

Book Reviews

Ann Thwaite

Glimpses of the Wonderful – the Life of Philip Henry Gosse 1810–1888

London: Faber & Faber, 2003. 387pp, hb £25.00. ISBN 0-571-19328-5

Those many who have read *Father and Son*, Edmund Gosse's bitter-sweet biography of his father, the great Victorian naturalist Philip Henry Gosse FRS, will have come away with an image of the father as 'something of a monster' and a 'joyless Puritan'. Ann Thwaite has done a great service by putting the record straight in this sympathetic biography, pointing out that *Father and Son*, published in 1907 nearly 20 years after the father's death, and destined to remain in print continuously to the present day, is riddled with historical inaccuracies and paints a picture of Henry Gosse that is barely recognisable when compared with that provided by the writings of his other contemporaries.

Philip Henry Gosse was born in Worcester on 6 April 1810 and his family moved to Poole in Dorset soon afterwards. It was in Poole that Henry's early interests in marine biology were kindled by his father's elder sister, Susan Bell. At the same time an early grounding in biblical teaching was ensured by regular attendance with his family at a local reformed 'Meeting House' (now a United Reformed Church). Henry's father lived the life of an impoverished painter and Henry therefore left school and started his first job in Poole as a shipping clerk soon after his fifteenth birthday at the princely wage of £20 per year, deemed to be somewhat miserly even by the norms of 1825. The job did not last long and in 1827 Henry went to Newfoundland, the Atlantic crossing taking 46 days, where he spent the next eight years, once again working as a shipping clerk in this chilly outpost of British colonialism. The year 1832 marked two turning points in Gosse's life: first he managed to purchase

for ten shillings (an enormous sum in comparison with his income) a copy of Adam's *Essays on the Microscope*, a book that set him on the road as a systematic collector of biological specimens. 'Providence', Gosse mused later, 'often causes the most important events of our life to originate in some trifling and apparently accidental circumstances....After years only can decide, how much of that happiness which chequers my earthly existence, may have depended on the laying out of ten shillings at a Book-sale'. The second great event of 1832 that was to have a profound effect on Gosse's life was his own turning to personal faith in Christ. This happened as a direct consequence of the severe illness of his sister Elizabeth back in Poole, an event that made Henry think very deeply about the purpose of his own life: 'I immediately, solemnly, deliberately and uprightly, took God for my God....I closed with Him; not hypocritically, but sincerely; intending henceforth to live a new, a holy life, to please and serve God.' For the rest of his life Henry kept alive his twin passions of service to Christ and a fascination with the natural world, remarking that 'I cannot look at the Bible with one eye, and at Nature with the other, I must take them together'.

In 1835 Gosse left Newfoundland to join a somewhat ill-conceived farming enterprise in Canada, moving on to Alabama and finally returning to England in 1839 on the schooner Isaac Newton, writing a book on the natural history of Canada during the long voyage home. Despite initial thoughts of becoming a church minister, Henry found upon his return that he was already too old at the age of 29 to be considered for ministerial training. Through links with his cousin Thomas Bell, Professor of Zoology at Kings College, London, and later President of the Linnean Society, Gosse moved to the capital where he managed to become established within a circle of

well-established naturalists. Henry's breakthrough was when his very first book, *The Canadian Naturalist*, was accepted for publication, but it was a time when virtually all scientists were men of independent means and so he started his own school as a way of securing a regular income. In parallel Gosse pursued his studies in natural history, publishing regularly in natural history journals, initially preaching on Sundays for the Wesleyan Methodists but later joining a local group of Christians who met for informal worship and who were already by this time (1843) known simply as the 'Brethren'. Eventually Gosse was commissioned to write other biological works and the success of his *Introduction to Zoology*, published by SPCK (who over the years published a further 12 of his books) secured Gosse sufficient income to launch into a full-time career as a natural historian.

A visit to Jamaica during 1844-46 on a prolonged collecting expedition and a further spate of books helped to establish Gosse as one of the most widely read naturalists of the Victorian era. Moving to Devon in 1852, Henry there developed his passion for marine biology, and support from the likes of Charles Kingsley as well as T.H. Huxley ensured that a continuous flow of clients made their way to his courses on the natural history of the seashore. Self-trained as an entomologist, botanist, lepidopterist and ornithologist, it was above all as a marine biologist that Gosse became well-known in Victorian society, not least due to his development of the aquarium, a word which Henry himself invented. Stephen Jay Gould wrote of Gosse that he was the 'David Attenborough of his day'. Thwaite brings out well the way in which Gosse's sense of awe at God's creation was so thoroughly integrated with his scientific writings. In his *The Aquarium: an Unveiling of the Wonders of the Deep Sea* (1854), Gosse reminded his readers that whereas (in Thwaite's summary) 'natural science can teach us many useful lessons and brings us, in a sense, into the pres-

ence of God...there is no way it can help us to salvation. That is only through the blood of Christ and through the written word of God.'

Gosse was a regular correspondent of Darwin and met him at the Linnean Society in 1855, responding to his queries on the minutiae of the behaviour of rock pigeons as Darwin was writing the *Origin of Species*. Edmund Gosse wrote of his father that he was 'captivated at once by the simplicity, frankness and cordiality of this great and charming man'. In 1856 Gosse was elected Fellow of the Royal Society after presenting several papers to the Society during the preceding years. His recommendation was signed by Owen and Huxley amongst others. Gosse's later description of his election to his brother William was characteristically robust: 'But what would all this be worth if I were not a member of another Royal Society, even of that society of Kings and Priests, for whom Jesus died. This is the true honour, to be an heir of God and a joint-heir with Christ, and this, through grace, has long been mine.'

Whilst Darwin was preparing his *Origin of Species* for publication, Gosse was working on a very different kind of book, in fact his only book that proved to be a complete failure, although it is the one now for which he is chiefly remembered. Henry, a firm believer in the fixity of species, was very optimistic that he had found a theory that would reconcile 'Scriptural statements and Geological deductions'. It was called *Omphalos*, the Greek word for 'navel', for central to the book's theme was the question: 'Did Adam have a navel?' Gosse did not believe (despite his son's later claim) that Creation took place in six literal days, preferring instead an interpretation of Genesis that allowed for long periods of time. Nevertheless he did believe that each species, including humankind, had been created separately by God, a view still shared at this point by most of his fellow scientists. Gosse's own reconciliation of his belief in the fixity of species

and a literalistic reading of the early chapters of Genesis was nothing if not imaginative. Ironically it was an attempted reconciliation that led him to adopt a non-linear view of time, in contrast to the widely accepted view that biblical teaching has nurtured understanding of a universe with a beginning and an end, with a 'time-line' of God's actions in between. Instead Gosse tried to argue that all the processes of nature move in circles: '...when the Omnipotent God proposed to create a given organism, the course of that organism was present to his idea, as an ever-evolving circle, without beginning and without end'. Therefore the whole of creation, complete with its biological diversity, exists in the mind of God who, by divine fiat, wills that his creation is actualised at a particular moment in history. At the dramatic moment of creation, wrote Gosse, 'the world presented, instantly, the structural appearance of a planet on which life had long existed'. The merry-go-round of creation is invisible until the whistle blows, when it appears complete with tree-rings, tortoises with laminae on their plates, and human navels. It was surely his reading of Gosse that led Bertrand Russell to comment at a later date that 'God could have created us all two minutes ago complete with our memories and the holes in our socks' (a point he made more formally in the ninth chapter of *The Analysis of Mind*).

The most charitable word that contemporary reviewers could find in describing *Omphalos* was 'ingenious'. More typical was the comment by the *Westminster Review* that Gosse's theory was 'too monstrous for belief'. The reactions of his Christian friends were also robust. Gosse's good friend Charles Kingsley made the rather obvious point that the whole fantastic theory made God into a deceiver on a grand scale ('You make God tell a lie' wrote Kingsley). Worried for his own children's faith if they read such nonsense, Kingsley also commented: 'I would not for a thousand pounds put your book into my children's hands', pre-

sumably not quite the response that Henry had been hoping for, given that the intention of his book had been to defend biblical faith against the sceptics!

But Thwaite is careful to point out that the negative reception to *Omphalos* did little to harm Henry's career at the time: during the three years that followed its publication, Gosse published not only 30 more papers, mostly zoological, but also four more books on natural history. Gosse was a man of enormous energy and in parallel with this outpouring of publications, also found time to act as unpaid pastor for his local Brethren assembly in Devon. At the same time he continued to hold Darwin in high regard and they continued to exchange views on natural history, like the Victorian gentlemen they both were, carefully avoiding the subject of 'descent with variation'.

In reacting against the inaccuracies of *Father and Son*, Ann Thwaite could so easily have painted her subject in heroic mode, but the warts are well represented in her biography as much as the achievements. The picture that emerges is of a great enthusiast for natural history who inspired generations of Victorian households to explore the biological diversity around them, bringing it right into their homes in collections and in aquaria. These 'glimpses of the wonderful' were all part and parcel of the wisdom of God in creation. Gosse never separated his science from his faith, and even though his attempts at integration may have been at times misplaced, the priority he gave to the kingdom of God in his scientific career, as much as in his family life, continues to challenge. Ann Thwaite's splendid biography is warmly recommended.

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G.B. Ferngren (ed.)

The History of Science & Religion in the Western Tradition: An Encyclopedia

Princeton: Princeton U.P., 2000. xxi+586 pp., hb. £90. ISBN 0-8153-1656-9

As far as the academic discipline of the history of science has pillars, you will find them in this volume. To discover names such as Colin Russell, John Hedley Brooke, Richard Westfall, Jim Moore, Edward Grant, Ronald Numbers, David Lindberg, Owen Gingerich, John Polkinghorne and David Livingstone scattered amongst the contributors to the 103 diverse chapters of this work is a powerful indicator of its prowess, especially to see several of them contributing more than one submission, according to their specialist expertise.

This book comes as close as I have seen to a definitive reference work on the current Western understanding of the history of science and religion. Running to almost 600 A4 pages, its encyclopaedic remit is only diminished by its price tag. It is a mammoth ten-section work, more a collection of essays than an encyclopaedia.

Section 1 explores the generalities of the relationship between science and religion. It includes a clear explanation of the conflict thesis and many other useful background or comparative articles, enabling the reader to grapple with common and less common interrelating ideas from theodicy to the impact of nineteenth-century biblical criticism on the relationship between science and religion.

The second section contains four biographies: Galileo, Pascal, Newton and Darwin are presented as exemplars of the Western tradition's grappling with science and religion through history. The third section focuses on Western thought traditions, with essays on intellectual foundations and philosophical backgrounds, aiding the understanding of both the heritages of science and religion.

Section four narrows down the focus specifically to examine individual religious traditions or historical periods – such as 'Islam' or post-Tridentine Catholicism or a history of Creationism since the publication of *The Origin of Species*.

The remaining six major sections, making up more than half the book's length, examine the relation of religion to specific scientific theories and aspects of science, from astronomy and cosmology to medicine and psychology.

Even the editorial advisory board reads like a hall of fame for the discipline of the history and philosophy of science and religion, and the six dozen or more contributors include experienced Christian communicators, academic scientists, theologians and historians from the UK, wider Europe and North America. The editors have managed to attract experts to contribute according to their specialist areas, such as Jim Moore – a biographical essay on Darwin; the late Richard Westfall on Newton; or John Hedley Brooke on Natural Theology.

Obviously the editors had many tough choices as they tried to cover the whole history of science and religion from a Western perspective. The size, and therefore the range, of the book and the spectrum of contributors they could draw from make this encyclopaedia the most comprehensive essay collection on the subject that I have seen. It is one that can afford to bear the weight of both popular intelligent comprehensibility and also rigorous historians' critical academic gaze.

Chapters tend to be between four and ten large pages, but each one can comfortably be read at a sitting. As might be expected from the contributors, there are competent examples of addressing the history of philosophy. It is hard not to be impressed with the fascinating plurality of topics. There is even chapter 66 which examines flat-earthism (zetetics), an often-neglected historical nineteenth-century

movement that often leaves a mythical impression of antiquity. The final section examines occult sciences such as astrology or alchemy in a confident manner. This book is often informative but never either dull or oversimplified.

The book's Western focus might be for some readers a potential criticism, but this is a necessary and deliberate choice. The book cannot be accused of parochialism – Islam still merits inclusion at the ten-page level, and the Western outlook is not a worthy point of criticism. The US publishers have an excellent balance of North American/UK/wider European coverage (for example, see the chapter on German Nature Philosophy).

Through many chapters there is a running theme of Brooke's 'complexity thesis', opening up the understanding of both science and religion in the light of locally contingent factors influenced by society, rather than representation as broad universals, linking well with the material on the social construction of science.

From this reader's perspective, one concerning omission is the absence of any material on technology. There is no discussion of the differences between science and technology through history, no delineation of the two, or account of the changing relationship between religion and technology through history. This important omission seems an especially notable absence when the editors managed to include a chapter on comets and meteors!

In summary, this is an excellent and accessible academic work. Perhaps I am unable to decide if I would prefer to recommend it as a fantastic coffee-table book for any Christians interested in the science-faith interface, or as an indispensable reference book for Christians in the history and philosophy of science; it merits acclaim for achieving readability as both. Certainly any scientists who dipped in would find something to help them better see and understand their place in

the history of science and religion.

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Carl Sagan and others

Carl Sagan's Cosmic Connection: an extraterrestrial perspective

Cambridge University Press, 2000. xxxii + 302 pp. £17.95 hb. ISBN 0 521 78303 8

Carl Sagan, 1934-1996, was a distinguished astronomer with a highly developed gift for communicating scientific achievements to the general public. During his work on preparation of the unmanned spacecraft Mariner 9, which on 14 November 1971 became the first man-made object to orbit another planet, he was approached by another prolific writer who suggested a collaborative popular book on space exploration. He agreed and it appeared in 1973 as *The Cosmic Connection* by Carl Sagan, produced by Jerome Agel. The present book contains that 1973 work, along with three other contributions written since Sagan's death.

There are many things here that touch on the dialogue between science and religion and most readers of *Science and Christian Belief* would find it stimulating and instructive. The original book consists of thirty-nine short chapters, most of which are self-contained essays. Here are a few of the chapter titles: 'A message from Earth'; 'A message to Earth'; 'Experiments in Utopias'; 'Venus is Hell'; 'The canals of Mars'; 'Terraforming the planets'; 'Some of my best friends are dolphins'; 'Has the Earth been visited?'; 'Astroengineering'; and 'Galactic cultural exchanges'. The text is enhanced by around fifty illustrations, including several imaginative drawings by artists such as Mauritz Escher and Jon Lomberg. The clear writing style and the attractive presentation make this an

easy book to read, but it does provide a great deal of food for thought. Sagan believed that the universe is populated by many civilisations, and that communication between them is possible. His work on the American space missions of the 1970s was driven by the belief that an understanding of the distribution of life in our solar system would help to guide the search for life elsewhere and he argued, with only partial success, for the funding of an ongoing search for radio signals from other inhabited planets.

The five pages of the foreword to this book were written by Freeman J. Dyson of the Institute for Advanced Study, Princeton. He tells us that Carl Sagan 'saw the cosmic connection as an enlargement of the human spirit'. He agrees that Sagan's vision of self-sustaining colonies on the Moon and international manned expeditions to Mars and other places in the solar system before the year 2000 has 'failed miserably', but claims that Sagan's work to convince us all of the possibility of extraterrestrial life has been successful. (In 2004 the President of the USA announced projects involving manned missions to the Moon and Mars; so perhaps the only fault with Sagan's vision was the timing.) Here is part of Dyson's assessment of Sagan's work as an advocate of scientific exploration. 'He was a great preacher. He knew how to spice his gospel of cosmic connection with stories and jokes... His audiences came to his performances to be entertained and went away converted.'

Then there are eleven pages by Ann Druyan, a writer and film producer who was Sagan's second wife and worked with him on his novel *Contact*, published in 1985. In her contribution, called 'Carl Sagan: a new sense of the sacred', she gives some information about his childhood and his philosophy of life, but much of her piece is a defence of his interest in public education, which she clearly feels was the object of criticism by 'the uncommunicative and completely self-absorbed scientific community'. She claims, quite

rightly, that 'Carl Sagan's respect for the foundational significance of religious tradition is evident throughout his work', and expresses her belief that his 'initiatives to unite the communities of science and faith in defense of the environment continue to flourish and produce results'. She expresses her own attitude to the Bible in a very negative way ('We are starstuff. You, me, and everybody. Not the failed clay of a disappointed Creator...') but it seems to this reviewer that Carl Sagan was more positive than that. In *Cosmic Connection* (and at greater length in *Contact*, which many readers of this journal would enjoy) he engaged with the beliefs of the major world religions, and with minor offshoots such as Young Earth Creationism, in a commendably irenic spirit.

In a valuable 'epilog' David Morrison, a senior NASA scientist, provides twenty-seven pages of comment from the standpoint of the year 2000 on what Sagan wrote in 1973, where possible using later writings by Sagan to fill out the picture. It is interesting to observe how public attitudes to space exploration and to science in general have changed during the past quarter-century.

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William J. Astore
Observing God: Thomas Dick, Evangelicalism, and Popular Science in Victorian Britain and America
Aldershot: Ashgate, 2001. 303 pp. hb.
£45. ISBN 0-7546-0202-8

This book is one of the many worthwhile studies of the historical relationship of science and religion being published at present. It is in marked contrast to several recent popular works on the history of science, which are often inaccurate, somewhat anti-Christian and cheap to

buy. This work is none of those things and at £45 its cost may be prohibitive.

The book is a reworking of an Oxford D.Phil. on the life and work of the Scottish evangelical populariser of science Thomas Dick (1774-1857). His popularising influenced many, none more famous than David Livingstone. Astore's presentation is straightforward and gives Dick's life and scientific work in the context of the nineteenth century and especially of evangelicalism. The style of this will be familiar to those *au fait* with the nineteenth century, and Dick's 'old earthism' is regarded as the commonplace understanding of Scottish evangelicals. Astore devotes two chapters to Dick's Natural Theology and his science – the plurality of worlds, the nebular hypothesis and geology. Dick was more competent in astronomy than geology, but he demonstrates his grasp of geology and his unconcern of an old earth, even though astronomy was his first love. The last three chapters analyse Dick's influence as a scientific populariser in Britain and America and how that waned as scientists became more reticent to proclaim the faith through their science. People began to read Thomas Huxley rather than Thomas Dick.

As well as giving the biography of an evangelical amateur scientist of yore Astore also gives the challenge to popularise science in a constructive way rather than let it go by default to atheistic scientists and Young Earth Creationists who seem to feed on each others' polarised views.

Though I don't think many readers will buy the book, I do recommend that you get a library copy and read it if only to see how evangelicals considered the relation between science and faith nearly 200 years ago. There is much we can learn from them. It also gives lie to the popular history of both secular scientists and Young Earth Creationists who wish to claim that our forbears of two centuries ago were dominantly literalist.

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Dennis Bonette

Origin of the Human Species

Amsterdam: Rodopi, 2001. 202 pp. pb.
£27.00. ISBN 90-420-1374-5

This is an ambitious book with a pretentious title and an expensive price. The chapter headings are impressive: 'Darwinian Evolution Versus Scientific Creationism', 'Philosophical Possibility of Inter-Specific Evolution', 'Significance of Recent Ape-Language Studies', 'The Human Soul's Spiritual Character and Divine Origin', 'The Metaphysical Structure of Natural Species', to pick but a few.

The author is a Professor of Philosophy at Niagara University, N.Y., USA, and writes from a Roman Catholic position. The presentation and discussion are very philosophical in tone, and although he does his best to present the scientific evidence, he lacks the breadth of knowledge that all evolutionary biologists would take as axiomatic, and the evidence presented is partial and often dated. Although he starts 'by operating on the supposition, solely for the sake of argument, that some sort of biological evolution has taken place' (16), and although he quotes authorities extensively (there are 81 references in the first chapter alone), he quotes much more heavily from those opposed to Darwinian evolution and from the writings of Roman Catholic philosophers and theologians, than from the major evolutionary authors, apart from Darwin, Mayr and Stephen Jay Gould. It makes me wonder how much he has read of the case put by working scientists for the theory of evolution. Indeed, leafing through the total of nearly 600 references at the end of the book, there were almost no names that I recognised; neither scientists nor Protestant philosophers or theologians.

The style is dense and I found it hard going. For example: 'Because an amino acid solution is many things, not one, the multiple reagents of the solution are not self-ordering. These multiple molecules order each other according to their nature's chemical finality. Given the internal necessity of their chemical structures, they interact predictably' (38). And 'Even the largest plants manifest no sensitive operations or sense organs. Because these powers and their organs are the highest and most useful in animals, they operate continuously. This invisibility is inexplicable because such operations and organs can be detected in even the smallest animals' (44). I think that I understand what he is getting at, but this is certainly not the language we are used to or can usefully converse in.

Throughout he writes as a philosopher, in a particular philosophical and religious tradition. He says of himself: 'As a philosopher, I am not directly concerned to determine the exact moment the human natural species first appears. I am concerned to ascertain criteria appropriate to such determination, especially because many natural scientists tend to err in this regard owing to unconscious, but mistaken, philosophical presuppositions' 109). I am sure that this is true but the gulf between his mode of thought and mine is so great that rarely could I grasp what he wanted to say. Too often a series of authors are quoted, one after the other, leaving me reeling and wondering what the author concludes; I rarely knew, so although there is much worthy effort here, I cannot recommend this book.

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David Wilkinson

The Message of Creation

The Bible Speaks Today Bible Themes series, ed. Derek Tidball

Leicester: Inter-Varsity Press, 2002. 296 pp. pb. ISBN 0-85111-269-2

Adding to the wealth of literature already published about creation, evolution and the surrounding debate is not a task to be taken lightly. In this book, refreshingly, David Wilkinson does not attempt to do so, relegating it to a summary of the main positions in an appendix. Instead, he draws us to look at creation as a whole; not just what happened at the beginning of time, but the entirety of all that has been, all that is and all that ever will be, and what it reveals to us about the creator.

This is not to say that the author is unqualified to comment on the creation/evolution issue. As a former research astrophysicist and the fellow in Christian Apologetics at St John's College, Durham, he compellingly weaves together the wonder of the scientist studying God's works with that of the theologian studying God's words. However, it is above all his qualifications as a preacher that come across in this book. The lucid theology to be found in each chapter is accompanied by helpful illustration and thorough application, making a whole which is easy to read and yet not lightweight.

Covering a theme which appears in so many different forms throughout the Bible requires a selective use of passages, which are here grouped into five main areas. The first of these is entitled 'the beginning of creation' and reads most like a traditional commentary, as it works steadily through Genesis 1-3. This is followed by 'the songs of creation,' giving us highlights from Proverbs and the Psalms, 'the Lord of creation,' looking at the relationship between Jesus and creation explored in the New Testament, 'the lessons of creation,' taking examples from Noah, Job, Isaiah and Paul, and 'the

fulfilment of creation,' showing how a biblical perception of creation informs our eschatology. All the passages which appear are aptly chosen and if any strong candidates for inclusion are omitted, it is difficult to see what could have been left out in order to fit them in.

The diversity of the material means that each chapter reads very much as a self-contained exposition of a passage. Detailed discussion of textual features is generally avoided; the commentary focuses on how the text is understood and applied. The writing style is informal and engaging without losing clarity in the theology being discussed, which is evangelical throughout. Despite the episodic nature of the chapters, they each contribute to an overarching picture of the Creator, His creation and the interactions between the two. Although the book ends neatly with the arrival of the new creation in Revelation 21, an additional summary chapter might have been helpful to bring this big picture into sharper relief.

However, this is a very minor criticism of a compelling and thought-provoking read. As the author himself points out, 'The Bible never discusses creation as purely an intellectual interest' (167), and his survey of the subject never lapses into a purely academic study. The practical impact of grasping and applying this doctrine is not only described in the content of the book, but also displayed in the warm enthusiasm that the author brings to his subject throughout; a strong testimony to its significance.

In conclusion, therefore, anyone who wants to understand the Bible and Christianity more deeply will find plenty to encourage, excite and challenge them in this book. It is both accessible enough for the informed lay person to enjoy, and detailed enough for the theology student or minister to learn from. And for scientists, whether Christian or not, it shows a view of the universe that complements and enhances the rationalistic perspective.

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T. Kelly & H. Regan (eds.)

God, Life, Intelligence & the Universe

Adelaide: Australian Theological Forum, 2002. 174pp. pb. £10.95.

ISBN 0-9586399-6-5

This book represents a response to some very contemporary challenges to the Christian faith emerging from the discipline of Artificial Intelligence and the search for other intelligent life forms in the universe. The task of the authors is to examine the nature of intelligence and the uniqueness of human beings in the light of these developments. Now that these issues are taken very seriously, and extraterrestrial intelligence reckoned by many to be a real possibility, there is certainly a need for a serious theological response. Written by people deeply involved in both science and theology, the book is quite accessible and will certainly be of interest to those who are concerned with debates between science and religion.

Anne Foerst's opening section emphasises the human need for meaning and our tendency as humans to 'tell stories' to make sense of our existence. We construct 'Mythos' statements to fulfil this need, religious discourse, not surprisingly, being the exemplar of this tendency. But because this existential need will *not* go away even in the post-Enlightenment world we inhabit, science itself falls into the trap of creating its own myths to meet this need, though not always conscious that it is doing so; its main brainchild being the myth of 'scientific objectivity'. Because the human mind is every bit a part of the natural order, Foerst concludes: 'The scientific mind as objective, reasonable and rational entity, cannot exist' (7). Yet conversely, religious apologists make the similar mistake of taking religious

'myths' as scientific statements; typically laying the opening chapters of Genesis as the basis for subsequent scientific knowledge. This, Foerst argues, has been the cause of much confusion and conflict in dialogue between the two camps. Much of what Foerst has to say is of great importance but the use of the term 'myth' is frustratingly unclear. Foerst, as a Christian and Lutheran minister 'believes in' the Gospels, and yet is forced to apply the term 'myth' to these narratives. Of course, 'Jesus is the Son of God' may be a myth (in the sense that it cannot claim to be a 'scientific' statement); but what about other scriptural claims such as 'Jesus was born in Bethlehem'? This might also provide problems for positivist verification, but cannot be thought of as 'myth' *in the same way*. There needs to be some way of upholding the truth claims of the faith without pretending it is a kind of science, and yet without tarring it as some kind of myth. Rightly or wrongly, this term will always jar on the ears of the majority of believers, especially when coming from the lips (or word processor) of a minister.

Mark Worthing challenges some of our assumptions about our place, as humans, in the universe. The Copernican revolution, it seems, did not remove our anthropocentricity. We are *still* at the centre of the universe metaphorically. ET's existence could play havoc with this metaphor. If there really are intelligent life forms 'out there', (and there are many who think that there are), what are the implications for Christian theology? Is the status of humanity somehow 'lowered'? And would ETs be in need of God's redemption as a result of the fall? Would there need to be myriads of Incarnations to spread the redeeming message? These are the kinds of questions Worthing addresses, concluding that, if these beings do exist, it can only serve to increase the richness of God's creation; and it would also place the emphasis on Christ rather than humanity because "The theological refrain "apart from Christ there is no salvation" remains

valid- even for ET" (83). Worthing goes on to address the uniqueness of humanity compared to other animals. Cognitive science and evolutionary biology are increasingly confirming our continuity with animals. Worthing argues that our uniqueness lies not in some empirical fact (such as language ability) but, 'it is the non-quantifiable gift of the *imago dei* that makes humans unique before God' (107).

Espousing a 'double aspect' theory of mind and brain, John Puddefoot raises the question; 'to what extent is it possible to create an intelligent machine?' Certainly, there are machines to which we might ascribe intelligence according to a set of weak criteria. But, rejecting a one-to-one correspondence of mind and brain, Puddefoot defends a theory of intelligence whereby, for a machine 'to be intelligent in any meaningful sense of the term' it must possess an inside story (114). There must be something *it is like* to be that entity (albeit perhaps very different from our own experience). This point is fairly uncontroversial; devising a test to establish consciousness is far more problematic, raising as it does the problems of 'other minds' and the possibility of 'zombies'.

The book overall is a very interesting read and it is refreshing to see theologians of this calibre responding to contemporary issues so thoroughly and intelligently. It will certainly whet the reader's appetite for more.

[The Australian Theological Forum website is www.atf.org.au. Their books are distributed in the UK and Europe by SCM Press]

Peter McCarthy researched philosophy at the University of Southampton where he now works in information services. He also teaches religious studies part-time for the Open University.

Charles Webster

The Great Instauration: science, medicine and reform 1626-1660

Oxford, Bern etc.: Peter Lang, 2002.
Second edition. 630 + xl pp. pb. £47.00,
\$68.95. ISBN 3-906768-37-6.

In 1975 a book appeared that would become a classic of its kind. The author was the Oxford historian Charles Webster. Its title concealed from all but the most learned the nature of its subject, but fortunately its subtitle revealed all. The volume was *The Great Instauration: science, medicine and reform 1626-1660*. In fact the title is borrowed from the famous book of Francis Bacon who in many ways could be considered the father of British science, and was enormously influential in wider spheres as well. The purpose of the book was to place the infant scientific enterprise in its cultural context of seventeenth century England. It traced the rise of socialised science and of the scientific academies. With these developments came a new medicine derived from science rather than superstition, and a growing confidence in mankind's ability to use science to control nature and to have dominion over the earth.

All of this may seem highly relevant to specialists' historical studies, as indeed it is, but of passing interest to today's scientist. However readers of this journal will soon be aware that important aspects of the relations between science and religion were displayed with startling clarity over three centuries ago. They were thoroughly examined in this book. In particular the role of Puritan theology was explored in great detail, with much sensitivity and refreshing absence of the usual prejudices. Indeed the final chapter was about 'The Puritan world-view and the rise of modern science'. It showed that 'the Puritans evolved a comprehensive system of science consistent with their millennial ideology'.

Webster's book has for a quarter of a

century been essential reading for any seriously concerned to see how science and religion had interacted in the past. But it has sadly become increasingly hard to get and is quite a collectors' item. And now a second edition has appeared and is still in print. Basically, it has the same text as the original but an additional Preface and Introduction. These twenty-two pages help to bring matters more up to date, and give a number of additional references. For some reason the work of R. Hooykaas, who came to very similar conclusions, does not appear to have been noticed, and not all the recent research on Robert Boyle is mentioned. But there was simply not enough space to do everything.

The great merit of this republication is that it once again makes freely available a book of seminal value. Historians will find the science easy to cope with, though scientists may have some difficulty in transposing themselves into such a different age. Yet if they realise that the differences are far less important than the ageless issues with which we all wrestle they will find that here is a gold-mine to which they will return again and again. Our thanks must go equally to the author and to his new publishers whose vision of academic excellence has been so justified.

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Peter Moore

Blood and Justice: the 17th century Parisian doctor who made blood transfusion history.

Chichester: John Wiley & Sons, 2003.
224 pp. hb. £16.99. ISBN 0-470-84842-1

This book is an account of the earliest attempts at blood transfusion with particular reference to those made by Jean-Baptiste Denis, the Parisian doctor who is credited with performing the first

human blood transfusion.

Three procedures involving the use of blood have been used in medical practice. The first and most ancient is blood letting or phlebotomy, which was the removal of blood by opening a vein. Then, in the seventeenth century, William Harvey demonstrated the circulation of the blood. His discovery led to the second procedure, that of intravenous infusion by which substances such as wine and opium were introduced directly into the blood stream.

The third procedure is blood transfusion, also made possible by Harvey's discovery. Interest in this procedure arose in both England and France at about the same time. At first, dogs were used for both donor and recipient. Thus in February 1665 Dr Richard Lower of Oxford transfused blood between two dogs. His colleagues then suggested that a similar procedure might be carried out with a man as the recipient. However, Lower was anticipated in this procedure by Dr Denis of Paris, who on 15 June 1667 became the first doctor to transfuse blood with a man as recipient. The donor in this case was a lamb and the recipient a youth who had already been bled twenty times. Following this success, Denis carried out a similar transfusion on a male labourer aged forty-five. His third patient was a Swedish nobleman who was already too near death to benefit from the transfusion.

The fourth patient was a thirty-four year old man named Antoine Mauroy, who suffered from bouts of insanity and may have had tertiary syphilis. On 19 December 1667 Denis successfully transfused about five or six ounces of calf's blood into an arm vein of this man. Three days later, when Mauroy appeared to have benefited from this transfusion, Denis repeated it with a larger amount of blood, again from a calf. In the following month, at the urgent request of Mauroy's wife, Denis attempted a third transfusion, which had to be abandoned when the patient had a violent fit, and before

any of the blood had been transfused. The patient died the next day, with the result that on 17 April 1668 Denis found himself facing a criminal charge of the unlawful killing of Mauroy. At the end of his trial Denis was found not guilty. In modern terms, Mauroy's death would be regarded as due to an incompatible blood transfusion.

The immediate effect of the Denis trial was to halt the progress of therapeutic blood transfusion in both England and France. A few experiments continued, but it was not until Karl Landsteiner demonstrated the existence and significance of the ABO blood groups in 1901 that the theory and practice of blood transfusion was put on a sound physiological basis.

Meantime there are several other aspects of Denis's story. First, the historical: the seventeenth century has been called 'the age of individual scientific endeavour' (Garrison). The early history of blood transfusion is an excellent example of that. Secondly, the logical: illustrated by the reasoning which led to the attempts at blood transfusion. Thirdly, the ethical: this case raises many issues which have become acute in more recent times, such as human rights, the status of experimentation on human beings, and the need for informed consent before such experimentation. Fourthly, the legal: Denis did not intend to kill his patient and so his action was not murder, although today it might be called manslaughter. Finally, it illustrates the problems which may arise when medical practice outstrips knowledge of its physiological basis.

The book is warmly recommended as an excellent account of a little-known, but important, event in medical history.

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