S & CB (2009), **21**, 79–96 0954–4194

Reviews

Philip Clayton (ed.), associate editor Zachary Simpson
The Oxford Handbook of Religion and Science

Oxford: Oxford University Press, 2006. 1023pp. Cloth. £85.00, paper £27.50. ISBN 0-19-927927-6

The first thing that strikes the reader of this *Handbook* is its sheer bulk. At 1023 pages the cloth edition is heavy in the hand, and the paperback will need to be very well bound to hold together for any length of time. However, I am sure that Philip Clayton needed this extent of volume for the book really to do any sort of justice to the subject of 'science and religion', as opposed to 'science and Christian theology', which is what is often meant when the former phrase is used.

The editor, though himself a committed Christian, claims his approach is one of 'pluriformity'. True to political correctness Part I – 'Religion and Science across the World's Traditions' – opens with general essays on Hindu and Buddhist thought. There follows what I thought was an excellent survey by Norbert Samuelson of the relation of Judaism to science. I am an outsider to this particular debate and cannot therefore say how it would be received by representatives of different traditions within Judaism, but to a Christian hoping to learn more this piece seemed exemplary in its clarity of thought and articulation.

The ground covered, also very clearly, by John Polkinghorne in his survey of Christianity's relation to science will be familiar to most readers of this Journal. The essay by Seyyed Hussain Nasr on Islam and science will puzzle many non-Islamic readers – indeed it seems not addressed to those readers in any way. This may be explicable by the piece having appeared first in the *Islamic Quarterly*. It consists mainly of a diatribe against Western culture, with which modern science is held to be inextricably bound up. Nasr searches for a genuinely Islamic science, of which the details remain tantalisingly vague. The hint that 'facts' may be taken from modern Western science but 'hypotheses' such as Darwinian evolution should be recognised as such is not encouraging to outsiders who want to see science both flourish and learn, wherever appropriate, from the wisdom, creativity and metaphysical reach of the great monotheisms. However, the piece should challenge Christian readers – to what extent do we, should we, hanker for a Christianised science? What would that look like?

There follows another excellent essay by Willem B. Drees on naturalism, and (more political correctness), Peter Atkins on 'Atheism and Science'.

Part II is entitled 'Conceiving Religion in the Light of the Contemporary Sciences'. I welcome the inclusion of a chapter 'Ecology and Religion' – too often have ecological concerns become separate from a (physics and Darwinism-dominated) view of 'the science-religion debate'. However, Susan Power Bratton falls into the trap of trying to stick literally to her title and thereby ends up with a disappointingly diffuse piece. Richard Fenn by contrast offers a too-specifically North American account of sociology and religion, neglecting important insights from Europe such as those of Grace Davie.

The competition for this book is of course J Wentzel van Huyssteen's edited *Encyclopedia of Science and Religion* (Macmillan, 2003), and the forthcoming encyclopedia planned by Springer. The Macmillan volume has short entries in the classic encyclopedia mode. On balance I consider that Clayton has successfully made the case for the longer, more discursive essays to be found in the *Handbook*. Short pieces help students gain basic information, but in a complex

interdisciplinary area they often beg as many questions as they answer – these essays are much more substantial and at their best give really helpful introductions to the field.

There were just a few junctures at which more cross-referencing would have been helpful – Kirk Wegter-McNelly's fine essay on 'Fundamental Physics and Religion' contained insights into the divine action debate (161-163) which bore importantly on a later section of the book. But generally the editors have been very skilful, and errors are extremely few for a volume of this length.

Part III contains (necessarily) brief treatments of 'the major fields of religion/science'. John Hedley Brooke offers a characteristically lucid piece on the contribution of history to the debate. Brooke casts proper doubt on any simplistic conclusion that only Protestantism, or only Christianity, could have given rise to modern science, and he also reminds us again of the particularity of every aspect of the debate, which is a complex matrix of interactions, not reducible to any of the classic accounts in terms of conflict, harmony, dialogue or whatever. Part IV on methodological approaches includes substantial philosophical contributions by Owen Flanagan on naturalism and Nancey Murphy on postmodernism. Part V addresses 'Central Theoretical Debates in Religion and Science', allocating two authors to each. One cannot help remarking that this is basically a Christian-inspired agenda – explorations of divine action, panentheism, evolution/creation and intelligent design head the list. In the last analysis it is Christian thought which has driven this debate in recent years, at least in the English-speaking world.

A short review cannot do justice to a massive volume. I consider briefly here the last section, 'Values Issues in Religion and Science'. Consideration of values points up the classic difficulty of reading off an 'ought' from an 'is'. Celia Deane-Drummond is alert to this, and also to the shift in the character of ecological science, which is no longer as preoccupied as it was with the tendency of systems to attain a static balance. She offers her now-familiar invocation of Thomistic virtue ethics as a platform for considering new challenges in biotechnology and environmental ethics. The strength of this approach is also its weakness – it gives good guidance but is simply not specific enough to give clear prescriptions on specific dilemmas. Holmes Rolston reflects sadly that 'humans are not genetically or psychologically prepared to deal with collective issues that upset individual goals' (918). There follow important pieces on biotechnology by Ronald Cole-Turner and on humans and other animals by Nancy Howell. Sensible editorial choices all, as is Clayton's decision to offer the last word to Mary Midgley. Taking as her starting point Arnold's 'Dover Beach', Midgley warns against the kind of Nietzschean individualism which must either pronounce God dead, or locate God somewhere definite in relation to autonomous individuals. Whereas, as Arnold would have realised, it is in shared spiritual exploration and the search for right action that we become aware of a reality not wholly outside ourselves but in William James' phrase 'both other and larger' than those selves.

I hope I have said enough to indicate the richness, reach and seriousness of this weighty contribution. Making friends with such a companion cannot be done casually, but given a sustained attention, it will amply repay the effort.

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Simon Conway Morris, editor
The Deep Structure of Biology
West Conshohocken: Templeton Foundation Press, 2008. 243 pp. pb. £15.99, US$29.95. ISBN 978-1-59947-138-9

This book explores the thesis that the course of evolution follows predictable channels. Despite the randomness (mutation) that generates evolutionary novelty, and the happenstance (asteroid impacts) that influences evolutionary change, there is an underlying pattern to evolution that ensures that certain endpoints will be reached. The implication is that a teleological (directional, end-orientated) interpretation of evolution is a credible alternative to the prevailing ateleological interpretation.

This striking claim is based on the phenomenon of evolutionary convergence. Given certain challenges, diverse living systems respond by generating comparable solutions. This suggests that there may be 'a map of life, a rugged landscape of almost entirely inaccessible regions that are threaded through by silver roads of vitality' (ix).

This book is a dialogue between leading scientists, philosophers and theologians. They represent diverse worldviews. The first eight chapters document remarkable examples of convergence as seen in biological structure and function (proteins, bacteria, coral-like organisms), intelligence (plants, ants, crows), and sociality (whales, elephants, and humans). There is minimal metaphysics here. Conway Morris suggests that the phenomena of evolution invite 'subtleties of interpretation' (47) that have been explored inadequately hitherto. Is the convergent development of music (or of language) a sign that these mental activities represent the discovery of 'genuine universals' (60-61)? Perhaps evolution is the motor by which the deeper realities of the universe are uncovered (62). Less prudently, NR Franks states that 'worldviews that are based on beliefs in the supernatural have nothing to contribute to science' (124). This is all very well, so long as one forgets that science runs on tacit presuppositions that have their origins in biblical thought.

The anthropologist RA Foley chides those who *affirm* purpose in evolution, but (inconsistently) preserves for himself the metaphysical privilege of *denying* purpose in evolution. But science is oblivious of the very concept of purpose and so evolution *as science* can neither affirm nor deny the reality of purpose. As persons we inevitably interpret that science. A teleological perspective that sees humanity as a purposed outcome of the evolutionary process, and an ateleological view that denies purpose are equally metaphysical interpretations. There are dangers in reading scientific data through the spectacles of unacknowledged metaphysical presuppositions.

More irenically, Michael Ruse suggests three attitudes with which evolutionary science resonates with Christian thought. These are the finiteness of human knowing, the importance of the body, and our inherently flawed nature (in traditional terms 'original sin'). These entail 'that we can never move forwards and upwards purely on our own' (192-193).

Celia Deane-Drummond nominates the concept of *natural law* as a means of interpreting the phenomenon of evolutionary convergence within a theological framework (201). As proposed by Thomas Aquinas, natural law entailed that 'purposeful behaviour in nature was directed toward a good end, and such purposefulness was under the providence of God' (203). God may govern his creation by bestowing upon creatures 'inherent properties' that direct them towards a given end (210). A natural law interpretation of evolutionary convergence is necessarily tentative – but promotes 'convergence' between science and theology in that inherently human capacity, wonder (215).

John Haught provides a lucent conclu-

sion. Firstly he emphasises that theologically, the concepts of *purpose* and *design* are different. 'Design is too shallow an idea to express all that is implied in the idea of meaning or purpose' (220). Secondly, he shows the inconsistency of denying purpose in the cosmos (because it is not apparent *scientifically*) but accepting that we as people possess purpose (because it is known *subjectively*). Herein lies the absurdity of scientific naturalism. Thirdly, chance, law and time (which tend to be splintered by naturalistic interpretations of evolution) should be seen as inseparably blended ingredients of *evolution as story*, and allow evolution to be seen as a meaningful, purposive process of becoming (229).

I would have liked one additional chapter that makes explicit the basis of the Christian conviction of cosmic purpose. This would require an analysis of the convergent features of the histories of life, of Israel and of Jesus Christ. Nevertheless this book is highly recommended. It is hugely erudite, generally lucid, and always thought-provoking.

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Peter Harrison

The Fall of Man and the Foundations of Science

Cambridge: Cambridge University Press, 2007. 300 pp. £50.00 (US$95.00). ISBN 978-0-521-87559-2

Anyone having read Peter Harrison's *'Religion' and the Religions in the English Enlightenment* (1990, 2002) and *The Bible, Protestantism and the Rise of Natural Science* (1998, 2001), would expect his latest book to offer another outstanding study in the history of the relationship between science and religion, and they will not be disappointed. The Andreas Idreos Professor of Science and Religion at the University of Oxford has chosen a much-neglected area in accounts of religious ideas influential at the beginning of modern science: theological anthropology, and more precisely original sin. Whereas current science-theology literature often focuses on the notion of creation, *The Fall of Man and the Foundations of Science* provides us with a magisterial account of how the idea of Adam's initial perfection and the corruption of human nature after the Fall helped to shape modern scientific methodology, in particular its emphasis on experiments. We all tend to read history backwards and therefore miss important topics in the past that are no longer on the agenda today. As the doctrine of original sin is not very popular these days, both in society and the church, it took the erudition of a historian like Harrison, steeped in primary sources right from antiquity to early modern times, to uncover the influence of this theme at the origins of modern science.

The main thesis of *The Fall of Man* is the assertion that the renewal of an Augustinian understanding of original sin at the Reformation 'was the starting-point for the methodological discussions of the early modern period' (87f). Different strands of early modern thought are seen to derive from the more pessimistic evaluation of reason that is implied (compared to the Aristotelian-Thomistic tradition). Some sought to find in logic and mathematics a stronghold untouched by the corruption of the Fall, from which to construct certain knowledge. Others, more radical, thought that the only remedy was divine revelation (either scriptural or personal). Still others considered that Genesis 3:19 ('In the sweat of your face shall you eat bread') set the paradigm for gaining knowledge about the natural world: through laborious and cooperative experimentation, the Adamic curse could be (at least partially) reversed. The experimental philosophy of Francis Bacon illustrated the third option: 'For man by the fall fell at the same time from his state of innocence

and from his dominion over creation. Both of these losses however can even in this life be in some part repaired; the former by religion and faith, the latter by arts and sciences' (*Novum Organum* II, §52, quoted p.139).

The influence of theological anthropology on early modern science is offered by Harrison as an alternative to the standard view about the link between Enlightenment's optimism and modern science: 'The birth of modern experimental science was not attended with a new awareness of the powers and capacities of human reason, but rather the opposite – a consciousness of the manifold deficiencies of the intellect, of the misery of the human condition, and of the limited scope of scientific achievement' (258). The author is conscious of the fact that his investigation – focusing in its second half on England where Calvinist influences were strong – calls for complementary studies, for example about the development of science in Italy (251-253). He also knows that the Fall did not play any significant role in Newton's thinking (234ff). Given the predominance of Newtonian physics in the following centuries, this fact helps to explain why subsequent authors often missed the link between this theme and the new experimental science, focusing instead on 'the rise of physico-theology and the quest for evidence of design in nature' (242).

Given the complexities of cultural history, it is prudent that Harrison offers *The Fall of Man* as complementing, rather than replacing, other historical accounts that focus on the idea of design and on the role Protestant eschatology played in the rise of early modern science (242). Although I have reservations concerning the author's scepticism about the importance of voluntarist understandings of creation (220, 239), I have no doubt that Harrison has succeeded in the present book in bringing to the fore a much-neglected religious theme which significantly shaped modern scientific methodology. I hope that this book will help to reintroduce the question of original sin into current thinking about the relationship between science and theology.

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Alister E. McGrath

The Open Secret: A New Vision for Natural Theology

Blackwell, 2008. 372pp. pb. £ 22.99.
ISBN 978-1-4051-2691-5

'The fundamental argument of this work is that the Christian tradition makes it possible to "see" or "behold" nature in such a way that its otherwise opaque or ambiguous truth, beauty, and goodness may be perceived.' (312) – hence the subtitle of this new series of essays *A New Vision for Natural Theology* following on from his ground breaking *The Order of Things* (reviewed *Science and Christian Belief*, (2008) 20(1)).

The real interest for many readers will be, has McGrath produced a convincing enough natural theology (NT) founded on Christian belief to challenge all comers (i.e. is it a persuasive enough apologetic?). The 'classic' natural theologies of the eighteenth century 'Age of Reason', epitomised in the Boyle Lectures and Paley's Watch, move in quite the opposite direction, beginning with 'signals of transcendence' emanating from the natural world which provide evidence of a transcendent reality and thereby 'proof' of the validity of Christian faith. McGrath starts from the Judaeo-Christian tradition in which, he believes, we can perceive a theology of the natural order of things. This 'disclosure' (Open Secret) is to be made known in 300 hundred pages and 13 chapters of tightly argued text heavily weighted with numerous invaluable footnotes (some 25% of the total work).

The work falls into three parts. The first deals with the human quest for transcendence as a premonition and desire – a 'longing' – for a natural theology which can be realised only through human perception and discernment. Part 2 clears the ground using the implements identified in Part 1, particularly those selected by the psychology of perception (see chapter 5 written by Joanna Collicut McGrath). With their aid McGrath seeks to establish a Christian natural theology with its unique combination of incarnational anthropology and salvation history.

The key factor in this enterprise is 'discernment' – the 'how' of our ability to perceive 'heaven in ordinarie' (Herbert, 115). This is facilitated by Jesus of Nazareth and his vision of nature. In his 'parables of creation' we see a disclosure of the divine which 'makes it clear that the empirical world – the ordinary, unsanitized, everyday domain of human experience – can function as a channel for the good news of the kingdom of God' (125): such disclosure enables us to see things 'as they really are in themselves' – a recurrent theme and objective of McGrath's new vision. He argues that the natural world is *stratified* and encountered at three levels: the observable, objective world of science and classical NT, the level of human interactions (perception as an egocentric, enactive process) and the level of culture and society – what Geetz refers to as 'symbolic anthropology' (127). Consideration of the Johannine 'I am' sayings at these three levels suggests that, whereas in his parables of creation Jesus enables us to see God *through* nature, in the great 'I ams' we find God *within* nature – 'embedded within the order of things' (132).

It was the ambiguities in nature unearthed by Darwin – why is the world so bad if it was created so good? – that dethroned Paley and led to the death of deism. Such ambiguities are make less problematic, believes McGrath, when 'interpreted within a theological framework shaped by the Christian vision of the economy of salvation'(201).

This leads us logically – and expectantly! – to Part 3. This new Christian based NT enables the rediscovery and restoration of the metaphysical (Truth), the aesthetic (Beauty) and the ethical (Goodness). In Christian eschatology, Christ will 'restore all things' (Col. 1:20): in Him we see realised and restored the classical triad of truth, beauty and goodness (221).

How successful has he been? I tried out his NT approach in a Bible study on one of the 'miracles of creation' (Mark 4:35-41) with a group of mainly young adults to see if his stratified view of the natural world would 'prove' to be more convincing in this context: it certainly helped. Anyway, what more challenging thesis could we wish for than this?

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Keith Ward

Why There Almost Certainly Is a God: Doubting Dawkins

Oxford: Lion, 2008. 159 pp. pb. £7.99.
ISBN 978-0-7459-5330-4

This is a brilliant little book, full of lightly-worn erudition, and, whilst I have much enjoyed Alister McGrath's and John Cornwell's books, I found this the most damning demolition of Richard Dawkins' *The God Delusion* that I have read to date. It is also very entertaining as it exposes the fatuousness and patent falsity of Dawkins' arguments.

Ward writes as a philosopher turned theologian and this gives him an overwhelming advantage against Dawkins, who is woefully ignorant of these disciplines (wilfully so of theology).

Ward's basic position is that ultimate reality comprises mind rather than matter. He rightly sees the conflict framed by Dawkins as between science and religion

as erroneous. It is really between the metaphysical hypotheses of materialism and theism. Materialism is at best controversial in philosophy, and indeed very hard to sustain in light of the phenomenon of consciousness. Moreover, agreeing with Richard Swinburne, Ward distinguishes personal explanation from scientific explanation, and argues that it is the former which is represented by the 'God hypothesis' and is required to explain the existence and special nature of the universe. Indeed he clearly and persuasively presents the 'New Argument from Design', which concerns why the laws of nature are such as to make possible the processes described by the Big Bang and evolutionary biology in the first place.

Ward easily demolishes Dawkins' ludicrous picture of God as a complex being who would have had to come into existence through evolution, and his so-called 747 Gambit whereby God would therefore be immensely improbable. No, God is a necessary being, eternally existing, and, moreover, God is simple, rather than complex in ways which Ward carefully explains. He rightly points out that Dawkins' computer simulation of evolving creatures, called 'biomorphs', and described in *The Blind Watchmaker*, needed an intelligent designer! I find it difficult to see how Dawkins can be so obtuse as to miss this obvious point.

It is worth a few choice quotations to get the flavour of this book. Ward quotes a classic Dawkins caricature of religion: 'Religion teaches us that it is a virtue to be satisfied with not understanding… If you don't understand how something works, never mind: just give up and say God did it.' His response is scathing: 'I have to say that this is one of the most obviously false statements in the history of human thought' (61). In reality of course it is the opposite way round: belief in God has provided the motivation to *find* understanding. Again, this highlights Dawkins' ignorance of history.

Ward notes that for Dawkins to claim to have exposed Aquinas' Five Ways as vacuous in three pages would be 'a very impressive achievement' (102). However, what Dawkins really does is 'to consider instead five arguments of his own, which bear a vague resemblance to those of Aquinas – in some cases, a resemblance so vague that it can no longer be recognised' (102). Ward elegantly reinstates Aquinas' arguments in modern terms.

Astonishingly, given the central importance of evidence to Dawkins, he espouses a multiverse to get round the anthropic fine-tuning problem. In fact only an extreme 'everything that can exist does exist' version of the multiverse will actually do what is required. With wonderful irony, Ward demonstrates that the extreme multiverse hypothesis entails the existence of God! If the extreme multiverse exists, it would seem possible that there is a universe created by God among its members. But then Plantinga's version of the ontological argument kicks in. If God is possible there is a possible world in which he exists. But God is necessary; ergo God exists in all possible worlds. Hence, whatever world we are in, God created it! However, the extreme multiverse idea also leads to absurdities, amply illustrated by Ward. The trouble is that the extreme multiverse hypothesis is the only way of avoiding the design argument – and it fails even in that!

Dawkins is highly selective in homing in on the most vindictive texts from early in the Old Testament tradition and concluding that its God is 'arguably the most unpleasant character in all fiction'. Ward argues that he completely fails to see the development of the idea of God in the Old Testament where he was always 'the best sort of God – the ideal of perfection – that the people of the time could imagine' (63-64). Ward's argument is something evangelical readers of this journal may not be comfortable with but need to face up to: how else is Dawkins to be answered on this point?

One slight reservation I have myself is Ward's statement that the resurrection

'is not public evidence for God' (30). He is right, contra Dawkins, that this is a historical rather than scientific question, and that interpretation of the evidence would more likely favour its acceptance given a prior belief in God. However, with Pannenberg, I think the argument works the other way as well. Evidence for the resurrection *is* public evidence, and should therefore raise the probability of God for any rational assessor.

All in all, a stimulating and refreshing book to read and thoroughly to be recommended!

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J. Wentzel van Huyssteen
Alone in the World? Human Uniqueness in Science and Theology (The Gifford Lectures)
Grand Rapids: Wm. B. Eerdmans, 2006. 347 pp. hb. US$40.00. ISBN 978-0-8028-3246-6

Theologian Wentzel van Huyssteen argues that 'theology and science' 'should be replaced by a focus on specific theologians who are trying to develop very specific kinds of theologies, and who are attempting to enter into disciplinary dialogue with very specific scientists' within specific sciences. His published Gifford Lectures *Alone in the World?* models just such a 'theology and science' project, as he discusses what it might mean for humans to be in the image of God in light of developments in select sciences. In particular van Huyssteen draws upon paleoanthropology, cognitive archaeology, and (to a lesser extent) neurosciences. As the topic demands an interdisciplinary treatment, van Huyssteen's selection is ideal. He persuasively argues the inadequacy of either a strictly scientific account of human uniqueness or a theological account that fails to consider scientific insights. His conciliatory stance is refreshing amidst the recent revival of and marketing of conflict between science and religion.

One of van Huyssteen's greatest contributions in this volume is the weaving together of so many different perspectives on human uniqueness including philosophical and theological positions from various traditions and ages, and scientific voices from different disciplines. That achievement on its own makes it a valuable resource for science and religion scholars. (The target audience is definitely scholars.) Unfortunately, van Huyssteen's enthusiasm for presenting others' perspectives sometimes obscures his own voice. Rather than building with others' arguments and insights a new distinctive structure, readers may find a process that feels more like snowball making: gather some from here and push it together with some over there until it feels substantial.

Alone in the World? presents some sound guideposts for an interdisciplinary treatment of human nature and uniqueness. Certainly arguments van Huyssteen reviews from Ian Tattersall and Steven Mithen should be included in a scientific treatment of distinctively human origins. Further, in chapter two van Huyssteen rightly and emphatically argues that human cognition is the 'crucially important mediator' between biology and culture (98). Such an observation is frequently missed in science and religion discussions and so van Huyssteen deserves high marks for identifying this important scientific area. He follows this triumph with the extremely problematic assertion that 'it is only through paleoanthropology that we can come to a fuller understanding of the cognitive capacities of our earliest human ancestors' (104). Paleoanthropology is particularly important here, but his focus on this area – which sometimes is not scientific at all – at the expense of comparative cognition, cognitive development, evolutionary psychology, cognitive anthropology and

archaeology, and other cognitive sciences suggests a (forgivable) lack of familiarity with the key sciences. Huge portions of the text are devoted to describing approvingly David Lewis-Williams' evidence-thin speculations about the motivations for and origins of Upper Palaeolithic cave paintings. Lewis-Williams' work is certainly captivating and creative but hardly constitutes the state-of-the-art in the evolution of human cognition and religion. In contrast, the work of cognitive scientists – those scientists that study human cognition that van Huyssteen repeatedly identifies as 'crucially important' – is poorly represented. The only cognitive scientist of religion van Huyssteen discusses, Pascal Boyer, is presented in a few critical and dismissive pages that succeed in misrepresenting Boyer's arguments and presenting none of his evidence.

Alone in the World? is not an easy or readily accessible read. Its interdisciplinary content means that most audiences will find at least one chapter foreign ground. Seemingly mindful of the difficulty of his text, van Huyssteen helpfully presents many summaries including one lengthy synopsis in conclusion. The frequency of these summaries, however, makes the text feel somewhat repetitive, as well as making clear that many of the main points van Huyssteen wants to make need considerably more evidence and argument.

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Nicolaas A. Rupke, editor

Eminent Lives in Twentieth-Century Science & Religion

Frankfurt am Main: Peter Lang, 2007. 266 pp. pb. £28.10. ISBN 978-3-631-56803-3

The vast majority of biographies that span both science and religion have been of scientists who lived in the period from the seventeenth to the late nineteenth century. During that period a variety of public spaces often existed for scientists to draw together their scientific worldviews and their religious commitments. By the early decades of the twentieth century not only had religion become increasingly a matter of personal belief, but the norms of scientific communication had become more constricted, leaving scientists fewer opportunities to reflect on issues of science and religion. Thus, Charles Coulson, the English theoretical chemist who is the subject of one of the chapters in this collection, aired his views on science and religion principally in lectures he gave to religious audiences and in various named public lectures, such as the Riddell Lecture at Durham, and the Rede and Eddington Memorial Lectures at Cambridge. Thus to study his views the historian has to make extensive use of the Coulson papers at the Bodleian Library.

This shift in the locus and form of science-religion discourse, as well as the reticence of many religious scientists to give voice to their views, makes it harder for historians to gain access to personal reflections of science-religion interrelations in the twentieth century than in earlier periods. While it is tempting also to attribute these shifts to secularisation, Ronald Numbers rightly warns in his epilogue that the reader should be critical of the simplistic view that science leads to secularisation and therefore we should not simply see religion declining in response to the advance of twentieth-century science.

We are greatly indebted to Nicolaas Rupke of the University of Göttingen for editing this volume that explores the religious lives of eight scientists who were professionally active during the course of the last century. Particularly welcome is the fact that three of the eight came from outside the Protestant tradition (which has been the main focus for so much dis-

cussion of science and religion); Theodosius Dobzhansky, Ivan Petrovich Pavlov and Michael Idvorsky Pupin were from Eastern Orthodox backgrounds. The other chapters are devoted to Coulson (Methodist), R.A. Fisher (Anglican), Julian Huxley (who mixed membership of the Rational Press Association with small doses of liberal Anglicanism), Pascual Jordan (German Protestant), and E.O. Wilson (Southern Baptist). With Einstein promised for a future volume, the range of religious backgrounds will be extended beyond Christianity.

The eight scientists negotiated such new fields of science as quantum chemistry, the modern evolutionary synthesis, and sociobiology. Some chapters focus rather too exclusively on their subjects' spiritual and intellectual lives, while others attempt more contextual understandings emphasising the importance of locality, and reflecting on the relevance of such social and political factors as nationalism, Marxism and the two world wars.

The reader is struck by the vast differences between the lives of these eight scientists and the very different ways in which both science and religion were engaged. For example, in James Moore's chapter, Fisher is depicted as pursuing a eugenicist vision that bridged his devout Anglicanism and his equally fervent commitment to Darwinian evolution. By contrast, Arie Leegwater's carefully-researched contribution portrays Coulson juggling models of chemical bonds while becoming increasingly immersed in his Methodism. Yet for Coulson both his science and his religion were seen as aspects of the wholeness and the unity of his personal experience.

The theme of unity also enters strongly into Jitse van der Meer's impressively detailed discussion of Dobzhansky, for whom evolutionary progress provided the major theme linking his science and his Russian Orthodox world-view. By contrast, Torsten Rüting argues that after Pavlov, the son of a priest, had completed his education in a monastery his exposure to Russian intellectual life at university in St Petersburg resulted in his making science the new religion and casting aside his Russian Orthodox upbringing.

Unlike some studies that celebrate only those scientists who were religious, it is pleasing that Rupke's includes biographies of scientists who (at least outwardly) repudiated their religious backgrounds; a trajectory followed by many twentieth-century scientists. This otherwise impressive and fascinating volume would have benefited from an index and a higher standard of proofreading.

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Nancey Murphy & Warren S. Brown

Did My Neurons Make Me Do It?: Philosophical and Neurobiological Perspectives on Moral Responsibility and Free Will

Oxford: Oxford University Press, 2007: 344 pp. hb. £42.00. ISBN 978-0-19-921539-3

This collaboration between Murphy (Philosopher/Theologian) and Brown (Neuropsychologist) has resulted in a noteworthy and helpful book for all those interested in the exploration of moral responsibility and free will. Although Murphy and Brown have religious roots in the Anabaptist and Wesleyan traditions, this volume is not an explicit work of theology; rather, it represents a seminal integration of philosophical discourse and relevant scientific discovery.

The authors boldly pursue the goal of defeating causal reductionism. In essence, they seek to show that complex systems do in fact possess the ability to be causes in their own right. This endeav-

our involves a substantial exploration of top-down causation as the philosophical basis for emergence and free will. This is not an easy task given that our culture still functions with a largely Newtonian understanding of cause and effect. The same is true for the cognitive neurosciences that continue to reflect a generally Cartesian view of the mental life. The latter is most evident when we note the popular tendency to think of 'I' as the *real* essence that lives 'inside' our bodies. Murphy and Brown make significant strides toward combating this notion in favour of a more holistic concept of the embodied self.

The book is arranged in such a way that each chapter represents a step in the authors' overall argument. These sections seem ambitious given their scope; however, Murphy and Brown provide a surprisingly comprehensive and cogent treatment of quite complex issues – for example Cartesian Materialism, Complexity Theory and self-directed systems, evolution of symbolic language, mental causation, moral agency and free will. They conclude with the claim that complex organisms are often the causes of their own behaviour and that through the evolution of symbolic language, humans are capable of acting for *reasons*, not merely on the basis of causes. Furthermore, Murphy and Brown argue that mature humans are able to act on the basis of *moral concepts* – the crowning achievement of the human species.

Among the most impressive features of the book include: (1) the authors' ability to bring together an impressive array of philosophical resources ranging from Friedrich Nietzsche to Alasdair MacIntyre for the purpose of demonstrating the role of moral agency and community; (2) an understanding of self-directed systems that appreciates the role of process and constraint in such a way that provides a viable model of 'self-causation'; (3) an extremely helpful discussion of the role of symbolic language that synthesises contributions from Terrence Deacon, George Lakoff, Donald MacKay, Ludwig Wittgenstein and others; (4) the articulation of beliefs as 'structuring causes' of goal-directed behaviour; and (5) a presentation of moral responsibility that is compatible with our essential nature as physical organisms.

This volume is an impressive achievement on the part of Murphy and Brown. They have provided a much-needed synthesis of philosophical and scientific resources dealing with moral responsibility and free will. Given the advanced nature of the topic, the book might be most suitable for teaching faculty, researchers and students. However, it is well written and organised in such a way that even those curious about the topic should consider it a necessary read.

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Nancey Murphy and William R. Stoeger, editors

Evolution and Emergence: Systems, Organisms, Persons

Oxford: Oxford University Press, 2007. xiv + 378 pp. hb. £60. ISBN 978-0-19-920471-7

Those interested in more theoretical aspects of the relationship between science and religion will find themselves drawn into the conversations represented in this stimulating and thought provoking book. Against materialism and reductionism on one hand, and in favour of emergentism and holism on the other, the authors that gathered for the conference that stimulated this collection of essays present no sterile monolithic account of scientific emergence and its significance for religious belief. What unites these essays is the belief that emergent views of reality demonstrate a paradigm shift in the philosophy of sci-

ence that has far reaching philosophical and theological implications. The scientific section is not for the faint hearted and while the authors try to avoid overuse of technical language, those without any scientific background may struggle with some of these essays. Yet while the authors are generally convincing in arguing for a paradigm shift, sceptics are not really represented. However, such a naming of this change is doubly important both for those scientists who may still adhere to reductionism and for theologians who might despair of finding any philosophy of science that is more readily coherent with religious belief than reductionism. The range of topics under consideration, from particle physics to evolutionary biology, to cognitive science, builds up some evidence for the position enunciated here, namely, that the changes suggested in such discourse are of general application, rather than limited to specific sciences.

Those unclear about precisely what emergence means, and what its significance for philosophy and theology might be, will find the chapters by Deacon, Murphy, Ellis and Stoeger particularly helpful as orientation essays. Emergence operates at the level of the components of the system (first order), the level of the system (second order) and through its interaction with the environment such that second and third order emergence includes the possibility of memory. The papers that discuss the scientific research are all drawn to the idea of downward causation, not necessarily of the strong kind that presupposes an efficient cause but rather more akin to the Aristotlean concept of formal cause, affecting the boundary condition at the lower level.

Theologians, such as Haught, drawn to process views of reality, are inclined to resist any view of scientific emergence as wholly sufficient. For him, a broader perspective is required that includes the experience of subjectivity. Peacocke's interpretation relies less on process philosophy and more on liberal accounts of classic doctrines such as incarnation and Eucharist in order to fill out the way theology might cohere with emergentist views. Gregerson's case study using AI reinforces the view of nature as information pattern, though in his case he extends such a view to incorporate a new theology of nature that is both classical in style, but resonates with insights from AI. Clayton's chapter pushes theological reflection further towards a more radical reshaping of our understanding of God, and like Haught, leans towards an emphasis on pneumatology, embedded in process thinking.

Much more, of course, could be said here in that, while different aspects of divine action, a theology of nature and anthropology are touched on in different ways by the contributors to the final section, it serves rather to open up new ways of appropriating emergentist ideas. In other words, the full challenge of such appropriation is hinted at rather than developed. It is clear, also, that while there are different theological positions represented, there is no given requirement for one over against another in relation to the new scientific paradigm presented here. I would have preferred rather more acknowledgement of precisely how these gaps might be filled in through a closing essay, but in as much as this collection serves to open up areas for debate, it achieves its purpose.

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Don O'Leary

Roman Catholicism and Modern Science: A History

New York and London: Continuum, 2006. 356 pp. hb. £25.00. ISBN-13: 978-0-8264-1868-5.

The main purpose of this book is 'to elucidate the response of the universal Roman Catholic Church to modern science in general terms' (xvii) and 'to contribute significantly to a greater understanding of the multifaceted relationship that exists between the faith of Roman Catholicism and the rational but fallible nature of the natural sciences' (259). It is a book which deserves the attention of all theologians and students of theology, not merely those with a declared interest in science. The title of the book does not do justice to its vast range as it probes issues of theological epistemology and scientific method.

Essentially a history of recent Roman Catholicism as seen through the lens of scientific preoccupations, the book examines the Catholic Church from a distinctive and specialised intellectual vantage point. All readers of church history will enjoy this refreshing trajectory. The constructive provocations offered by the author will revive even the most experienced scholar from lethargy and whet the appetites of both scientists and theologians for interdisciplinary approaches. The author refrains from writing from a confessional standpoint so it is not apparent, from reading the text, what religious beliefs he may have. His work benefits from this objective voice. It adopts an exemplary written style and overall presentation in which theology, church history and the sciences are discussed with equal authority. The text is detailed and meticulous yet manages to convey the wider picture. The Notes and Bibliography are an outstanding resource for further study.

O'Leary examines issues in the interaction of Roman Catholicism and science from the nineteenth century to the present day. After a preliminary look at Galileo, his rapid, but never shallow treatments take in *inter alia* the Church's ongoing responses to the issues raised by the Galileo case, the Church's handling of Darwin and evolution, modernism and the anti-modernist reaction, historical aspects of biblical interpretation, cosmology and the God question, natural theology, the impact of the Second Vatican Council, and sexual ethics including *in vitro* fertilisation and cloning.

I would offer just one critical engagement with the text. O'Leary is much opposed to John Paul II's suggestion that the Church's arguments for God's existence depend for their acceptance on virtuous dispositions and finds 'offensive' (251) the pope's suggestion that people not amenable to theistic proofs are in bad faith. Yet the pope's point is surely only that the final acceptance of any 'proof' of God's existence by me is an ethical and not merely a metaphysical issue. For, to admit the validity of an argument that God exists, involves not only assenting to an intellectual conclusion but also a submission by me to the claims that this God may now make. If I am not prepared to submit to the God my argument purports to discover, then I will probably reject my argument for His existence, even if it would otherwise have appeared a comprehensible and valid argument to me. This, I suggest, is how the pope may be thinking when he attributes flawed dispositions to those who reject certain theistic 'proofs'.

This point opens out further to shed light on all human thinking. As William James suggests in his essay *The Will to Believe*, sheer rationality does not determine our beliefs, since volitions and passional tendencies are present in our choices. However valid my proofs may seem on any matter whatsoever, it is ultimately I who have to give or withhold assent. Is it ever possible to remove from assent that personal element which John Henry Newman (in his *Essay in Aid of a*

Grammar of Assent) calls the 'illative sense'? It is not proofs, as such, which persuade; proofs are found persuasive, or not, by whole people with flaws, fears, biases and antecedent dispositions.

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Peter S. Williams

I Wish I Could Believe in Meaning and Purpose: A Response to Nihilism

Southampton: Damaris Publishing, 2004. 499pp. pb. £9.99. ISBN 1-904753-06-X

I was unclear whether I was rightfully part of this book's audience, or whether the book was only partly right for its audience. Peter Williams dedicates his monograph to the six thousand or more teenagers who attend his annual school conferences and openly discuss their beliefs with him. One assumes, therefore, that its contents and style have been aimed at them. If this is so, I was unsure whether teenagers would cope with its, at times, quite high-level philosophical arguments. On the other hand, a less youthful reader may be irritated by the periodic references to contemporary (pop) culture no doubt intended to entice the young to stay with it.

That said, there is much here that is good and at times excellent. The book achieved its aim which is 'to build a case for a theistic understanding of life as objectively meaningful and purposeful because God exists' (14). It does so by clearly restating and deploying a classical Thomist notion of truth to embrace the transcendentals: truth, beauty and goodness as underwritten by ultimate reality. In many places Richard Dawkins' scientism is the foil, and the book can be read as a spirited attack on the supposed sufficiency of ontological (atheistic) naturalism. Its theological scope is quite broad. The clear influence of Thomist commentators in the initial chapters, Stephen Clark, Anthony Kenny, Paul Helm, Herb McCabe, Denys Turner and others, is offset by later references to more Augustinian sources such as C.S. Lewis and even Reformed Epistemologists such as Alvin Plantinga. The obvious philosophical sophistication of the author allows him to weave together arguments from such disparate sources, though to the theological eye it can seem that important differences have been glossed over at times. To be fair, however, the author's aim was to build a convincing, converging case for theism, not to instruct further the theologically already convinced.

An interesting and helpful feature was the inclusion of the aesthetic, an often neglected topic in such discussions, and a spirited defence of the notion that 'the subjective view of beauty is wrong because God, the maximally beautiful being of whom all lesser beauties speak, exists' (286). I was, though, less comfortable with the slide from aesthetic arguments to research on intelligent design (ID). I do acknowledge that ID work was presented both reasonably and thoroughly, but feel that the dangers of a new 'God of the gaps' position were not adequately faced. My own preference would have been to see more emphasis laid on work by Kaufmann and others on the predictable arrival rather than contingent survival of complex structures. Not only might this offer more by way of a sustainable research programme, it also allows biology to aspire again to laws of form rather than offering only historicist and contingent accounts. That aside, the general coverage of evolutionary arguments was good, and, like the book as a whole, provided a useful springboard for further reading.

Unsurprisingly given its aim, the book's realism is largely theistically based; it also foregrounds biology rather than psychology and the human sciences. The two omissions may not be unrelated as a fuller exploration of the meaningfulness of *human* nature and experience

may require a step change to Christological realism – Williams' next book perhaps?

Overall, this is an excellent source book, worth shelf-room, clearly written, with a comprehensive bibliography, though its inclusiveness means that a lot of ground was covered rather breathlessly. Annoyingly, for a reviewer, there was no index. On the whole I recommend it, but whether the whole is greater than the sum of its many excellent, hope-inspiring parts I remain unsure.

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Jeff Astley, David Brown, Ann Loades (editors)

Problems in theology 4: science and religion

London: T & T Clark, 2004. 126 pp. pb. $29.95. ISBN 0-567-08243-1

This book is designed for a sixth form (16-18 year old) or undergraduate readership as an introduction to some of the main areas of debate in the science-religion field. It is composed of four sections which explore the basic relationship between a scientific and a theological approach to truth: issues in relation to physics; issues around evolution; and the concept of a designer world. Each section is subdivided and the whole section ends with five questions for discussion or reflection.

The editors of this and other volumes in the series (which explore creation, evil, war and peace and God in action) are two theologians and an educationalist from the University of Durham. The majority of the authors quoted are British, including well known contributors to the field such as Barbour, Peacocke, Polkinghorne, Torrance and Watts.

The problems discussed and the content of the readings will be familiar material to readers of this journal. For someone wanting to find out where to begin when faced with the volume of publications in this field, such a book may be a valued guide. The authors have succeeded in introducing the novice reader to some of the leading contributors in the field. If the reader is encouraged to explore some of the further reading indicated in the book, then the authors will have succeeded.

So what about the detail of the selections made? The introductory section provides some helpful ground-clearing of popular misconceptions regarding the inevitable conflict between science and faith. This is achieved through quotations on historical aspects, philosophical approaches, and the place of models in scientific and theological approaches to truth. The authors selected indicate that moving beyond the conflict metaphor should not lead to a separation of the disciplines but to a mutual respect and some fruitful interaction.

The section on evolution includes an introduction to the Darwin-Wallace theory of natural selection and some background on the historical response including the origins of special creationism. The selection from David Fergusson's 'The Cosmos and the Creator' provides a concise introduction to the evidence for the majority scientific view of the origin of the Universe and an evolutionary understanding of life on earth, alongside the claims of creationists.

An illustrative reading on the intelligent design argument from Michael Behe focuses on the irreducible complexity of the hairlike organelle, the cilium. Philip Kitcher's response points out that without demonstrating the evolution of the cilium it is possible to refute claims that such evolution is impossible and therefore that a designer must be at work.

The section on evolution concludes with readings exploring the wider implications of evolutionary theory for our

understanding of human freedom and ethics. Here, T.H. Huxley is quoted together with more contemporary authors including Michael Ruse and Keith Ward. Clearly this is a complex area but the selections highlight the dangers of the naturalistic fallacy – 'the ethical progress of a society depends not on imitating the cosmic process' (Huxley).

The final section 'A designer world?' moves beyond questions of design to a further discussion of the relationship between science and theology, with reflections on the anthropic principle, the limits of reductionism, and natural suffering as a challenge to Christian belief.

Overall this is a valuable introduction, brief but not superficial in the arguments it addresses and the calibre of the authors selected for the readings.

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John Farrell

The Day Without Yesterday: Lemaître, Einstein, and the Birth of Modern Cosmology

New York: Thunder's Mouth Press, 2006. 256 pp. pb. £10.99. ISBN 1-56025-902-7

Georges Lemaître (1894 – 1966), a Belgian Catholic priest who had a doctorate in physics from the Massachusetts Institute of Technology, made a great cosmological discovery so early in his career that hardly anyone noticed his achievement. The fact that he published in an obscure Belgian journal hardly helped.

He enrolled at an engineering college in 1913, but left for military service after one year. At the end of World War I he entered a seminary, where he studied mathematics in his leisure time. Ten days after his ordination, in 1923, he arrived in Cambridge to commence graduate training with Sir Arthur Eddington, who had shot to fame in 1919 by confirming Einstein's general theory of relativity.

When Lemaître entered cosmology, it was already accepted that research had to be pursued using the general theory, which is, in essence, a geometrical theory of gravitation. Einstein's field equations have numerous solutions (that is one reason why theoretical cosmologists have indulged in many flights of fancy). In 1923 the only solutions available applied to a static universe, which does not evolve. But a static universe is unstable because gravity is always an attractive force. Einstein added an arbitrary term to the field equations to represent a repulsive force acting on the large scale. Newton, who had also struggled to prevent the collapse of the universe via gravity, had earlier taken the bolder step of invoking the hand of God.

In the summer of 1924 Lemaître moved to Cambridge, Massachusetts, where he studied at Harvard and MIT. In the USA he quickly became aware of developments in observational astronomy. He was on the spot for two crucial breakthroughs: Edwin Hubble's announcement, in 1925, that the Andromeda Nebula lay far beyond the Milky Way, together with news from the Lowell Observatory and Mount Wilson which showed that the majority of the nebulae had redshifts, which meant they were receding. These results excited Lemaître: he was possibly the first cosmologist to assume that the recession of some two dozen nebulae could apply to the universe as a whole.

Before he returned to Belgium in late 1925, he shared his thoughts with Eddington and Hubble, although the latter had little time for theorists. Lemaître had by then a solution to Einstein's field equations that jerked the universe into action: in Lemaître's cosmology, the universe could expand, which was precisely what the redshifts appeared to indicate. In 1927 he published his results by sending a paper in French to the scientific society of Brussels. Even Eddington was

unaware of this paper until 1931, when the author sent him a copy. He immediately arranged publication in English by the Royal Astronomical Society.

Emboldened by Eddington's endorsement, Lemaître submitted a letter to *Nature*, proposing that the universe had a definite beginning, as 'a single quantum', from which it had expanded like a firework ever since. To arrive at this solution, Lemaître borrowed Einstein's repulsion term. The use of this fudge was seen as a weakness of his model, and Lemaître's fireworks universe (his expression) became forgotten.

Its re-awakening is due to observations of distant supernovae made in 1998. These showed that the expansion rate of the universe was slower in the past than it is today. The expansion of the universe is accelerating, powered up by mysterious dark energy. At the formal level of equations, this dark energy has similarities to the adjustments made by Einstein and Lemaître.

John Farrell has produced a lively, popular, account. This is the first full length biography in English, and it will do much to establish Lemaître's reputation. Farrell has done a fine job in showing how Lemaître reacted to his colleagues and his critics. Lemaître had a twin-track approach in trying to understand the universe. In this account we meet Lemaître the scientist, the real inventor of the hot big bang universe, and President of the Pontifical Academy of Sciences from 1960 until his death.

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David J. Bartholomew
God, Chance and Purpose

Cambridge: CUP, 2008. 259pp. pb. $19.99. £14.99. ISBN 978-0-521-70708-4

In his book *The Mysterious Universe* (CUP, 1930, p. 134) Sir James Jeans remarks that 'We have already considered with disfavour the possibility of the universe having been planned by a biologist or an engineer; from the intrinsic evidence of his creation, the Great Architect of the Universe now begins to appear as a pure mathematician.' In this book, David Bartholomew, who is Emeritus Professor of Statistics at the London School of Economics, suggests that the Great Architect is perhaps better viewed as a statistician. One is tempted to quip that, at least when it comes to scientists, perhaps Feuerbach had a point!

God, chance and purpose are all big themes, and David Bartholomew seeks to address them in an accessible way. To do this he gives the reader an overview of ideas and applications of statistics and probability in a number of chapters throughout the book. This is done at a very accessible level and makes for excellent reading. Thus common fallacies (e.g. the prosecutor's fallacy, or assuming independent events) are pointed out and common techniques (e.g. hypothesis testing) are explained. The author points out that chance is not necessarily the enemy to order that it seems. Thus systems can be random (either epistemologically or ontologically) at one level, but highly predictable at another – consider for example the behaviour of a mole of gas. The motion of individual molecules may appear random, but at the macro level we have the gas laws. The author does a very good job of explaining the mathematics of probability without recourse to any mathematical formalism. But as a teacher of maths I can't help wishing that some of the formalism was put in place (at least perhaps in a few appendices) for the more numerate reader.

The central thesis of the book is that

God uses chance both in the creation and rule of the world. Thus at the level of creation God may have performed probability calculations to estimate how big the universe would need to be to be relatively sure that at least one life bearing planet would come into existence. For example, if the Deity wanted to have a 0.999 chance of getting at least one such planet, then a simple calculation by the author reveals that he would actually get on average 6 in the universe (181). Or more controversially the author suggests that there may have been a number of attempts at the incarnation before success (228-237). Or (less controversially) the author suggests that rather than view God as a supreme sovereign it is better to view him as the CEO of a large organisation, steering the overall direction, but not controlling, nor needing to control, every detail of the company's operations.

In his chapter on the Intelligent Design (ID) movement Bartholomew concludes that Dembski's probability calculations (e.g. that the probability of the bacterial flagellum occurring by chance is 10^{-263}) are incorrect and that his approach is methodologically flawed. However it would have been helpful to present some sort of feel for what the author believes to be the correct probabilities in the case of the flagellum. Thus if it isn't 10^{-263} what is it? I am reminded of John Polkinghorne's remark on such issues at the beginning of his Gifford lectures where he says that 'One is only looking for an order of magnitude answer, comparable in crudity to the back-of-the-envelope calculations of early cosmologists, but our biological friends tell us, without any apparent anxiety, that it just can't be done' (*Science and Christian Belief*, SPCK: (1994), p. 16). I expect and hope that 14 years on from Polkinghorne's comment the burgeoning field of mathematical biology has presented us with answers to at least some of these questions.

On the issue of chance, the question of where it can exist in the physical world is placed at the quantum level. At the human level Bartholomew argues that individual choices can appear random, but this is epistemological since it occurs in 'private experience…which is not accessible to outside observers' (216) with the 'self' supervening upon the brain to reach decisions. Although one feels that this may suggest dualism, the author does not appear to draw that conclusion. The author also feels that 'The most natural way to accommodate God's action in the scheme of things is to suppose that he acts partly, if not exclusively, through interaction with the human mind' (217).

I found this book hugely stimulating, partly because I found myself in disagreement with some of the author's views, but also because he discusses such a wide range of fascinating topics in what one might almost describe as swashbuckling style!

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