

Book Reviews

David Lindberg and Ronald Numbers (eds.)

When Science and Christianity Meet

Chicago: University of Chicago Press, 2004. 357 pp. hb. \$29.00. ISBN 0-226-48214-6

When undergraduates first start out doing history of science they usually come equipped with a number of preconceptions picked up from popular culture, one of the most pervasive being that science and religion are in conflict. Lindberg and Numbers have taught generations of students and none of them could have continued to labour under this error once they had passed through the University of Wisconsin-Madison where both men work. In 1986, they edited a collection of essays called *God and Nature: Historical Essays on the Encounter between Christianity and Science* and the current collection, dubbed ‘Son of *God and Nature*’ by one wag, continues their successful collaboration.

If anything, *When Science and Christianity Meet*, is even more of a textbook than the previous collection and is clearly aimed at university students in the United States. This is reflected both in the subject matter (three of the twelve chapters are on American science) and the fact that readers are advised that Yorkshire is ‘a large county in north east England’ while the location of Tennessee is left unstated! Also, the conflict hypothesis is attacked in almost every chapter. Over and over again we are assured that it is an inadequate description of history and the only martyrs it produced were the trees that supplied the paper it was promulgated on. This almost becomes tedious for those of us fully aware of the fact. But these are minor criticisms of a book that is both very interesting and extremely useful.

There are twelve chapters, each of which contains a different case study.

These include the standard controversial episodes in science and religion’s relationship such as Galileo’s trial and that of John Scopes, the so-called Monkey Trial. Contributed by Lindberg and Edward Larson respectively, these two chapters are probably a little bit too simplistic as they are intent on debunking myths (the film *Inherit the Wind*, in Larson’s case) rather than producing new understanding. Still, both chapters are good fun and it is useful to have such succinct summaries of these events available. Many of the other chapters are excellent primers on issues such as the mechanistic universe or natural history, geology and Genesis but will be of less value to anyone who already has a basic grounding in history of science. Unfortunately, David N. Livingstone’s chapter on Darwinism is one of the poorest precisely because he tries to cram in a bit too much of his inestimable erudition on the subject.

Two chapters, however, stand out and are worth the price of admission alone. G. Blair Nelson has barely completed his PhD but, as Ronald Numbers was his supervisor, was drafted in to write up his research on the nineteenth century debate about whether man is one species or many. This is a fascinating topic which most readers will know nothing at all about. Nelson’s writing is clear and he tells his story with some flair for getting maximum impact out of the killer fact. In this case, contrary to the usual conflict scenario, there is also the historical irony that it was racist anti-Christians who were pushing the wrong science and Christians who insisted all men were the same species. Robert Bruce Mullin contributes a chapter on the little known but illuminating matter of the prayer gauge debate sparked off in 1872 by the suggestion of a test to see if prayer had any healing effects. It never took place (although something similar was attempted recently) but opens up all

sorts of interesting questions about the competences of science and theology.

Lindberg and Numbers' collection is a vital addition to the textbook armoury as well as containing enough meat to be an interesting read for those who already have a firm grasp of the history of science and religion. They and the other contributors are to be commended for their efforts.

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Celia E. Deane-Drummond

The Ethics of Nature

Oxford: Blackwell, 2004. 256 pp. pb. £19.99. ISBN 0-631-22938-8

This book adds to the already impressive list of books on theology, biology/nature and ethics written by Professor Deane-Drummond. In it she shows how a modern virtue ethics, building on and re-interpreting ideas from St Thomas Aquinas can successfully illuminate a wide range of ethical issues in modern biotechnology and in our handling of nature. Central to this ethics is an insistence that prudence or practical wisdom is the primary of the cardinal virtues, and that the right use of wisdom can only take place within a realisation that the world is not contingent but created. The author calls this a 'Wisdom ethics'.

The most original and groundbreaking part of the book is probably the application of wisdom ethics to the environmental area. While an application of a virtue ethics approach to interpersonal ethics is relatively straightforward and has been explored by, for instance, Philippa Foot and Rosalind Hursthouse, a virtue ethics approach to the impersonal area of environmental concerns and ecology seems initially more problematic. The author, however, manages to show convincingly

that wisdom must be at the core of any adequate environmental ethics. Approaches denying the role of wisdom either rely on a false model of ecology, or on a problematic theology of nature.

Other parts of the book deal with animal ethics, biotechnology, cloning, Gaia and feminism and they all show the author's ability to weave together theology, philosophy and up to date biological knowledge. At the end of the book even the most ardent opponent of virtue ethics must have some niggling doubts whether there is not something to be said for the relevance of a wisdom ethics.

This is not an easy book to read. Not because it is badly written, but because it assumes that the reader possesses a vast amount of background knowledge in theology, philosophy and to a lesser extent biology. I can nevertheless recommend it wholeheartedly to anyone interested in a sophisticated and thoughtful rethinking of virtue ethics for the modern world.

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Stephen Barr

Modern Physics and Ancient Faith

Notre Dame, Indiana: University of Notre Dame Press, 2003. 312pp. hb. \$30. ISBN 0-268-03471-0

This well-informed book, written by a physicist, aims to show that the clash between physics and biblical truth was a passing episode, and that recent advances in physics heal the rift by relating well to scriptural truth. I welcome the author's aim of reconciliation, believing that revealed and observed truth both reflect the intentions of God. Most of the battles were not really between physics and scripture, but between the Hebraic outlook of scripture and the

Greek-influenced philosophy of Western culture in which science grew. And grow it did, as soon as it stopped asking what things were (or were for), and asked merely how things interact with each other. Science is the study of order in nature, of the patterns that arise in the created world. Interpreted through the Greek eyes of our culture, though, its success has led to a materialist outlook and to what Barr calls the 'marginalisation of man' – not at the centre of the material universe, and supposedly a chance outcome of evolution. Navigating through the resulting debate is a difficult task.

Scripture does claim that science is sometimes transcended – there is a clash between the law of gravity and the report of Jesus and Peter walking on water, and Peter sinking as his faith weakened (Matt. 14:25-31). Likewise the basis of Christian faith, Jesus' resurrection following a very public death, will never be biologically explicable. Thankfully, God sometimes has higher priorities than the rules he built into the world. But generally we expect science and scripture to accord with each other.

Barr's first example of how modern physics accords with the Bible is the 'Big Bang' theory of cosmology. We can apply the equations of general relativity to the entire universe and, by working backwards from the present rate of expansion and size of the universe, both found by observation, we deduce that the universe began as a single point thousands of millions of years ago. Scientists call the instant at which this point began to expand the 'Big Bang'. Einstein showed that time and space are related, so that time as well as space came out of the Big Bang. This fits beautifully with the notion that time, like all that is not God, is created – a concept that is notoriously hard to grasp. (Try it!) So the difficulty of reconciling astrophysics and scripture, which arose with the rise of science, went away with further scientific progress. It is also necessary to understand that the six *Yom* ('days') of creation in Genesis

need not necessarily mean six twenty-four hour intervals, but six eras. This is an ambiguity that English shares with Hebrew, as in 'steam power has had its day'. The 'day of the Lord' that the Old Testament repeatedly promises clearly refers to an era.

Barr next examines 'design' arguments for God's existence. It was Darwin's theory of evolution that put design arguments in the forefront of the debate between science and scripture and greatly widened the unhappy rift between the two. People generally either find it obvious that God is reflected in the order and beauty of the world ('The heavens declare the glory of the Lord') or they don't, depending on their prior beliefs about the existence of God. Since those preconceptions are stronger than logical argument, design arguments should not be mistaken for evangelism. Attempts to make design arguments watertight have caused them to become increasingly complicated, and when I am asked to prove that God exists I prefer to ask what would count as proof, or to reply that I was recently privileged to have had a conversation with God. The resulting discussions are more interesting than ones about blind watchmakers.

Another facet of design arguments considered here is the 'Anthropic Principle,' about the values of those 'fundamental' constants that currently have to be determined experimentally. If those constants differed only slightly from their actual values, we – indeed life – could not have come into being. Is this a valid 'design' argument for a God who fine-tuned the universe? Zealots who use such reasoning to seek the probability of a Designer should remember that a future theory might yet be discovered which correctly predicts the values of all those constants. In that case God would supposedly have had no freedom at all – a *reductio ad absurdum* to Christians who believe that God has sovereign freedom over his creation. Certainly there is power in qualitative arguments that the universe is

fine-tuned, but the probability of a theory depends not only on the details of that theory but also on the theories it is tested against – the class of theories considered – and that choice is up to us. Of course, we can use the observed abundance of life-facilitating carbon to make inference about unknown physical constants, in the same way that observation and theory are related in other areas of science. That is how Fred Hoyle predicted (correctly) a detail of the spectrum of Carbon-12 in the 1950s. Most people would call this an application of the so-called weak anthropic principle, and although there is no agreement over terminology (Barr specifically rejects what he calls the ‘weak’ anthropic principle), it is abuses rather than legitimate uses of the idea that tend to give anthropic reasoning a bad name.

Barr moves on to issues of mind, including the continuing tension between deterministic laws of physics and human free will. But until ‘free will’ is defined in terms of basic physical quantities there is nothing to debate, much fog about the defect by which quantum mechanics fails to predict deterministically and about ‘emergent properties’ notwithstanding. It has even been suggested that a unified theory of quantum mechanics and general relativity is needed to describe thought processes in the brain. I doubt whether there is more in this argument than the hope that two things we do not understand might be related. Barr goes on to discuss in detail the argument of John Lucas that the human mind must be more than a computer program. Building on the famous theorem of Kurt Gödel, Lucas explains that if we were just computer programs then we should be able to know our own programs and outwit ourselves, which is clearly impossible. (This is of course a simplification!) Passions run high over the issue because materialists suppose that the ‘extra’ that distinguishes humans from computers would be intrinsically mystical, in opposition to their worldview. But I believe less is at stake. For we now know that the assem-

blies of hardware called neural nets, which resemble the brain, can perform what looks like reasoning following ‘training’ exposure to inputs. Yet they do not contain programs in the sense used by Lucas, and it is far from clear that they are equivalent. In that case the Lucas’ argument is irrelevant. A better way to show we are more than computer programs is to ask: How does a feeling feel? This does not refer to what a feeling correlates with in the material world (tears on cheeks, or brain patterns), but something in a different realm. Tears or brain patterns don’t tell us how a person actually feels; to do that we must observe their tears and then go to our own inner library of feelings to recall how we feel when we cry. Where does the inner library come from, or at least the basis for it that develops during growth? Christians understand it as part of the image of God. A further question of the same sort is: Can a machine know that it exists?

I am not convinced this book succeeds in showing that modern science harmonises better with scripture than older science. But the work is such a deep and well-informed survey of the interface between scripture and science, and of its history, that it is worth buying for that alone.

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Celia E. Deane-Drummond
Biology and Theology Today

London: SCM Press, 2001. 248 pp. pb.
£16.95. ISBN 0-334-02823-X

Most scientists are aware that their personal theological and ethical beliefs are likely to impinge upon their concept of nature, and therefore influence their practice of science. The work of Isaac Newton, revealing order in nature and leading to the rise of a mechanistic

worldview in science, was inspired by biblical study and a desire to look into the work of the God he openly acknowledged (*Nature* 243, 271; 2004). The science of our own age is equally entwined with the theological and ethical attitudes of both the scientists and the public, who, through democratically elected governments, can control the funding and the development of science. Whereas science and theology were once at loggerheads, they are now seen to be intertwined as closely as the strands of a molecule of DNA. The application of science in society, therefore, needs to be examined in the light of clear ethical and theological thought.

Celia Deane-Drummond examines in this book the current relationship between theology and biology, using the case studies of genetic engineering and ecology. The science of these two disciplines is laid out in a simple and reasonably unbiased manner, in as far as any account of scientific research can be truly disinterested. Scientists, the author tells us, emphasise the public worth of science because they expect to be met by hostility and suspicion. This suggests that the dissemination of science by scientists is slanted and suspect. But then Deane-Drummond's subtle insertion of emotive words into her own interpretation of science rather confirms the scientist's fears. Biotechnology, she tells us, is 'the commercial application of biology'. This is an unfair and rather cynical definition, since biotechnology at its best is altruistic, seeking the improvement of humanity's lot, and its commercial aspects are often the inevitable consequence of making practical and widespread use of science. Perhaps she has inadvertently proved her point that we each begin our approach to ethical problems with entrenched attitudes.

Our attitude to modern science, in particular to genetic modification and ecological problems, the author tells us, must be determined by Wisdom. She expends time and care on the problem of

defining this Wisdom in its historical context and then applying it to the modern applications of science in society. Take the genetic modification of organisms, for example. Is the transference of genes between species simply an extension of domestication and breeding, or is it the usurpation of the creative role of God? It is interesting that Hieronymus Bosch also saw the mixing of species' characteristics as the essence of devilish disorder in some of his imaginative images. Wisdom in this case, we are told, will be directed by love for the organism, and our action should be determined by whether the outcome will be for the good of that creature. On this definition, however, no plant or animal breeding could ever have been regarded as Wise, since almost all of the characters we have bred into our domesticates reduce their fitness. Few would survive if deprived of human care and protection. Whether we like it or not, agriculture and its associated breeding programmes have always been directed at human benefits rather than those of the domesticated species. Is this Unwise, or unethical?

Ecological issues in the book centre on the Gaia Hypothesis. The holistic concept of a world that is constrained and directed by positive and negative feedback mechanisms, linking the living and non-living world, is an attractive and scientifically acceptable one. Most ecologists are happy with the idea of a complex and self-sustaining system that adjusts to stress and, at least so far in Earth's history, recovers from catastrophe. The adoption of the name Gaia, or Gaea (the Greek feminine personification of the Earth), was perhaps an error on James Lovelock's part. The suggestion for a name came from author William Golding and has led to scientific suspicion and New Age delight. That the Earth itself (or herself) might have a sense of purpose and destiny is clearly anathema to both the scientist and the Christian. The author, however, feels that the organic image of Gaia would have been accepted more readily if women rather than men

were responsible for the development of science.

When facing the ethical and theological dilemmas that modern science places before us, it is only too easy to hide behind the vague and intangible concept of Wisdom. Would that it were easily obtainable. Would that all humanity could agree upon its nature. The concept of Wisdom provided by this book, however, or 'Lady Wisdom', 'Sophia', 'the feminine face of God', does not help me personally in resolving scientific, theological, or ethical dilemmas. But the thesis presented here is thought provoking, sometimes irritating, and may assist some in the clarification of their attitudes.

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C. L. E. Lewis and S. J. Knell (eds.)
The Age of the Earth: from 4004BC to AD2002

London: Geological Society of London
Special Publication No. 190, 2001.
288pp. hb. £80.00. ISBN1-86239-093-2

This work is the collection of papers presented at a conference in June 2000 under the auspices of the History of Geology Group of the Geological Society on the age of the earth. Most are devoted to historical topics and the rest are on contemporary geological aspects on time. It is a great shame that this book is so expensive that few will buy it, yet it is one of the most valuable books I have read on the age of the earth, which is so often eclipsed by cosmological concerns.

There are twelve essays on historical aspects ranging from Ussher's magic date until today. All are of high quality but Martin Rudwick's essay *Jean-Andre de Luc and nature's chronology* is the most significant. Though the primary concern is the development of the under-

standing of geological time over the last 350 years, several authors also discuss the relationship of geological time and Christian teaching. The result is that there is a good survey of the development of geological time, from the virtual biblical chronology in the seventeenth century, through the many guesstimates and Kelvin's arguments of the nineteenth century to the radiometric age-dating and cosmological arguments in the twentieth.

The tenacity of the warfare historiography and the assumption that orthodox Christians were literalists is still to be found in many papers, except Rudwick's, though it is becoming muted. Rudwick totally undermines this scenario in his extended study on Jean-Andre de Luc (1727-1817), and damns the suggestion of the conflict between Genesis and geology (51-2). De Luc was a Swiss savant with geological expertise and from 1778 wrote much on geology and its relation to Genesis, but even though he lived in Britain he wrote in French. De Luc attracts a bad press, because he opposed Hutton, yet argued forcibly for an ancient earth (though younger than Hutton's) and its compatibility with Genesis. This was in the 1770s, sixty years before Lyell. Rudwick argues that the Christian de Luc was decisive in transferring chronology from Ussher's 4004BC and opening the way for geological time.

There is not space to discuss each paper, but I must refer to Torrens' fascinating account of how William Smith changed from young earth to old earth in about 1800. In an essay *Genesis and Geochronology* on John Phillips (1800-74), who calculated the age of the earth to be less than 100 m.y., Morrell argued that Phillips took his 'liberal' ideas from the Unitarian Kenrick and Adam Sedgwick – an Evangelical who once criticised Francis Close for 'stretching Genesis like an elastic band!' I must not cavil as this book gives one of the best historical surveys of geological time available.

The last third of the book deals with

contemporary work on the age of the earth. There is a fine chapter on *The Oldest Rocks on Earth* and an intriguing essay by Hofmann suggesting that the use of lead isotopes giving the age as 4.5 b.y. was a geochemical accident. Brent Dalrymple, who wrote *The age of the Earth* (1994) gives a good summary of *The age of the Earth in the twentieth century*. Most fascinating is a table giving pre-1950 estimates of the age of the earth.

This book can be recommended unreservedly to a wide range of readers, as the historical chapters are both reliable and accessible and the technical chapters give an excellent summary of the state of play today. My only complaint is the price.

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William B Drees

Creation: from Nothing until Now.

London: Routledge, 2002. 115pp. pb.
£12.99. ISBN 0-415 25653-4

Drees, physicist, theologian and philosopher, Professor of Philosophy of Religion and Ethics, University of Leiden in the Netherlands, describes his work as a 'grand tour from nothing until now' (56). As a tour guide (for the general reader) it is written with charm, well informed and up to date, holding one's interest and devoid of unnecessary technical jargon. Drees begins his saga in poetic style in the grand tradition of the creation epics from the birth of our civilisation in the cradle of the Fertile Crescent. He then takes each stanza of his creation poem and expounds it in the prose of a short essay (he calls Scenes) with titles: (1) When time was not yet, (2) Mystery, (3) Integrity, (4) Independence, (5) Purpose, (6) Luck, (7) Humanity, (8) Religion, (9) Critical Thought, (10) Responsibility –

with a conclusion, 'From now on: Playing and Imagining God'. The result is a handy guide-book of just 96 pages with some 15 pages of useful additional notes for guidance at the end.

As the ancient creation dramas unfolded in the mythology of their time Drees cleverly expounds this theme in the mythology of modern science showing how it likewise can give meaning to our existence – the role of religion. So, for example, on 'Integrity' he concludes: 'The universe has its own integrity; it stands on its own feet, without a supply of mass, energy or space flowing in from elsewhere.'(24). Consequently there are no 'miraculous interventions', so he prefers (following Tillich?) 'to think of God as the sustaining Ground of Being' (25). 'It is, in my opinion, a very good thing for faith if we do not give miracles a place in our view of natural reality', as faith then runs the risk of believing in a 'God of the gaps' (55). Regarding 'Purpose' he believes that knowledge 'of natural history diminishes the cosmic significance of human existence' (29) in that 'purposiveness has emerged in a process without purpose' (30), i.e. evolution shows 'no foresight'(31) and can give us only a 'cumulative' history as 'information is embodied in the DNA' (32). Nevertheless the 'contingent character of the process is also a basis for freedom and responsibility' (40).

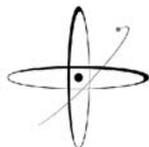
Regarding 'Humanity' he first traces the evolutionary path of anatomically modern humans and, with regard to their cultural and religious characteristics, believes that, 'Myths, stories transfer the values of the group from generation to generation' and religious practices and beliefs 'may have been important to our ancestors as ways to maintain social, cosmic, and personal order' (51). 'In the religious myths our lives are confronted with something different, something better' (53). He believes the 'road to God is not one of extrapolation but of denial, of abandoning our images and descriptions' (58). So, rather than 'focussing on the

truth claims embodied in metaphors and models', he prefers 'to give primacy to the relevance these images had in the context of the period.' from which they came. (93) 'I believe that we should seek to share the faith of Jesus, rather than faith in Jesus' (54).

Such contextual theology runs the risk of seeing biblical images as redundant in the modern world and the confinement of faith to the scientific world-view of undermining biblical authority and that of our encounter with God. In our contemporary world which reaches out in expectation of extraterrestrial life, it is his opinion that 'we need to think more modestly about Jesus' (91). As to the future he again insists we must be willing to discard outdated models and images – 'no tradition is beyond dispute and beyond development' (94); we 'can "play God", create new visions and new realities' (84).

There is much here to both stimulate and challenge evangelical faith in Jesus. John Barrow in his book *Impossibility* (1998) quotes George Bernard Shaw: 'The reasonable man adapts himself to the world: the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man.' As Drees ends this open-ended tour guide with a final paragraph on 'Wandering Humans' we may feel a Pauline frustration that we have adapted ourselves too much to scientific rationalism and that the way forward is through the unreasonableness of the Cross, which is for 'those who have been called... Christ the power of God and the wisdom of God' (1 Cor.1:24).

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