an increased acknowledgement of truths which span different religions. Various levels of integration of science and religion were outlined, embracing a multitude of elements such as symbolism, aesthetics, the individual world view, different models of reality, mystery and meaning. The insistence upon sound evidence was contrasted with the risk taken by the use of intuition and natural passion: by avoiding error one might make the mistake of missing the truth.

Dr Michael Burdett reviewed the history of the relationship between science and religion, pointing out that it had traditionally been a dialogue between Christianity and the natural sciences. For the future, it was suggested that a wider dialogue would be more fruitful through the inclusion of non-Christian religions, technology and the humanities. Tribute was paid to the late Ian Barbour as 'the patron saint of science and religion' and those issues still important today were noted, including divine action, the implications of Big Bang theory for creation theology and eschatology. With the rise of non-Christian religions and globalisation, comparative theology was predicted to play an increasing part in the science-religion dialogue. As the human person is now more the focus than nature itself, a greater involvement of the humanities was seen as a likely development for the future. This would include such themes as science as a social activity, cultural environments and different religious practices. Technology, with its associated impact upon society, was also presented as being a relevant future partner, particularly with its potential for transforming the human being.

The Revd Dr Gillian Straine explored the interpretation of science in a pastoral setting, based largely upon her faith and struggles with life-threatening illness. She introduced the thinking of the French philosopher, Paul Ricoeur, who

believed that an understanding of the world was a necessary prerequisite for transcending it towards new levels of thinking. Gillian explained how a sense of freedom can be achieved by changes of attitude towards disease: from that of a battle, which can turn one against one's own body, to one of reconciliation between oneself and one's body through biological understanding and enlivened faith.

The Revd Professor David Wilkinson reviewed the design argument for the existence of God from William's Paley's musings on a watch to the notion of fine tuning, the anthropic principle and intelligent design. He presented the work of the 19th century Durham scholar, Temple Chevalier, whose eminent positions in both the church and scientific academic life made him a key contributor to the science and religion debate. Chevalier's response to the creation was one of awe and a recognition that science cannot provide the whole path to its understanding. Professor Wilkinson pointed out that this approach exists today, with philosophy being an inescapable ingredient when considering such ideas as creation's purpose, the Multiverse and apparent fine tuning of the cosmological constants.

This final lecture appeared to point the way to the Forum's next conference which will consider the limits of science. We hope all who were in Durham, and more, will join us next year.

THE ARTHUR PEACOCKE PRIZE 2015

The Committee members of the Science and Religion Forum are pleased to announce that the 2015 Peacocke Essay Prize has been awarded to Jaeho Jang of the University of Edinburgh for his essay 'The Future of Dialogue between Science and Religion: A Methodology for Comparative Study between Science, Christianity and East-Asian Religions,' the abstract of which is reproduced below. Many congratulations go to Jaeho for his excellent essay. In recognition of the quality of their submissions, honorary membership goes to Bill Atkins of the University of Edinburgh and Lapo Lappin from Uppsala in Sweden. I would like to express my thanks to all those on the committee who assisted with the judging of the competition. Congratulations go to all our prizewinners and we welcome them to the Forum.

Jaeho Jang, 'The Future of Dialogue between Science and Religion: A Methodology for Comparative Study between Science, Christianity and East-Asian Religions.'

Comparative studies between science and religion have actively been discussed, but technically speaking, those are the comparative studies between science and *theology*. Here I will briefly discuss the limitations of the present conversation between science and religion in which Christianity has become central. Then, I will examine a new methodology of conversation between science and religion with the help of representative comparative scholars, Jonathan Smith and Francis Clooney: description, comparison, generalisation, differentiation and supplementation.

Through my new methodology, I will suggest widening the science-religion conversation's parameters by incorporating East-Asian religious thought. I will suggest that Western evolutionary theologies would benefit from engagement with East-Asian philosophy. Additionally, I expect that East-Asian philosophy can be seen in a new light through engagement with evolutionary theology and evolutionary science. Finally, it is hoped that these suggestions will act as a catalyst for further comparative study between science, Christianity and other religions.

A BOOK THAT MADE A DIFFERENCE

Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy*. London, New York: Routledge, 1962 [1958].

REVIEWED BY MARK HARRIS

Before I moved into the science and religion field I'd spent most of my adult life working in experimental physics. During that time, I rarely had cause to reflect in any joined-up way on the human dimensions of how science is done. All of that changed around eight years ago, when I had cause to read Thomas Kuhn's *Structures of Scientific Revolutions* (1962), and Michael Polanyi's *Personal Knowledge* (1958) in quick succession. Kuhn's book was easily grasped (and mistrusted as being a little too simplistic, and insufficiently rooted in first-hand experience), but Polanyi's continues to both challenge and inform me. Kuhn may have given the world the phrase 'paradigm shift', but it was Michael Polanyi who informed much of my own personal paradigm shift as I moved from physics into the science and religion field. And ever since first reading these two books I've been intrigued that, while Kuhn has been (and continues to be) the subject of ongoing fascination in the philosophy of science, Polanyi's much more sophisticated treatment is comparatively little-known there. In the science and religion field, on the other hand, Polanyi's *Personal Knowledge* is held up by many as a work of lasting genius.

Personal Knowledge is by no means an easy read. It's much longer than it needs to be, given the simplicity of its celebrated main point about the mysterious 'personal knowledge' of the scientist, which enables her to go about her job. In fact, the book rarely makes its main point clearly in so many words, which makes me wonder whether its main point is really its main point! The book does, though, contain a massive wealth

of seasoned reflection on the nature of science and other forms of human enquiry, including theology. While Kuhn was concerned chiefly to describe his ideas on scientific paradigms, Polanyi's aim is to go much deeper into the way that scientists work as human beings. He was able to do so from personal experience, since he had a successful academic career in physical chemistry before turning to philosophy. Part of the attraction of his book to other working scientists then, is that it's written with intimate first-hand experience. In addition though, Polanyi made use of philosophical and scientific thinking current to his time on language, human consciousness, politics and religion, amongst other topics. Polanyi's study is therefore considerably wider in scope than Kuhn's, and I can do little more here than draw out some of the points that have had an impact upon me. One thing to note: his prose is wonderful at times, which is why I've included some lengthy quotes.

Polanyi was writing at least partly in reaction to the positivism of his time, in contrast to which he comes across as an incorrigible realist in the opening pages:

To say that the discovery of objective truth in science consists in the apprehension of a rationality which commands our respect and arouses our contemplative admiration; that such discovery, while using the experience of our senses as clues, transcends this experience by embracing the vision of a reality beyond the impressions of our sense, a vision which speaks for itself in guiding us to an ever deeper understanding of reality – such an account of scientific procedure would be generally shrugged aside as out-dated Platonism: a piece of mystery-mongering unworthy of an enlightened age. Yet it is precisely on this conception of objectivity that I wish to insist (pp. 5-6).

Those of us rooted in Christian theology would find it hard not to read into Polanyi's high-blown prose here the search for

the divine rationality which underpins the cosmos – the Logos by whom and in whom all was made – but it's actually the 'positivistic conception of science' that Polanyi wishes to attack, a conception which reduces scientific theory 'to the rank of a convenient contrivance' (p. 6). In its place, Polanyi wants to restore 'the power of science to make contact with reality in nature by recognizing what is rational in nature' (p. 6). At this point then, early in the book, Polanyi's agenda comes across as an assertion of objectivity against those of his day who were driving a wedge between the doing of science and the potential reality it investigated.

Twenty-first century physics is considerably more realist than in Polanyi's day – his battle has been won – but we do not seem to have grasped his subtleties. I suspect that the New Atheism debate, for instance, would evaporate in an instant if Polanyi's philosophy of science was to be appreciated more widely. For, against the positivism of his time – and arguably against the scientism of ours – Polanyi goes on in much of the rest of the book to highlight the scientist's *personal* participation in the reality of what she seeks. The various subjective and human levels which affect how science is done aren't subsidiary to the enterprise (although they may effectively be 'invisible'), and neither should they be regarded as contaminants to be removed before 'objective' knowledge may be obtained. In fact, the human dimensions are essential and necessary to the whole, according to Polanyi. He was dubious whether objectivity was possible or even worth pursuing, since he regarded it as a 'delusion' and a 'false ideal' in the sciences (p. 18).

In place of this false objectivity, Polanyi promotes his notion of 'personal knowledge' (although as far as I can see he never defines the term concisely). To my mind, Polanyi's most evocative explanation comes in a passage where he's discussing – not science – but religious faith, and especially the

importance of doubt (i.e. not knowing). He summarises by saying:

We owe our mental existence predominantly to works of art, morality, religious worship, scientific theory and other articulate systems which we accept as our dwelling place and as the soil of our mental development. Objectivism has totally falsified our conception of truth, by exalting what we can know and prove, while covering up with ambiguous utterances all that we know and *cannot* prove, even though the latter knowledge underlies, and must ultimately set its seal to, all that we *can* prove (p. 286).

Not just religion, and not just science, Polanyi has the whole enterprise of human knowing in view here. Indeed, through statements like this it's possible to read Polanyi as implying that the natural sciences are branches of the humanities, and insofar as we often forget that science is done by humans (largely) for the sake of humans this is not perhaps an unfair reading of Polanyi. However, Polanyi's wider point in the book is to emphasise what we *cannot* prove, because it's precisely this 'personal knowledge' which allows us to be sure we're onto something in science without fully knowing why.

For Polanyi, science doesn't consist of a series of logical rules or steps by which anyone may perform experiments, analyse them, and construct theories. Instead, Polanyi emphasises the tacit skills of the scientist which can only be acquired through years of laborious training – rather like an apprentice learning from a master – and the creativity, emotion, and passionate commitment which control 'interest' and discovery. 'Scientific passion', for instance, is an important factor in helping scientists judge between what's worth investigating, what might show promise, and what's best left un-investigated:

Only a tiny fraction of all knowable facts are of interest to scientists, and scientific passion serves also as a guide in the assessment of what is higher and what of lesser interest; what is great in science, and what relatively slight. I want to show that this appreciation depends ultimately on a sense of intellectual beauty; that it is an emotional response which can never be dispassionately defined, any more than we can dispassionately define the beauty of a work of art or the excellence of a noble action (p. 135).

Quite simply our irrational, passionate, and aesthetic tendencies are essential to the doing of science: without them we might get caught in a morass of impossibilities; we wouldn't be able to see the wood for trees. Also, creativity – not unlike the creativity of the artist – is a similarly useful trait for a scientist to acquire, because it enables her (and others) to fashion the world anew:

Scientists – that is, creative scientists – spend their lives in trying to guess right. They are sustained and guided therein by their heuristic passion. We call their work creative because it changes the world as we see it, by deepening our understanding of it. The change is irrevocable. A problem that I have once solved can no longer puzzle me; I cannot guess what I already know. Having made a discovery, I shall never see the world again as before. My eyes have become different; I have made myself into a person seeing and thinking differently. I have crossed a gap, the heuristic gap which lies between problem and discovery. Major discoveries change our interpretative framework. Hence it is logically impossible to arrive at these by the continued application of our previous interpretative framework. So we see once more that discovery is creative, in the sense that it is not to be achieved by the diligent performance of any previously known and specifiable procedure (p. 143).

Hence, scientific progress is more haphazard than it is logical and systematic. Polanyi is here articulating something similar to Kuhn's idea of the paradigm shift. And as with Kuhn, it's possible to emphasise the subjective in Polanyi to such a degree that he sounds like an early postmodernist/relativist. This wouldn't be true to Polanyi though, since his point is that, although science might work through acts of tacit knowing which can't be clearly articulated or proven, this doesn't make it a subjective enterprise. Rather, scientists operate as fully-committed members of a (world-wide) research community. In order to function as scientists they follow a 'calling', where they accept the wider, impersonal objectives of the community as their own, seeking to further its universal aims responsibly (pp. 321-4). In this way, Polanyi claims, personal knowledge bridges 'the disjunction between subjectivity and objectivity' (p. 17). As he explains in his Preface:

The personal participation of the knower ... does not make our understanding *subjective*. Comprehension is neither an arbitrary act nor a passive experience, but a responsible act claiming universal validity (pp. vii-viii).

Knowing is both 'responsible' and 'universal' in that science is a communal activity: individuals can make key discoveries, but only because the consensus of the scientific community judges them to be such after the event. Indeed, it's the scientific community which adjudicates over what's to be considered as 'science' in the first place (pp. 163-4, 216-7). From that point of view, the holy grail of objectivity – pushed out of reach by postmodernity – becomes graspable again in the form of the scientific community's current consensus.

I'm already way over the word count which the editor placed upon me, but I feel that I've barely scratched the surface of this magnificent book. Perhaps I'd better end

(because there's barely an end in sight for a book such as this which continues to inspire and inform) simply by acknowledging my debt to the Hungarian genius. I would be less of a human being without him.

REVIEW ARTICLE

Curtis Johnson, *Darwin's Dice: The Idea of Chance in the Thought of Charles Darwin*. New York: Oxford University Press, 2015. pp. xxxii+253, Hbk £19.99, ISBN 978-0-19-936141-0.

REVIEWED BY JOHN HEDLEY BROOKE

In one of Alan Ayckbourn's plays, *Sisterly Feelings* (1979), the toss of a coin occurs at a critical moment. What happens next depends on which way up the coin lands. Several courses through the play become possible, all scripted; but in any performance not even the actors know in advance which of the sequences will be acted out. I have often thought there might be an interesting analogy here for those who have wrestled with the problem whether ascribing outcomes to "chance" necessarily precludes a complementary ascription to divine ordainment or design. If the God of Christian theism can be conceived as a creative author, what that author creates (by whatever means) could, like Ayckbourn's play, be both pre-scripted and yet inclusive of "chance" determinants.

This is not how Curtis Johnson, in an impressive display of Darwin scholarship, has structured his novel and tenacious investigation into what Darwin himself understood by "chance" and its radical implications. At the close of a chapter on the "causes and laws of variation" he writes: "A designed world in all of its parts and operations cannot be a chance world in any of them; and a world in which chance plays any role at all seems to be one that excludes a place for an omnipotent designer. Eventually, it is necessary to decide one way or another, and Darwin understood this" (p. 67). Much depends, of course, on what meaning is given to the word "chance". As Johnson recognises, on many occasions Darwin simply ascribed events to "chance" when he was ignorant of their cause or causes. It is not clear why that of itself should have theological implications. When vacillating between

theism and agnosticism Darwin's references to chance again seem innocuous: he would confess that he could not make himself believe that everything in the world is merely the product of chance. If, as Johnson maintains, Darwin probably had to change his, initially conventional, religious views once he had discovered chance elements in the process of evolution, there would have to be more to "chance" in his theory than a cover for ignorance.

This was certainly the case when Darwin spoke of differential chances of survival and reproduction when comparing the prospects of variants that had advantageous or disadvantageous features – the basis of his concept of natural selection. Here a better "chance" of survival meant a higher probability of survival. But, as Johnson correctly notes, for the most radical implications of the word "chance" we have to look to Darwin's ruminations on the causes of the variations on which natural selection worked. It was Darwin's view that, when variations appeared in the parts of living things, they were randomly distributed in that some were advantageous, others (almost certainly the majority) detrimental in the struggle for survival. He could not believe that variant features were produced in offspring with a prospective use in mind. Here there *was* a theological issue, instantiated in his controversy with his friend, the Harvard botanist Asa Gray. Darwin was delighted with Gray's exposition of natural selection that was sensitive to potentially hostile religious criticism. But their opinions diverged when Gray, as a Presbyterian Christian, proposed that, until the causes of variation were known, it would be wise to assume they were guided, led in a propitious direction, rather than just happening at random. Darwin demurred, claiming (with some exaggeration, as Johnson notes) that such a view would render redundant the mechanisms for biological change that he had proposed.

Whereas the majority of books on Darwin highlight his advocacy of natural selection, Johnson chooses instead to make Darwin's understanding of variation, and particularly its accidental character, the main subject of his study. From the outset he provocatively argues that "chance variation" was a bigger idea for Darwin than natural selection. Darwin had become used to thinking of certain kinds of event in nature as accidental, Johnson suggests, when, during and after the *Beagle* voyage, he had reflected on the manner in which flora and fauna were transported, floating across oceans, from mainland to island locations. It was not that such events were uncaused or outside the jurisdiction of natural laws. It was simply that they just happened – apparently without ulterior rhyme or reason. Johnson contends that, when transposed to the question of variation and its causes, this understanding of accidental occurrences became Darwin's dangerous idea and was recognised as such by critics whose reactions forced him to reconsider how his ideas should be presented so as to cause minimal offence. Here we begin to glimpse the most original aspect of Johnson's thesis, which is that, having recognised how repellent his references to "chance" could be, and how easily misconstrued, Darwin struggled to find ways of articulating his theory that, without subverting what he unwaveringly believed, concealed the role of "chance" from his readership. It is then no accident that Darwin increasingly avoided the word in successive editions of his *Origin of Species* (1859), replacing the "chance" in chance variation with the adjective "occasional", or by the fourth edition with references to "spontaneous variation", and by the fifth deleting references to the accidental in nature altogether. Nothing less than a deliberate "campaign" (p. 209) was advanced by Darwin to disguise, in the presentation of his ideas, the role of chance or accident in his theory.

This is a controversial thesis and one that generates its own layers of difficulty for the exegesis of Darwinian texts. Much of

the fascination of Johnson's commentary stems from his struggle to hold together at least three Darwins who repeatedly appear in his text. There is the Darwin whose scientific concepts, on Johnson's reading, remained essentially the same from 1842 onwards – the year of the first sketch of his theory. Then there is Darwin the presenter of his theory, ever calculating on how best to instruct and pacify his audience. The interpretation of Darwin's utterances, particularly on the big metaphysical questions, is complicated by the appearance of a third Darwin whose remarks, which at first appear elusive, may reflect a genuine ambivalence.

With reference to what I have called the first Darwin, Johnson has other theses to defend. Contrary to prevailing wisdom, he maintains, for example, that Darwin had not become more Lamarckian in his understanding of evolutionary change by the sixth edition of the *Origin* (1872). In a well-argued chapter he pointedly observes that there was no need for "chance" in Lamarck's theory, given an organism's innate tendency to progress and its innate capacity to adapt to a changed environment. Moreover, as Darwin insisted in his riposte to St. George Mivart, he had accepted even in the first edition that the effects of use and disuse could be transmitted and accumulate over many generations, leading to changes in the parts of an organism. But it is not easy to weigh the respective importance Darwin accords the different components of his evolutionary mechanism in the sixth edition. To the question whether he had become increasingly Lamarckian, Johnson suggests that Darwin may even have been unsure of the answer himself. There is, at the very least, a tension between Johnson's immutable Darwin and the Darwin who wrote to his cousin Francis Galton in 1875, saying that every year he had come to attribute more and more to the agency of use and disuse in accounting for modifications. A Darwin immutable in his science also suffers the inconvenience of the Darwin who in *The Descent of Man* (1871)

wrote of his self-correction where he had been overly influenced by a legacy from natural theology: "I was not able to annul the influence of my former belief, then almost universal, that each species had been purposely created; and this led to my tacit assumption that every detail of structure, excepting rudiments, was of some special, though unrecognised, service". Clearly he had had second thoughts on whether his understanding of natural selection required that every detail of structure must have a use.

With reference to the second Darwin above, Johnson is fastidious in tracing the innovations that crept into Darwin's presentation of his argument and their possible sources. It is well known that, following Alfred Russel Wallace's suggestion that the term "natural selection" was creating confusion through its apparent personification of nature, Darwin accepted Herbert Spencer's trope, the "survival of the fittest", as an alternative. Johnson gives us another Darwinian debt to Spencer, whom he considers the most likely source of the phrase "spontaneous variation", which from the fourth edition of the *Origin* onwards eclipsed references to "chance". On the question of Darwin's self-presentation, particularly when religious issues were in the frame, a good case is made for a certain evasiveness with which it is difficult to disagree.

But this is where we encounter the third Darwin and the problems of interpretation that arise when confronting his remarks on the big questions. Consider, for example, his verdict on the question of design in nature when in correspondence with Asa Gray. In May 1860, when Darwin confessed to being in a muddle on the subject, he declared that he was inclined to see everything as the product of "designed laws, with the details, whether good or bad left to the working out of what we may call chance." Note that in this formulation chance and design are co-operating and not mutually exclusive. But then, as if to make life difficult for his eventual biographers, he adds: "Not that this notion *at all* satisfies me."

Johnson is right that when he was being evasive Darwin would appeal to the limitations of the human mind. He did so in this same letter to Gray, adding that "I feel most deeply that the whole subject is too profound for the human intellect." The problem is how to determine in such cases whether Darwin is being deliberately evasive or simply expressing a genuine ambivalence. Johnson acknowledges the ambivalence when he writes that "in any given edition Darwin might be found to be arguing for 'undesigned laws,' or for 'designed laws,' or for both at once" (p. 66). Even in his most agnostic phase, late in life, Darwin confessed that his views often fluctuated. Pinning him down on the big questions has never been easy. The struggle Johnson has in trying to do so is engrossing, always informative and, in the wealth of nuances required, almost dizzying. For this reason I see his book as a "must read" for Darwin scholars but not an ideal introduction for novices.

On the subject of Darwin and religion, which will probably of greatest interest to members of the Forum, J. David Pleins's *The Evolving God* (reviewed here in July 2014) provides a more accessible point of entry. One sometimes senses that in the back of Johnson's mind there is an "essential" Darwin to be found in his Metaphysical Notebook and the "Old and Useless Notes" (as Darwin himself labelled them) from the year 1838. The latter are described as "in one sense the most exciting and revealing body of work in the corpus of Darwin's writings, public or private" (p. 198). They reveal to Johnson a Darwin with a tendency to materialism and atheism, and more than a tendency to deny the freedom of the will. Yet to his question whether his views at that time made him an atheist, Darwin replied with a resounding "No". In his Metaphysical Notebook he could still speak of the "most magnificent laws" of the Creator, "which we profane in thinking not capable to produce every effect of every kind." Johnson neither denies nor conceals ambivalence in Darwin, but he clearly does

believe there is an essential incompatibility between the admission of chance and subscription to design, invoking Einstein's non-dice-throwing God as a witness, and interpreting Darwin's campaign to protect his theory accordingly.

After digesting Johnson's revisionist thesis, I found myself asking whether there might there be a contrary, though not necessarily contradictory, explanation for the linguistic manipulation in which explicit references to "chance" largely disappeared. Might Darwin have realised that this troublesome word was a nuisance not just because it sounded alarm bells for those with religious sensibilities but because it had such a complex of meanings and connotations that its use precluded clarity? To read *Darwin's Dice* is to encounter at least the following senses of chance, of each of which Darwin would probably have been aware: without cause; cause unknown; cause unknowable; chance in the sense of probability; a chance event in the sense of resulting from the intersection of otherwise independent causal chains; random in the sense in which Darwin interpreted the distribution of variation, whatever its cause; and, though as a meta-level interpretation, without design. Darwin would surely have been aware of both murkiness and ambiguity in the ascription of phenomena to "chance"?

It has become a cliché of modernity that Darwin's theory undermined the doctrine of Providence by according chance, rather than design, a primary role in biological evolution. For all its many nuances and conjectures, readers of *Darwin's Dice* will search in vain for any alternative perspective. It is the result of extraordinary dedication in exploring every corner of the Darwin corpus; but it effectively closes down the various options that theologians would eventually adopt in responding to Darwin's science. In that respect, readers of this review might wish to consider the point made so well by Arthur Peacocke that, for evolution to be truly creative, a

continual supply of random variations on which natural selection could work might be seen as the best guarantee of the emergence of novelty. Darwin, albeit diffidently, could affirm both chance and design in the same sentence. Modern playwrights have integrated the two. And to add one final (and ironic) qualification to Johnson's characterisation of the natural theology Darwin is supposed to have destroyed, there is a fine essay by John Beatty which shows that the admission of chance features in the world had held no terrors for William Paley with whom Darwin is so remorselessly contrasted.¹

¹ John Beatty, "Chance and Design", in Michael Ruse, ed., *The Cambridge Encyclopedia of Darwin and Evolutionary Thought* (Cambridge: Cambridge University Press, 2013), 146-51, especially 150-51.

REVIEWS

Michael Welker (ed.), *The Depth of the Human Person: A Multidisciplinary approach*. Grand Rapids / Cambridge: William B. Eerdmans, 2014. pp. x+396, Pbk £25, ISBN 978-0-8028-6979-1.

REVIEWED BY ERNST M. CONRADIE

In recent years several edited volumes offering multidisciplinary perspectives on human nature have been published. For example, Warren Brown, Nancey Murphy and Newton Murray produced *Whatever happened to the soul? Scientific and theological portraits of human nature* (Minneapolis: Fortress Press, 1998), while Niels Henrik Gregersen, Willem Drees and Ulf Görman edited *The human person in science and theology* (Edinburgh: T. & T. Clark, 2000). Joel Green edited *What about the Soul: Neuroscience and Christian Anthropology* (Nashville: Abingdon, 2004), while Malcolm Jeeves edited two similar volumes, namely *From Cells to Souls – and Beyond* (Grand Rapids: Eerdmans, 2004) and *Rethinking Human Nature: A Multidisciplinary Approach* (Grand Rapids: Eerdmans, 2011). Many other monographs (too many to mention here) explored the theme of human nature by bringing scientific, anthropological, philosophical and theological perspectives in dialogue.

These contributions typically have a common thread, namely a resistance against a disconnection of theological discourse on being human from other perspectives as well as a critique of scientific reductionism, i.e. attempts to explain human personhood in terms of lower levels of complexity (e.g. genes). There is also a common critique of former dualisms (e.g. of body and soul, brain and mind, matter and spirit, nature and nurture), although one may also argue that such dualisms at least attempted (but mostly failed) to maintain the

tension between the two poles of such binaries – instead of reducing the one to the other. Others tried to overcome such binaries by adding third categories or to integrate such aspects within some higher order.

The Depth of the Human Person follows this by now well established pattern. As the word ‘depth’ in the title suggests, it explores the irreducible complexity of human personhood. There is no paradigm shift compared to the previous contributions mentioned above. The introduction by Michael Welker does mention such literature but there is no detailed discussion of how this volume takes the debate forward. Nevertheless, this volume does elicit considerable excitement, if only because of the calibre of the quite remarkable team of contributors. There are 20 essays by leading authors and several of them also contributed to the earlier volumes.

The volume is divided in four parts. The first part explores introductory questions on personhood and includes essays by Andreas Kemmerling, Michael Welker and Philip Clayton. The second part offers scientific perspectives on human personhood by bringing cosmological, evolutionary and psychological perspectives in dialogue with wider debates. There are essays by John Polkinghorne, Malcolm Jeeves, Warren Brown and Jeffrey Schloss. The third part of the volume includes biblical and historical perspectives as ‘sources’ for the various Christian traditions in ‘global’ contexts. Andreas Schüle and Gerd Theissen offer essays on biblical terminology; Volker Henning Drecoll and Eiichi Katayanagi both contribute essays on Augustine, Markus Höfner one on Melancton, while Origen Jathanna explores views on embodiment in Indian Christian theology. The fourth part addresses contemporary theological, ethical and interdisciplinary challenges. It includes essays by Bernd Oberdorfer and Stephan Kirste on human dignity, Frank Vogelsang on embodiment, Maria Antonaccio on a naturalised ethics, Isolde Karle on gendered identities, William Schweiker

on moral inwardness and finally one by Günter Thomas on personhood at the 'edges of life'.

It is obviously not possible to do justice to all these essays in a brief review. Suffice it to say that each of the essays is indeed excellent and instructive, thorough and thought provoking. They do probe the depths of personhood and do so in considerable depth. One may say that the real contribution of the volume lies in the space created in between these contributions for further dialogue. There is ample evidence (through cross references) that this space was occupied during the conferences that preceded this volume, but there is also room for the reader to 'fill the gaps' from within other contexts. The more difficult task here is to assess what a volume such as this one has accomplished as a whole and what it has not (yet) accomplished.

I would suggest that the main accomplishment is a terminological one. The volume succeeded in bringing together biblical terminology (such as flesh, body, life, heart, nous, soul, spirit), classic theological terminology (persona, prosopon, hypostasis, imago Dei, conscience), philosophical categories (thinking, rationality, emotion, volition, freedom, mind, intentionality, responsibility), contemporary political / ethical categories (human dignity, sociality, embodiment, gender, the self, otherness, happiness) and scientific descriptions (organism, self-consciousness, brain, psyche, personality) on the same page (or at least within the same volume). The result is of course utterly confusing (with a cacophony more than a dissonant choir of voices), but at least there is no way of backtracking from the complexity through some form of reductionism or disconnection. One is indeed confronted with the depth, the 'bewildering plenitude' (Kemmerling) of the human person – which both is and is not to be equated with being a human being.

What the volume has not accomplished (and could not be expected to) is perhaps threefold:

Firstly, one may explore human distinctiveness in several ways, also from within a theological orientation, namely by focusing on human excellence (brain, mind, dignity, language, symbolic imagination), or on virtues (joy, gratitude, cooperation, compassion, friendship, love), or on vices (corruption, sin, evil, guilt, grief), or on functionality (homo faber, homo ludens, dominium terrae, stewardship), or on relationality (including faith, hope and love). In this volume Thomas touches on frailty, Höfner on virtue and on sin, also on persuasion, Welker on the heart, Clayton on kenosis, Schweiker on inwardness and vulnerability, and many on relatedness (e.g. Brown and Jeeves, also Oberdorfer, Vogelsang on recognition of the embodied other and Thomas on personhood as a 'network term' for dependence). Nevertheless, I still have the impression that the focus of the volume remains on human excellence, at least in its understanding of 'depth'. This is intriguing because the term 'depth' is not only used in the sense of complexity, but also with reference to the depths of despair, depression and destruction. Human evil is certainly not off the radar (e.g. in Jathanna's references to the subaltern and in Karle's essay on gender constructions), but it may have been interesting to also explore the question whether only human beings sin. What about guilt, genocide, economic injustices and social inequality? The relatedness of 'natural evil' and 'moral evil' was explored in interdisciplinary volumes edited by Willem Drees, *Is Nature ever Evil? Religion, Science and Value* (Routledge, 2003) and by Nancey Murphy, Robert John Russell and William Stoeger, *Physics and Cosmology: Scientific Perspectives on the Problem of Natural Evil* (CTNS, 2007), but is underplayed here.

Secondly, it is notable that the volume does not include perspectives from the social sciences (except perhaps for Karle's essay). There is one contribution from the perspective of law (by Kirste), but none from experts in cultural

anthropology, sociology or the economic and political sciences. The depth of the human person could also be explored from the perspective of development psychology, education and social development (where a retrieval of personhood and self-respect may well be crucial). Then there is the recent debate on posthumanism and transhumanism. Of course one cannot include everything in a volume such as this, but dialogue between theology, philosophy and the natural sciences clearly needs the mediation of the social sciences, not to mention the role of language, literature and the arts.

Thirdly (and since this review is situated from within the South African context), there is a need to comment on the selection of contributors. It is to be appreciated that there are one contributor from Japan (Katayanagi) and one from India (Jathanna), but the complexity of the discussion would have been enhanced by perspectives from Africa (consider Desmond Tutu's notion of Ubuntu) and from Latin America in order for the volume to be as 'global' as the title of the third section suggests. It is also striking that 18 of the contributors are male while only two are female, one may say despite Karle's vehement critique of the social construction of the human body. Again, all-inclusivity is not necessarily desirable, but then the more particular perspective that is offered in such a volume may need to be better delineated.

William A. Dembski, *Being as Communion: A Metaphysics of Information*. Farnham: Ashgate, 2014, pp. xvii+218, Pbk £34.95, ISBN 978-0-7546-3858-2.

REVIEWED BY JUUSO LOIKKANEN

One of the leading proponents of the theory of intelligent design, American mathematician, philosopher and theologian William A. Dembski has published the third and final book in his "ID trilogy" (a series of more academic books on the subject), entitled *Being as Communion: A Metaphysics of*

Information. While the two previous volumes in the series, *The Design Inference: Eliminating Chance through Small Probabilities* (Cambridge University Press 1998) and *No Free Lunch: Why Specified Complexity Cannot Be Purchased without Intelligence* (Rowman & Littlefield 2002), were concerned with introducing statistical and information-theoretic approaches for inferring design, in *Being as Communion*, as the subtitle implies, Dembski goes all philosophical. His aim is to “paint a metaphysical picture of what the world must be like for intelligent design to be credible” (xiii).

Dembski’s metaphysics can justly be described as “metaphysics of information.” According to him, everything in the world is infused by information, which – instead of matter, as is more commonly thought – is the fundamental substance of reality. Dembski thinks that “like the ancient myths of the old, the ‘matter myth’ is outliving its usefulness” (96) and must be replaced with a worldview based on information. For Dembski, matter is nothing more than a convenience to thought, merely a medium for information. In addition to physical matter, Dembski mentions mathematical matter (abstract objects, e.g., sequences of bits containing information) and spiritual matter (some “stuff” that lies outside our ordinary space-time continuum and can perhaps transmit hidden information created by God) which, too, can serve as a medium of information.

So, according to Dembski, information always gets realised in some embodiment and, furthermore, the same information can be re-embodied in different embodiments. Material embodiments come and go but information itself is indestructible. In the case of spiritual information, it would be appropriate to say that information is eternal, existing “in the mind of God,” if you will. Dembski believes that the multiple realisability of information can be helpful in understanding some Christian doctrines. He gives an example of the bodily resurrection of humans, the “core identity” of whom he claims

to be essentially informational. In resurrection, the unique core identity of each human being will be realized in a completely new heavenly medium, a medium that enables the limitations of our old earthly bodies to be removed and us to be glorified.

God himself, Dembski emphasises, is completely immaterial and thus does not exhibit any information. Dembski joins the apophatic tradition and, citing the Eastern Orthodox Divine Liturgy of St. John Chrysostom, describes God as “ineffable,” “invisible” and “incomprehensible” (97–8). Yet, God is able to interact with the world through generating and transmitting information and is the ultimate source of all information that has ever existed. But how exactly does God – or any other agent, be it humans or forces of nature (in addition to design, Dembski also seems to embrace the thought of Aristotelian intrinsic teleology) – make information move? Dembski offers a rather conventional answer to the question: energy. He, however, divides energy into “material” and “non-material” energy, the former of which is energy in the sense of physics, while the latter is involved in causal interactions between non-material entities and therefore unobservable to science.

One thing that disturbs me is the marginal role of matter Dembski’s thinking. Is matter really nothing more than “a myth, a convenience we can live without” (104), as Dembski suggests? I am not convinced it is. Even if we were to accept Dembski’s assertion that matter cannot exist without information and that the only function of matter is to embody information, the coin has another side to it: information always needs to be embodied in matter in order to be realised, so information cannot exist without matter, either. I would be inclined to believe that information and matter are more intertwined and the relationship between them more complex than Dembski likes to admit. You simply cannot have one without the other.

Although far from being an established philosophical theory, from the point of view of Christian theology, Dembski's approach could potentially turn out to be a fruitful one. Although the metaphysical picture painted by Dembski might require some refining (I am, for instance, somewhat sceptical about the way Dembski treats energy since the actual mechanism of information transmission still remains unclear), his basic claim that matter is not ultimately all there is – and not even the most important thing there is – is not difficult for Christians to embrace. In fact, it is probably the only option for any Christian. Perhaps Dembski's metaphysics of information can offer some philosophical support for the belief in God who has created the world and still acts in it.

What about intelligent design, then? According to the endorsements on the back cover, in *Being as Communion*, Dembski "definitely smashes the common caricatures and misrepresentations of the [intelligent design] movement." It is actually quite easy to agree with this. The book is really not that much about intelligent design as a scientific theory as it is about metaphysics (and it certainly is not about intelligent design as a form of creatonism). For example, two of the core "scientific" concepts of the theory of intelligent design, Dembski's "specified complexity" and Michael Behe's "irreducible complexity," are conspicuously absent from the text; the former is explicitly mentioned in only one footnote (although implicitly referred to in a couple of other places), the latter is completely ignored.

Instead, Dembski focuses on arguing why – philosophically speaking – it is a fundamental error to assume that no teleology can exist in nature. Teleology, Dembski holds, deserves a fair chance and cannot be excluded from discussion *a priori*. In this light, one way to see intelligent design is to regard it as a philosophical standpoint asserting that teleology and design are real features of the universe and that the search for the signs of design in nature is therefore a justified

enterprise. In my opinion, this line of thinking is worth developing further.

John H. Walton, *The Lost World of Adam and Eve: Genesis 2-3 and the Human Origins Debate*. Illinois: IVP Academic, 2015, pp. 256, Pbk £12.99, ISBN: 978-0-8308-2461-8.

REVIEWED BY RICHARD GOODE

It is important to recognise that this book has been written for a very specific target audience; conservative evangelicals who are troubled by claims that science contradicts Genesis 2-3. The context is firmly that of the science-creationist debate in the US. For readers outside the States, I would recommend that they read Walton's impassioned and, at times, touching appeal in 'Ministry' (207-208) and 'Considering the Future' (209-210) as this will help to make sense of his rather eccentric emphases and omissions – as well as the idiosyncratic methodology and conclusions. The premise of this book is rather than to attempt a synthesis of scientific theory with biblical text (and/or theology) – something the author readily concedes is beyond his expertise (181) – Walton asks does science conflict with the accounts of Adam and Eve in Genesis 1-3 (12-13). If there is conflict, the reader is expected 'to take a stand against [the] emerging scientific consensus' (183) in favour of the authority of the inspired biblical text. However, if there is no conflict, the reader is free to accept or reject the scientific claims of evolution on their own merits (13; 81; 183). Walton clearly thinks that no such conflict exists.

In fact, clarity is the hallmark of Walton's work and he appears to go to great lengths to present his arguments unambiguously. He writes extremely well, expressing ideas with simplicity, energy and colour. He draws on a very wide range of sources which are introduced with clarity and confidence. Walton's argument is meticulously constructed

taking the reader through each step of his reasoning with carefully explained propositional statements that build towards his particular reading of Genesis 2-3. He knows exactly the argument that he wishes to present and sets clearly defined parameters for his investigation. He also understands his readership and the possible arguments that they might raise. It is therefore surprising that despite so much apparent clarity that the end result is rather confused and contradictory.

Simply stated, Walton argues that, rather than being a description of the material origins of the cosmos, the Genesis creation accounts relate to the establishment of (divine) order and humankind's role in its expansion and maintenance. Consequently, he suggests that there is nothing within this reading that can conflict with science; one describes function and the other material origins.

Walton incrementally builds his argument step by step by establishing twenty one propositions. Each of these acts as a short chapter in which they are explained and possible problems are countered. With the proviso of a couple, there is nothing here that would surprise any theology or biblical studies undergraduate. For the most part, Walton's propositions have been part of European critical biblical studies for over a century; particularly those relating to the archetypal nature of the accounts and their reflection of a very different worldview. This might be the reason why Europe has not experienced the ferocity of the evolution/creationism debate encountered in the US. However, what is striking is the unusual (and some might find questionable) way Walton reaches these conclusions. Ironically, Walton's problem is not his attempt to balance his reading of Genesis 2-3 with current scientific thinking, but trying to balance it within his own (predefined) parameters of conservative evangelical thought.

Walton writes for an audience that hold definite views of the Bible as an authoritative, inerrant, infallible and divinely inspired text (a position which he also claims to hold) (13-14;

15-17; 19). The overall tenor of the book is one of finding oneself in the middle of an in-group conversation between people who share a common set of beliefs. Consequently, frames of reference are (generally) left unexamined or are unspecified, but, nevertheless, there is an assumption that the reader will also share them. Hence Walton begins his discussion on sin and death (153-160) by appealing to those shared beliefs without the need for any critical discussion; for example, '*We all agree that theologically, biblically and experientially, sin is ...*' (153) (italics added for emphasis).

Walton takes the role of an approachable teacher-pastor who gently but firmly leads his young flock through a subject that both view potentially threatening to Christian faith. The reader is repeatedly assured how a particular reading/proposition upholds the belief in a divinely inspired and inerrant text (for example, 99). When he offers an alternative to the traditional interpretation of the text, he re-assures the reader of the dynamic nature of interpretation and that we are simply following in the footsteps of the fathers of the Protestant faith (11-12, 23, 202). The reader is also repeatedly reminded that, should science be found to contradict the biblical text, science must be rejected in favour of the revealed truth in the Bible. For example, addressing the argument that evolutionary models make the need for a creator God obsolete, Walton states, 'Obviously such conclusions cannot be accepted by Christians.' (191). At all times, he is keen to assert that the Bible is the means through which God communicates his revealed truth to the church (Walton's readings are highly Christocentric) (15-17) and to endorse the figure of a creator God: '[W]hen God created the material cosmos (and he is the one who did), he did it *ex nihilo*'(33).

Walton's problem is not trying to argue that the creation accounts do not describe the scientific processes of material origins (cosmos and humanity), but how a non-material reading of the texts make sense theologically within the

parameters of conservative evangelical thought. Walton quickly establishes that the seven days of Genesis 1 concern the divine ordering of an inchoate chaos (67-68). Although this is a fairly standard critical reading, Walton appears to want to distance himself from critical (particularly liberal) scholarship. There is a total absence of any acknowledgement to pre-1990 European biblical scholarship. Walton instead bases his interpretation on his own analysis of the text, which he sets out in his earlier book *The Lost World of Genesis One*. Consequently, the first few chapters are simply a summary of the main arguments he presents there. While this might be an editorial decision to avoid duplication and putting the reader off with too much technical information, unfortunately, it does mean that the reader is not always able to critically assess the evidence that has been put forward or examine the methodology supporting the conclusions. In this respect, the footnotes relating to these sections are wholly inadequate, referring to Walton's earlier works, but not to his primary sources.

Walton understands the Genesis accounts as describing the creation of sacred space through the establishment of divine order within a disordered cosmos. He then develops this theme using the 'temple' motif (46-52), which is particularly relevant to Yahweh's siting of the garden (104; 116-118). For Walton, Genesis 1 is the story of the creation of a 'home' (non-material) rather than the building of a 'house' (material) (45).

Rather than reading Genesis 2 as a more detailed recapitulation of Day Six in Genesis 1, Walton views it as a continuation of the narrative, which is set some time *after* the creation (63-69). He argues that the account is not about material human origins, but the divine commission of humankind to continue God's work of establishing and maintaining order. Extending his depiction of Eden as a sacred space (temple), Walton then describes how Adam and Eve are assigned roles as priests (104-115) – although it is noted that

Walton does have to clarify precisely what he means by 'priest' (112-113). For this to work, Walton has to depart from some traditional interpretations. He asserts that the repeated divine declarations of *tov* ('good') in Genesis 1 do not denote perfection (54-57). This means that not even Eden should be viewed as being perfect; for Walton, a perfect cosmos will only be possible following the new creation (150). Walton contends that, although the process of ordering had been started by Yahweh, it was Adam and Eve's priestly role to continue that work in the 'temple' of Eden (150). Consequently, according to Walton, the created world of Genesis 1 and 2 should not be viewed as perfect, but contained elements of non-order, disorder (52; 57), and even pain and death (150; 159-160). Furthermore, Genesis 2 does not describe a *de novo* creation of humans (although Walton allows readers to adopt this understanding if they want, 204), but aetiologically explains the close relationship between men and women (81); neatly shoring up another key conservative concern, heterosexual marriage. Adam and Eve are therefore seen as archetypal representatives chosen from a population of humans by Yahweh to work alongside him.

Walton is strongly informed by a 'plain sense' view of scripture (23) whereby, even though some texts may contain multiple meanings, biblical texts also have an unambiguous message that is open to everyone; however, he is careful in his use of 'literal interpretation' (72). Therefore, alongside this archetypal reading, Walton is also keen to argue that, although written 'imagistically' (Walton's preferred term for 'myth'; 136-139), it does not mean that the events were not historical (96-103). In other words, the events recorded in Genesis 2-3 did, in some form, actually take place. Walton concedes that not everyone will accept his argument and emphasises that such a reading is not theologically contingent and offers it to those who might find it helpful. However, Walton fails to explain the numerous questions that his approach raises.

Particularly problematic is his treatment of the snake. Walton examines the snake motif within Ancient Near Eastern (A.N.E.) literature and correctly identifies the highly ambiguous role it played there. The mythic nature of the serpent as a figure of legend, once again, is widely accepted in scholarship. However, Walton insists that the text is also an account of an actual event – albeit ‘imagistically’ presented. Whilst rightly pointing out the anachronism of identifying the snake with Satan (128-129) – Walton views it as a liminal creature of non-order or a chaos creature (133-136) – he makes no attempt to explain how he sees this event in real terms. Even though he addresses the question about possible legs, he makes no reference to the snake’s ability to talk. In other words, how much of the text (or any like it) denote the actual event and how much is poetic/symbolic?

Throughout the book, Walton draws on an impressively wide range of A.N.E. texts. However, his use of them is undermined by his methodology. From the outset, the theological constraints that he places on it predetermine its outcomes. When, in the introduction, he explains the usefulness of comparing the biblical text with literature from the A.N.E., he then adds that this should only be done in a way that the ‘broad spectrum of core theology is retained: the authority of Scripture’ (13-14). Therefore, Walton is keen to discount any relationship between A.N.E. and biblical texts, treating the former as mythical literature and the latter as inspired revelation. In so doing, Walton seems to overplay the uniqueness of the Israelite depiction of Yahweh (for Walton, the Christian God) and his relationship with humanity in contrast to, what he calls, the ‘Great Symbiosis’ (242) of the A.N.E., whereby humans work to meet the needs of their gods (88; 91). His desire to present the biblical texts as unique also means that he seriously underplays the motif of order and chaos within the A.N.E., particularly the Egyptian cosmologies. It is therefore not surprising that, for Walton,

Genesis 3 presents a unique depiction of the creator God because any reading that would offer an alternative portrait has been rejected by his theologically prescribed methodology.

However, there is an even greater methodological problem that stems from Walton's lack of acknowledgement of source critical readings of Genesis. This severely weakens his comparative and exegetical methodology. Most scholars view the creation account of Genesis 2 as being drawn from a much earlier source than Genesis 1; Genesis 1 is generally viewed as belonging to the Priestly ('P') tradition and Genesis 2 as either reflecting the Yahwist ('J') source or, more latterly, 'non P' strata. This means that the creation texts are chronologically layered; reflecting different ages, theologies, literary and historical contexts. Although both relate to the creation of the cosmos and humanity, the accounts are generally understood to be making different (not necessarily contradictory) socio-theological points. However, Walton's starting point is the text as it appears in the Old Testament that most scholars believe to have been edited into (approximately) its present form during the Post-exilic period (c. 5th century B.C.E.). Although he acknowledges that the two accounts are separate (65) and that Genesis has undergone editorial change (164), as we have seen above, Walton constantly reads them as a continuous text (41; 55; 64; 89). Whilst repeatedly referring to the ancient world and the A.N.E., he is vague about any specific dates. At one point he links Genesis 2 with second millennium B.C.E. (121) – much earlier than most scholars would place it. Moreover, Walton is working with a text in its final editorialised form which is centuries later still. This lack of precision problematises Walton's attempts to draw meaningful data from his comparisons, particularly with his highly generalised assertions that those in the ancient Near East thought in a particular way or used particular literary conventions.

More seriously, from an exegetical (critical study of the text) point of view, this can be very problematic. Although

canonical criticism (using one biblical text to help understand another), has been part of the Jewish (Midrashic) and later Christian interpretive tradition for centuries, it does not help us to understand individual texts within their particular historical and literary contexts. Although Walton recognises that the meanings of words can change over time (33), he nevertheless persists in comparing words in Genesis 2 with instances of them in other biblical texts regardless of their chronology. For example, he bases his argument that *yšr* ('formed') does not necessarily imply a material act by comparing its use in 2 Kings, Isaiah, Psalms, Zechariah, Amos and Jeremiah (71-72). The question for the exegete is not how this word has been used in later texts, but what did it denote at the time of writing?

The New Testament also plays an important interpretive role in Walton's textual analysis. Whilst acknowledging that New Testament and Christocentric readings of the creation accounts are not always appropriate (128), his interpretation is essentially driven by Christian soteriology. Consequently, although Walton is keen to describe his textual analysis as 'exegesis' (103; 194; 206) it can be seen that it is exegesis done through a very specific theological lens.

Although the flawed methodology and theological bias means that I would be reluctant to recommend this book to my students and that the book's overall contribution to the science/religion debate is fairly limited, it would be unfair not to acknowledge its merits. Walton asks some serious questions of the text and, while not everyone will agree with him, posits some interesting theological arguments (Adam and Eve not being the first humans, non-order and specifically death being part of the original pre-fall creation). However, its main contribution relates to eco-theology and the environment. Walton uses the creation to re-situate Christian soteriology (traditionally, the salvation of humankind) from its essentially anthropocentric focus to the cosmos. This change in direction

is also robustly supported by NT Wright's excursive chapter (170-180). Wright also argues for a change in focus away from a purely anthropocentric understanding of salvation in his recent *Paul and the Faithfulness of God* (2013). In other words, the work of salvation through Christ is not simply to save humans, but to once more include humankind in the greater work of bringing 'salvation' to the cosmos.

Fraser Watts and Léon Turner (eds.) *Evolution, Religion and Cognitive Science: Critical and Constructive Essays*. Oxford: Oxford University Press, 2014, pp. 272, Hbk £69, ISBN 978-0-190968808-1.

REVIEWED BY MICHAEL FULLER

This is a very timely collection of essays. The quantity of publications in the Cognitive Science of Religion (CSR) has been rapidly increasing in the last decade or more, with a number of key thinkers (such as Scott Atran, Pascal Boyer and Justin Barrett) having their work widely quoted and approved. But what exactly is the Cognitive Science of Religion? On what data, and on what assumptions, do its conclusions rest? What (if any) are its theological implications for those with an adherence to traditional religious beliefs? It transpires that there are a number of different responses that can be made to these questions, and the contributors to this volume exemplify a range of these.

One thing that is immediately acknowledged by CSR practitioners is that theirs is an *interdisciplinary* approach to the study of religion as an evolved phenomenon. This book contains contributions from scholars active in the fields of psychology, sociology, anthropology, evolutionary studies and theology. It is especially valuable to have the range of approaches they represent gathered between one set of covers – illustrating, as it does, the remark of one contributor (Michael Ruse) that 'the one thing that strikes the disinterested

observer is the extent to which there is a total lack of uniformity by enthusiasts' (p. 44).

Léon Turner begins by introducing the 'standard model' of CSR (essentially, that the human mind may be assumed to be comprised of a number of 'modules', which have developed because of the evolutionary advantages they convey: these modules have the side-effect of generating a strong unconscious tendency for humans to believe in gods, conceived of as supernatural agents). Turner explores some of the debates that stem from this model (for example, are the religions generated in this way themselves evolutionarily beneficial, or are they simply unintended by-products of systems that are?), and points out some of the various aims guiding CSR research (e.g. explaining the origins of religion, or accounting for its spread and its persistence). He also notes some of the criticisms that have been levelled at it: for example, that the modular system of the mind is too simplistic, or that the narrowness of the understanding of 'religion' it proposes is unhelpful (not least because it fails to acknowledge the contributions made by sociology to the study of religion – the whiff of an academic 'turf war' hangs over a number of contributions to this collection).

Ilkka Pyysiäinen offers a valuable survey of the CSR research programme to date, from its origins in its present form in the early 1990s. He notes the key role that 'agency' has played in the development of CSR, and also its 'strong commitment to methodological naturalism', i.e. that 'explaining religion as human behaviour necessitates neither special 'religious' methods nor a personal commitment to beliefs about the supernatural (or their rejection)' (p. 23). His wise conclusion is that, 'the questions we want to ask determine the level at which we seek for answers. Thus there is no predetermined 'right' level of analysis' (p. 31): this stands as a valuable corrective to those who might wish (or fear) to see CSR as essentially reductionist in its approach to religion.

A characteristically forthright and penetrating essay by Michael Ruse kicks off with the questions: 'Does religion have a natural origin and is that natural origin explicable in terms of evolutionary biology? And if this is so, does this have any implications for the truths of religious beliefs?' (p. 38). He surveys the origins of evolutionary accounts of religious belief in the thinking of David Hume and Charles Darwin, and then looks at contemporary expressions of this in the work of writers like E. O. Wilson and Daniel Dennett. He remarks that, 'the extent to which one is going to be inclined to take one or other of these various proposals seriously is going to depend less on the proposals themselves and more on one's background commitments' (p. 49). This is echoed by Aku Visala (formerly a doctoral student of Pyysiäinen), whose essay explores the standard model of CSR for its 'religious relevance' to both theists and atheists, and who concludes that, 'the religious relevance of cognitive and evolutionary approaches to religion are (at least in the case of theism) relatively neutral' (p. 70).

Purzycki, Haque and Sosis draw on a wide range of research to address the issue of whether religion is best considered a by-product of evolutionary pressures or an adaptation generated by them. They discuss the 'costly signalling' theory which has found favour in some quarters – the idea that, 'The costs of ritual performance, including time, energy, risk, material, and opportunity costs, enable religious behaviours to serve as reliable signals of in-group commitments. ... Religious rituals can therefore be a means to communicate trustworthiness' (p. 79). Nathaniel F. Barrett offers an interesting development of this idea, developing 'a radical reframing of the question of religion's evolutionary origins in terms that make value-rich engagement, rather than truthful belief, the primary driving force of human biocultural evolution' (p. 93). The idea that it is the effects of religious practice, rather than the content of religious belief, that is

crucial to an understanding of religion makes a refreshing alternative to some of the other accounts reported here.

Fraser Watts extends this approach still further, arguing that 'evolutionary CSR is unnecessarily committed to speculative assumptions that constrain its theorising' (p. 110). *Contra* the modularity module, he notes that 'Religion seems to be an emergent capacity of the whole brain' (p. 114); and, criticising the 'standard model' for its assumption that early humans must have had thoughts and intuitions in much the same way as modern ones, he develops the alternative idea that early humans might have viewed the world in an 'undifferentiated' way, not making the distinctions we do between agents and non-agents, or between material and psycho spiritual realities. Drawing on Justin Barrett's experimental work, which demonstrates that children appear to be born with an instinctive capacity to think in terms of gods, Watts suggests that 'religion might really be natural ... in the sense of being intuitively correct' (p. 127). In a fascinating concluding reflection on the story of Adam and Eve in Genesis 3, he suggests that CSR has constructed a 'myth of a "fall" from naturalism ... rather than a fall from God and paradise, as in Genesis 3, it is a fall from naturalism into religion' (p. 128). Watts' paper is perhaps the most significant of all the essays in this collection, and it deserves to be widely read.

Another fascinating paper, from Wentzel van Huyssteen, urges that it is a mistake to view humans as minds only: the question of the origin of religion 'can never be disentangled from the evolution of embodied human personhood' (p. 133). He concludes that, 'if religious beliefs are largely produced by normal human cognitive systems and if we generally trust these systems, then we should not suspect them in the case of religious beliefs' (p. 149).

The final few papers in the collection constitute appeals for the study of the origins of religion to continue to draw on the insights of other disciplines and not to become too

'straightjacketed' by modern CSR approaches. Leon Turner's paper warns that, 'if CSR continues to emphasise the natural foundations of religion in a way that excludes sociocultural explanations at key points, then its broader relationship with the humanities and social sciences will be severely, perhaps terminally, compromised' (p. 170). Timothy Jenkins illustrates the different approaches of social anthropology and cognitive psychology with reference to the accounts these disciplines give of witchcraft. He urges that, 'it is possible to anticipate the development of a social psychology which may reconcile some of the present oppositions. But the reconciliation will be through making nature historical, rather than making history natural, at the cost of the human' (p. 190). Lesley Newson and Peter Richerson explore the evolution of cultural complexity and the role of religion as something which shapes, and is shaped by, cultural dynamics. William Sims Bainbridge offers examples of ways in which the computer modelling used by Artificial Intelligence theorists can be used to predict the spread of religious thinking dependent upon a number of variable factors (strength of belief, interconnectedness with neighbours, and so on). The links between these last two essays and the preceding ones felt rather tenuous, perhaps indicating the extent to which a particular 'brand' of CSR has come to dominate thinking in this interdisciplinary field.

'Concluding reflections' by Malcolm Jeeves recaps the arguments of the other authors, noting their breadth, and pointing out some recurring themes. Jeeves' wise and judicious conclusion feels like a fitting way of ending this review: he observes that these ideas

will undoubtedly be revisited as the twenty-first century evolves. After one or two decades have passed, it will be possible to see how firmly some of the views expressed here have become established, how others have been significantly

modified, and how others, in the light of accumulating empirical evidence, no longer seem tenable. (p. 246)

One can only guess how many of the ideas of CSR, a century hence, will appear as quaint as Freud's Oedipus complex (a similar 'catch-all' theory) appears to us now.

David Knight, *Voyaging in Strange Seas. The Great Revolution in Science*. New Haven and London: Yale University Press, 2014, pp. 344, Hbk £25, ISBN 978-0300173796; Pbk £10.99, ISBN 978-0300212754.

REVIEWED BY GEOFFREY CANTOR

Although the history of the Scientific Revolution has been the subject of a number of book-length studies, this is a superb account of the rise of modern science and an excellent read. There are many more reasons to recommend it. David Knight, who taught the History of Science for many years at the University of Durham, is a highly experienced lecturer and has successfully transferred the content of one of his lecture courses to the written word. Indeed, his prose possesses a lightness that buoys the reader. The numerous felicitous phrases and examples of gentle humour add further to the reader's enjoyment.

Knight's title – 'Voyaging in Strange Seas' – provides a metaphor for the book's main argument. While stressing the importance of the discovery of new lands by intrepid navigators, such as Vasco da Gama and James Cook, and the role of collectors who brought specimens back from their travels to exotic places, the history of science is portrayed as a magnificent voyage of discovery for humankind. Just as people's experience is (or should be) expanded by travel and their preconceptions challenged, so the early voyagers of science vastly extended human knowledge and changed their

– and our – understanding of the world. These metaphorical voyagers came in many guises, included philosophers, experimentalists, theoreticians, technicians, mathematicians, theologians and travellers. Such instruments as the telescope and later the microscope radically revealed new worlds and impelled the curious to revise their understanding of nature.

Knight does not limit the scope of his analysis to the period from Copernicus to Newton, but sees the questioning of assumptions about the natural world as predating Copernicus. Moreover, he ends his narrative with the nineteenth century, when science ‘truly became of age ... confident and well prepared for the cultural and economic dominance that was its destiny’ (p. 283). Most importantly, this broad historical sweep is not limited to the history of ideas. While emphasising the importance of scientific ideas, Knight portrays the development of science in relation to such issues as philosophy, religion (to which I will return), patronage, the rise of institutions and scientific journals, and the many practical uses to which science has been put and which, in turn, have decisively influenced its development. Thus Knight presents science in a rounded, historically-contextualised manner that enables the reader to appreciate it as an intense activity possessing many diverse modalities – practical, social, intellectual, political, religious, cultural, etc. Chapters are not only devoted to specific subjects, such as astronomy, chemistry, medicine, technology and natural history, but also to the innovative philosophies of nature, the role of experiment, the rise and importance of scientific institutions, science from a global perspective and science in the Enlightenment. The breadth of issues is complemented by the wide range of sources that Knight has utilised.

The *dramatis personae* likewise extend far beyond the usual list of characters – Copernicus, Harvey, Galileo, etc. – to include such diverse individuals as Daniel Defoe (as recorder of the impact of the plague), the ‘shoemaker mystic’ Jacob

Böhme, the structural engineer Jean-Rodolphe Perronet, and the independently-minded Elizabeth Carter. Although the reader sometimes feels rather overwhelmed by the number of people mentioned, each is introduced by an appropriately pithy description together with his or her dates. Knight also possesses a keen sense of drama which he uses to good effect in citing memorable and pertinent quotations. Extracts from literary sources, such as a passage from a poem of Henry More's in which he allied atomism with Neoplatonism, are likewise seamlessly integrated into this history of science.

As might be expected from a clergyman's son and the author of *Science and Spirituality: The Volatile Connection* (2004), Knight is highly sensitive to religious issues and the many roles played by religion in the rise and consolidation of modern science. Thus in discussing medieval maps, such as the one in Hereford Cathedral, he notes that they were 'to help us get to Heaven' (p. 16). Likewise, he stresses the importance of Jesuits both in pursuing scientific research and in the international dissemination of scientific knowledge.

A separate chapter is also devoted to the subject of science and religion, which Knight initiates by dismissing the conflict thesis, adding, 'Actually, science grew out of the religious impulse to understand God through His works' (p. 106). Over the next 30 pages he provides a succinct analysis of a wide range of different forms of engagement between science and religion during the period under discussion.

Knight sees the expanding frontiers of science as providing a vast and challenging resource for theological reflection, especially through the portrayal of the natural world as a celebration of God's Creation. While some developed natural theologies to connect that world with its Creator, others sought ways of inter-relating the Bible's text with new understandings of the Book of Nature. Optimistically many writers saw the Two Books as confirming each other and any conflict was dismissed as merely apparent or, as Francis Bacon argued, it

was the result of our finite mental capability. Exciting new projects were attempted, such as the construction of a definitive biblical chronology, which was attempted not only by the erudite James Ussher but also by Isaac Newton. Genesis and geology were likewise creatively combined by such writers as the antiquary John Woodward and William Whiston, who was expelled from the University of Cambridge for his Arianism. Yet the brash new science was perceived by others as a severe challenge to religious truth and religious orthodoxy and also as detracting from the really important issues of sin and salvation. In drawing together these and other issues in his short chapter, Knight strikes a good balance between the various positions taken on issues of science and religion and sets them clearly within the wider context of the Reformation and other religious movements that swept through Europe.

Although this is primarily an historical account of the rise of modern science, Knight includes a number of brief reflections not only on early-modern science but also the nature of the scientific enterprise in our own time. For example, in commenting on the diverse approaches to the study of nature by early modern writers, he adds: 'Science works not by following an infallible royal road, but through curiosity and imagination, criticism and rigorous testing, and the building of a community' (p.59). Such interjects, though originally aimed at students, provide the reader with useful links between the historical material and wider questions about the pursuit of science, past and present

My only criticism concerns the 55 illustrations that are printed on glossy paper and bound into two places in the book. All these illustrations are of good quality and each addresses a pertinent issue. However, as they are not cross-referenced in the main text, there is an awkward disjunction between the text and the usefulness of these illustrations.

REVIEWS REPRINTED FROM ELSEWHERE

David N. Livingstone, *Dealing with Darwin. Place, Politics, and Rhetoric in Religious Engagements with Evolution*. Johns Hopkins University Press, 2014, pp. 265, Hbk £26, ISBN 13: 978-1-4214-1326-6.

REVIEWED BY FRANCISCO J AYALA

This review was originally published in *Science, Religion and Culture* Vol. 1 Issue 2, 2014, pp. 70-72. Reprinted with kind permission from the editor and author.

The eminent evolutionist, Theodosius Dobzhansky wrote in 1973 that, “Nothing in biology makes sense except in the light of evolution.” But it was only in the middle decades of the twentieth century that Darwin’s theory of evolution by natural selection became generally accepted by biologists and other scientists. How was Darwin’s *On the Origin of Species* received by his contemporary scholars, particularly by theologians and religious authors? That is the subject of the thoroughly researched and elegantly written book by David N. Livingstone, *Dealing with Darwin. Place, Politics, and Rhetoric in Religious Engagements with Evolution*.

Two answers. The first answer is that Darwin’s theory of evolution was well received and, at times enthusiastically endorsed, by Darwin’s contemporary religious authors in the English speaking world. The second answer is that Darwin’s theory and supporting evidence to account for the origin and evolution of organisms, including humans, were energetically rejected, as contrary to the teachings of the Bible and the Christian faith, by his contemporary religious authors in the English speaking world. Whether the first or the second answer obtains deepens on where in the English speaking

world you look. The responses were different in different countries, and between different institutions within the same country, particularly in the United States and the United Kingdom.

The book's focus is on "how Calvinist communities in different cities *dealt* with the Darwinian phenomenon—some rejecting it outright, others tolerating it, yet others embracing it" (p. 26 [author's emphasis]). As Livingstone asserts, "delving into local culture and conditions exposes new dimensions of the evolution-religion interface ... there is, I think, a need to go ... to a ... systematic interrogation of place, politics, and rhetoric in religious encounters with evolution. That is this book's ambition" (p. 25)—and what the book splendidly delivers.

John Duns (1820-1909), professor at Edinburgh's New College, is representative of how Darwin was received in Calvinist Scotland. In his two-volume *Biblical Natural Science* (1863), Duns concluded that, "species have a real and permanent existence in nature"; the Darwinian version of evolution by natural selection was "wholly opposed to the utterances of the Bible on these topics." The physicist David Brewster, Principal of the University of Edinburgh, asserted in 1862 that the *Origin of Species* was composed of "little more than conjectures" in support of which Darwin had "not addressed a single fact." In 1867, the Rev. Thomas Smith, minister of Cowgate-Head Free Church sneered at the idea of a gorilla transmuting into a human. According to Robert Flint (1876), professor of divinity at Edinburgh University, the "speculations of the Darwinians have left unshaken [William Paley's] design argument." The 1985 General Assembly of Highland Presbyteries carried a rebuttal of Darwin's *Ascent of Man* by a voting majority of more than 120 members.

There were early on conciliatory voices. Robert Rainy (1826-1906), undisputed leader of the Free Church of Scotland in his 1874 Inaugural Address as Principal of New College in

Edinburgh, did “not regard the question, whether man’s animal constitution could conceivably be developed from lower forms, as one of great theological interest.” As the nineteenth century wore on and in early years of the ensuing century, the significant voices of conciliation kept increasing and even coming into first place. To the theologian George Matheson (1842-1906) there simply was no “incompatibility between the claims of evolution and the claims of creation.” It was as easy for the Christian “to admit that man has grown out of the animal, as it is to hold that the man was made immediately from the dust of the earth.” James Iverach (1839-1922), Free church Professor of Apologetics in Aberdeen, saw that it was “in the interests of theology to welcome every conquest of science and every fresh proof of the universal reign of law”; the “view ... that each species or kind was directly created by God ... and has gone on reproducing itself after its kind ... [could] no longer be held.”

In Belfast, the theologians’ responses to evolution traced Scotland’s. “The Scottish intellectual tradition”, writes Livingstone, “had delivered to Ulster Calvinists both philosophical and theological resources to foster the cultivation of a scientific culture in the north of Ireland” (p. 61). Yet Josias Leslie Porter (1823-1889) could only discern “melancholy proofs that science and philosophy” were no longer “safe guides in the education of people.” In his inaugural 1874 address at the Presbyterian College in Belfast he asserted that, “not a single scientific fact has ever been established ... from which [evolution] dogmas can be logically deduced.” A meeting in Belfast in 1874 of the British Association for the Advancement of Science attracted the attention of numerous theologians and religious authors. According to Henry Wallace (1801-1887), professor of ethics at Assembly’s College, the aim of the Belfast meeting was the dissemination of the “atheist principle” and the findings presented were not “dwelt upon so much for their scientific

value, nor as records of progress, but merely to serve the cause of atheism." There was an additional dimension in Belfast's reaction to evolution: "tussles over who should control higher education in Ireland, and a long-standing anti-Catholicism that colored virtually every aspect of cultural and political life during the final decades of the nineteenth century" (p. 88).

"On Monday, 9 June 1884, the pages of the *Toronto World* were host to a spat between a certain Dr. Wild and an anonymous correspondent writing under the signature 'evolutionist'" (p. 89). Joseph Wild, "a theological controversialist," minister of the Bond Street congregational Church in Toronto, had promised the readers of the *Toronto World* that the Pope and Freemasonry would be in his crosshairs but evolution had gotten his attention and focused instead in "ridiculing the theories of some writers as to an evolution from an incandescent nebulae as being as silly as the evolution from a monkey." Much of *Dealing with Darwin's* chapter 4 is dedicated to "the august authority of Sir John William Dawson (1820-1899), the Nova Scotia-born geologist ... who became principal of McGill University in 1855" (p. 91). Ostensibly, Dawson dwelt on the "scientific flaws" in Darwinism, "conspicuously trading on his geological expertise" (p. 94). He proudly characterized himself "as one of the few naturalists who do not believe in the theory of evolution." He argued that, "evolutionary progress [could only] be understood as the empirical outworkings of divine design" (p. 96). Dawson asserted that "there may be a theistic form of evolution, but let it be observed that this is essentially distinct from Darwinism ... It necessarily admits design and final cause." Other Toronto scientists seeking a theologically-acceptable evolution included the Scottish archeologist Daniel Wilson, who spent nearly forty years at the University of Toronto, the geologist Edward John Chapman (1821-1904) and the Irishman William Hincks (1793?-1871), who had come to the University of Toronto in 1853, when he obtained the chair

of natural history, defeating "Darwin's bulldog" Thomas Henry Huxley, who was seeking the same chair. In Livingstone's view "in Toronto evolutionary motifs fared rather better in certain theological circles than in scientific ones" (p. 115).

Antebellum Presbyterians of the Old South "had come to regard biblical orthodoxy as the foundation stone of the southern societal order" (p. 155). Notwithstanding the occasional but increasing threat of antislavery sentiments, southern Presbyterians asserted "their conviction that an honest-to-goodness, unadulterated reading of the bible provided ample warrant for the institution of slavery and, later, for racial segregation" (p. 155). The Bible provided the authority to resist the Yankee evils of racial democracy, emancipation, and higher criticism. Scientific claims arising from geology and evolution were thus to be resisted as intolerable attacks on the supremacy of the Bible.

The most entangled case of the emerging controversy involved the uncle of Woodrow Wilson, James Woodrow (1827-1907), a firm believer in the "divine inspiration of every word" in the Bible and its "absolute inerrancy." On account of his views on Darwin's theory of evolution, Woodrow was dismissed from the professorship he held at the southern Presbyterian Theological Seminary in Columbia, South Carolina. Woodrow insisted to no avail that evolution simply described the derivation of organic beings from previous life-forms without "any reference to the power by which the origination is effected; it refers to the mode, and to the mode alone." Attacks emerged from all sources, numerous civilian and theologian authorities. Eventually the General Assembly convened in Columbia in 1888 "detected in evolution an infidel canker that would rot the entire fabric of southern culture" (p. 118). Eventually, Woodrow received the unexpected, and surely unwanted, commendation of Andrew Dickson White's famous *History of the Warfare of Science with*

Theology (1896). Woodrow in 1863 had lamented the “mistake of anti-geologists, who are so fond of classing geologists with infidels, or with those who know little of the bible and its teachings.” In 1878, the distinguished geologist Alexander Winchell was dismissed from Methodist Vanderbilt University because of his acceptance of evolution. John Girardean, a leading vocal antagonist of Woodrow, had made it clear that “the immediate creation of Adam from literal dust was a non-negotiable doctrine” (p. 152).

In the last third of the nineteenth century, Charles Hodge enjoyed an unrivaled reputation as the leading exponent of Calvinism in the United States. In addition to numerous other writings, he published in 1872 two volumes of his *Systematic Theology*, an extended and authoritative exposition of Old School confessional Presbyterianism. Two years later in a volume entitled *What is Darwinism?*, he delivered the unambiguous answer: “It is atheism.” Hodge saw Darwin’s use of “natural” as “antithetical to supernatural”: “in using the expression Natural Selection, Mr. Darwin intends to exclude design, or final causes”; which brought “it into conflict not only with Christianity, but with the fundamental principles of natural religion.”

James McCosh (1811-1894) had arrived from Belfast in 1868 to take the presidency of the college of New Jersey (later Princeton University), which for more than three decades would be, together with Princeton Seminary, the focus of the controversy and antagonism against evolution. McCosh would later emerge “as perhaps the foremost reconciler of evolution and Protestant theology” (p. 162). But McCosh strenuously resisted any resort to Darwinian explanations in ethics. However powerful an explanatory mechanism natural selection was, it could not explain “how Life arises, or Sensation, or Consciousness, or Intelligence, or Moral Discernment.” “Princeton Calvinists found themselves located somewhere between their Presbyterian colleagues in

Edinburgh and Toronto, on the one hand, and Belfast and Columbia on the other ... all the while they reiterated their deep conviction that should evolution come to be verified, it could be Calvinized with little difficulty" (p. 196).

"Darwinian Engagements: Place, Politics, Rhetoric," chapter seven, is the last one and the shortest of *Dealing with Darwin*. It is a summarizing meditation on the themes subjacent to all the previous, historical chapters. "In one place [Darwin's] theory of evolution was seen as an individualist assault on collectivism, in another as a justification for colonial supremacy; elsewhere it was taken to be a subversive attack on racial segregation, yet elsewhere as a symbol of progressive enlightenment" (p. 197). Livingstone adds: "Multiple geographies are at work here. The religious communities on which this analysis concentrates were deeply rooted in Scottish Calvinist culture, but in different places this confessional tradition was marked by the fixations of the society in which it was domesticated" (p. 198). Like all previous chapters, chapter seven is clearly written, intelligent and enlightening—a superb colophon to a superb book.

John Bryant, *Beyond Human? Science and the Changing Face of Humanity*. Oxford: Lion Hudson, 2013, pp. 253, Pbk £9.99, ISBN 9-780745-953960.

REVIEWED BY ROBIN GILL

First published in *Science and Christian Belief* Vol. 26 no. 2, 2014 pp. 186-187. Reprinted with the kind permission of the editor and author.

John Bryant is a great explainer. Without using unnecessary jargon he is at his most impressive when, as a cell and molecular biologist, he is explaining some of the astonishing recent developments in biological and medical science and the

ethical challenges that they raise. He does this pellucidly and with great enthusiasm. His focus, as the title of his new book suggests, is especially on those areas of science that might be seen to be changing, or about to change, human nature itself—whether through genetic manipulation, IVF, drugs or digital implants. He is particularly critical of utilitarian enthusiasts, such as the secular philosopher John Harris, and exponents and proponents of transhumanism, such as Nick Bostrom—regarding the first as too shallow and the second as too exaggerated. In contrast, his own ethical position has explicit roots in the Christian virtues of compassion and humility—virtues that shape almost every chapter in this very accessible book.

The weakest chapters are the first four; three of which attempt to provide a sort of social history of *homo sapiens* from the beginning until the present, and the fourth a summary of moral philosophy. This was probably much too ambitious and too far removed from his own academic expertise. Readers might wish simply to skip these chapters and begin instead on page 93, where they will be on much more solid ground. From this point onwards science readers may well learn from the careful and balanced way that he sets out the ethical arguments for and against a particular biological development (often refraining from reaching an ethical conclusion himself and leaving the reader to decide). Theologians and Christian ethicists, in turn, may learn that they need to listen carefully to scientists before rushing to judgment about, say, embryonic stem cell research or GM crops. It is interesting that, although he occasionally cites the Christian ethicist Stanley Hauerwas, he largely ignores his highly theological approach and favours instead the more scientifically informed approach of Celia Deane-Drummond.

He ends his book with a note of caution. He argues that the main problem is not with science (for which he remains an enthusiast) but with the application of science. As Ian Barbour

used to remind us, almost every scientific development can be used for our benefit or misused at our cost. In addition John Bryant repeatedly raises issues of justice, pointing out that while some complex medical developments may benefit the rich they may never be made available to the poor. He envisages some point in the future when people will look back amazed that we did so little to prevent hunger and treatable diseases among the poor and, instead, put 'resources into research on thought transfer and thought-control technology, on dramatic extension of human lifespan, on artificial wombs and sexless reproduction! What were we thinking of?' (241).

Paul Thompson and Denis Walsh (eds.) *Evolutionary Biology. Conceptual, Ethical and Religious Issues*. Cambridge: Cambridge University Press, 2014, pp. 243, Hbk £60, ISBN 978-1-107-02701-5.

REVIEWED BY SAM BERRY

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Has an edict gone out from publishers, that 'thou shalt not publish festschrifts?' *Evolutionary Biology* is an unashamed festschrift for Michael Ruse - or perhaps it should be called an ashamed festschrift, for the word and the concept are nowhere used. One can see that book titled *Festschrift for Michael Ruse* is not as likely to sell as many copies as one called *Evolutionary Biology*. In addition, a problem about festschrifts is that authors asked to contribute may have to dredge for ideas to make a suitable tribute to the recipient of the festschrift. Both these problems are evident in this book: it is largely about philosophy, not biology *sensu stricto*; and some of the authors seem to be straining to say anything usefully original. Please don't misinterpret me: I share the authors' high regard for

Michael Ruse, who has contributed greatly to the science-faith debate whilst sitting on the sidelines, as it were; and there is much that is interesting and refreshing in the book. It may add to evolutionary philosophy, but hardly at all to our understanding of evolutionary biology.

The first sentence of the editors' Introduction is 'Contemporary analytic philosophy was forged in the 1960s.' They then give their game away with a footnote, 'A few biologists - J. H. Woodger, C. H. Waddington, and Bernard Rensch, for example ... had tackled philosophical aspects of biology, but philosophical interest in biology by philosophers of science dates from the world of [Morton Beckner, Thomas Goudge, David Hull, and Michael Ruse].' By their restricting definition, they sever themselves from a not unimpressive intellectual heritage. This surfaces to various degrees in some of the chapters. As they mention C. H. Waddington only in this footnote (1), it is pertinent to recall his considerable contribution to evolutionary ideas through his embryological work and influence on his successors. His *Strategy of the Genes* (1957) brought together many of the ideas being discovered (or re-discovered) by the current generation of evo-devo-ists, and he built on these in such books as *The Ethical Animal* (1961) and *Tools for Thought* (1977), together with his chapter in Julian Huxley's *The Humanist Frame* (1961), which prefigures many of the themes in the Thompson and Walsh volume. And Huxley is also ill-served by being mentioned only in passing (155) that 'rate genes control the timing of developmental processes'. He did pioneering work on rate genes, and one of his more important books was on the *Problems of Relative Growth* (1932). I am not arguing for the uncritical acceptance of either Waddington's or Huxley's thought, but to ignore them completely detracts from the current volume.

Likewise, the chapter on the origins of variation fails to note Darwin's eight year long study on barnacles, which he undertook to answer the criticism that he was ignorant of

variation in the natural world, or Simon Conway Morris's impressive presentation of the constraints on new variation in a variety of taxa, and the implications of these for human evolution (*Life's Solution: Inevitable Humans in a Lonely Universe*, 2003).

This intellectual isolationism does not apply throughout the book. There is an excellent introductory chapter by Francisco Ayala ('Human evolution: whence and whither'), followed by two very useful chapters grouped as 'Evolution and theology' by Elliott Sober (on 'guided' mutation) and Philip Kitcher (excoriating bad arguments from both biblical literalists and dogmatic atheists). The next two sections ('Taxonomy and systematics' and 'The structure of evolutionary theory') are less impressive. The most interesting is an examination by Jean Gayon on the use by R. A. Fisher of economic concepts in developing his argument about adaptation in the *Genetical Theory of Natural Selection* (1930). Some of Fisher's seminal thoughts came from considering lepidopteran mimicry. I would be intrigued if Gaydon develops his idea by seeing if he can integrate Fisher's use of these two very different inspirations. The book concludes with three chapters on 'Function, adaptation and design'.

There is good material in *Evolutionary Biology*, but not £60 worth. I hope my criticism of his faux festschrift do not detract from Ruse's own work. It is well worth absorbing. Perhaps he can be given a more rigorous celebration sometime in the future.

BOOKS AVAILABLE FOR REVIEW

John Hart, *Encountering ETI: Aliens in Avatar and the Americas* (Cambridge: The Lutterworth Press, 2014).

Ellen L. Idler (ed.) *Religion as a Social Determinant of Public Health* (Oxford: Oxford University Press, 2014).

Snezana Lawrence and Mark McCartney (eds.) *Mathematicians and their Gods* (Oxford: Oxford University Press, 2015).

Christopher Nassaar, *The War on God: Science, versus Religion Today*. (AuthorHouseUK, 2015).

D. Jason Sloane and James A. Van Slyke, *The Attraction of Religion: A New Evolutionary Psychology of Religion* (London: Bloomsbury, 2015).

The Editor welcomes offers to review these publications. Please contact her on L.Hickman@newman.ac.uk

NOTE: This Journal aims to publish original and reprinted reviews of books published in the science-religion area. The Editor regrets that she is not able to publish, or enter into dialogue on, original articles not tied to a book in the field.