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Reviews

Thomas Dixon

Science and Religion – A Very Short Introduction

Oxford: Oxford University Press, 2008.
150pp. pb. £7.99 ISBN 978-0-19-929551-7

The Very Short Introduction series by Oxford University Press is designed for the reader who is new to a subject area. Its aim is to provide with a brief, balanced and very accessible introduction to the topic that demands no previous knowledge. This volume adds to a growing list of titles on a wide range of topics, now numbering nearly 200. The author of this volume, Thomas Dixon, is a lecturer at Queen Mary, University of London, and a member of the International Society for Science and Religion. He is an expert on modern intellectual history who writes regularly for The Times Literary Supplement and this is reflected in the clarity and lively style of his writing which makes this book a pleasure to read. He starts out by recognising the commonly held belief that Science and Religion are in conflict as promoted by the likes of Richard Dawkins, but notes that 'recent academic writing on the subject has been devoted primarily to undermining the notion of an inevitable conflict'. His stated aim in writing the book is 'to look historically at how we came to think as we do about science and religion, to explore philosophically what preconceptions about knowledge are involved, and to reflect on the political and ethical questions that often set the unspoken agenda for these intellectual debates'. In my view he does this in a very balanced manner and I found his approach very logical and easy to follow.

The book has six chapters and in all of them the main emphasis is on the relationship between science and the Christian faith, although other faiths such as Judaism and Islam are considered where they have a distinctive contribution to make. In the first chapter, the author sets the scene by asking the question 'What are science-religion debates all about?' before considering the philosophy of science in more detail in the context of Galileo. In Chapter 3 he moves on to ask the question 'Does God act in nature and if so how?' before looking at Darwin and Evolution in more detail in Chapter 4 and the Creationism and Intelligent Design movements in Chapter 5. Finally, in the last chapter he considers the impact of modern neuroscience on our understanding of the mind and morality and how this may influence the ways we think about human behaviour and religious experience. He ends by looking to the future and concludes that the debate will continue.

Looking to the future there is every reason to believe that science and religion will both continue to flourish, to enlighten, to inspire as well as to frustrate, to obfuscate, and to oppress. Some people may wish that one half of this essentially modern pairing could be disposed of, or could be persuaded to relinquish its troublesome claims to authority in some sphere or other sphere of knowledge, morality or politics. But such people should be careful what they wish for. Would they really prefer to live in a society where everyone agreed about the question that this book has been about? What sort of place would that be?

For many readers of this journal, Thomas Dixon's Very Short Introduction to Science and Religion will provide few new insights; nor would they find much to disagree with. But what this book does do superbly is to address the topic in a very accessible and balanced manner that would make it an ideal introduction to someone new to the topic, whether or not they came from either a religious or scientific background. I would recommend it highly.

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Nancy K. Frankenberry
The Faith of Scientists in their Own Words

Princeton, NJ: Princeton University Press, 2008. 523 hb. £20.95. ISBN 978-0-691-13487-1

It has always been easy to oversimplify and caricature the religious position of renowned scientists and now we have a book that gives us the evidence to do that far more intelligently. That may sound like faint praise, but actually this is a very good book that takes the reader directly to the source documents of scientists musing on issues of faith, from those working at the dawn of the scientific revolution to today. In that sense, this is as near as we are going to get to the 'horse's mouth'.

There is no doubt that this book is an ambitious project and the author's expertise in the field of the philosophy of religion comes through (the author is the John Phillips Professor of Religion at Dartmouth College, New Hampshire). Frankenberry has selected twenty one scientists working over the last 400 years and collected some of their original material that relates to the science/faith interface. She has provided an introduction of them to place them in their historical context, commented on their specific work in order to help the reader navigate the documents and then placed extracts from those documents to complete each chapter. The resulting collection spans the period from Galileo (1564-1642) to Stephen Hawking (1942-) and encompasses both devout believers like Freeman Dyson and ardent atheists like Richard Dawkins.

Does it work? On the whole – yes. The summaries are helpful. The layout of the book gives the reader a good perspective on how thought has developed through the ages. The scientists selected range from the highly renowned such as Darwin, Einstein and Hawking to others who may be less familiar working in fields of anthropology, physics, cell biology and palaeontology. The notes that the editor provides on each scientist's contribution to their field of study and the bibliographical notes all serve to make this a useful resource for further reading. As such the book is both readable for the amateur and a good starting place for the academic.

It has to be recognised that in a book such as this, the hand of the editor is necessarily strong both in the selection of the scientists around whom the chapters are structured and in the material included. The extracts from original material are necessarily fragmented which makes the guiding notes of the editor invaluable. These are extremely well written and introduce in a succinct way the slightly more obscure and sometimes quirky writings of the scientists themselves. However, while recognising the influence of the editor it has to be said that the book is not seeking to drive a specific agenda other than to follow the development of the shifting relationship between science and religion. There is no strong polemic or editorial comment on the broad range of perspectives contained within the work. This book is a genuine attempt to let the scientists speak for themselves and as such it works well as a valuable contribution in the science/faith dialogue and is to be commended.

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Jerry A Coyne
Why Evolution is True

Oxford: Oxford University Press. 2009. 309 pp. hb. £14.99. ISBN 978 0 19 923084 6

The author's message in this attractive book is comprehensible. Jerry Coyne specialises in evolutionary genetics at the University of Chicago. Demonstrating expertise in his own field of study he also shows an extensive and precise knowledge of the fauna and flora he uses to

illustrate his thesis. The confrontation between evolution and religious fundamentalism is a recurring theme perhaps because 'creationism' is not a uniquely American dilemma.

As an evolutionary biologist the author emphasises that speciation arises by natural selection from a common ancestry. Each organism resulting from this bifurcation may possibly be better adapted to a particular niche in nature. Coyne posits that the transitional forms in birds and whales occur at the times predicted and supports the truth of evolution that he believes is without a tenable rival. The origin of birds from therapod dinosaurs is supported by fossils found in China dating from 135-110 million years ago [mya]. The fossil evidence also supported by DNA studies show that whales have descended from even-toed ungulates, the artiodactyls of 30 mya.

The author states that science is the pre-eminent story of our age and that evolution indicates humanity's place in the extraordinary spread of life. Evolution operates by a mechanism of staggering simplicity: the selection of the small helpful inherited variations in an individual which enhance its ability to survive. The design now seen in nature, according to Darwin and A R Wallace, is the result of a materialistic process that did not require supernatural intervention. Coyne believes that resistance to this idea stems largely from pervasive dogma, especially from the 'creationists'.

In the first chapter Coyne explains Charles Darwin's novel idea that accounts for the relatedness throughout the biota. Linnaeus, recognising this nested hierarchy in nature proceeded with its classification. Many readers, alerted to this new theory, accepted that natural theology had now been vanquished.

In Coyne's view embryology provides the strongest evidence for evolution. All vertebrates follow a prescribed developmental pattern, in this example the six branchial arches [not gill slits in the human fetus (80)]. In animals, the basic forelimb structure in the whale's flipper and the bat and bird wing, are similar. The lack of functional wings in the ostrich and kiwi still fit this basic pattern.

In chapter 4, Coyne provides an excellent account of the geography of our world in relation to evolution. Comparing oceanic with continental islands he notes the absence of fresh water fish, amphibians, reptiles and mammals on oceanic, volcanic islands and contrasts this with continental islands where these groups occur, persuasive evidence for evolution.

Coyne then provides answers to puzzling problems that can now be explained by continental drift. In this case most species are already in place on the land and adjacent continental shelf. When Gondwanaland split apart about 170 mya the land masses transported their biota with them. Hence the cacti of the Americas, storing water in fat stems, are not found in Australia, Asia or Africa. In these places it is the euphorbs, with a bitter, milky sap that are found and may even resemble cacti. The author questions why a creator would place different plants in these diverse areas of the world? The marsupials of Australia and placentals found elsewhere may resemble each other. He also demonstrates the importance of geological isolation in this matter of the origin of new species. The author points out that the 'creationist' beliefs concerning these matters of fact are illogical but their attitudes may be immune to change.

As a generalisation the oldest fossils occur in the earlier geological strata. The photosynthetic bacteria were present in the first two billion years of life on earth. Then geological seams occur with mainly bones, shells, teeth and especially plankton of marine origin. More recent fossils tend to resemble modern species living in the areas.

'How sex drives evolution' in chapter 6

raises new and fascinating information based on the author's extensive knowledge in this field. This is an informative read, excellently written. Coyne continues: 'We are contingent products of the blind and mindless process of natural selection' while acknowledging that the fossil hominid record is far from complete. A number of genes distinguish us from chimpanzees. In hominid evolution bipedal walking appears before there was a significant increase in brain size.

Coyne writes, 'Everywhere we look in nature, we see animals that seem beautifully designed to fit their environment,' and, quoting Darwin, 'he completely replaced centuries of certainty about divine design with the notion of a mindless, mechanistic process – natural selection – that could accomplish the same result'. Neither scientist answers the posit of Romans 1:19ff. The author considers that Darwin relied mainly on analogy to make his case: the well-known success of breeders in transforming animals and plants into organisms suitable for food, pets and decoration was accepted by him as a good parallel of the outcome of natural selection operating over aeons. Coyne says that evolution is the natural selection of indifferent mutations, a filtering process, not chance affecting the individual only.

Coyne provides a wealth of relevant information supporting his carefully argued views and has justified the title chosen for his book. As shown, the evidence for relatedness throughout nature is now overwhelming. I would suggest that this book be read together with 'Creation or Evolution: do we have to choose?' by Denis Alexander and 'The language of God' by Francis S Collins, head of the Human Genome project in the States. The reader of Coyne's book will be better informed regarding the dialogue between science and religion.

Ken Mickleson has retired from paediatrics, has a theological qualification and is interested in the truth in science and the Christian scriptures.

Michael Pfundner in discussion with Ernest Lucas

Think God, Think Science: Conversations on Life, the Universe and Faith

Milton Keynes: Paternoster. 2008. 112pp. pb. £9.49. ISBN 978-1-84227-609-9

This is an excellent brief treatment of the problems science presents to biblical interpretation and traditional Christian doctrines. The issues are clarified and the problem for Christians in the past as well as for the present are described and a modern understanding offered.

The introductory section is gripping and important. It vividly describes our society's loss of faith and meaning and then outlines how Christianity and science have related to each other since they both began. At first Christianity seemed to support science, later on came conflicts. Significant personalities who will be familiar to the general reader are introduced and their place in history clarified.

The next section, 'The sky', deals with the relevance of cosmology to the faith. In the face of the Big Bang are we utterly insignificant? These more philosophical problems are discussed and modern understanding of the creation narrative is presented.

The third section, 'The cell', is devoted to evolution. The story is of Darwin's development of an idea that had been toyed with in the past and how it has since been established. As before, the ideas are set out in their historical context, both that of science and of the church. The three Christian responses of creationism, intelligent design and acceptance of evolution but not Darwinism are dealt with as appropriate.

The final chapter, 'The Faith', deals with the scientific approach to the Bible that grew up in the nineteenth century and reached its culmination in the works of Bultmann. This is the first time that I

have found a treatment of biblical criticism in a book about Science and Faith and it is most welcome and relevant. The chapter goes on to look briefly at modern problems with central Christian beliefs.

The question and answer format makes for a smooth conversational style but means that topics are not readily found again after reading; a problem which is made worse by the lack of an index. However this is not supposed to be a reference book but rather a fairly simple introduction to the issues with helpful Endnotes on some of the important people mentioned and a challenging final summing up at the end of the book.

The striking cover and easy style, to say nothing of the quality of the work, should make this very useful for young people including non Christians. How popular its approach to the interpretation of parts of the Bible will be in the church generally I don't know, but that is all the more reason for its wide use. I think there is a lot of literalism in the church which preachers do not like to disagree with. This book should help them see that other interpretations of the Bible are not just possible but necessary today, and do not conflict with the central teachings of the Christian faith.

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Mary Kathleen Cunningham (ed.)
God and Evolution: A Reader

London: Routledge, 2007. 408pp. pb. £19.79. ISBN 978-0-415-38014-0

So far as this reviewer can tell, the main purpose of 'readers' is to help instructors and students by removing some of the work of finding helpful passages to read, and to free them from photocopying copious amounts of material, thereby avoiding the treacherous shoals of copyright law.

God and Evolution: A Reader, by Mary Kathleen Cunningham, is arranged in seven parts that work well together, but which are self-contained and as such are useful for quick reference. Each part is prefaced with an introduction by Cunningham. These are done well and are short enough to be worth reading.

Part one examines methodological issues and focuses on how literalism, metaphor, models and myth function in the interpretation of the Bible, experience and science. The selection from Charles Hodge is a wonderful and highly nuanced example of how methodology can be resolutely theological, while the ideas contained in McFague's chapter on the importance of metaphor in language and thought should form a basic part of any student's higher education. Part two gives an overview of the argument and ideas behind modern evolutionary theory, with selections giving Darwin's general argument, the history leading up to and post-Darwin, and the limits of what we can know about evolution.

Parts three and four, on creationism and intelligent design, comprise the only weak part of the book. Part three contains just the first two chapters of Genesis and a single selection about creationism by historian Ron Numbers. It is unfortunate that Cunningham has chosen to put the Genesis passage here as it leaves the impression that Genesis 1-2 falls within the exclusive purview of creationists. Many theologians would be unhappy with this. The creationists' interpretation of Genesis – far from being the only valid approach – is actually not a very good interpretation at all. Numbers' historical survey of various creationist movements is very well written and interesting, but might not one creationist have been allowed in to state their case personally?

On intelligent design, Cunningham includes a selection from Paley, helpful because of his notoriety and infamy in natural theology. She links the intelligent design argument of Michael Behe to historical arguments to God from the design of nature. Responding directly to

Behe's argument is a chapter by Ken Miller. In this reviewer's opinion, Miller does not engage fully with Behe's argument. It is also odd that William Dembski's arguments are not mentioned, even though they form an important part of many cases for ID.

Part five deals with naturalism and includes two passages by Dawkins and one by Dennett which argue that Darwin, through the discovery of a process which can bring about the appearance of design without the intervention of an intelligence, not only allows one to be an 'intellectually fulfilled atheist', but very nearly requires it. Mary Midgley and Michael Ruse give short but incisive responses questioning the logic of applying evolutionary theory outside of biology.

Parts six and seven contain selections by theologians of various traditions showing how evolutionary theory and theology can be happy bed-mates. Part six is generally more conservative or orthodox, while part seven contains contributions from revisionist and feminist theologians. Jürgen Moltmann's contribution in part six stands out as being of exceptional quality. Nearly all the selections rely on a 'kenotic' theology of creation, in addition to rejecting the doctrine of divine impassibility as inappropriate. While these may be widely-held positions among theologians today, it is unfortunate that no clear dissenting voice has been found.

In God and Evolution: A Reader, Mary Kathleen Cunningham has made a very helpful contribution to anyone thinking about the issues raised for Christian belief by evolutionary theory. The minor problems are far outweighed by the high level of most of the selections, their organization, and the short introductions.

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Louis Caruana (ed.)

Darwin and Catholicism: the Past and Present Dynamics of a Cultural Encounter

London and New York: T & T Clark, 2009. 230 pp. ISBN: 978-0-567-25672-0

As the editor of this book observes, despite the abundance of work on the relationship of Darwin's thought to Christianity, little has focused on the relationship of Darwin's thought to Roman Catholicism. The main purpose of this book is to discuss 'the impact of Darwin on Catholicism' (2), and by 'taking Darwin's empirical work as the core of a cultural paradigm' (4) to show how that paradigm has interacted, and continues to interact, with Catholic theology, philosophy, and Church teaching. In the light of John Paul II's 1996 statement to the Pontifical Academy of Sciences that evolution is 'more than a hypothesis', a book like this on the history of the growing acceptability of Darwinian themes within Catholic intellectual contexts is overdue. Every one of the fifteen essays is of the highest quality, full of valuable insights and deserving a book in its own right. They are masterpieces of interdisciplinary scholarship and at the cutting edge of the science/religion conversation. The editor is based at Heythrop College, London. Of the fifteen contributors, seven have American, six European academic affiliations, with one from Taiwan.

The body of the book is divided into three categories of essay, dealing respectively with the historical, philosophical and theological aspects of the Darwin and Catholicism connection. The three categories focus the essays convincingly without being constraining. The written styles are clear, though the wide range of diverse specialisms broached will cause nearly every reader to be taken out of his or her depth at some point. This, of course, is not a criticism of the book but a reflection of its breadth. For the present reviewer the most striking essay is one by Nicholas Rescher, in which he argues that the hypothesis of the intelligent design of

the universe does not, surprisingly, require the postulation of an intelligent designer. The most interesting connection in the book is that between Aquinas and Darwin, made by Fainche Ryan, who looks for the seeds of evolutionary thought in the medieval theologian.

In the book's historical category of essays, I would have liked to see an essay linking Darwin and John Henry Newman via the notion of gradual development. Such an essay would discuss Newman's theory of the gradual development of Christian doctrine in the Church side by side with Darwin's theory of the evolution of species. Why did these two famous theories, in many ways similar, develop around the same time and in the same country? Where did this general idea of some kind of all-pervasive and slow development, within which Darwin and Newman both choose to frame their particular subject matters, originate? In both men's theories we have the idea of a gradual ascent to greater perfection generated by a prior process of confrontation. Thus, for Darwin, the contest of natural selection leads to stronger species, while, for Newman, a historical contest of orthodoxy and heresy leads to a more purified clarification of Christian doctrine in the Church.

A major motive in the rise of twentieth-century biblical studies was to retrieve the authority of the Bible after a fundamentalist hermeneutic, as exemplified by a literal reading of Genesis, had been discredited by the impact of Darwin's theories. This rise of biblical studies was rapid in the Protestant world, to be followed, after much heel dragging, in the Catholic world. The Catholic Church finally reconciled itself officially to modern biblical methodologies through the encyclical Divino Afflante Spiritu (1943). I would have liked, in this collection of essays, to see one which asked whether the knock-on effect of Darwin could be felt right through this development of biblical studies, affecting not just Protestant but Catholic forms of scholarship, these being investigated in the essay as possibly post-Darwinian processes responding unconsciously to Darwinian paradigms.

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R. John Elford and D. Gareth Jones (eds.)

A Tangled Web: Medicine and Theology in Dialogue

Bern: Peter Lang, 2009. 289 pp. pb. £35.
ISBN 978-3-03911-541-9

In the early days of the 'new genetics' a number of American theologians bemoaned the fact that not enough people in their discipline were engaging in discussion about the rapidly moving science. The implications of applying new genetic and genomic knowledge were, they said, too wide-ranging and significant to be left to the attention of scientists and medics. Be that as it may, it is equally true that these issues are too important to be left to the attention of theologians: we need dialogue. And thus *A Tangled Web* should be a welcome addition to the literature. However, I need to stress that this is not the first book on which medical / biomedical and theological authors have collaborated, nor was the meeting at Liverpool Hope University (from which the book grew) the first of its kind. Indeed, there is a long tradition in the UK of debate between medics and clerics. In the eighteenth century for example, Dr Alured Clarke became Dean of Exeter and was also co-founder of the Royal Devon and Exeter Hospital. For many years, until quite recently, the Alured Clarke Society met regularly for doctors and theologians to discuss together issues of mutual concern (including the 'new genetics'). There is a very slight but detectable undercurrent that the authors of this book think of themselves as pioneers. This comes over in the literature on which they have (and have not) drawn. Gareth Jones is not the only medic/biomedical scientist to have

written about these issues from a Christian perspective. I can, off the top of my head, think of several others, none of whom are quoted. There are also theologians who have written in this area. Two are quoted, namely Celia Deane-Drummond and John Habgood. But where is mention of those American theologians who initially complained about the lack of theological engagement with modern biomedical science (as mentioned above)? Audrey Chapman, Ronald Cole-Turner and Ted Peters, amongst others, have made significant contributions but one looks in vain for reference to their work. So, the authors of *A Tangled Web* are not the pioneers they seem to think themselves to be. Nevertheless, they certainly have their chance to inform and extend our thinking at the Medicine-Theology interface. Whether or not they have succeeded will depend to some extent on how much the reader has already engaged with these issues. For my part, I confess that despite the book's several good features, I am overall a little disappointed.

After a short Preface by John Elford (an ethicist) and a long Introduction by Gareth Jones (a medic/medical scientist), the book is divided into three main sections, followed by John Elford's concluding chapter. The first section is entitled *Theological Background* and consists of four chapters written by Gerard Mannion, John Elford, Adam Hood and Ann Marie Mealey. These chapters are certainly interesting and each would work well as a stand-alone paper. I especially liked Mannion's emphasis on the Christian church as a moral community (it reminded me of one of the major themes in Richard Heys' excellent text, *The Moral Vision of the New Testament*). However, it is difficult to discern from these four chapters exactly where the book is heading. Several different approaches are taken and there does not seem to be any real engagement with the biomedical issues.

The second section, *Moral Boundaries*, contains five chapters, four of which are authored by Gareth Jones (one of these with a co-author, Maja Whitaker) and one by Gerard Mannion. Readers familiar with Jones' writing will recognise some of the themes here, including a warm embracing of new medical technologies, a liberal attitude to the pre-implantation human embryo (I go some of the way with him on this) and warnings against scaremongering. Concerning the last point, it is true that discussion often focuses on worst-case scenarios but nevertheless I think that Jones is too blasé. Firstly, contrary to what he implies, there are some eugenic undertones in genetic testing and secondly, we have learned in science that things that seem impossible today become commonplace in years to come. So, while we should not concentrate on the extremes, neither should we be complacent about what might become possible. In addition to this more familiar material, some parts of section two do bring new insights. The chapter concerned with the ethics of the human body is helpful and informative while it is interesting to see the inclusion of the Jones-Whitaker chapter on scientific fraud. I note that this topic has also found its way of late into some 'secular' bioethics books. Finally in this section, Mannion returns to his community theme with an excellent chapter (one of the best in the book in my opinion), 'Genetics and the Ethics of Community'.

Part three is entitled *Regulation and Policy*. This title does not immediately inspire and yet for me, this was overall the best section in the book and although I am not in agreement with the authors on all points, I found these three chapters readable, interesting and challenging. Jones uses a number of scenarios to make some pertinent points about regulatory procedures. Stephen Bellamy, writing on the role of public consultation in determining policy, laments the lack of real ethical thinking on some issues, while the thrust of Mannion's chapter in this section may be discerned from a sentence in his opening paragraph. '[The chapter]

seeks to make the case that, rather than the ethical horse drawing the legislative cart and, in turn, the legislative horse drawing the scientific cart… the opposite is all too often the case.' He does indeed make his case well, but I would comment that although we might use ethics to derive legislation in order to limit how we should apply scientific discoveries, no legislation in the world can stop scientific discoveries being made (unless the practice of science is prohibited altogether). Since the pace of scientific discovery is so fast, it is almost inevitably going to precede appropriate legislation.

Finally, John Elford's concluding chapter provides a good overview of and commentary on the debate. I especially affirm his view that Christians cannot ignore modern biomedical science (a point that, as I mentioned at the start of this review, several US theologians made back in the 1990s): '[the] extreme… of doing nothing, or of Luddism… is not an option for serious and morally motivated people, particularly Christians.' However, as he points out, the other extreme, of allowing everything and anything is also morally unacceptable. We are thus left with the significant challenge of finding our way between these two extremes and, I would add, different Christians will come to different conclusions about what that way should be.

Finally I need, sadly, to mention two more negative points. The first of these is a matter of factual correctness. Gareth Jones is wrong to suggest (12) that scientists are unlikely to receive ethical training. I know from personal experience that since the mid-1990s, ethics has been introduced into many degree courses in the life sciences, often as a result of both student and academic staff interest. This trend was accelerated in 2002 when the UK's Quality Assurance Agency introduced ethics into its benchmarks for life science degree programmes. At the time of the most recent survey about 75% of relevant degree programmes conformed to this benchmark. Further, many of us involved in this teaching would take exception to Gerard Mannion's comments that ethics is being taught just to cover our backs (251) without any interest in ethical theory (250). Doubtless this is true in some cases but I know that many life science academics have worked hard to familiarise themselves with ethical theory and moral philosophy in order to help their students understand the processes of ethical decision making. The fact that '*Teaching Ethics to Bioscience Students*' is now by far the longest running Special Interest Group of the HE Academy (formerly LTSN) Centre for Bioscience bears witness to this: the group's regular workshops are always well attended, even seven years after the group was founded.

My second point here is that I think that a major opportunity has been missed. Jones mentions a range of Christian attitudes to the early human embryo in his chapter on Regulatory Procedures and Mannion writes briefly about the moral status of the early embryo in the chapter on Genetics and the Ethics of Community. However, nowhere is there an in-depth ethical and theological analysis of this topic. Attitudes to the early embryo underlie our thinking on IVF, pre-implantation genetic diagnosis, stem cells and cloning. Whatever one's view of the early human embryo, a chapter about it, written very specifically from theological and moral philosophical standpoints would have proved very illuminating. It is a great pity that *A Tangled Web* does not contain such a chapter.

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Helge S. Kragh
Entropic Creation: Religious Contexts of Thermodynamics and Cosmology
Aldershot: Ashgate, 2008. 272pp. hb. £60. ISBN 0754664147

Helge Kragh is widely known in the history of science community as author of a number of well received books on the history of physics (for example *Dirac: A Scientific Biography* (CUP, 1990) or *Quantum Generations: A History of Physics in the Twentieth Century* (Princeton, 1999)). He is an established and respected historian, and so it came as something of surprise to me to discover that the current book is an edited version of Kragh's doctoral thesis from 2007.

As one might expect from a doctoral thesis, *Entropic Creation* is a substantial and scholarly work with a fairly tight focus and detailed engagement with a large array of primary and secondary sources which are referenced and expanded upon via over 700 footnotes. In short, it is a weighty read. However, this weight of scholarship is what makes the book so rewarding, with the author opening a window on an important era (focused primarily on 1850-1920) and upon a debate within that period which is not widely known.

The entropic creation argument arose from the development of the new science of heat in the 1840s and 1850s. In this era we find the formulation of the first and second laws of thermodynamics (i.e. that the total energy of a closed system is a constant, and that the total entropy of a closed system always increases) by men such as Julius Robert Mayer, (1814-1878), Hermann von Helmholtz (1821-1894), Rudolf Clausius (1822-1888), James Prescott Joule (1818-1889) and William Thomson (1824-1907). In the nineteenth century both laws were seen in some circles to have theological significance. Thus for example Thomson saw the idea of conservation of energy as a sign of God as creator. Writing in 1851 he stated 'We may… regard it as certain that, neither by natural agencies of inanimate matter, nor by the operations arbitrarily effected by animated Creatures, can there be any change in the amount of mechanical energy in the universe; and the belief that Creative Power alone can either call into existence or annihilate mechanical energy, enters the mind with perfect conviction.' (quoted 29). Men such as Joule agreed wholeheartedly with Thomson, while others, though unwilling to make positive statements about the deity, certainly saw the law of conservation of energy as at least standing against materialism.

The second law can be stated as informally as: In any process some energy is always dissipated as heat and hence lost to useful work. This gave rise to the idea of the heat death of the universe, namely, that eventually the universe would run down and would be of uniform temperature at all points. It was the second law that gave rise to the entropic creation argument and Kragh states the argument (48) thus:

I The entropy of the world increases continually.
II Our present world is not in a state of very high entropy.
III Hence the world must be of finite age.
IV If the world had a beginning, it must have been created.
V If created, there must be a creator, that is, God must exist.

Thus the entropic creation argument is an argument about *beginnings* and the use of such beginnings to infer the existence of God. Kragh traces the uses of, and attacks upon, the entropic creation argument from 1850 up to as late as 1946 when E. T. Whittaker made the last substantive apologetic use of it. Perhaps unsurprisingly Kragh shows that many theists found the entropic argument helpful and many atheists attacked it via a denial of one or more of the five points above. However, full play should be given to the word *many*. Thus for example, some Catholic scholars were unenthusi-

astic about the argument, seeing Thomism as more important as a valid pointer to God than thermodynamics. Or indeed some atheists (for example Bertrand Russell) were willing to embrace the idea that the second law implied that the universe had a beginning, but denied that this could be used as evidence for a divine creator. To a twenty-first century reader Russell's view hardly sounds surprising, but it should be noted that most nineteenth century atheists did in fact deny that the universe had a beginning, positing either an eternal or a cyclic universe. It seems that many of them feared that an acceptance of III above meant IV and V were highly likely to follow. It is a fear that many modern atheists have unwisely lost.

In *Entropic Creation* Helge Kragh weaves a rich and nuanced historical narrative drawing out the different ways thermodynamics was received and used by both theist and atheist. Any scholar with a serious interest in the interaction between physical science and religion in the nineteenth and early twentieth century would do well to read it.

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Edward O. Wilson

The Creation: An Appeal to Save Life on Earth

New York and London: W. W. Norton & Company, 2006. 175 pp. hb. $21.95.
ISBN-13 978-0-393-06217-5

Readers of this journal are unlikely to require any introduction to E. O. Wilson, the Harvard naturalist whose groundbreaking contributions to behavioural and population biology, founding of the field of sociobiology and work in conservation biology are known far beyond the realm of academia. Wilson is also well-known as an articulate advocate of secular humanism, but – as he is at pains to point out in this book – he was raised in Alabama as a Southern Baptist and apparently was 'lastingly influenced by the lyrical and spiritual power of evangelical Christianity' (174). In this slim volume he returns to these roots with an impassioned attempt to convince a (imagined) Southern Baptist pastor of the need for science and religion to join forces to save life on an imperilled earth.

Wilson has addressed a hypothetical audience before in *The Future of Life* (Knopf, 2002), where he began with an open letter to Henry David Thoreau. In that book, the conceit serves as a compelling introduction to Wilson's discussion of the status and prognosis of life on earth and what needs to be done to preserve it. The conceit works rather less well in the present volume. This is because, whatever his childhood encounter with Christianity might have involved and despite what seem to be the best of intentions, Wilson apparently finds it impossible to understand the audience he claims to be addressing, and his impatience with the imagined Baptist clergyman is often all too evident. There may indeed be Southern Baptist pastors who resemble the caricature who emerges as Wilson's dialogue partner, but I suspect that few Christians – Southern Baptist or not – will actually find themselves represented by him. This is a shame, because Wilson is an authoritative and compelling voice when he writes about science, and his very decision to address people of religious belief ostensibly on their own terms represents a rare and telling condescension – a condescension that reveals something of the gravity of the situation which Wilson believes we face.

The book begins with a section that describes, often in beautiful detail and via well-chosen examples, the 'creation' in which we live, the world around us both near and far in all of its wonder and diversity. Along the way, Wilson includes a brief but cogent attack on the recently popular notion that 'nature' as such does not exist or that it can be reduced merely to a socially-determined construct (22-

25). He points out that our own experiences as well as scientific data – for example, on the biodiversity of rainforest versus that of adjacent agricultural fields – reveal the possibility of making genuine distinctions between the humanised world and the natural world, however fuzzy the transition between the two. As Wilson points out, the planetary trend is almost inexorably away from the natural and towards the humanised, with less and less space for that which is truly wild or even for functioning ecosystems. This is borne out by the astonishing rate of species extinction, which is estimated for land and freshwater species to be anywhere from 50 times to 500 times the pre-human baseline rate (79). The causes of this are well-documented: habitat loss (including that caused by climate change), invasive species, pollution, human overpopulation and overharvesting (75).

For Wilson, all this threatens not only the integrity of nature and the basic material benefits with which it provides us, but it also goes against our own human nature, which bears traces of our long genetic heritage of intimacy with the rest of the living world. Here as elsewhere in the book, biodiversity and non-human life in general are valued by Wilson pre-eminently for the services (physical and what might be called 'spiritual') that other life renders to human beings. Although he predicts that ultimately our 'central ethic will shift' such that we learn 'to cherish all of life – not just our own' (69), and he deftly attacks the notion of 'exceptionalism' (which claims that the special status of human beings means that we can escape the 'laws of Nature')(82-90), Wilson's own arguments for caring for creation nearly all derive from the value of other life for us. This approach is rooted in Wilson's humanism, and he understandably assumes that a conservative Christian audience will share at least this human-centred ethic. Many Christians would nonetheless want to say that non-human life has intrinsic value before God and thus deserves our care whether or not it can be seen to serve us directly.

In any case, the task of 'stewardship of life' that Wilson proposes is one that he rightly expects ought to concern all of us, even if – as he charitably acknowledges – Christians might not be comfortable expressing it quite as he does, as 'ascending to nature'. The task as Wilson envisions it involves such things as moving towards a sustainable human population and reducing our consumption, but above all – and this is at the heart of his proposal – it involves a one-off investment to protect those areas that contain the greatest number of earth's species (91-99). Wilson estimates the cost of this to be 30 billion US dollars – a mere pittance, he points out, compared to the estimated 30 trillion dollar rate of the ecosystems services given us by the natural environment (98).

The weakest section of the book – which comes in the middle of an otherwise clear and helpful explanation of what the science of biology involves – is Wilson's brief foray into the history of science, where he propagates time-worn stereotypes about the advance of science in the face of religious opposition. (He observes early on that Darwin's scientific discoveries were possible only when he had 'first abandoned Christian dogma' (7)). Wilson's conception of religious belief is perhaps glimpsed most clearly when he observes, 'Without science, there had to be religion' (105). In other words, religion and science are alternative explanations for reality; and so if we are to accept science, we must ultimately reject traditional religion, much as Wilson himself has done.

Despite its many strong points, I unfortunately cannot think of anyone to whom I would recommend this book. Most Christians will be put off by the almost unrecognisable stereotype of their beliefs that Wilson assumes they hold, and I cannot think why anyone else would prefer to read this book to one of Wilson's many other excellent ones. There are in

any case many better books to recommend to evangelical Christians whom we might hope to convince of the need to care for creation. The value of this book is primarily in the compelling example it provides of how environmentalists, climate-change activists and, indeed, conservation biologists are increasingly recognising the need to engage seriously with people of religious belief if we are to address the profound challenges being posed to life on earth.

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R. J. Berry (ed.)
When Enough is Enough: A Christian Framework for Environmental Sustainability
Leicester: IVP, 2007. 212 pp. pb. £11.99.
ISBN 978-1-84474-180-9

This collection of essays edited by R. J. Berry addresses an issue of crucial and topical importance to us all. Originally papers given at a 2005 conference on 'The Christian Framework for Sustainability' it draws on the experience and expertise of Christians working in a wide range of areas to present a wealth of sobering and relevant reflection on living sustainably with the rest of God's creation. The book is heartily endorsed in a Foreword by the Bishop of Liverpool, the Rt Revd James Jones, and the individual chapters are framed by an Introduction and Epilogue by Berry, who gives a brief historical overview of Christian responses to environmental issues and sets out compelling reasons why sustainability should be a major concern of the church.

But what is 'sustainability'? Dave Bookless explores this elusive concept from a theological point of view, in one of two theological chapters in the book, suggesting that a Christian view of sustainability incorporates the notion of God as creator and sustainer of the universe, human responsibility, based on covenant, towards God's world, and the theological paradigm of creation-fall-redemption. The closing reflection by Margot Hodson on Isaiah's vision for sustainability reminds us that the Old Testament prophets have much to teach us about living in God's world.

The remainder of the book comprises short chapters tackling a wide range of sustainability issues including agriculture (John Wibberley), biodiversity (Ghillean Prance), consumption (Brian Heap and Flavio Comin), economics (Donald Hay) and waste management (David Stafford and John Bryant). John Houghton sets out the challenges of global warming and our reliance on fossil fuels for energy, and Joanne Green explores the injustices associated with lack of access to clean, safe water. Each author presents an outline of sustainability issues within their area of expertise or interest, and it is this clear yet detailed analysis that is the most compelling aspect of the book. Each chapter, to a certain extent, relates this to Christian faith and practice, although, in many cases, without much attempt to develop a sustained theological response. Many of the authors suggest practical approaches and actions that can be taken.

As one would expect in a collection of essays, there is variety in both the analysis of the problems we face and the responses needed. Some chapters are based on personal experience, for example Ghillean Prance draws on a lifetime's work as a botanist in the Amazon rainforests to earth his reflections. Others are more technical and dense, for example Donald Hay's critique of economic responses to sustainability, which was harder for this reviewer to understand fully. But all the authors are as one in maintaining that sustainability is an issue that is inextricably linked to authentic Christian faith and one that we should, and must, engage with seriously and reflectively. Recent years have seen the publication of a number of Christian responses to environmental

and sustainability issues, to which this book makes a valuable contribution. Read it and be prepared to be challenged!

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Willem B. Drees, Hubert Meisinger & Taede A. Smedes (eds.)

Creation's Diversity: Voices from Theology and Science

London, New York: T&T Clark, 2008. 186 pp. pb. £29.99. ISBN 978-0-567-03329-1

This volume, in the 'Issues in Science and Theology' series, arises from the 2006 ESSSAT conference. An introductory chapter by Willem Drees is followed by the opening conference address from Daniel Ciobotea (now Patriarch of the Romanian Orthodox Church) that draws on the work of Staniloea and reflects on the limits of science. The other papers are divided between two sections although the 'natural variation' of a collection of conference papers (in topic, scope and quality) results in considerable diversity both within and between the two parts. I have focused more especially on those I found most interesting.

In part 1, 'A Diversity of Visions of Creation', Anne Primavesi discusses the value of reflecting on the scale and events of the geohistory of the world; considering the ages and life forms that passed before the appearance of humanity helps us understand our existence as a gift from them for us and suggests that God has a relationship with the Earth and all living things. In the light of this perspective, treating natural resources as commodities to be bought and sold can be seen as sin. Focusing on the book of Job, David Goodin notes, as do others, that it relativises the importance of those things exalted by capitalism: the Joban God 'values the well-being of wild creation more than catering to humankind's happiness' (49). Christopher Southgate uses the concept of kenosis, both human and divine, to explore the creator/creation relationship in the light of evolutionary science and our awareness of the vast numbers of creatures that fail to live fully to 'self'. Humanity is able to go further and give of self, a giving exemplified in the Incarnation. This leads to some concrete suggestions as to how human kenosis might express itself in joining God's work of healing the cosmos. The emergence of the 'competing myths of nature and technology' are traced by Alfred Kracher, who notes three attitudes towards nature: a desire for its preservation against exploitation, a wish to domesticate or control it and, in contrast to that, a desire to retain nature's wildness, albeit without harm to ourselves. This mythology needs replacing. Further exploration of myths is found in Tony Watling's survey of three current metaphors that may stimulate debate on the relationship between humanity and nature: Deep Ecology, the Gaia hypothesis, and the 'epic of evolution'. The epic of evolution is the scientific account transmuted into 'a new transcultural creation myth, stressing the cosmos as a living system' (101).

In the second, equally varied section, 'Sustaining Creation's Diversity', Sam Berry provides a helpful recent history of secular debate on sustainability and environmental law and calls for theological engagement based on a Christian calling to act as caretakers/stewards of creation. A clear explanation of biodiversity, and its importance, is provided in Jan Boersema's essay, which concludes by noting a need for religions to help 'green' their adherents' world-views. However, very wisely, he also notes some caveats. Religions should ensure that their texts are not plundered for environmentally friendly passages while ignoring, or brushing aside, the less helpful parts. This hermeneutical reminder is one that too many well-meaning writers ignore. Some contributors, including Chris Wiltshire and Peter Kirschenmann, highlight the vagueness of the

concepts 'sustainability' and 'diversity' and the often unexamined assumption that sustaining diversity is a good. Wiltshire notes that few would promote the preservation of those life forms inimical to human flourishing, such as some viruses.

The blurb speaks of 'environmental engagement in the context of religious convictions', but in the final two papers Zbigniew Liana draws on Popper to discuss diversity in beliefs within a faith and Dirk Evers considers Christian approaches to religious pluralism and scientific enquiry; neither specifically discuss the environment.

Generally, this collection presents a hugely varied, and sometimes thought-provoking set of approaches to the topic of diversity. Its value to readers will depend on their background and interests. A few of the 'scientific' examples and illustrations made me wince, as they betrayed a rather cursory or naive scientific understanding, and there were places where clarity seemed to have been lost in translation. However, generally the quality of writing is clear and the papers should be accessible to readers of this journal.

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Jacob Klapwijk

Purpose in the living world? Creation and emergent evolution

Cambridge University Press, 2008. 311 pp. pb. £14.99. ISBN 978-0-521-72943-7

When is an explanation not an explanation? Answer: when it is a 'philosophical framework'. Lured by the sub-title, casual readers may begin reading this book in the hope of finding an explanation, or at least a definition, of 'emergent evolution'. If so, they will be disappointed, though they will not find the experience unrewarding. The central question of the book is whether or not evolution proceeds purely by chance or can be seen to give expression to purpose. How does the philosophical framework of emergent evolution provide evidence of purpose?

Modern atheism, emboldened by the success of modern science and its reductionist method, declares confidently that the universe is simply an accident out of which we humans have emerged by chance. Our world-view is now infected with the notion that since physics reduces everything to a chaotic dance of elementary particles there can be no meaning to life. It is biology, however, and in particular evolution, based on random mutations, that has been most corrosive of belief in purpose. The logical continuity of reductionist explanations seems to undermine all our 'higher' level concepts – leaving them ultimately as effects of merely physical causes. It is not however simply the logical force of the argument that is a problem, it is that it persuades us that any explanation that does not proceed in this way isn't an explanation at all. We have become conditioned to accept only explanations that use reductionism in an unbroken chain to take us to something simple that we believe we understand. Herein lies the problem in following the argument of this book, for, ultimately, it cannot use this form of explanation! It is not until the reader is more than halfway through that he or she discovers that emergent evolution is not an explanation in the conventional sense but a way of seeing and thinking about other explanations that highlights their limitations. We find that Jacob Klapwijk, an emeritus professor of philosophy, has been leading us to think about our thinking. This is of course the purpose of philosophy!

The first part of the book surveys models of creation and provides a critique of creationism and intelligent design as well as the category mistakes inherent in philosophical naturalism before introducing the ideas of emergence that were

first developed towards the end of the nineteenth century. Klapwijk writes from the perspective of the Catholic tradition and bases his critiques on the prescient ideas of Augustine who first expressed the notion that time itself was created. Thus creation needs no special interventions or designed features of irreducible complexity since everything is designed! Furthermore Klapwijk separates himself from theistic evolutionists by taking the Augustinian view that evolution is the unrolling of a pre-written script. All the features apparently revealed to us by evolution are simply the effects of time uncovering the inherent creaturely aspects put there at the beginning of time itself.

This Augustinian perspective informs the second part of the book where Klapwijk considers the implications of emergent evolution in various contexts such as culture, the philosophy of mind and the interface of science and faith. He introduces emergence as a kind of 'irreducible novelty' that defies explanation in reductionist terms. Thus properties emerge at various levels in creation that are not causally connected to lower levels of being – in his philosopher's jargon, this is 'ontological stratification'. The gaps between the levels simply have to be accepted as they are. At first sight this seems a risky tactic – a kind of 'God of the very thin gaps' – since the idea of 'irreducibility' had been comprehensively demolished earlier in the book in his treatment of Intelligent Design theory. His escape from this trap has been prepared by his concept of emergence since it is not contingent upon the physical connections between levels. Thus even if physical explanations close the gaps, say, between neurons in the brain and thought processes, the concepts of logic and ideas are independent of such physical relationships. Klapwijk is wisely aware of the dangers of developing a metaphysics of emergence that could lead to unprofitable speculations. He counsels a rigorously empirical approach whereby experience is the final test. There remains, however, a lingering doubt in my mind that since experience needs to be interpreted we have to make some kind of faith commitment to make any progress in understanding. The validation of 'emergent evolution' therefore must remain incomplete.

This book is not an easy read. I found it helpful to have a dictionary close by when reading it. Klapwijk's learning oozes from every page. His familiarity with disciplines beyond philosophy is impressive. Much of the book could be described as 'extensive ground clearing' and in so doing he sweeps a wide range of topics with his rigorous philosopher's brush. His message is that purpose cannot be detected by reductive naturalism – a change in perspective is required that is sensitive to the way the world is. Evolution has produced a complex interlacing and organic system where the emergence of mind and awareness of logical connections is itself the evidence of purposeful development. He provides no easy answers and no trite definitions of the purpose of life. The connections to the Christian's hope in the Kingdom of God are arrived at in the closing pages, but left for the individual to explore in personal experience. This is a challenging book and its satisfactions are gained by those who, like me, are not well-versed in philosophical discourse, only by careful and thoughtful reading – and re-reading.

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Alexei V. Nesteruk

The Universe as Communion: Towards a Neo-Patristic Synthesis of Theology and Science

London: T & T Clark, 2008. 286 pp. hb. £75.00. ISBN-10 0-567-03327-9

For the vast majority of Western Christians, to enter the world of Eastern Orthodox thought is to begin an exploration of a *terra incognita* in which the familiar landmarks of the West are either

missing or, when apparently present, turn out to be misleading. It is, for example, a world in which Protestants can often, in the words of a nineteenth century Russian theologian, be seen as nothing but 'Crypto-Papists'.

The man who made that remark, Alexis Khomiakov, went on to explain what he meant, using what he called 'the concise language of algebra'. The West, he said, 'knows but one datum *a*; whether it be preceded by the positive sign +, as with the Romanists, or with the negative -, as with the Protestants.' For Orthodox Christians, he went on to explain, that *a* is simply irrelevant. Orthodox theology has been influenced neither by the Augustinianism and scholasticism of Western medieval thought nor by the Protestant appropriation of (and partial reaction against) this medieval inheritance. As a modern commentator has put it, 'Christians in the West… generally start by asking the same questions, although they may disagree about the answers. In Orthodoxy, however, it is not merely the answers that are different – the questions themselves are not the same as in the West.'

What Khomiakov saw as true of the relationship between the Western and Eastern Christianities of his day arguably remains true today, and not least in relation to the dialogue between science and theology. The relationship between God and the created order is simply seen in a different way in the two parts of the Christian world, and the Eastern perspective – if it were ever to be accepted in the Christian West – would inevitably affect almost all aspects of the Western dialogue between science and theology. Up until very recently, however, participants in this dialogue had few resources to draw on to begin to gauge this potential contribution. Once they had read two very different assessments – Alexei Nesteruk's *Light From the East* and Christopher Knight's *The God of Nature* – there was, quite simply, little else to look at. Now, however, Nesteruk has added to his previous work this important and impressive new book.

Nesteruk is a cosmologist by profession, but he does not present his case in terms of cosmology or of any other scientific discipline. (Indeed, some might find the relative lack of reference to current scientific understanding in this book somewhat disconcerting.) Rather, his main argument is presented partly in terms of the phenomenological tradition of philosophical thought and partly in terms of an appeal 'to patristics as that historical and theological background which is common to all Christian Churches'. His style, it must be said, does not make for easy reading, and it may well be that those who are unfamiliar with both phenomenology and the Orthodox tradition should do some background reading before attempting to read him. For those with at least some background in one of these approaches to reality, however, Nesteruk is able to point out intriguing links between them.

Ultimately, however, it is not the linkage between phenomenology and the Orthodox understanding that makes this book important, but its vision of the possibility of using resources from patristic thinking to develop a 'neo-patristic synthesis of theology and science'. To write a book that attempts to take us 'towards' such a synthesis is an extremely ambitious undertaking, and some – especially those unconvinced by the phenomenological tradition – may judge this ambition to have been only partially fulfilled in this book. They will still, nevertheless, surely remain grateful that the vision has been set before them.

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Thomas Jay Oord
Divine Grace and Emerging Creation: Wesleyan Forays in Science and Theology of Creation
Eugene, Oregon: Pickwick, 2009. xiv + 229pp. pb. $27.00. ISBN 13:978-1-60608-287-4

As the science and religion debate has matured, studies have tended to become less general and more concerned with the interaction between specific aspects of science and particular expressions of religion. Thus an exploration of the relation between the Wesleyan tradition and science has the potential to raise a number of important questions, especially in the American context where the relation between Methodist theology and the Pentecostal and Holiness movements remains close. The present volume has its origins in a joint Conference between the Wesleyan Theological Society and the Society for Pentecostal Studies: 'Sighs, Signs, and Significance: Pentecostal and Wesleyan Explorations of Science and Creation'.

Unfortunately the two societies chose to publish separate volumes from the conference. The volume under review reprints a characteristically insightful address from Jürgen Moltmann on the Pentecostal aspects of the conference theme, exploring their relation to Eucharist and Incarnation. Moltmann's chapter, however, is stranded in the midst of a set of disparate contributions which fail to present a coherent approach. Links could have been drawn with Wesleyan theology. The rediscovery of the past, present and future aspects of the Eucharist upon which Moltmann draws is largely due to the work of the Methodist theologian Geoffrey Wainwright; Moltmann's optimistic conclusions for the future of the finite in the light of the incarnation chime well with Gordon Rupp's pithy summary of Methodist theology as 'the optimism of grace'. But none of that is worked out here.

Randy Maddox's chapter sketches out different but significant ways in which Wesleyan theology and science might interact, and draws some careful lessons from Wesley's own approach and context. His approach is measured and judicious. Apart from this opening chapter there is little here that will attract the non-specialist. The early chapters explore John Wesley's understanding of science, and to a lesser extent his philosophical presuppositions. The later chapters discuss Intelligent Design, the critical study of Genesis and modern psychological foundations for Wesley's use of small groups. What links these chapters is the context of the authors, each writing from an academic base within the broad Wesleyan or Holiness tradition. Little here is original, although Rebecca Flietstra's attempt to draw positive theological lessons from natural selection is a worthy attempt by a teacher of biology. Robert Branson's chapter on science and archaeology could have discussed the specifically Wesleyan context to good effect, but spends too much space rehearsing the well known general history.

John Wesley has been called 'the great cannibaliser': perfectly willing to edit Cranmer's *Book of Common Prayer* in order to reflect his own theology. Each of the early chapters of this book discusses Wesley's *Survey of the Wisdom of God in Creation*. This is a little known compilation which Wesley produced and expanded in the last years of his life, drawing on well known, and more obscure, eighteenth century scientific writing; part of Wesley's project to ensure that his preachers had the opportunity of a good general education. These chapters open a window into Wesley's perspective as an interested and well read teacher. They would, however, have benefited from greater editorial rigour, both to remove duplication and also to highlight the significant differences between Laura Felleman's reading of the Survey as an almost neutral attempt to allow Wesley's readers to understand and glory in the wonders of Creation, and Otto and

Lodahl's reading which sees the work as more explicitly combative, seeking to refute atheism. Felleman's reading is surely correct as she can demonstrate Wesley's removal of the more controversial passages from his sources. Felleman highlights the fact that eighteenth century science was not simply natural *theology*, straightforwardly in the service of apologetics, but that Wesley, for one, took care that the education of his preachers should be both rounded and nuanced. This, at least, is a lesson from the eighteenth century that we could well relearn today.

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Olaf Pedersen

The Two Books: Historical Notes on Some Interactions Between Natural Science and Theology

Vatican City: Vatican Observatory Foundation, 2007. 448 pp. pb. £18.50. ISBN-13 978-8820979010

For many years, this book was only available in Danish and Polish. Wonderfully it has now appeared posthumously in a more widely read language. It is based on some lectures the author gave in Denmark and in Cambridge in the 1980s. It is a book on a topic that I have long desired to see written about: the relationship between Scripture and the natural world. Scripture has much to say about the natural order and what it can (and cannot) tell us about its creator (e.g. Ps. 19: 1-6; Isa. 40: 26; 45: 18; Matt. 6: 28-30; John 12: 24; and supremely Rom. 1: 19-20). But for much of the Christian era, a non-scriptural metaphor was dominant whereby the natural world was compared to a book, God's other book in fact. There were few problems with this metaphor until about 500 years ago when Europeans started exploring the world by sea and discovered lands that they had not even suspected existed. This roughly coincided with the start of the process of undoing the submergence of the literal interpretation of Scripture beneath the allegorical or spiritual interpretation.

One impact of these two events was that questions arose about Noah's Ark: How could the animals of the Americas reach the Near East? Was there room in the Ark even if they could, by some miracle, make the journey? And it has become a lot worse as the centuries have passed since then: the chasm between Scripture's account of the natural world and what we have found out about it just keeps growing. An aside: was the Holy Spirit's intention in breathing out Scripture to tell us about the natural world (things we can discover for ourselves) or to tell us about God (things we cannot know unless God tells us)? Scripture certainly encourages us to discern certain characteristics of God from the created order, but it also tells us there are distinct limits to what the world can tell us about God's power and eternal nature.

The problem is not restricted to Darwin's theory, but includes the whole vast ancient cosmos. What to do about it? What to think about it? Do the two books tell the same story? Should we expect them to? And is the idea that nature can be treated as a book a valid one anyway? (Just because an idea is an old one, doesn't make it right).

This is where Pedersen's book is so helpful. He explores how people have thought about the relationship between Scripture and nature since this metaphor arose during the time of the Church Fathers (and particularly Augustine). He starts with the ancient Greek philosophers such as Archimedes, Plato and Aristotle as they provided much of the cultural background against which the New Testament was written. They also gave new technical and philosophical meanings to everyday Greek words, some of which appear in the New Testament with their technical rather than their everyday sense. Pedersen's discussion of the first chapter of John is particularly

helpful on this point.

He discusses how the fourfold interpretation of Scripture arose (which can be simplified to 'literal' and spiritual'). He sets out how theologians interacted with Greek philosophy and astrology. He outlines what happened in the flowering of intellectual life in the church in the thirteenth century in both France and Britain under the impact of contacts with Muslim Spain, particularly the question as to whether there any limits on God's power. One unintended consequence of this discussion was the overturning of the old saying 'Nature abhors a vacuum'. For one proposition that was condemned by a bishop of Paris in the thirteenth century was the notion that God could not move the cosmos if he chose to. Since the bishop was unwilling to countenance any limits on God's power at all, then if he chose to move the universe, a vacuum would necessarily be left behind (although it was several centuries before vacuums were created experimentally).

Although it is a large book (424 pages, including an extensive bibliography) printed in a large font size, with helpfully wide margins for making notes, many of the discussions are in fact quite brief. Pedersen only ever intended these to be notes. Thus often I was only able to read a few pages at a time, having to stop and let the information sink in. And at times I was blown away with the profundity of what he had said. He takes the discussion as far as the nineteenth century with the rise of modern geology and evolutionary biology (these are linked through a new historical understanding of the Earth that arose at the end of the eighteenth century). So he does not discuss the impact in the twentieth century of the discovery of how vast and ancient the universe is. Ironically many (though not all) Christians have accepted the more recent discoveries in astronomy but reject the former discoveries in geology and biology.

I will finish with one very helpful quotation Pedersen gives from Chalmers (writing in 1833) concerning Natural Theology:

> 'What shall I do to be saved?' is not answered by Natural Theology, but only by the doctrines of the Gospel. The restoration of sinners to acceptance and favour with a God of justice cannot be achieved by all the resources and expedients of natural theology… which makes known to us our sin, but cannot make known to us our salvation. Nevertheless, however little natural theology can be trusted as an informer, yet as an enquirer, or rather as a prompter to enquiry, it is of inestimable value.

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Tatha Wiley

Creation and the Conflict over Evolution

Cambridge: James Clarke, 2009. 164 pp. pb. £19.50. ISBN-13 978-0-227-17282-7

The author, a Roman Catholic academic, sets the scene in the first chapter for the ones to follow, by sketching out the procedures of 'modern critical scholarship' of the Bible with special reference to the concept of creation.

A lucid and succinct account of the development of the Judaeo-Christian doctrine of creation follows. Its readability and economy of words is warming. It distinguishes clearly between the theological concept of creation and scientific accounts of origins in a big bang, touching on the category difference between the two and also between creation and (organic) evolution. But, as the author pithily remarks, 'It is one thing to say what a Christian doctrine is or what its development has been, and another to say what Christians themselves know of it' (52). She summarises nine all-too-familiar examples of students' doctrinal perceptions in a piece of litotes – 'the understanding of doctrines is a bit tenu-

ous' – while bemoaning that 'their understanding of science is even more problematic' (52).

The third chapter gets down to discussing the antiquity of the idea of evolution and the birth and growth of Darwin's theory about the mechanisms of adaptation and the origin of species. Paley, Mendel, Dobzhansky, Crick, Watson (DNA structure – 1953, not 1943 as on p. 66), Ayala et al. are in the procession and halfway through the chapter the verdict is reached that 'Darwin's methodological principle rejects neither God nor creation.' (59) The rest of the chapter is devoted to philosophical matters about the nature of science and its 'method' – though I would rather have had 'scientific methods' in the plural as the subheading, and again elsewhere. The nature of the difference between a scientific hypothesis and a 'theory' is clarified, as it needs to be in view of common dismissive comments like 'evolution is just a theory'. A final section on science and faith concludes the chapter and leads into an inspection of Roman Catholic responses to evolutionary theory.

There follows a lengthy chapter which returns to the key difference between the timeless act of creation as a theological concept and the physical origins of matter and life. Confusion between the two has spawned so much unnecessary tension about the big bang and Darwin's theory. To portray evolution and creation as alternatives not only commits a category mistake but creates an imaginary opponent for would-be 'shadow-boxers'. Professor Kenneth R. Miller, on the back cover, encapsulates the author's distinctive contribution by saying, 'The scientific failures of Intelligent Design and other forms of creationism have been detailed in dozens of books, scores of articles, and in a handful of spectacular court cases. What Tatha Wiley adds to this mix is a provocative and highly readable analysis of the theological failings of today's creationist movement.' The chapter begins with 'some strong criticisms of fundamentalism', many of which are valid; and what follows particularly reflects the American scene. The term 'fundamentalism', however, is not as monolithic as seems to be implied. Its meaning has changed from that which underpins the writing of *The Fundamentals* to being almost a theological swearword equated with an undiscerning literalism – which, sadly, it often is. I don't think it is correct to generalise by saying of *The Fundamentals* that 'Sharing first place for rejection… [was] Charles Darwin's theory of evolution.' (103) Ronald Numbers, in his magisterial work *The Creationists*, points out that 'The essays in *The Fundamentals*, roughly one fifth of which touched on the issue of evolution, covered the entire spectrum of evangelical opinion…' (2nd edn., p. 53). I also want to distance myself from the claim of this and some other authors (Forrest is cited, but there are others) 'that Intelligent Design is creation*ism* under a new name. I [Wiley] take this view here, too.' [98 footnote] But two different sets of arguments are involved in *young-Earth creationism* and Intelligent Design. Creationism, from about the 1980s, in popular understanding has come to mean young-Earth creationism [Numbers *op. cit.* 329] with a consequent rejection of evolution. It accepts the traditional belief in divine creation, but adds belief in a geologically young Earth. The Intelligent Design Movement, developed in the 1990s, uses a different line of argument, one for design and by implication an intelligent designer. Wiley correctly identifies their strategy as exemplifying an ancient philosophical 'chestnut' – the 'God-of-the-gaps'. The confusion leaves traditional arguments for design unaffected but it does muddy the waters. This penultimate chapter ends with a useful collection of extracts from major court proceedings and legal rulings in the US and concludes with the perceptive observation that, even among those who do not favour the YEC/ID positions, 'Whatever debate takes place on the issue is formulated in creationists' terms' (128).

The author, in summarising her main points under the final chapter heading *Fundamentalist Anxiety*, briefly addresses the concept of truth. It would need a longer book to unpack this key concept but I would like to have seen it tackled in more detail. An earlier point (40) is reinforced, namely Augustine's belief that 'original sin' passes to all humankind through *biological inheritance*, which leads her to conclude that 'the fundamentalist concern is with original sin rather than with creation' in promoting 'their attempts to eliminate evolution in science programs' (137).

An extensive bibliography is provided, but I would also have appreciated an index.

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Mark Graves

Mind, Brain and the Elusive Soul: Human Systems of Cognitive Science and Religion

Aldershot: Ashgate, 2008. 244 pp. hb. £55.00. ISBN 978-0-7546-6266-6

This book is a very ambitious multi-disciplinary undertaking. It draws on fields as diverse and specialised as pragmatic philosophy, Irenaean theology, quantum physics, information theory, cybernetics, psychology, neuroscience and molecular biophysics. Furthermore, defining the 'human soul' and justifying its existence in a scientific framework is going to be fraught with significant challenges.

The goal is to address the question, 'How do contemporary investigations in cognitive and brain science, pragmatic philosophy and emergent systems theory impact upon a theological understanding of soul and spirit?' (207). Unfortunately, I do not think the author has succeeded in breaking new ground and may have even muddied the waters. At least, he has delineated some of the issues, given some potentially relevant references and ideas and gives an example (but not necessarily a good model) of how one might proceed in exploring this issue.

My understanding of the basic argument of the book is the following. Life is emergent, that is, the sum is greater than the parts. Furthermore, it can be viewed and interpreted from a hierarchy of levels: physical, biological, psychological and cultural. Objects at each level cannot be simply reduced to their lower level components. Systems theory provides a possible methodology to characterise the components of each level, their interaction with each other, and with constraints. Graves claims that the 'soul' is something that operates at the psychological and cultural level. It is characterised as 'a systems constellation of constitutive relationships regardless of emergent level' (206).

For me some of the weaknesses of the book overpower it. I struggle to see how passages such as the following provide new or helpful insights: 'In an emergent interpretation, Jesus would typify the transcendent-level systems of spirit as best grounded in human physical, biological, and psychological-level systems and as constructed through the cultural-level systems of first-century Palestine.' (146) Does this provide new insights compared to the 'classical' interpretation? Does this make the doctrine of the Incarnation clearer, or more obtuse?

Sin is interpreted in terms of the writings of the psychiatrist Gerald May and the Catholic mystic Thomas Merton, both of which are heavily influenced by Buddhism. This leads to statements such as 'decisions affect one's "natural" self, but through a willingness to participate in transcendent-level systems, one connects one's self to spiritual systems historically considered "supernatural"' (207).

Although the book claims to be concerned with how science impacts 'a theological understanding of soul and spirit,' I found there is little theology in the

book. Theology is largely reduced to anthropology. The review of theological perspectives on the soul is brief and limited. (I actually found the Wikipedia entry more helpful). There is no engagement with leading Protestant thinkers such as Luther, Calvin and Barth. Neither, is there exploration of relevant biblical texts or biblical scholarship. I would have liked discussion of texts such as Matthew 22:37-38 and 1 Thessalonians 5:23 which explicitly discuss the soul. A key issue is whether the biblical texts endorse the partition of a person into mind, body and soul.

I would have found it helpful if Graves had clearly stated his theological commitments. It appears to be a liberal Catholic position, which appears to deny the 'super-natural'. To what extent did his pre-suppositions and prior commitments determine his conclusions? I am curious whether he considers basic questions such as the following meaningful: did the historical person Jesus Christ rise from the dead? Was Jesus' death a substitutionary atonement for the sin of mankind?

Here is a possible way of considering how the author's approach might be received. If a reader is familiar with systems theory and considers it a legitimate and valuable academic discipline then this book may provide a way to understand better the notion of a soul and spirituality. However, a more stringent test of the significance of this work is the question, 'for those not familiar with systems theory is it worth learning it in order to gain new insights into theology?' My answer is no.

To me, cognitive science is a legitimate and exciting enterprise involving multiple academic disciplines. It is populated by many leading researchers from a range of disciplines and has made important contributions to our understanding of how the brain works and functions (and does not function at times). However, in distinct contrast, 'emergent systems theory' claims to be a 'theory of everything' that is 'going to change the world'. It is promoted by people such as Ervin Laszlo who do not hold regular academic positions and try to argue for highly speculative positions that are well outside the scientific mainstream. To me, Laszlo's writings are just scientific gobbledygook.

I was not convinced Graves has really adopted an 'emergentist approach' to theological questions. Alister McGrath and I have written separately how a key aspect to such an approach is to acknowledge two related points. First, ontology determines epistemology. Second, theology is a legitimate discipline in its own right. It involves objects, concepts, categories, and methods that are distinct from those in other disciplines. It cannot be reduced to psychology or anthropology.

There are a number of basic technical errors in the book. For example, the following statements are incorrect: 'hemoglobin does not contain iron' (14), 'Scientists, using galaxies as gravitational lenses, have demonstrated quantum entanglement among particles that at one time were separated over a hundred thousand light years' (84) and 'the pattern of protons striking the retina' (108).

Graves overstates the case in the following claims, with which most of my theoretical physicists colleagues would disagree. 'Quantum mechanical phenomena, such as non-locality, challenge physical reductionism.' (65); 'In the twentieth century, physicists discovered that the physical universe was in constant flux. Some physicists began looking to Eastern philosophies for a replacement for crumbling Western metaphysics…' (38).

I would have hoped for a higher standard from a book in the Ashgate Science and Religion series. In particular, I would hope for both a greater depth and breadth of scholarship.

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Benjamin Wiker and Jonathan Witt
A Meaningful World: How the Arts and Sciences Reveal the Genius of Nature
Downers Grove: InterVarsity Press, 2006. 257 pp. pb. $18.00. ISBN 0 -8308-2799-4

This is a disappointing book on an important theme. Its authors are both linked with the Discovery Institute in Seattle, and while both have written on scientific themes, their academic training is in ethics and literature respectively. The target of their polemic is materialist reductionism, represented, for example, by the writings of Richard Dawkins, or by the statement of Steven Weinberg in his book on cosmology *The First Three Minutes* that 'The more the universe seems comprehensible, the more it seems pointless.' Their aim is to show that the universe is in fact full of meaning, and that to reduce it, as in their view Darwinism does, to nothing more than random motions of atoms governed by chance and necessity, is both scientifically and philosophically mistaken.

Their method is to consider the quality which they call genius, the work of a great and original mind; they attempt to show what genius is, and how it can be recognised, and to demonstrate that the natural world, and especially the biological world, demonstrates such genius. So they consider first the plays of Shakespeare, represented by *Hamlet* and the *Tempest*, secondly mathematics, represented by Euclid's geometry, and in particular his proof of the theorem of Pythagoras, before looking at the history of chemistry, culminating in the understanding of the nature and properties of the elements, as represented by Mendeleev's Periodic Table. Their claim at this point is first, that the discovery and elucidation of the periodic table is evidence of human genius, an intellectual quality not explicable by Darwinian means; second, that the table itself demonstrates a quality of genius in nature which points to a cosmic designer; and third, that the chemistry has been so arranged as to act as a tutor, revealing its secrets step by step so as to lead human investigators deeper and deeper into truth.

This claim is taken further in their chapter entitled 'A Cosmic Home Designed for Discovery', in which after summarising some of the fine tuning of the laws and constants of physics necessary for life, they paraphrase the arguments of *The Privileged Planet* by Gonzalez and Richards, claiming not only that the earth is remarkably, perhaps uniquely, suited for life, but that it is also uniquely fitted for the process of human discovery. They conclude their main argument with a section on biology, which briefly rehearses arguments presented elsewhere (for example by Michael Behe and William Dembski) in favour of intelligent input into biological mechanisms, but focuses more on an attack on biological reductionism, in the sense of describing and analysing organisms in terms of parts and functions, instead of describing them as individuals or classifying them as species; they claim (if I understand them correctly) that this sort of reductionism takes away meaning. There is substantial critical reference in this section on biology to postmodernism, deconstruction, and the writings of Jacques Derrida.

It will be clear that this publication is part of the output of the Intelligent Design movement; in my judgement it is the least satisfactory of any of the books from this school that I have read. For authors with a background in philosophy and literature, the style of writing is astonishingly bad; their knowledge of scientific matters seems second-hand, and it is alarming for example that a book that makes one of its main subjects the elements of the periodic table should consistently misspell 'phophorus'. I wondered whether there has been any serious attempt at proof reading and editing, and I feel that in its present form it damages the reputation of IVP academic. I

am astonished that it receives such remarkable commendation from other authors in the Intelligent Design tradition; for Guillermo Gonzalez to write that 'I am not exaggerating too much to say that this book is in the same class as the works of genius its authors describe' is in my judgement ridiculous. This is a tragedy, for most of the readers of this journal will agree with the main conclusion of the book, that the universe is full of meaning and purpose, and that science properly understood confirms rather than challenges that verdict. It is an argument that deserves to be better made – and has been, for example by Alister McGrath (*The Re-enchantment of Nature – Science, Religion and the Human Sense of Wonder*; London, Hodder and Stoughton, 2002).

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Eliezer Sternberg

My Brain Made Me Do It: The Rise of Neuroscience and the Threat to Moral Responsibility

Amherst: N.Y.: Prometheus Books, 2010. 244 pp. pb. £10.99. ISBN-13 978-1616141653

A recent graduate of Brandeis, who majored in neuroscience and philosophy, has produced a book that reads as if an experienced professor wrote it. Although his beginning is like John Calvin – writing a book at an early age – he argues in opposition to Calvin by calling for a moral responsibility in light of human freedom. This freedom shows up in the fact that 'the agent can navigate his inner world of experience in any way he chooses,' and this is what 'distinguishes us from machines and from animals' (198). Sternberg's argument is that 'though the threat of neuroscience to free will and moral responsibility is strong, there is a way they can be reconciled' (19). Interestingly enough, Sternberg's case is not a *compatibilist* position; a theory that seeks to show how physical determination and human freedom are compatible. He differs from compatibilism because compatibilism defines freedom as 'having alternate choices available' and he defines it as 'the extent to which my mind controls my actions, regardless of what choices happen to be available' (41). He asks the pertinent question: 'Do I control my decisions or does my brain?' (23). Is what the brain does *sufficient* or *insufficient* to determine any given act?

Biological determinism, upheld by many scientists and philosophers – including Francis Crick, Joseph LeDoux, Mark Hallett, Richard Rorty, Pierre Laplace, and Paul and Patricia Churchland – is growing the further we understand the physical processes of the brain. It has 'been fruitful in science,' according to Sternberg, since it 'provides a basis for projectile motion, collisions, elasticity, and movements of planets' (29). This basis would not be there if the world behaved randomly on a macroscopic level, since there would be no way to have controlled measurements or provide reliable predictions. Science simply cannot function without some sense of determinism; the extent to which people, brains, and other physical objects are determined is the central question. The randomness of quantum events, discovered by Copenhagen and Bohr, cannot and should not be used to argue for human responsibility since 'we also cannot be held accountable for our actions if they are caused by *random* events' (34). We would have to discover something more than quantum indeterminateness and randomness to show humans are morally accountable.

So what justifies belief in human freedom and moral responsibility? For Sternberg, freedom lies in '*the ability of a person's conscious self to control his or her thoughts and actions*' (36), and the justification may lie in our common-sense

experience of controlling our actions and thoughts. I may decide to pick up a pen on the ground or I may not. But, as many eliminative materialists say, common sense and folk understandings of freedom do not justify belief in free will. Sternberg argues that certain deep, troubling moral considerations – like Jean Valjean's torment over whether to turn himself in or not – 'suggests to us that he has freedom of the will' (47). This is related to the notion of moral introspection, conscious deliberation, and lament, whereby an agent freely chooses between options, even where there are no rules to go by (only existential concerns).

Sternberg goes on to analyse two popular theories of mind: dualism and emergence. For Sternberg dualism 'doesn't hold water as a theory' and emergence 'doesn't help the case for free will and moral responsibility' because 'an emergent property may be more than the sum of its parts, *but it is still determined by its parts*' (49). So how can one escape these two positions? Modern findings in neuroscience indicate the level to which the brain determines behaviour: just think of Tourette's syndrome, Parkinson's disease, Huntington's chorea, alien hand syndrome, obsessive compulsive disorder (OCD), forced hyperphasia, and schizophrenia as examples. Many neuroscientists have used these as evidence for the direct correlation between brain and bodily behaviour. They speak of 'executive functioning' instead of 'free will'. The executive functioning, they say, is located in the frontal lobe; the area where the brain 'coordinates actions that reflect the knowledge and goals stored in memory' (63). For Sternberg, 'there is no doubt that, without a healthy brain, we would not have free will. That doesn't mean that free will is equivalent to the operation of the frontal lobe – only that it depends on it' (64). So if freedom is not located in some immaterial, irreducible substance or soul, or as an emergent property, where is it located?

As far as I can tell Sternberg does not answer this question. It might be what he would call a *boundless question*; one that is extremely hard to disentangle, identify and locate. He ends his work on a positive note saying that we [those in neuroscience] 'are up to the task' (199). I would agree with him in so far as neuroscience is rapidly growing and may someday provide a suitable answer that can be agreed upon. But this may be impossible as well. Arthur Schopenhauer rightly called this issue (the mind-brain problem) the 'world-knot' (*Weltknoten*) and it is obvious just how tight this knot is tied. Sternberg does a great job in clarifying and analysing this knot. His usage of life examples and metaphors allows the reader to follow his train of thought easily. He may need to further his approach by attempting a constructive argument for how neuronal activity and human freedom relate, but for what it is worth, Sternberg does a great job.

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Fraser Watts & Kevin Dutton (eds.)
Why the Science and Religion Dialogue Matters: Voices from the International Society for Science and Religion

Philadelphia & London: Templeton Foundation Press, 2006. 158pp. pb. $19.95. ISBN 13: 978-1-59947-103-7 & 10: 1-59947-103-5

The title for this collection of essays, emerging from contributors across the continents and the major religious traditions, is well chosen. No impartial reader could come away from this book with an indifferent attitude to the science and religion dialogue. In the context of the ecological crisis (to which the use of technology has contributed), and a socially and politically fragmented world order (in which religion is entangled), the stakes are high and the conversation

matters. The false hubris capable of being exhibited equally by science and religion needs tempering through the engagement of the one with the other (4).

As John Polkinghorne rightly observes, science succeeds by the narrowness of its ambitions (27). It concerns itself, almost entirely, with the general and the repeatable. Yet, as George Ellis affirms, the things that are of highest value in human life are the unique and unrepeatable (18). An inevitable danger of the (methodologically) reductionist stance of science is the promotion of a distasteful, dehumanising view of humanity (4 cf. 56). 'It is an extraordinary phenomenon', observes Ellis, 'people from sociology, psychology, evolutionary theory, molecular biology, neuroscience, philosophy, and so on, making claims that humans are far less than they actually are.' (8). The religious perspective on human identity offers a vantage point from which to challenge such conclusions. It is in any case unclear why one should listen to someone who is convinced that consciousness is but an epiphenomenon (a mere appearance) when, on their own account, such a view is not the product of 'rational cognition by a conscious and critical mind' (10).

Many contributors to this volume (among them Ellis, Polkinghorne, Rolston and Watts) point out that science per se is incapable of addressing ethical questions concerning an appropriate hierarchy of values by virtue of its restricted focus. Additionally, as Watts rightly asserts, science's methodological specificity cannot immunise it against the influence of culture (54-57) in both the choice of what science gets done and in the background assumptions utilised in its models of the world. Thus science is embroiled in the business of values even as it eschews questions of value. Without the kind of critical orientation that religion can offer science is dangerously blind.

A genuine dialogue is, of course, a two way process. Religion too has much to gain from science. Watts introduces the distinction between healthy and unhealthy religion (59) while recognising that the world religions do not constitute a monolithic whole; indeed they are 'not even the same kind of thing' (57). For him, an unhealthy religion is defined by being socially separatist and intellectually closed. Engagement with science not only offers a route of escape from these confinements, but, in science, religions may find a model of the search for truth that is intrinsically open to new insight. If religion is genuinely concerned with the ground of *all* reality then it cannot ignore the insights that science offers from within its realm of competence (44 cf. 69).

A particular concern of this volume, stemming from the impetus behind the formation of the International Society for Science and Religion, is that each religious tradition has potentially something to learn from how other religious voices have faced the *common* question of the appropriate mode of engagement with the claims of science (137). This is seen as an important expansion of the debate over against the engagement of Western Christianity with science which has tended to dominate. Accordingly, half this volume of essays is given over to contributors outside the Western Christian tradition who view the debate from their own religious stance. Thus we hear Jewish, Muslim, Hindu, Buddhist and Asian Christian voices wrestling honestly with the peculiarities of their context. This is not a question of forcing a pluralist agenda – though there is a diversity of approach here, compare Polkinghorne (49) with Kim (125f.) – but rather of enabling genuine dialogue.

These essays will be of interest both to seasoned observers of the science and religion debate, wishing to broaden the range of perspectives open to them, as well as the person who is new to this area and seeking an orientating map. The essays are, without exception, commendably succinct, lucid and engaged. They will reward the reader's attention.

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Celia Deane-Drummond
Eco-Theology

London: Darton, Longman and Todd, 2008. 240 pp. pb. £19.95. ISBN 0-232-52616-8

In writing *Eco-Theology*, Celia Deane-Drummond has produced an authoritative textbook for this important area of theology. This makes it essential reading for all those who are interested in environmental theology and it will almost certainly become the standard textbook in the field for the foreseeable future.

The book begins with two introductory chapters. The first provides an introduction to the key environmental problems (human population, resources use, pollution, climate change and biodiversity loss). The second considers the social issues of economic and environmental justice. These give a helpful context for the later chapters on theology. The next four chapters explore eco-theology from the four geographic points of the globe. The view from the South gives an excellent introduction to the emerging synergy between environmental concerns and the theologies of South American and African theologians, with an emphasis on liberation and justice. Likewise the chapter on the East provides a valuable overview of Eastern Orthodox approaches, whose tradition gives a central place for creation in theology. The chapter on the North considers environmental ethics and looks at the classic secular approaches of Aldo Leopold and Arne Naess. Though not all would consider these strictly eco-theology, their inclusion is extremely useful in an overview book of this nature. This chapter also explores creation spirituality, considering views as wide ranging as Teilhard de Chardin, Matthew Fox and Thomas Berry. The chapter on the West focuses on genetically modified crops, considering them from the perspective of social ecology. This did not quite seem to fit the chapter title but is informative and provides more context for Western environmental theology, which makes up the majority of the rest of the book.

Chapter seven acts as an archway into the second half of *Eco-Theology* by considering the strengths and weaknesses of biblical eco-theology. The final five chapters develop environmental theologies of Christology, theodicy, Spirit, eschatology and eco-feminist theology. Each of these chapters is well focused and each would stand alone as elegant essays on these important themes. The first chapter on Christology uncovers a paradox that an emphasis on the historical (earthly) Jesus can lead to a neglect of the environmental dimension of the Cosmic Christ as set out for example in the hymn in Colossians 1. This idea is developed and a more cosmic understanding of the incarnation is explored, drawing on John 1 and the concept of Christ as incarnate wisdom. In the chapter on theodicy the author considers the suffering of animals as well as some of the classic and modern responses to evil, including the work of experts such as Marilyn McCord Adams and Keith Ward. Deane-Drummond develops her own concept of a shadow Sophia based on a Christological approach. This develops her work on John 1 in the previous chapter. The chapter on eco-feminist theology gives a good overview of this popular area. The author convincingly develops a wisdom strand within this area, providing a coherent theology across these different sub disciplines. Ecology and Spirit and eco-eschatology both draw heavily on the ideas of Moltmann and propose an ultimate redemption of nature, which will set creation free.

The book ends with a postscript on praxis and some study questions. These serve to remind us that much of the purpose of environmental theology is to provide a basis for change and action. Overall this is a landmark book and an outstanding achievement. It is inclusive of a very broad range of approaches, while still steering a distinctive path through them. Deane-Drummond has drawn sensitively from non-Christian traditions

while providing a deeply Christian theological foundation.

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Nigel Bovey

God, the big bang and Bunsen-burning issues

Milton Keynes: Authentic Media, 2008. xxi+204pp. pb. £8.99. ISBN-13: 978-1-85078-806-5

Based on a series of seventeen interviews with well-known scientists, that were originally published in the Salvation Army magazine *The War Cry*, this book addresses the relation of science and Christian faith at a level that is suitable for the ordinary Christian (rather than those with a background in science). The author, a journalist, is not a scientist and has aimed to produce a book suitable for a thinking layman and has to a large extent succeeded. I would be happy to recommend this to Christians without a scientific background, and even to those not yet Christian who are interested in how science and the Christian faith can be related.

Each chapter, except the last, is an interview with a leading scientist who is also a Christian. Chapters start with a brief biography and end with a short 'fact file' that outlines the interviewee's career. In between, there is a series of questions to, and answers from, the scientist. The questions range over general issues such as: How did you come to faith? How did you get interested in science? What is your current research? Do you see a conflict between science and faith? Can science prove / disprove God? Is it possible to believe in evolution and be a Christian? and so on. There are also some very specific questions asked of individual scientists, for example: What light can an understanding of genetics shed on the virgin birth? Did Adam and Eve exist? What role do genes play in governing our behaviour? Do you approve of the use of human embryos for research? Thus the questions and answers span a broad range of topics relating to science and the Christian faith. On the whole the scientists interviewed give good, succinct answers, though inevitably there is some repetition of material in the responses as there are common views on some topics.

The final chapter is a summary of the interviews, with the author trying to pick out the common threads and key themes in the answers that the scientists have provided to his questions. The key themes chosen are: creation; limitations of science; faith; miracles; suffering; proving God; the Goldilocks effect; dark energy; the moral law; written evidence; eyewitness accounts; forensic evidence. I found this chapter somewhat unsatisfactory in that the space devoted to each theme was very uneven and their choice and arrangement did not seem to follow a totally coherent pattern.

If I have a criticism of the book it is that it features only the 'usual suspects', whose names will be familiar to readers of *Science and Christian Belief*, and no women at all are represented. This lack of women and younger scientists could give the impression that you will only be interested in the issues raised if you are older and male – this is unfortunate and, I think, a missed opportunity to broaden the appeal of the book and to show that Christians of all ages and both genders are involved in science.

Overall, this book is a useful contribution on the subject of science and Christian faith issues for the right audience (non-scientists). However, it will probably only have a short shelf life as science moves on and changes, so the book will seem dated in a few years time.

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John B. Cobb (ed.)
Back to Darwin: a richer account of evolution
Grand Rapids, Michigan/Cambridge UK: William B Eerdmans Publishing Company, 2008. 450pp. pb. £23.99. ISBN 978-0-08028-4837-6

Back to Darwin is a compilation of 23 chapters (and a single significant appendix) penned by 15 authors and edited by John Cobb. The central, unifying theme is a critical discussion of the metaphysical assumptions of neo-Darwinism and the book brings aspects of history, theology and philosophy to bear on the idea that evolutionary science and Christian belief can be harmonised. The book, of some 450 pages, is divided into four sections:

I. Background materials. This part deals with historical issues and examines the origin of the transition from 'design' to natural selection.

II. To broaden and diversify evolutionary theory. This part looks at alternatives to neo-Darwinism and some of the mechanisms in evolution.

III. The philosophical challenge to neo-Darwinism. This part looks at key issues of neo-Darwinism and its religious implications.

IV. Evolution and God. This part expands on the question of how we can affirm a role for God in a world explained by science and includes the enticingly headed chapter 'What God does'.

Plus an appendix on 'the metaphysics of consciousness and evolution'.

This is a complex and intriguing book and most of the 23 chapters could easily be the subject of a lengthy review for *Science and Christian Belief*. The range of topics is vast and while a few are self contained (and sometimes isolated from the rest of the book) many of them address philosophical subjects to do with evolutionary theory or its history.

The book is an expansion and updating of proceedings of a conference organised in 2004 by the Centre for Process Studies, an organisation dedicated to the exploration of the ideas of Alfred North Whitehead and it is around his ideas that much of the book revolves. Whitehead's influence is explained by the editor in the introduction to the first section as a world-view that postulates that 'materialistic and dualistic metaphysics' is misleading and proposes a replacement. This proposal is that 'energy' is the most basic unit (rather than matter) and that units of energy are events rather than objects. This leads to a metaphysics of organic events (which does not seem to be explained satisfactorily) as part of an energy flux: it becomes data for subsequent events to act upon. As this section is key background to the book the following passage is taken from it and quoted in its entirety.

> Accordingly, instead of viewing the units of physical reality as tiny lumps of matter that act on one another only from without, we emphasize the advantages of understanding them as momentary happenings or energy events, largely constituted by their relations with events in the past. They are interrelated occurrences of energy rather than self-contained material atoms. Whereas the individual entities posited by the metaphysics underlying neo-Darwinism theory are bits of matter affected only by physical forces, the energy events posited by process metaphysics are affected internally by their environments. (9).

From this the argument is developed the idea that genes act in relation to their environment and to one another (hence denying the idea of mutations being random). The first part of this statement is current to modern biology and indeed 'nature via nurture' develops the intimate connection between genes and their

environment (Ridley, M. *Nature via Nurture: Genes, experience and what makes us human*, Harper (2004)).

What is then added to this is a kind of network of relations that seems to rely on some form of transmission of information between the different hierarchies. Now this may fit in with the notion of quantum entanglement or, at least, be consistent at the quantum level, but the ideas require some founding in how this causes a relationship with macromolecules transcribing information at the DNA level.

In seeking clarification I accessed the centre's website http://www.ctr4process.org/ but the link to hear John Cobb's lecture 'Process theology: an introductory introduction' was broken.

The book, as stated, combines the writings from many authors and while a number profess Christian belief others do not and so contributions from Francisco Ayala (who authors four chapters) sit alongside Lynn Margulis and Dorian Sagan. Margulis, in particular, brings a hard and keen focus on the Gaia hypothesis. Here Lovelock's ideas are extended, but in a way that moves away from an evidence base towards a philosophy of environmentalism and human extinction. I often had a sense of authors bringing particular theories to the book and then riding these hobby horses.

At a conference, there would, no doubt, be some lively debate after a presentation and the chapters presented here would be greatly improved if there were some discussion about the ideas that were presented, but there is no sense of engagement with many of these issues and one wonders what the reaction was to some of the more contentious claims. Ideas come thick and fast. Questions about the nature of God, whether God is part of nature, if God is the divine Pattern in evolution are all mentioned but not examined.

Unlike neo-Darwinism the lens that Whitehead proposed to examine the universe with seventy years ago does not seem to have been updated. The trouble is that a lot of water has passed under the bridge since Whitehead first posited his theory of the universe. Modern physics paints a picture of the universe as being much stranger than it was perceived in the 1940s and within the nested hierarchy of causal explanation the proposals by Whitehead need much stronger underpinning. Science, by its legitimate methods, excludes purpose and seeks to minimise subjectivity. It provides a powerful, systematic way of describing how the universe works. To add levels of explanation in order to encompass purpose takes the scientific method beyond where it can justifiably be pushed.

For instance, take chapter 8 ('Hydrogen: humanity's maker and breaker' by Reg Morrison) dedicated to the hydrogen atom and the weakness of the hydrogen bond. He describes how this is the key to many processes in the universe from nuclear fusion in stars to the way that DNA is able to be transcribed to the power that turns the bacterial flagellum. Oddly, perhaps, the property of the bond that makes water such an interesting compound only merits the penultimate paragraph. In the final paragraph, however, he suggests that hydrogen is the 'vital force' or 'spark of life'. Why? It seems to me that this is an assertion that is neither needed nor makes sense. If it were true then the end of a life would be harder to describe. A dead body contains the same amount of hydrogen as a living body, but the processes have stopped. The editor also includes a note that this is part of a larger essay describing how hydrogen-related incidents will prove to be the death knell for humanity caught between the upcoming deficiency of hydrocarbon-based fuels and methane fuelled global warming.

The blurb at the back of the book claims that the discussions within present a holistic case for evolution that both theists and non-theists can accept. This is probably too bold a claim. Hardened materialists will not be convinced by the

philosophy and biblical literalists will baulk at the lack of any engagement with the Bible. There is much to be drawn from this book and, as a study book, it would yield fertile soil for discussion, but it is patchy and would definitely need chapter by chapter scrutiny.

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Robert John Russell

Cosmology : From Alpha to Omega

Minneapolis: Fortress Press, 2008. 344 pp. pb. £19.99. ISBN 978-0-8006-6273-8

This is an anthology of papers written over the last few decades by the physicist and theologian Robert John Russell, the founder of the *Center for Theology and the Natural Sciences*, partly re-edited and arranged in such a way as to present a panoramic overview of the way in which research in science & theology can inform our understanding of the beginning of the universe, its development, and its end and eschatological fulfilment. The overall approach is that of a two-way interaction which seeks to avoid unilateral relationships (theology adapts to the influence of science, but not vice-versa), 'picking and choosing' (41) on the part of theology, mutual isolation along the lines of the 'non-overlapping magisteria' paradigm, or reductionistic philosophies. Instead, deeper theological and scientific understanding is aimed at through taking the data of both fields squarely on board in such a way that, where there is apparent dissonance between the two, consonance at a deeper level is sought for. R. J. Russell follows as his guiding methodology in this endeavour Nancey Murphy's idea of employing the concept of Lakatosian research programmes in the encounter between science and theology: that is to say theology makes predictions about the characteristics of the physical world, which are then explored and pursued.

Thus, in the first part of the book, Russell provides a rigorous discussion of Big Bang cosmology and its relation to theology, especially concerning the question of actual infinites of space and time in current cosmological models in the context of theology's claim that the universe, not being itself absolute, is therefore limited and in some sense finite. The following exploration of the possibilities which the theory of transfinite numbers as developed by Cantor offers here is enlightening, though at times the reading becomes quite technical.

The same can be said of part two of the book, a discussion of the possibility that God acts continuously at the quantum level (though, importantly, not necessarily at that level alone), especially in biological evolution at the level of genetic mutations. This part also includes a rather detailed survey of the positions of several scholars in science and theology concerning this disputed question, not only as regards the issue of divine action in the realm of physics and biology, but also its relationship to human free will. The author gives a frank appraisal of scientific and theological arguments on both sides and follows a 'what if' approach, which in my view succeeds in presenting a solid case that the notion of divine action at the quantum level (or indeed a still deeper level yet to be discovered) makes scientific and theological sense.

The final part then deals with the relationship between Christian eschatology and scientific predictions for the future of the universe. Indeed, one of the chief merits of this book is that it addresses squarely an issue which is generally marked by a 'surprising lack of engagement' (302) even within the science-theology community. Russell steers clear of all-too-easy non-literal, demythologised or merely presentist readings of eschatology, proposing instead once again a two-way approach: science imposes constraints on theological eschatology, which must take scientific scenarios for the future into account and cannot simply

ignore them. At the same time, the resurrection of Jesus challenges the assumption that the only reasonable approach to the future consists in extrapolating the laws of nature. Instead, the resurrection is understood as a 'first instantiation of a new law of the new creation' (24), so that 'something radically new really happened *to the universe* at Easter' (289, author's emphasis). The author provides an outline of a Lakatosian research programme for a reconstructed eschatology, identifying directions of scientific research that hold promise for such a rapprochement, especially in the fields of relativity theory and cosmology and their implications for our understanding of time.

In sum, this book contains resources of great value for scholars in science and theology. The overall approach of 'playing the game fairly' (12), by which is meant daring a genuine encounter that takes the inputs of both science and theology seriously without falling into the traps of 'creationism', reductionism and two-language philosophies proves fruitful, and in my view the author delivers on his promise that such an approach leads to deeper understanding in both science and theology. The book is academic in style and by no means easy reading, and readers without a scientific background will not be able to follow some of the very intricate discussion, though large parts can nevertheless be read by the general educated reader with great profit.

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Norman C. Nevin (ed.)
Should Christians Embrace Evolution? Biblical and scientific responses

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I have been intrigued and horrified by this book. It is not the sort of rational exposition that one expects in a book published by IVP, particularly under their main imprint as opposed to the more venturesome Apollos. Rather, it is a concerted and frenzied assault on another book, that by Denis Alexander, *Creation or Evolution: Do we have to choose?* (Monarch, 2008). Clearly Alexander's book has touched a raw spot for the contributors to Nevin's compilation. The authors seem to have raided their lockers for all the anti-Alexander ammunition that they could find, even though much – perhaps, even, all – of it has been retrieved from ancient battles where history shows that it caused more noise than damage. This desperation surprised me. I have just come back from a meeting of scientists, ministers and conservative theologians in the United States where, in a forum where doubts about evolution might be expected to be widespread, Alexander's book was widely lauded.

Alexander is described as having a 'novel' theology which 'cannot be described as mainstream', and failing to address the significant theological questions that arise from embracing evolution (13). All I can say is that the ideas propounded by Alexander have been around for years; they may be faulty or contentious, but they are not 'novel'. And the questions which he discusses in *Creation or Evolution* are precisely those taken up in *Should Christians Embrace Evolution?*

The hate figure for Nevin's men is the 'theistic evolutionist'. Alexander is revealed as the front man for this tribe, with geologist Davis Young and geneticist Francis Collins hiding behind him (58). He is portrayed as someone who has sold out to the enemy through bad sci-

ence and sloppy exegesis. The problem is that the theistic evolutionist demonised by Nevin et al. is made of straw. For example, what about the historicity of Adam? Contrary to Nevin, ('The theology of theistic evolution necessarily denies any notion of a fall and curse…' (213), there is nothing in theistic evolution as such that denies the existence of a historic Adam and a historic fall. Many theistic evolutionists do not accept that such an individual ever existed, but nor do many reputable exegetes. Since Adam was the first man 'in God's image', we are not talking about genetic descent or anatomical resemblance (although this is wrongly claimed) (21). It is entirely possible to suggest that Adam actually existed in time and that God's image conferred on him 'extended outwards to his contemporaries as well as to his offspring, and his disobedience disinherited both alike'. This quotation comes from Derek Kidner's Tyndale commentary on Genesis, published over forty years ago. The criticism (53 in Nevin) that this has no ontological basis is odd: How does one ontologise God's image? Is it really a manifestation of the Pelagian heresy (51)?

Evolution is also described as a Gnostic heresy (72f.), although elsewhere the analogy of God's 'two books' is quoted without demur. The ghostly horde of non-evolution-believing scientists is resurrected again (without evidence) (113). The fallacy that knowing the mechanism behind a miracle discredits its miraculous nature is repeated (112); Aristotle dealt with that one three centuries before Christ. Nevin claims that there is no evidence that new genetic information can arise (218). He will find the evidence in any modern genetics textbook. Alexander is castigated for vagueness about God's immanence in creation. Aubrey Moore claimed that this was the great theological value of Darwinism as long ago as 1889.

The Editors close their volume (there is no Index) with a clear conclusion, 'Should Christians embrace evolution? Our answer is an unequivocal "no"!' I am afraid my conclusion is equally stark. In words adapted from my favourite review (originally referring to a film starring Elvis Presley), 'This is not a book to read, even by mistake.'

I was unpleasantly surprised by this book. IVP have a well-earned reputation for publishing sound scholarship. One may not always agree with it, but their books provide a solid basis for debate. Should *Christians Embrace Evolution?* fails badly on this criterion.

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