

Book Reviews

Peter S. Williams

The Case for God

Crowborough: Monarch Books, 1999.
427pp. pb. £9.99.
ISBN 1 85424 454 X.

Peter S. Williams is described by his blurb as a young Christian philosopher – ‘a new author from today’s generation’ – still in his early twenties. Some of the material in this book we are told originated in the form of pamphlets produced for university Christian Unions, and certainly his book often reads like material produced for enthusiastic student audiences: there is passion and the occasional gimmicky touch, the odd straw man playfully beaten off. It will, I am sure, quite properly appeal to many who enjoy a robust defence of basic Christian positions in the philosophy of religion from an evangelical but open point of view. There is an admirable breadth of learning and thought on offer here – and yet also some perplexing omissions and unexamined assumptions.

Williams begins, unusually but sensibly in many ways, with the ‘problem of evil’ – the case *against* God. He proceeds through more positive arguments, the moral argument, cosmological and design arguments, and a special examination of the ‘anthropic teleological argument’. Then what he calls arguments from ‘common consent, authority and religious experience’ (the weakest and least convincing chapter), and on to arguments ‘from desire and absurdity’, and Pascal’s wager and other concluding areas.

He has interesting things to say on all these subjects – though he often has too much to say. It is a very long book given its probable audience – and the lists of suggested reading would be found off-putting by many starting out. A weakness from the point of view of one seeking

a book to put into the hands of a ‘beginner’ in the field is that he often adopts a very idiosyncratic approach. His discussion of design, for instance, is almost entirely a scientific discussion – though very interesting in its way. But nowhere does he mention or discuss the key critique offered by David Hume on this family of arguments, and Hume does not even make it into the index. Hume’s arguments still short-circuit many of Williams’ best efforts. In the chapter on the moral arguments we have all sorts of positions labelled, only finely distinguished from one another, too many for a newcomer to the field to be able easily to see the wood for the trees. Yet there is no mention of the classic Euthyphro dilemma: are good things good because the gods love them or do the gods love them because they are good? (named after the dialogue in which Plato discusses this question).

The chapter on evil also shows the unevenness that is present throughout. Williams says ‘Nature as it is now ... is a temporary evil...’ (56): a remarkable statement, lacking in nuance. We know what he means, but...! The apparently technical argument he lays out in five numbered stages (63) for the compatibility of God and Wrong, is just fideism dressed up in rationalist clothes. He touches on the cross, but fails to give it the central place it surely ought to have in any Christian theodicy.

What the book needs is a chapter on the ontological argument. Of course, we know it doesn’t work – but it exposes the extent to which all arguments for the existence of God rely upon the assumptions (the faith) with which one begins. Williams needs to bring this awareness to the forefront of his discussions more clearly – and then see how, for instance, his discussion of proper function (236ff)

and irreducible complexity (Behe etc, 228ff) are affected, and undermined by it.

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Roger Highfield

Can Reindeer Fly?

London: Metro Books, 1999. x + 304 pp.
pb. £6.99. ISBN 1-900512-74-2

This is a revised edition of a book first published in 1998. The sub-title, 'The science of Christmas', is explained by the author as follows: 'Christmas and associated celebrations offer a wonderful excuse to explore a broad range of fields, from biotechnology and fractals to neuropharmacology and nanotechnology'.

Dr Highfield is a prolific writer and broadcaster. As Science Editor of the *Daily Telegraph* he has written around five thousand articles and he has co-authored several substantial books. This book is basically a stocking-filler (as he acknowledges on page 104) and most of it is whimsical nonsense, entertainingly derived from a clever concatenation of fact and fantasy. 'Reindeer hide ... is an efficient insulator. Outer hairs are long and hollow Indeed, Rudolph, Dasher, Prancer and the rest are so well adapted to the freezing cold they would probably find loafing around chimneys and fire-sides with Santa too warm to be comfortable.' It does, however, address some issues that have been the subject of articles in this journal.

The first chapter, 'The Bethlehem Star', quotes from a paper by Colin Humphreys (in S&CB Vol. 5(2)). Does it add anything to the discussion? Not really, although by bringing together the views of a range of writers on the subject it draws attention to possible contributions from astronomy to the interpretation of Matthew 2. The second chapter, 'Miracle', is about the virgin birth of Jesus. It draws heavily on a

paper by Sam Berry (in S&CB Vol. 8(2)) and includes comments on it, by a number of other scientists, which have probably not been published elsewhere; this chapter has the virtue of stimulating thought about the meaning of the word 'miracle'.

Chapter 10, on 'Christmas Blues and Seasonal Moods', contains some interesting information about these topics. It describes some bizarre theories about seasonal moods but also comments on the 'quantifiable evidence that those who respect religious traditions, and thus take the seasonal festivities seriously, can expect to lead a healthier life'. The discussion leads on (somehow or other) to a mention of the 1918 survey of the level of belief in God among American scientists and of the recent repeat of this survey, which shows that the result remains the same at the end of the century as it was at the beginning. 'The future of Christmas and Hanukkah in our increasingly technological age seems assured.'

Amid the welter of facts and fancies in the book there were not a few that caught my attention, including the criticism of Michael Faraday's Christmas Lecture of 1860 by Peter Atkins (95), three Murphy's Laws of Odd Socks proposed by Robert Matthews (127), and the opinion of David Booth about the attraction of chocolate (181). Among the 150 potential purchasers of the book who are thanked by the author are the editor of this journal and an Oxford theologian for 'his kind reassurance that the religious sections of my book are not blasphemous'!

There is a comprehensive (and amusing) glossary of technical terms and the bibliography, with more than a hundred entries, could be very useful for anyone trying to track down the original research that underpins this entertaining book.

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Michael R Molnar

The Star of Bethlehem: The Legacy of the Magi

Piscataway, NJ: Rutgers University Press, 1999. 187 pp. hb. £19.95.
ISBN 0-8135-2701-5

Mark Kidger

The Star of Bethlehem: An Astronomer's View

Princeton, NJ: Princeton University Press, 1999. 603 pp. hb. £14.50.
ISBN 0-691-05823-7

The new millennium brings two new books on the Star of Bethlehem, both very different. Michael Molnar is an astronomer and former manager of the Physics Instructional Laboratories at Rutgers University. His book has received wide acclaim from other astronomers and from historians of astronomy. For example, on the dust cover of this book Owen Gingerich, from the Harvard-Smithsonian Center for Astrophysics, writes, 'In my opinion the book is the most original and important contribution of the entire twentieth century on the thorny question of how events recorded there [in Matthew's gospel on the Star] should be interpreted'. Strong praise, but is it justified?

Michael Molnar is not only an astronomer, he is also a keen amateur coin collector, and it is a coin that provided the inspiration of Molnar's new theory on the Star of Bethlehem. The particular coin that attracted Molnar's attention was issued in Antioch in Syria in about AD 6 and depicts a leaping ram looking backwards at an overhead star. Other similar coins were issued in Antioch at later dates, all showing a ram looking at a star. A ram is the zodiacal sign of Aries, and Molnar argues that Aries the ram looking back at the star is connected to the astrological beliefs of the Magi. Why does Molnar make this connection, which seems highly unlikely?

It is widely accepted that the Magi were astronomers/astrologers (the two were not distinguished in the ancient world) who 'interpreted' the stars. The various star constellations were associated with

different countries on the Earth. Molnar notes that Ptolemy, writing in about AD150 from Alexandria, Egypt, associates Aries with a number of countries including Judea and hence argues that Israel was astrologically associated with Aries the ram. However, we know from a variety of historians (Herodotus, Suetonius, Tacitus, etc) that the Magi lived in Babylon, Persia and Arabia in the first century AD (in agreement with Matthew 2:1 'Magi from the east came to Jerusalem') and that the Magi did not live in Egypt. The eighth century AD writer Masha'allah, in a book wonderfully entitled 'On Conjunctions, Religions and Peoples' describes how in earlier Babylonian theory it is the constellation Pisces that is associated with Israel, and the medieval Jewish writer Abarbanal, writing in the fifteenth century AD, also states that in Magian astrology it was Pisces that is associated with Israel. Molnar appears to be aware of this, but argues that Greek astrology had replaced Babylonian astrology by the time of Christ and that 'the Magi saw something auspicious according to the conventions of Greek astrology, something that revealed a newborn king of Judea' (Molnar p 42). I do not believe there is any evidence that in the first century AD the Magi associated Aries with Judea, and Molnar does not give any such evidence. What appears to be the case is that there were different 'schools' on the question of the association of star constellations with regions on the Earth. Ptolemy associated Aries with Judea, but, I would argue, the Magi associated Pisces with Judea. This is the first possible weakness of Molnar's theory.

On the reverse side of the Antioch coins depicting a ram looking at a star, is the bust of Zeus (Jupiter). Molnar argues that astrological records show that if the Moon comes in front of Jupiter and totally obscures it (this is called a lunar occultation of Jupiter) then this indicates a royal birth. He then calculates that two such occultations occurred in 6 BC, one on March 20 and the other on April 17, and suggests that the latter of these occultations was the Star of Bethlehem.

However, the March 20 occultation was not visible in Babylon because Jupiter was below the horizon. The April 17 occultation occurred in the daytime in both Babylon and Jerusalem, and Jupiter cannot normally be seen in the daytime. Hence, unfortunately for Molnar, both of these occultations would have been invisible to the Magi. Molnar recognises this, but then argues that the Magi would not have needed to see the occultation, it would have been sufficient for them to have calculated it in advance and know that it was going to happen, even though it was invisible. Whilst Molnar is correct in stating that planetary phenomena did not necessarily have to be observable to be important, there can be no doubt that observation was extremely helpful (and note that Matthew 2:2 has 'we [the Magi] have *seen* his star in the east'). In addition, we have no evidence that Greek astronomy at that time could predict occultations (it could predict conjunctions, when astronomical objects are close together, as viewed from Earth, but predicting occultations, when one object is directly in front of another, is much more difficult). If the Magi used Greek astronomy, as Molnar claims, then they probably could not have predicted the occultation of Jupiter by the Moon. However if the Magi had used the more cumbersome, but ultimately more accurate, Babylonian astronomy, then they probably could have predicted the occultation, but Molnar claims the Magi practised Greek astronomy in the first century AD, hence he cannot have it both ways! Thus his theory has a major flaw: the occultation of Jupiter by the Moon, that Molnar claims was the Star of Bethlehem, was neither observable nor predictable using Greek astronomy.

The last part of Molnar's book is devoted to detailed horoscopes constructed using Greek astrology. Molnar states that the horoscope for April 17, 6 BC, his preferred date for the birth of Christ, is 'truly astounding' (p98) and produces 'incredible regal conditions' (p100). I have two comments to make here. First Molnar himself writes 'There

are many possible sets of conditions that would produce a regal portent...in fact, the subjective element of interpretation prevents any objective examination' (Molnar p101). Hence horoscopes, then as now, are very subjective and subject to different interpretations. Second, and very importantly, in the first century AD, there is no evidence that horoscopes were used for predictive purposes: this is a serious flaw in Molnar's horoscope approach.

Overall, the ingenious theory of Molnar has too many serious flaws to be tenable. In particular any link between the Antioch coins and the Star of Bethlehem is extremely unlikely, the April 17, 6 BC occultation of Jupiter by the Moon, which Molnar takes to be the Star of Bethlehem, was invisible from Babylon and Jerusalem and unpredictable using Greek astronomy, and Greek horoscopes were not used for predictive purposes in the first century AD.

We now turn to the more conventional book by Mark Kidger, who is a researcher at an astronomical observatory in Tenerife, Spain. The main strength of this book is its unbiased survey of all the main theories of the Star, plus a detailed explanation of astronomical terms. Kidger then presents his own theory of the Star: a nova in 5 BC, preceded by three precursors, a triple conjunction of Saturn and Jupiter in Pisces in 7 BC, a triple massing of Mars, Saturn and Jupiter in Pisces in 6 BC and two pairings in Pisces in 5 BC, one of Jupiter with the Moon, the other of Mars and Saturn. This theory closely resembles that of the reviewer (Humphreys C J, 1991, *Q J Roy Ast Soc* 32, 389 and *Science & Christian Belief*, 1993, 5, 83-101) except that Kidger believes the 5 BC object to be a nova whereas I believe it to be a comet.

Thus both Kidger and the reviewer opt for precursor signs in the sky, followed by the Star of Bethlehem itself. First a triple conjunction of Saturn and Jupiter in 7 BC against a backdrop of the constellation Pisces. We know this conjunction was important to the Babylonians since they predicted it on the famous Star Almanac

for 7 BC found at Sippur, 30 miles north of Babylon. In Magian astronomy Saturn represented the divine father and Jupiter was his son. The constellation Pisces was associated with Israel. Thus the astrological significance of Saturn and Jupiter coming together and then separating was that a divine son would be born in Pisces, that is in Israel. The fact that this conjunction happened three times in 7 BC emphasised the importance of the message. Then in 6 BC, Mars joined Jupiter and Saturn in the sky in a close array and all in Pisces. Mars represented the king of war, hence the significance of this triple massing of these three major planets was that the new king to be born in Israel would be a mighty king. Kidger then has the two pairings in Pisces in 5 BC setting the scene for the final sign which would indicate that the birth of this king was imminent.

Kidger takes this final sign to be a nova in 5 BC, described in the ancient Chinese records of the times (the Han dynasty). This is the same object that I take to be a comet. So who is correct? The Chinese had three words to describe comets and nova. A nova was described as a k'o-hsing, a short-tailed comet as a po-hsing and a long tailed comet as a sui (or hui) hsing. In the records for 5 BC the word used by the Chinese to describe the star is sui-hsing, and Chinese experts tell me that there can be no doubt that the Chinese are describing a long-tailed comet. So why does Kidger identify this object with a nova? The main reason is that the usual translation of the Chinese records does not describe the object as moving through the sky (as a comet would) and has 'a sui-hsing appeared at Ch'ien-nui [which we now call Capricornus]'. However, Chinese experts again tell me that the word translated 'appeared', in fact conveys motion and an alternative translation is 'exited from'. Hence it seems clear that the Chinese in 5 BC saw and recorded a long-tailed comet, and not a nova. In the astrology of the time we know that a comet in the east signified a rapidly approaching event, hence this was the star which signalled to

the Magi that the birth of the new king was imminent. In addition, a long-tailed comet is the only celestial object which could be said to 'stand over' a place.

Although I disagree with the conclusions of both Molnar and Kidger, they are both excellent books in many ways. Michael Molnar writes with great style, clarity and originality, and Mark Kidger provides the best survey available of all the main theories of the Star. If you are one of the many people interested in the Star then you should buy both books! Both contain a wealth of different information and there is very little overlap. But remember to read critically!

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Steven Jay Gould

Rocks of Ages: Science and Religion in the Fullness of Life

New York: Balantine Publishing Group,
1999. 241 pp. hb. \$18.95.
ISBN 0-345-43009-3

Those who are weary of non-sequitur swipes against the Christian faith from gifted communicators of science would surely welcome a book from a writer of no Christian persuasion who sets out to establish that there is no conflict between science and faith. Such a book has now been written by Steven Jay Gould. He sets out his position by defining a new acronym: NOMA, which stands for Non-Overlapping Magisteria. Gould explains, 'the magisterium of science covers the empirical realm: what the universe is made of (fact) and why does it work this way (theory). The magisterium of religion extends over questions of ultimate meaning and moral value. These two magisteria do not overlap, nor do they encompass all enquiry (consider, for example, the magisterium of art and the meaning of beauty)' (6). He later recapitulates, 'NOMA is a simple, humane, rational and altogether conventional argument for

mutual respect, based on non-overlapping subject matter, between two components of wisdom in a full human life: our drive to understand the factual character of nature (the magisterium of science), and our need to define meaning in our lives and a moral basis for our actions (the magisterium of religion)' (175).

In *Rocks of Ages* Steven Jay Gould more than lives up to his reputation for clear writing. No one could fail to follow his central message, and few could fail to enjoy the clarity of his English. He has the confidence to use a wide vocabulary, and also to use short words and colloquialisms where they suffice. He quotes from his extensive reading, both within and outside his field of specialization. And his material is brilliantly selected for the message that he intends to convey. The book is in four chapters. In the first two he sets out the argument for NOMA, with support from leaders from both Magisteria: Chapter 1 states the problem of the supposed conflict between science and religion; Chapter 2 presents NOMA as the solution, at least in principle. 'The second half of the book then examines the central paradox of why such an eminently sensible solution to the nonproblem of supposed conflict between science and religion – a resolution supported by nearly all major thinkers in both magisteria – has been poorly comprehended and frequently resisted. The two major reasons, defining the last two chapters of this book, can also be simply stated and understood' (175f). The first is the historical reason, 'the reluctance of many religious devotees to withdraw from turf once legitimately occupied under previous views of life and nature, but now properly deduced to the newer magisterium of science.' The second is the psychological reason, 'we live in a vale of tears (or at least on a field of confusion), and we therefore clutch at any proffered comfort of an encompassing sort, however dubious the logic, and however contrary the evidence' (176).

The book appears in a monthly series *The Library of Contemporary Thought*, the purpose of which is to give 'top opinion

makers a forum to explore topics that matter urgently to themselves and their readers.' In places the book appears to have been rushed to meet the next month's deadline. I wonder whether he really intended the same quotation from Darwin's letter to Gray to be printed twice in the book, especially since he strives so hard to give a fair balance in his accounts of the two magisteria. He introduces the statement of the problem with the Gospel story of Thomas' encounter with the resurrected Jesus, 'the moral tale of a brave and inquisitive man, led astray by doubt, but chastened and forgiven with a gentle but firm lesson for us all' (13). Gould gives a robust exposé of influential Nineteenth Century antireligious writers such as Draper and White, through a case study of 'Columbus and the Flat Earth: An Example of the Fallacy of Warfare Between Science and Religion' (111–124). He is able to write with particular poignancy about 'The Struggle Against Modern Creationism,' (125–170) since he himself testified as an expert witness in the 1987 Arkansas trial. He describes the outcome as a clear victory against the creationists, but he strives to be accurate too about nonsense propagated by the scientists. He certainly succeeds in identifying creationism as 'A Distinctively American Violation of NOMA,' (125–133) thus helping us bewildered Europeans to understand how (without sympathizing why) our American friends can still go on arguing about issues that should have been resolved since Darwin's time. When I lived in California it grieved me to see how widely such mischievous (but academically accredited) authors as Philip Johnson were read, with their persistent sub-creationist anti-science (in the guise of anti-materialist) innuendoes. And it still beggars belief for most of us to read of the 1999 vote of the Kansas State Board of Education to remove references to evolution and cosmology from its state education standards and education, spawning coverage in both *Nature* and *Science* and a formal statement by the Board of Directors of the American Association for the Advancement of Science.

As the repeated quotation from Darwin indicates, the thinkers whom Gould commends most warmly are by and large those whose faith is at best agnostic, with whom he himself identifies. 'I am agnostic in the wise sense of T.H. Huxley, who coined the word in identifying such open-minded skepticism as the only rational position because, truly, one cannot know' (8–9). He cites at length Huxley's letter to Charles Kingsley as the most moving and incisive defense of personal intellectual honesty he has ever read, 'whatever the allure of immediate and easy solace from comforts that one can neither truly believe nor justify by cogent argument' (37–42). But it is churlish to nit-pick; we should surely be grateful for a conciliatory book from such a gifted and well-known writer.

And yet The 'religion' whose magisterium Gould asserts as non-overlapping with science is an emaciated religion. It is certainly not one that Christians would recognize, and it might well be inadequate for followers of other faiths too. The religion of which he speaks is religion of values (though not aesthetic values such as beauty), purposes, ethics and opinions. There is no sense of the God Who is There (in Schaeffer's phrase), of the God who cares, speaks, and acts in creation and in history. Gould quotes approvingly J.B.S. Haldane, 'If my reasoning has been correct, there is no real connection between religion and the belief in supernatural events of any sort or kind' (91). Paul was quite clear about the implications for faith if Christ had not been raised from the dead, and the Thomas encounter is about that kind of faith. In the Eighteenth Century the experiment was tried of a Christian faith minus God's activity and revelation. Ian Barbour summarized the outcome thus, 'The waning of Deism can be attributed primarily to its own inherent weaknesses. The Cosmic Designer, who started the world machine and left it to run on its own, seemed impersonal and remote – not a God who cares for individuals and is actively related to man, or a Being to whom prayer would be appropriate. It is not

surprising that such a do-nothing God, irrelevant to daily life, became a hypothesis for the origin of the world or a verbal formula which before long could be dispensed with completely' (*Issues in Science and Religion*, SCM, 1966, 62f). Of course, if science has monopoly of factual enquiry, and religion is confined to ethical enquiry, then it is not hard to ensure that they do not overlap; Gould is right that you cannot deduce morality from nature. But the two millennia of the Christian Church, and what went before, have been characterized by passionate concern for truth. 'The real antithesis of science seems to be not theology but politics,' wrote John Carey, since 'its aims seem identical with those of theology, in that they both seek to discover the truth. Science seeks the truth about the physical universe; theology, about God. But these are not essentially distinct objectives, for theologians (or at any rate Christian theologians) believe God created the universe, so may be contacted through it' (*The Faber Book of Science*, Faber, 1995, xxiif).

NOMA allows no debate between science and religion (despite the assertion that 'NOMA forces dialogue and respectful discourse about different primary commitments' 92), because overlap is excluded *a priori*. Gould is scathing in his attack on the conference organized in Berkeley in 1998 by the Templeton Foundation, to which he devotes over six pages of vitriolic contempt (214–220). He even has the temerity to turn his guns on the Oxford (and Cambridge) scientist-scholar Arthur Peacocke, 'Or is Mr. [sic] Peacocke's God just retooling himself in the spiffy language of modern science?' (217). By this point in the concluding chapter *Rocks of Ages* had lost credibility for me. The argument is based on an account of the proceedings that had appeared in *The Wall Street Journal*. Peacocke's writing is often demanding, esoteric sometimes, but spiffy never! The gospels will not allow the cop-out of NOMA. When John wrote 'And the Word became flesh' (Jn 1:14), he emphasized through their juxtaposition that the Word and the Flesh were fused in the most

complete way possible: incarnation involved complete overlap of the 'magisteria' of the divine and the material world. That means that you run a risk (or perhaps a certainty) of polemics, not because of an intrinsic incompatibility but because believers and scientists are alike imperfect, as John Brooke has so thoroughly charted. But since there is integrity in truth, then ultimately there will be no conflict between proper faith and proper science, not because they have nothing to say to each other but because they will be found to be in perfect harmony.

The over-constrained concept of the scope of religious enquiry leads to (or perhaps follows from – it is hard to say) another, and even more disastrous, inadequacy of the concept of the magisterium of religion as set out in *Rocks of Ages*. That is that like science, religion is set forth as one of several legitimate spheres of human enquiry. Gould avoids the mistake of reductionism; he nowhere claims that science is all, and there is no inconsistency in his assertion of values such as personal and intellectual honesty. But his magisterium of religion is just that: a magisterium with its own legitimate sphere of enquiry. As a description of intellectual (or even emotional) activity, this may have its place, rather as the subject of Theology may serve as a useful academic category; but as a description of a vibrant faith in the Living God it is woefully inadequate. 'Words fail me in trying to describe the awfulness of the Faith Zone,' wrote Anne Atkins about the Millennium Dome. If you want to celebrate two thousand years of the Christian Faith (which may not have been the aim), then why confine faith to a zone? Faith should pervade the whole of legitimate human endeavour, not to exclude it but rather to embrace it. My Christian colleagues in professional science do not regard faith and science as non-overlapping magisteria. So far from leaving their faith on a peg outside, they take it with them through the laboratory door.

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William A. Dembski

The Design Inference: Eliminating Chance Through Small Probabilities

Cambridge: Cambridge University Press, 1998. 243 pp. hb. £35.00.
ISBN 0-521-62387-1.

William Dembski is a Fellow at the Discovery Institute's Center for the Renewal of Science and Culture, Seattle. Readers may be familiar with his name as associated with the Intelligent Design movement. Any suspicions on this score should be allayed, for it will be important for anyone interested in the development of a rigorous methodology to evaluate design arguments to read this book. A valid reason to be put off is the technical nature of the book – it is really for specialists.

The Design Inference runs like this (48). Take as premises the following:

1. Event E has occurred.
2. E is 'specified', i.e. conforms to a certain, independently stateable pattern.
3. If E is due to chance, then E has small probability.
4. Specified events of small probability do not occur by chance.
5. E is not due to a regularity, such as a law of nature.
6. E is due to either a regularity, chance or design.

The conclusion then follows:

7. E is due to design.

It is important to note that 'design' is not quite what we might naively think it is. On Dembski's definition it is merely what is left when one has eliminated chance and regularity. It asserts 'what an event is not, not what it is' (19). Design does not therefore attribute agency. One might feel that the terminology is therefore misleading, because no doubt the idea of intelligent agency springs to mind when the word 'design' is used, a point Dembski acknowledges. Indeed he states that the Design Inference, though not 'delivering a causal story' (xii), is preliminary to attributing intelligent agency, and makes the latter plausible.

Over succeeding chapters Dembski develops the mathematical apparatus required to make his initial statement of the Design Inference rigorous. This takes us into the realms of probability, statistics and complexity theory. For example we find that 'Specified events of low probability do not occur by chance', which at first sight sounds a little too bold, comes to mean 'One is not warranted in inferring that E occurred according to the chance hypothesis' (218).

Dembski's methodology leaves me rather dissatisfied. That is because I am a convinced Bayesian and Dembski dismisses Bayesianism in a couple of pages (67–69). The Design Inference only eliminates hypotheses; it does not confirm them (68). If all 'design' means within the technical apparatus of the Design Inference is that E does not occur due to chance or regularity, that leaves me wanting to know more. In contrast, Bayesianism directly compares the probability of competing hypotheses, given E, in terms of their (mathematically well-defined) explanatory power and prior probability.

Dembski gives a number of helpful examples to illustrate his methodology. One which recurs is the case of Nicholas Caputo who drew the Democrats to take first place ahead of the Republicans on the ballot paper for elections in Essex County, New Jersey, 40 out of 41 times. Dembski claims that 40 out of 41 first places is 'specified' because it conforms to a pattern (any draw is highly improbable – this one is very special), and is not due to a regularity, because a reliable method was used for choosing the first place at random. It is also of small probability (about 1 in 50 billion). It therefore occurred by 'design', meaning not by chance or regularity.

Of course one is suspicious of Caputo. Did he cheat? Bayesianism would estimate the probability that Caputo cheated, given the incriminating sequence of draws, using background knowledge such as his general reliability, Democratic party membership and so on, and would compare this directly with the chance hypothesis. The

Design Inference simply eliminates chance and regularity.

Dembski also realises that the notion of 'small probability' needs to be removed from the realms of pure subjectivity. This he does by appealing to the 'probabilistic resources' available in the relevant context, ie the number of opportunities for an event to occur. If they are great the probability for rejecting chance has to be proportionately smaller. He comes up with a universal probability bound of 1 in 10¹⁵⁰ by considering all possible events in the visible universe. At this stage he makes the controversial move of banning an appeal to many universes. Whilst he makes some good points here (eg that they undermine induction), my own view is that many universe theories should be treated carefully on their merits, not dismissed out of hand.

Notwithstanding my criticisms, this is a valuable and scholarly contribution to the debate about how one might evaluate design arguments, using the sophisticated tools of probability theory, and as such is essential reading for the specialist.

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**Roger Penrose, with Abner
Shimony, Nancy Cartwright and
Stephen Hawking
Edited by Malcolm Longair.**

**Translator: Javier García.
*Lo grande, lo pequeño y la mente
humana***

Cambridge & Madrid: Cambridge
University Press, 1999, xiv + 139 pp.
pb. £6.95 (US\$9.95)
ISBN 8-483-23047-X

This book is the Spanish translation of *The Large, the Small and the Human Mind*, issued as a result of the Turner Conference lectures given by the author in 1995. It presents the author's dissatisfaction with the present state of the theoretical physics together with an incursion into the

human mind looking for a physical explanation of human consciousness. These ideas were presented at length in two previous books ("The Emperor's New Mind" and "Shadows of the Mind") and have been summarized in this new one. This is one of the main difficulties when reading the book, that also includes short contributions by A. Shimony, N. Cartwright and S. Hawking, a brief reply of R. Penrose and two appendices, one on a result related to Gödel's Theorem, used by the author to show the intrinsic non-computability of human knowledge, and the other one proposing experiments in order to test the objective reduction of two quantum states.

The interested reader will find a very useful review of the original English edition of this book, by Dr. Polkinghorne, in Vol 9 (2), pp. 179–180 of this journal. The careful Spanish translation reflects a clear style, with reminiscences of an original talk. Christian readers will appreciate the questions raised by the author, but their answers will follow different lines.

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W. Daniel Hillis

The Pattern on the Stone

London: Weidenfeld & Nicolson, 1998.
164 pp. hb. £12.99.
ISBN 0-297-81541-5

In this fascinating book, Daniel Hillis, co-founder and Chief Scientist of Thinking Machines Corporation, achieves the not inconsiderable goal of taking the reader through the spectrum of ideas that lie behind the workings of the computer. He never gets bogged down in unnecessary detail, but with broad brush-strokes and well-chosen practical examples he illuminates the key ideas of a degree course in computing. The style is excellent and he manages to be informative and amusing at the same time. He starts from simple circuits and logic gates, explains

programming languages and how the computer handles them, and goes on to the processes behind a good program and the possibility of the infinite computer and things it can and cannot do. After a look at information compression and secret codes, he explains computer programs which can detect and correct errors in their own data, and then computers which can learn from their mistakes by feedback and begin to simulate some of the processes of the human mind. Finally he brings us to the most up-to-the minute research, into parallel computers which mimic the human brain, programs generated by a process akin to Darwinian evolution, and the possibility that the Internet, with its vast array of interconnected computers, may actually produce new and surprising interactions and display behaviour beyond that of its component parts.

Whilst not adopting a religious or anti-religious stance, Hillis addresses the insecurity we sometimes feel when our identity as centre of the Universe is brought into question. He likens the issues raised by the possibility of artificial intelligence to those which surfaced first with the notion of the Sun as centre of the solar system, and then by the idea of humans evolving from animals. In both cases, our identity appeared to be threatened, but this was not really the case. Hillis does not embrace a reductionist view, but expects that increasing complexity will cause new and exciting possibilities to arise (possibly incomprehensible to the human mind), and he regards these with expectancy and wonder. Understanding the nuts and bolts of thought and consciousness has led him to a new appreciation of the possibilities of machines, but not to a diminished sense of the greatness of the human mind. With these attitudes many thinking Christians would concur.

My only criticisms of the book are that early diagrams, (supposedly the easiest to understand), are insufficiently clear, particularly to the non-American reader, and that some very frustrating puzzles are

provided with no answers! With these very minor criticisms, I could not but admire someone who built a tic-tac-toe (noughts and crosses) computer out of 150 switches made from wood and nails, and who is able to question the most tacit assumptions of the engineering process with such skill. He cannot predict the moral and philosophical questions which artificial intelligence may one day pose for us, but reading a book like this will certainly help both Christians and non-Christians to prepare for the issues that lie ahead. This book will be illuminating to sixth-form students and above.

Hazel Lucas has a doctorate in physics and is a secondary school teacher specialising in physics and electronics. She has a lifelong interest in science and religion and has written several books on this theme for children.

Thomas F. Gieryn

Cultural Boundaries of Science: Credibility on the Line

Chicago: University of Chicago Press, 1999. xiv + 398 pp. pb. £16.75. ISBN 0-226-29262-2.

How can we demarcate between science, non-science and pseudo-science? What are the boundaries that mark off science from any other cultural activity? Gieryn, Professor of Sociology at Indiana University, examines various attempts to demarcate science. He does it from a sociological perspective. He deals with science 'not upstream at facts in their making, but downstream at their consumption' (ix). Upstream science, he contends, substantially 'underdetermines the epistemic authority that marks its consumption downstream' (x).

He focuses on five, suggestive rather than representative, episodes spanning two continents and two centuries. Before doing so, in an illuminating and insightful introductory chapter, Gieryn draws upon his lifelong interest in maps and map

making to develop a cartographic metaphor for the role of science in culture. This introduction provides the theoretical underpinnings for the sociological investigations of the five incidents; it provides the skeleton on which the flesh of the rest of the chapters hangs.

The first of the five episodes, set in Victorian Britain, concerns the attempts by John Tyndall to demarcate science from religion on the one hand and science from mechanics on the other. Tyndall was keen to show that science was non-religion and non-mechanics for purely pragmatic and economic reasons.

The second spans several decades of the mid-twentieth century. It concerns the US Congress and the establishment of the National Science Foundation (NSF) in the forties and the possibility of the creation of the National Foundation for Social Science (NFSS) in the sixties. At both times the issue was, should social science be included or excluded in the NSF?

Chapter 3 examines the debate that arose in Edinburgh in 1836 as George Combe and William Hamilton contested the chair of logic and metaphysics at Edinburgh University. The arguments here are primarily concerned with the place of phrenology. Was it science (as Combe contended) or non-science (as Hamilton maintained)?

The now familiar story of Fleishman, and Pons' cold fusion experiments provide the quarry from which chapter 4 draws. Here the issue is over the relationship of science and technology: a sequential (science precedes technology) against a simultaneous (science and technology develop in tandem) model. The other issue was the role of the media in demarcating good science from poor science.

Chapter 5, the longest by far, explores the work of Albert (1873–1947) and Gabrielle (1866–1930) Howard and their attempts to develop the science of composting and organic agriculture. In doing so they attempt to integrate modern science with traditional Indian wisdom.

An epilogue returns us to the twentieth century, here the so-called 'science wars' are examined. While it is too early to look back on these (continuing) debates, Gieryn shows how his introductory 'telltale markings of cultural cartographies involving science' can be applied.

Throughout Gieryn maintains that boundary-work is 'brought on by disputes over (the) credibility' of science and is used 'to delegitimize the other's pretension to official renderings of science'; this results in the 'cultural space' for science taking 'diverse and pragmatic shapes'. He sees it happening when there is something valued, such as a truth claim or resources, which is 'on the line.'

This is a fascinating and highly readable book. There are copious footnotes, a 66 pages index and 19 pages of secondary literature. Unfortunately, all the primary literature details are left in the footnotes.

Gieryn is successful in showing the cultural aspect of the demarcation issue and although Gieryn is a self-confessed social constructivist, he doesn't see science as merely a social construct. He carefully avoids the trap of contending that a *partial* truth (the cultural imbeddedness of science) is the *whole* truth (science is nothing more than a social construction) as the more radical social constructivists maintain. The detailed contemporary comments from each of the episodes alone mean that this book will repay careful study, and it should be required reading for anyone interested in the demarcation issue.

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Graham Cunningham
Religion & Magic: Approaches & Theories

Edinburgh: Edinburgh University Press,
1999. 126 pp. pb. £9.95
ISBN 0-7486-1013-8

The study of religion and magic has changed immensely during the last

hundred years. It has expanded beyond the bounds of theology to become an important part of anthropology and psychology. Cunningham provides a panoramic view of how the notion of the sacred has been discussed by the leading scholars of the period. He does this by placing them into ten chapters based around distinct approaches to the study of religion.

He commences with three pioneering German scholars, Hegel, Marx and Weber, who were more interested in identifying the origins of religion. He then discusses the views of Spencer, Tylor and Frazer who were the three leading British writers on this subject in the nineteenth century who took an intellectualist approach. Chapter 3 concentrates on Marett, Freud and Malinowski who Cunningham says professed "Emotionalist approaches". Some may question whether the functionalist Malinowski rightly fits into such company, but such limited designations are always a danger in writing such structured overviews. Chapter 4 examines the phenomenological approaches of Otto, Jung, Eliade and Ninian Smart. The next chapter commences with the theories of Durkheim who considered that religion is collective and socially integrating, while magic is more individualist. Mauss, Radcliffe-Brown, and Evans-Pritchard are also discussed in this chapter.

The remaining five chapters focus upon the period since 1945, and include a review of the symbolic approach of Douglas, Beattie, and Victor Turner. Chapter 7 considers the more recent intellectualist ideas of Goody, Horton and Skorupski. The following chapter examines the structuralist ideas of Levi-Strauss and Leach. Chapter 9 considers some of the post-modern approaches commencing in the 1970s with the works of Sperber, Lawson and McCauley, and Boyer. Chapter 10 finally examines some of the recent Feminist approaches to the subject.

The book claims to be accessible, structured, concise and inter-disciplinary. Concise it is. So condensed and sweeping were the comments that at times I felt

that I was reading a student's revision notes. This conciseness lost much of the subtlety of the historical debate, but this can perhaps be seen as the advantage of this text over longer existing expositions of the subject. The text is indeed firmly structured, but I felt that the continual stream of one great scholar after another could cause confusion and possibly tedium. I would also question some of the categories into which scholars were fixed because most writers are influenced by more than one trend, and during their lives can show significant changes in their ideas.

I was puzzled as to the character of the last chapter that was aptly called "Afterword: Secularism assessed". Secularism is certainly an important issue within the period, and one wonders why Cummings did not weave this into the main storyline and not add it as some limp extra. Overall, I am sure that students will find this is a useful book and I will add it to my reading list.

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Edgar Powell

On Giants' Shoulders – Studies in Christian Apologetics

Epsom: Day One Publications, 1999. 280 pp. pb. £8.99. ISBN 0-9025-48 93-X

In a secular world, where the majority either reject or ignore God, it is important that Christians are able to challenge the pervading philosophy with well-reasoned arguments. In this short book on Christian apologetics, Edgar Powell seeks to provide the reader with an arsenal of ammunition with which to defend the traditional Christian faith and attack the secular position. In doing so he relies heavily on the wisdom of great minds, both past and present. Hence the title of the book, based on a quotation from Sir Isaac Newton: "If I have seen further it is

by standing on the shoulders of giants". Indeed, a great strength of the author's style is his use of numerous well chosen quotations. These could prove very useful for readers who find themselves searching fruitlessly for appropriate words of wisdom to illustrate a talk! Another positive feature of the book is a comprehensive glossary of terms which makes no assumptions of previous knowledge; even words like "hypothesis" and "infinite" are defined. This reflects the audience for whom the book would be most suitable. It is definitely *not* for the professional apologist who is seeking a rigorous exploration of all the aspects of a particular issue. As the author states (17) : "This approach would be too long and complex for our present purpose. Instead the main principles are reviewed – alternatives and solutions are offered to genuine intellectual enquiries. The text seeks to illustrate the credibility and relevance of the gospel, as it is the most up-to-date message for today"

For a short book Mr Powell covers an impressive array of topics appropriate for "coal-face" apologetics. In his first chapter he sets out why well-informed minds are essential for effective contemporary Christian witness. In four subsequent chapters he then considers the arguments for the existence of God, whether life has any meaning, the significance of belief systems and how God reveals himself through the natural world and scripture. The latter includes a section on the reliability of the Bible. Chapter 6 considers the nature and limitations of science and illustrates how the scientific discipline of investigation and discovery too easily becomes a belief system, "Scientism". The author then addresses some of the common objections to the Christian faith: the claim that Christ is the only way to God, the doctrine of Hell, why a loving god allows suffering and believing in miracles in the light of science. The next chapter entitled "Evolution – on the rocks?" seems somewhat out of place and brings to the fore what was visible beneath the surface throughout the earlier chapters; the authors creationist views. This is undoubtedly the

Achilles heel of the book as will be discussed further below. The final chapter of the book acts as a summary. In the words of the author: "Men and women of faith can have discernment of the times in which we live, because they stand on giants' shoulders and apply their wisdom and knowledge to today's problems – both religious and secular. Christianity is logical and credible, given the fact that we all have either explicit or implicit "belief systems" "(194). The book concludes with two appendices. The first is a hypothetical case study of how a Christian might use apologetics in discussion with an agnostic. The second is an appreciation of C.S. Lewis, whom the author greatly admires for his enormous contribution towards making the Christian message accessible to twentieth century men and women. Consequently, I was somewhat surprised that Mr Powell felt it necessary to include comments such as "Despite limitation in his theological understanding" (16) and "Jack Lewis did have defects in his appreciation of Christian doctrine. He was never exposed to any clear and systematic exposition of the Reformed Faith" (225). However, it is clear that this reflects the author's rather narrow view of orthodox Christianity and biblical interpretation. This fundamentalist perspective is also apparent in his attitude towards evolution as noted above and other doctrines such as hell.

Many readers of this journal will find the Creationist views that pervade the whole book immensely irritating. The reader is led to believe that on many matters there is only one position consistent with biblical Christianity. Thus the author states "Christians are clearly illogical if they try to adopt evolution as God's way of creating, when this explanation is founded on the a priori assumption of philosophical materialism. How can a science based on materialism be a means of investigating how God created? It is trying to marry evolution to creation, which will inevitably result in a strange hybrid" (202). Many Christians with a firm belief in the authority of scripture find the evidence for evolution

overwhelming, derived as it is from many branches of science. This cannot simply be dismissed as being dependent on materialistic assumptions. God can still be seen as the driving force, the architect and workman in the creative process. In the Chapter "Evolution – on the rocks?" the author makes it perfectly clear that he is sympathetic towards "Creationist Science", and falls into the trap of being very selective in his choice of data! Mainstream scientists in the fields of Geology, Molecular Biology and Palaeontology will find his arguments untenable in the light of the overwhelming body of evidence that supports an evolutionary process. Likewise, many readers would also be uneasy about the author's perspective on how a Christian can approach cosmological research. "There are the same aims as for any scientific endeavour with the additional one of showing how accurate the Bible is" (130). The imposition of such a constraint upon scientific research appears to remove the objectivity which should be integral to its purpose. One cannot help but think that, had Mr Powell written this book in an earlier century, he might have joined forces with those who attacked Galileo with the words of Ps 96:10 "The earth cannot be moved". Such an approach will do little to advance the cause of Christian apologetics.

It is not just in his dealings with evolution that the author takes a narrow line, but in other aspects of doctrine. This is most noticeable in his treatment of Hell (chapter 8). Whilst it is clearly right to insist that the doctrine of Hell is a mainstream and indispensable biblical doctrine, it is perhaps unwise to be too dogmatic about the nature of Hell. The author asserts that the only view of Hell that is consistent with scripture is that of eternal torment and quotes with approval Augustine: "To say that life eternal shall be endless but that punishment shall come to an end is the height of absurdity" (155). The possibility of a judgement followed by annihilation is ruled out of court, yet there are many Christians who would hold this view and justify it from scripture using a different set of verses to

those offered by the author. Words such as death, destruction and burning up are used frequently when describing Hell and appear terminal to many Christians! The critical point here is not which view is right or wrong, but what is helpful for the cause of effective Christian apologetics. In his first chapter entitled "Gone Fishing!- the do's and don'ts of witness", the author uses the analogy of casting out our gospel net to catch men and women for Christ. To be dogmatic on issues where Christians themselves hold differing views is hardly the best way to ensure a good catch!

In conclusion, although there is much to commend this book, I do not consider it to be a good starting point for those wishing to improve their apologetic skills. It is far too narrow in the line it takes and will alienate those in the scientific community to whom readers of this journal will wish to witness. Furthermore, it may mislead some into an unnecessary belief that there is a conflict between science and faith. Despite these strong reservations, the book does bring into sharp focus many of the key issues in Christian apologetics and is liberally embellished with useful quotations, both old and new. I am sure that some of them will find their way into my own talks and for that reason I am glad to have read the book.

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David Lorimer et al.

Wider Horizons: Explorations in Science and Human Experience
Leven, Fife: Scientific and Medical Network, 1999. 368 pp. pb. £12.
ISBN 0-9535333-0-1

This book celebrates the Silver Jubilee of the Science and Medical Network, which has about 2000 members world-wide 'who are inclined towards a non-materialist interpretation of the Universe and who have a sympathetic personal interest in

studies of and research into parapsychical, parapsychological and spiritual matters...'

The first chapter gives an overview of the Network and makes clear that the members consider that the Churches could not bring about a spiritual understanding of the world because they are 'immovably shackled to a fixed past.' The members are more sympathetic to telepathy, "near-death experiences" as evidence for the survival of the human personality after death, psychokinesis and Lovelock's Gaia hypothesis of the earth as a living organism, not to mention reincarnation.

Chapter 2 deals with science and its transformation from the classical picture to the indeterminism of quantum theory in which the observer is all-important. Consciousness is considered inexplicable in mechanistic terms and evolution by blind chance cannot be proved. There is a surprising discussion of the ability of dogs to know when their owners are coming home. A "morphic field" linking pet to owner is suggested. What can I say? This chapter also includes an outline of Goethe's view of science, which I found rather opaque. For instance: 'He tries to come out of the unity intuitively into multiplicity, instead of trying to derive the unity intellectually from the multiplicity'. There is also a review of a book on the science of indigenous American people, in which spirituality is important. However, it seems not to be science in our sense of the word.

The third chapter deals with health and healing. Prince Charles is quoted and of course there is much on complementary medicine. Spiritual healing is commended, being defined as 'restoring the balance of body, mind, emotion and spirit by means of contact or at a distance'. It is admitted that 'experiments designed to look for statistically significant effects from this and other complementary therapies are urgently needed'.

Chapter 4 deals with consciousness, saying that a new interdisciplinary science of it is required, which will include the 'softer' approaches of developmental and social psychology. 'The college kids who did inhale and who are now department

heads of psychology and psychiatry know from first-hand experience that there are softer realities than are dreamt of in hard-headed science.' There is much on Eastern thought: 'It is the action of our consciousness upon the infinite potential of the energy flux outside our heads that brings the outer world into being' and 'The Real is immeasurable; but it can be tested, experienced, delighted in.' "Psi" phenomena are discussed at length – precognition, telepathy, clairvoyance. We are told that 'Psi has been used to enhance decision-making in business and political arenas for many years. Combined with the best available information, even the briefest intuitive flash about future possibilities can recast a devastating loss into a gigantic profit'.

Chapters 5 and 6 deal with the Network's philosophy and the future. The members seem to be pantheists. Sir Kelvin Spencer, for instance, prefers the term 'Cosmic Consciousness' to God. They believe that 'science has discredited or undermined all traditional religions'. Education is fossilised – we need a science of creativity. We also need a new economic system without the profit motive, perhaps based on Schumacher's *Small is Beautiful*. The Network would like a series of conferences on 'what the Cosmos (God?) is expecting from us in our next phase of evolution'. What indeed!

Sadly, the book has not been edited well. There is much overlap between the different contributions and many printers' errors. On the whole, though the Network is full of idealism and clearly means well, I found its evidence for 'a wider and deeper world-view' rather shaky. Perhaps that is less important than dealing with the darkness in the human heart, a topic that is significantly left out.

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John Weaver

Earthshaping Earthkeeping: A Doctrine of Creation

London: SPCK/Lynx Communications, 1999. 172 pp. pb. £12.99.
ISBN 1-901443-11-6.

The dust cover of this book describes it as 'largely a book of stories'. This phrase sets out accurately the appealing conception behind the project, which is to let stories both ancient and modern, scientific and theological, testify to their understanding of the physical world and the place of humanity within it. The author, the Director of Pastoral Training at Regent's Park College, Oxford, and formerly a research geologist, is well qualified for the task he has set himself.

The book is divided into three parts. In the first part ('Ancient Stories') we are taken through the creation stories of the Jews, the Babylonians and others, and into an Old Testament theology of creation as the work of a covenant God. Because each of the three chapters in this section deals extensively with Genesis 1–11, there is a fair amount of repetition. Part of the reason for this is that Babylon is seen as the setting for the putting together of the Pentateuch during the Exile. What is valuable in this section is the demonstration of the polemical function of Genesis 1–11 with regard to other ancient Near-Eastern creation accounts, although once again there is some repetition, and the theme appears at several different points in the text. The stress on Genesis 1–11 also means that other Old Testament texts receive much more cursory treatment, and I missed any reference to the important material in Leviticus 25.

The second section tells in summary form the 'stories' of the world revealed by cosmology and geology. A major conclusion, which is essential to the arguments of the third section, is to do with the importance of the strong form of the anthropic principle, in which the development of the universe had to be the way it is for humans to be here.

In the third section a careful attempt is made to put scientific and theological understandings of creation together. The anthropic principle figures large in his treatment too, along with the importance of boundary questions and different levels of meaning: these are questions which science cannot answer, but that theology can address. There is a memorable quote from former NASA physicist Robert Jastrow:

'For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; and as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries' (98).

Once again, the reading of this section is made difficult by repetition of material. There is one particularly glaring example, when a whole paragraph dealing with the views of Paul Fiddes on p.111 is reproduced almost verbatim on p.141.

Who is this book for? It will make some demands on readers with no scientific training, because a large amount of scientific and theological material is introduced, and the terminology is not always adequately explained. There are other books that cover the ground better, but Christian students at third level could well read it with profit.

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Susan Blackmore
The Meme Machine

Oxford: Oxford University Press, 1999,
264 pp. hb. £18.99.
ISBN 0-19-850365-2

A meme is an element of a culture, such as a catchy tune, a fashion for clothes or a scientific idea, that is passed on by non-genetic means, especially by imitation. The

term was coined by Richard Dawkins, who has written a Foreword for the book.

Blackmore stresses that it is the ability to imitate that really distinguishes humans from other animals. Successful memes are the ones that spread widely. In a wide-ranging discussion she sets out to show how memetic theory may help to explain, for example, the large human brain, the origin of language, sex in the modern world and altruism. Altruism is useful to memes, because altruistic people are popular and readily spread memes among their friends. A separate chapter deals with religions as 'memeplexes' (memes acting as a group). Science, too, is a mass of memeplexes. But at the heart of science lies the method of demanding tests of an idea and so Blackmore regards science, at its best, as being more truthful than religion.

In the last two chapters Blackmore raises the question of the 'inner self'. The obvious place to look for a 'self' is the brain. However, neuroscientists can find no centre of action in the brain into which all inputs go and from which all the instructions get sent out. All human actions, whether conscious or not, come from complex interactions between memes, genes and all their products in complicated environments. The inner self is an illusion created by the memes for the sake for their own replication.

Only metaphorically can a meme be regarded as having a life of its own. Memes may be spread by imitation, but are initiated by human inventors, although Blackmore envisages the possibility of memes interacting on the Internet beyond human control. Like Dawkins, Blackmore believes the origin and evolution of life did not require a Creator. (One might ask 'Where did the 'primeval soup' come from?' Should not such a view lead to agnosticism rather than atheism?)

Blackmore advocates concentrating on the present moment, letting go any ideas that come into the head and paying attention to everything equally. Such practices help the individual to drop the false sense of self and be free to take more notice of

other people, leading to compassion and empathy. For religious persons such a state of mind may also lead to feeling greater closeness to God.

Blackmore's lively, readable book might be said to do for the meme what Richard Dawkins did for the gene. It powerfully makes explicit some of the doubts that may lurk at the back of the mind of many Christians. Working through such questions may well serve to strengthen faith.

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S.J. Barnett (Editor)

Isaac Newton's Observation on the Prophecies of Daniel and the Apocalypse of St. John. A Critical Edition: Prophecy as History

Lewiston, NY: The Edward Mellen Press, 1999. 324 pp. hb. \$99.95.
ISBN 0-7734-8155-9

Although the last few decades have seen some studies of Newton's religious beliefs and works, it is still not generally recognised just how much of his time and energy went into theological and biblical study. According to F. Manuel (*The Religion of Isaac Newton*, Oxford, 1974, 8) he wrote over a million words on these matters. At least three reasons can be given for the general ignorance of this side of Newton's life and work. One is that he was a religious dissenter, holding to a unitarian position theologically. This was at a time when dissent from the Anglican Church could be a bar to academic and social advancement. Others who held views similar to Newton's and made them known suffered as a result. During his lifetime Newton was very circumspect with regard to those with whom he discussed his religious views. His heirs probably considered it prudent not to publish much of his religious writings in order not to

imperil his reputation. Secondly, the growth of the idea that science and religion were somehow opposed to each other led people to neglect Newton's theological work as an aberration, even an embarrassment. Thirdly, as Barnett makes clear in his introductory study in this volume, there is the fact that whereas Newton's scientific work was innovative and revolutionary, this is not the case with his theological and biblical work. In the biblical field, 'his endeavours should be understood as minor amendments, clarifications and elaboration of a Protestant anti-Catholic exegetical tradition already well-established before his birth' (3).

The *Observations* is the only part of Newton's biblical work to become well-known. He began his work on these prophecies at least as early as 1675 and rewrote drafts of the work right up until his death in 1727. His nephew Benjamin Smith published the work in 1733, and it was a success. It was translated into German and Latin, and reprinted more than once in English. Although, as Barnett makes clear, it lacks any great originality, it bears the same marks as his scientific work: the ability to master a large corpus of earlier writing, the ferreting out of a great deal of data, the ability to systematise this data, and the application to it of a rigorous and logical mind. One of the most interesting aspects of the work is his attempt to develop a precise method of interpretation in order to decipher the prophecies. He believed that the ancient writers had been consistent in their use of symbolism – that there was an internal harmony in the 'code' used by the prophets analogous to that which exists in the physical world. He considered that he had discovered consistent rules which could be applied to the understanding of the prophecies. However, it was not a case of simple one-for-one correspondence of symbols and meaning. Newton held that there were different levels of meaning in the prophecies, which meant that read in different contexts the same symbols had different meanings.

The last edition of the *Observations* to be published was that of Sir William Whitla in 1922. However, he was concerned with defending the validity of the prophecies, not with providing a critical edition of Newton's text. Barnett sets out to present the text as it was first printed in 1733, with its abbreviated references, spelling variations, and grammar. The text is made accessible to the non-specialist by quite extensive footnotes and a glossary. The latter not only clarifies obscurities in the text but contains references to medieval religious figures and sects mentioned by Newton. Newton's quotations from original Latin sources, which were omitted in the 1922 edition, are included, and translated in the footnotes. The relatively few Greek and Hebrew words or phrases used by Newton are transliterated and then translated in a footnote. Newton's own marginal notes are either turned into footnotes or incorporated into the text, but are clearly marked as originally *marginalia*. An extensive Introduction of 61 pages provides an introduction to Newton's life and religious thought, and sets it in the context of his own period. Mary Mills provides a useful short essay on Newton's approach to biblical studies, which includes relating it to modern approaches to biblical exegesis.

It is good to have this useful and accessible modern critical edition of the *Observations* available. It will obviously be of value primarily to those who are interested in the life and thought of Sir Isaac Newton and in the religious thought of the seventeenth and early eighteenth centuries. Those interested in the history of biblical exegesis will also find interesting material in Newton's attempt at a 'scientific' methodology in interpreting prophecy. Also, of course, by providing some insight into the religious interests and thoughts of a major figure in the development of modern science the study of it will contribute something to the understanding of the relationship between science and religious faith.

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Neil Broom

How Blind is the Watchmaker?

Theism or atheism: should science decide?

Aldershot: Ashgate Publishing Ltd, 1998.
226pp. hb. £37.50
ISBN 1-84014-517-X

This book is about the drama of living things. The author seems well qualified to discuss the issues raised by him. He makes good use of his extensive knowledge of the work of others and shows an understanding of many concepts of the philosophy of science. Hence there are extensive quotations from these writings, both scientists and theologians. The illustrations augment the text.

Broom's thesis is that there is a meaning in nature, which extends beyond the information that the tools of science have discovered. He carefully defines the terms he uses. This is a great help to the reader unfamiliar with the issues discussed. Broom contends that the life sciences do not support the materialistic world-view depicted in many books today. He challenges the claims of some that findings of these studies have dispensed with the need for God in nature. Science, in his view is inadequate to evaluate this issue. Materialistic humanists have not explained the origin of life and these cellular systems. Yet they deny any place for a transcendent personal Being in the cosmos.

The author explores the function of some of these cellular systems. The workings of the chloroplasts, the DNA template and other cellular mechanisms are described. He agrees with many of the concepts outlined by Polyani in his writings. He emphasises that the highly complex biological systems of even the simplest cells function as a whole. The complexity and importance of these systems sometimes seem to be

downplayed simply because the individual components can be analysed in isolation. They are then often fitted into a materialistic humanistic plan.

The increasing complexity of life forms in the fossil record is examined. The neo-Darwinist equates this with a non-directed, random variation in the genetic material of organisms. This view is rejected. The author assesses, and then counters, the arguments of Richard Dawkins who holds this view. Broom concludes that the Watchmaker is not blind.

The book is not about a 'God of the gaps'. The contents invite the reader to reflect on the premise that in nature we see an intentionality of purpose. The writer's task is done well. I enjoyed reading what Broom had to say and recommend the book to others. Materialists and Christians alike will find much of interest for ongoing discussion.

Dr K.N.P. Mickleson is a paediatrician with an ongoing interest in this area of study.

Erratum

In the review by Dr. John Wilkinson of Joel J. Shuman's book 'The Body of Compassion: Ethics, Medicine, and the Church' (Science & Christian Belief 12, 84, 2000), the word 'principalism' in the 9th line of the 3rd par. should have read 'principlism'.