

History, science & theology: An essay review of Han Schwarz's *Creation*

Introduction

'Science-theology dialogue' is in vogue. But as Nicholas Lash has reminded us in another context,¹ 'dialogue' implies difference and distance. Husbands and wives who are relating well just talk to each other – they have conversations. Those who 'dialogue' do it in a marriage councillor's office. Theologians naturally talk to philosophers, novelists, historians, painters, even sociologists in their writings: there is no need to speak of 'dialogue'. But we *do* speak of the 'science-theology dialogue' – because the relationship is not as easy and natural as it should be. One sign of this unease is the plethora of books and articles specially devoted to this topic: precisely because theologians do not yet habitually take cognisance of the results of science in their work.

Hans Schwarz's new text *Creation* is one of a growing number of books that seek to be make a difference in this area:² his intention was to write a theology book that took science seriously. After a brief introduction, Schwarz surveys the historical relationship between science and theology (Part 1). He next summarises the 'world picture' according to contemporary science (Part 2), before moving on to construct a Christian doctrine of creation (Part 3). Below I give an essay review of the book focussing on some of the general questions it raises about the science-theology interface.

History

Schwarz announces his historiography in the introduction: 'until recently theology and the sciences were on a collision course.' 'Recently' is explained in the title of Chapter 4c: 'The Beginning Dialogue with the Natural Sciences in the Twentieth Century.' The impression given here and elsewhere is that meaningful dialogue between these two disciplines only got off to a fitful start in the 1900s. The combative tone of the word 'collision' runs throughout the book, suggesting that the dominant mode of the theology-science relation before 1900 was that of conflict.

Is this accurate history? Science, *sensus strictus*, cannot be said to have begun much earlier than, say, Galileo; in other words, during the seventeenth century 'scientific revolution.' It is indeed a popular belief that from then on until practically the modern day, science and theology have been locked in mortal combat. The Galileo affair is, of course, a *cause célèbre*, as is the Darwinian controversy, which features prominently in Schwarz's book.

Voluminous research over the last few decades³ has shown that this monolithic 'conflict thesis' greatly oversimplifies the evidence, even for Galileo and Darwin, and originated with the late nineteenth century American polemicists Draper and White. Controversies there were a-plenty, but they were often intra-religious quarrels over scientific matters rather than quarrels between 'science' and 'religion.' For instance, pre-Darwinian controversies about the 'new geology' can be seen as disagreement between different religious factions within the scientific establishment.⁴ And dialogue certainly took place from the beginning, even during well known 'conflicts', e.g. Galileo's celebrated discussion of biblical hermeneutics and science⁵.

Science, in the modern sense, had precursors. While to describe this precursor activity as 'science' is anachronistic, scholars do find it defensible to talk of 'Greek science', 'medieval science', etc. During these periods, the 'conflict thesis' wears even thinner. In fact, going back to the roots of Christian theology, we find many examples of conversations with the natural sciences, *sensus latus*, amongst the early Fathers.⁶ This is pertinent to Schwarz's book, because a significant proportion of these examples occur in

Patristic discussions of creation, Basil's *Hexaemeron* (homilies on the six days of creation) being a celebrated example.

So, the claim that 'until recently theology and the sciences were on a collision course' certainly is not good history. But does it matter? I think it does, if only because it blinds us to lessons from the past. It is surely instructive, for example, to watch bishop Basil *say* one thing about Greek science – useless at best, and corrupting at worst – and *does* another thing – witness the joyous use of science in his *Hexaemeron*. Such double standards are common, but not always easy to spot when it is done by one's contemporaries (e.g. Richard Dawkins' militant anti-religious rhetoric, and his religious fervour for truth). Or, to take an example of direct relevance to Schwarz's subject, exemplars from the last two millennia on how to relate Genesis 1 to the science of the day⁷ are certainly illuminating.

To return to the modern period, Schwarz briefly describes how the science-theology dialogue in different countries has been influenced by the socio-political background, e.g. the denomination-based universities in many country in continental Europe. It seems to me that this avenue is well worth following up, if only to alert us to our own idiosyncrasies.

So history matters; it affords us a 'distant mirror'⁸ in our continuing attempt to learn to talk to each other.

Science

Part 2 of Schwarz's book is a 65-page account of the world according to modern science. It is refreshing to find a theologian telling his readers that there are more things in heaven and earth than in the average theology book! In three chapters, Schwarz surveys cosmogenesis (big bang and all that), the origins and evolution of life on earth, and the nature of matter/energy and space/time.

Unfortunately, Schwarz's account is problematic in many ways. First, his decision to discuss the *historical* development of cosmology and biological evolution sits very uneasily with the avowed intention of reviewing the *modern* scientific world picture. In direct contrast to theology, scientific advances usually *supersede* previous knowledge. Thus, it is completely irrelevant that Gamov and his colleagues believed in 1948 that the primordial hot gas consisted of 'protons and electrons packed so tightly together that they formed a mass of electrically uncharged ... neutrons.' To a big-bang cosmologist today who deals in the currency of 'quark-gluon plasma,' this statement has about the same feel as flat earth theory. In any case, it gives the completely wrong impression that neutrons are made of electrons and protons (dubious even in 1948).

To make matters worse, Schwarz often treats different ideas from his sources as items on an *à la carte* menu. In a typical passage, we are told what various scientists have 'suggested' concerning the antimatter content of the universe, ending up with 'perhaps we should follow Hannes Alfen ...' But nothing recognizable as an argument was given to tell us why we should so choose. In any case, we now know the answer for definite – the universe contains next to no antimatter – pinning down and explaining this matter-antimatter asymmetry is one of the triumphs of late 20th century science.

The case of antimatter illustrates a general point: Schwarz's historical account simply stops a whole generation too soon! None of the major advances in cosmology and evolution since about 1970 feature. For example, why are we pointed to the 1930-1940s papers of H. J. Muller (a pioneer geneticist), and not told about the tracing of our common female ancestor (dubbed 'Eve' by some scientists) using 'mitochondrial DNA' in the last 20 years? It would have been far better to introduce 'dark matter' and 'dark energy' (the latter accelerating the universe's expansion – with serious implications for the future!)

than giving two pages over to ‘steady-state cosmology’ – a historical curiosity bearing testament to the tenacity of one brilliant man (Fred Hoyle).

For most authors writing today on ‘science and theology,’ the temptation is precisely the opposite – it is hard to resist theologising about the very latest results. But new findings are often over-stated (especially in popular accounts), not infrequently outright wrong, and always in need of evaluation by the community. When the Bishop of Gloucester and Bristol asked James Clerk Maxwell in 1876 how the latest theories of the science of light should be related to Genesis 1, Maxwell cautioned that science changes more rapidly than biblical interpretation.⁹ In fact, he thought that people ought to keep to themselves their own opinions about relating the latest science with theology, because ‘it is the nature of science, especially of those branches ... which are spreading into unknown regions to be continually [changing].’¹⁰ This advice is, of course, extreme (Maxwell was a very private person). But the point is well taken. The balance to be struck is to aim to be up to date, but *not* up to the minute – wise theologians do not build their houses on scientific sand!

Schwarz’s accounts of cosmology and evolution also contain simple factual errors. Heavy elements were *not* created ‘because of’ stellar explosions – they were created in stellar interiors and dispersed when stars exploded. Bacteria do *not* develop drug resistance because drugs change their genes; the drugs ‘select’ survivors amongst a naturally variable genetic pool. Such errors do not materially affect Schwarz’s discussion. But in any conversation (let alone in a dialogue aimed at *rapprochement*), representing the other side’s position as accurately as possible is simple courtesy. These factual errors could easily have been avoided by asking scientists to read the manuscript. Surprisingly, none were acknowledged as having done so.

When it comes to relativity and quantum mechanics, many confused statements throw doubt on Schwarz’s grasp of these subjects. ‘Complementarity’ and the ‘Copenhagen interpretation’ of quantum mechanics do not provide any grounds for rejecting an alternative interpretation based on ‘hidden variables.’ Its rejection is based on experiments pertaining to the so-called ‘Bell’s inequality.’ Einstein’s relativity does *not* teach that we can never observe simultaneous events. Neither does it teach that ‘space and time presuppose matter.’ There exist very high quality expositions of these two pillars of modern physics for the general reader requiring no more than high-school mathematics¹¹ – so there is no excuse not getting them right.

In fact, we are very well served by popular science publications nowadays. Nevertheless, hidden dangers lurk for the unwary non-specialist, the chief one being oversimplification. Many concepts of modern science are profoundly ‘unnatural.’¹² This is especially so when it comes to the latest speculations in quantum cosmology. Stephen Hawking’s coffee-table book on the subject,¹³ written in non-technical (almost colloquial) language and supported by glitzy graphics, hides too well its utter abstruseness – even to most physicists. Non-experts beware of oversimplified accounts.

All said and done, interdisciplinary conversation is hard work, for both sides. On the most basic level, there is a duty to exercise ‘due diligence’ with each other’s work. Worryingly, some of the scientists participating in the dialogue highlighted by Schwarz, such as Stephen Hawking and Frank Tipler, are *not* known for showing ‘due diligence’ with the theological literature in their writings, where words like ‘God’, ‘omniscience’, ‘eschatology’, etc., are used with scant regard to their technical (and tradition-laden) meanings. For example, when John Barrow and Frank Tipler wrote¹⁴ that ‘a modern-day theologian might wish to say that the totality of life at the Omega Point is omnipotent, omnipresent and omniscient,’ there was little evidence that they had consulted any *actual* ‘modern-day theologian’! Tipler’s later review of theological writings¹⁵ is mostly

Whiggish propaganda – all theologians since Lactantius simply paved the way for his brand of physical eschatology. Few theologians would agree. But scientists also have a right to expect their results work to be correctly represented before they are built upon theologically.

Theology

I like Schwarz's insistence that 'preservation' is a central part of a theology of creation (its discussion occupies a third of Part 3). A God who does not continue to be present in and interact with his creation is *not* the God who 'became flesh and dwelt among us.'

To my mind, 'preservation' is an area where questions raised by science are very directly, and often painfully, *felt*. In fact, Schwarz's discussion of divine preservation in nature, in moral conduct, and in history inevitably and urgently raises the question of theodicy. His treatment of this topic is, however, sporadic and brief.

The discussion on miracles is disappointing. It cannot be satisfactory for either theologians or scientists to be told that healing miracles 'no doubt' exist, but not why the author has no such doubts. Apparently, if a miraculous healing happens to someone whose 'relationship with God in prayer is weakened ... its source must be antigodly powers' – whatever happened to divine mercy?

The Bible is the basic sources for Christian theology. I do not believe that it features as prominently as it should in the contemporary science-theology conversation. In many cases, the interaction with Scripture does not go much beyond 'proof texting' – isolated verses being quoted to 'support' this or that position. The doctrine of creation is an area where a sustained and exegetically sophisticated conversation with Scripture in the light of science can very fruitfully be attempted. Schwarz rightly warns against doing this superficially vis-à-vis Genesis 1. An 'updated' account that simply tells the 'big-bang + evolution story' just ignores the text's *polemical* intent against competing contemporary cosmogonies. We may add that a proper update would, in fact, *question* many aspects of the modern scientific world view.

Other aspects of Schwarz's interaction with the Bible are perhaps less satisfactory. For example, he quotes Claus Westermann's comments on the Noahic covenant, but otherwise ignores his insistence on the unity of Genesis 1-11, which explore the ambiguity of the mandate to 'have dominion' after the entry of sin. Some texts are conspicuous by their absence – e.g. Yahweh's speech to Job, the johannine prologue, and those short but crucial references to *ta panta* ('all things') in Ephesians and Colossians. The brief discussion of the 'new creation' rather emphasizes those texts that speak of 'discontinuity' – but the disciples' cry 'It is the Lord!', the promise to 'recapitulate' *ta panta* in Christ (Eph. 1:10), and much else in the Bible speak equally eloquently of continuity.

Conclusion: the science-theology conversation and the future of science

So, finally, how should we evaluate Schwarz's book (or indeed any other piece of writing) as a contribution to the ongoing science-theology conversation? Schwarz gives us an excellent criterion in his preface – the two subjects should be 'mutually enriching.'

The science of cosmology and evolution can indeed enrich the doctrine of creation. Despite Schwarz's extensive review of these subjects, however, he grasps few of the opportunities for meaningful conversation. It is striking, for example, that there is no discussion of 'fine tuning' – the hypothesis that if the fundamental constants of physics were just a little different, sentient life in the universe could not have evolved. Moreover, Schwarz's silence on post-1970 research means that many potential points of contact are lost, e.g. 'mitochondrial DNA' and 'Eve'.

Where Schwarz does bring his science and theology into dialogue, the result is often unconvincing. For example, that ‘matter can be transformed into energy and it can appear as either corpuscle or wave’ leads him to conclude that ‘matter is not irrevocably given but fundamentally relative,’ so that only the metaphysical can ‘endow our life (*sic.*) with ultimate orientation and foundation.’ But matter/energy transformation and wave/particle duality do not teach that matter is relative! They just tell us that everyday language is wholly inadequate when it comes to talking about physics outside the everyday realm, and the language of mathematics is needed. Equally unconvincing is Schwarz’s attempt to contrast scientific and historical causality. These two are indeed quite different in many ways, but *not* because ‘complementarity’ resolves all ‘paradoxical phenomena,’ or because all causal explanations in science ‘can be repeated by any one at any time’ – cosmogenesis and evolution are one-offs.

So, I am not entirely sure that science has enriched Schwarz’s creation theology very much. But the general expectation that science could indeed be enriching to theology is by now no longer contentious. It is much less obvious how theology may enrich science. To conclude, therefore, let me make one suggestion.

Why should science exist (where ‘exist’ is a euphemism for ‘spend large amounts of public money’)? The dominant rhetoric of justification today is the familiar one of utility. A second, perhaps less obvious, rhetoric is fundamentally religious. There is little doubt about the religious roots of science, both ancient and modern: devout men (yes, it was an overwhelmingly male affair)¹⁶ seeking unity, intelligibility and ‘reasonable worship’ were largely responsible for its rise and initial development. One only needs barely to scratch the surface to realise that essentially the same motivations remain – biologists ‘read the book of life,’ physicists hunt ‘the God particle’ and ‘read the mind of God.’ Such extravagant language, together with the promise of utility in some areas, make up the rhetoric justifying the human genome project and particle accelerators alike. (Scientists like myself doing more mundane things rely simply on utility!) Each of these strategies for justification can (and does) lead to crudities harmful to science and to society at large.

To be sure, the religious-cum-utilitarian rhetoric was there even in Roger Bacon’s justification of science to Pope Clement IV, but with one crucial difference. Then, this rhetorical yarn was spun in a religious world that was (in Colin Gunton’s words) ‘credally static’ – a stable set of assumptions were shared from Bacon’s Ilchester to Copernicus’ Krakow. No such consensus obtains today. A critique of this rhetoric in the modern context,¹⁷ and suggestions of a more sober and holistic approach,¹⁸ are urgent projects in which theologians can make a vital contribution. Without sustained interdisciplinary conversation of this kind, no one can be sure that science will become a source of genuine enrichment for all, so that it will work towards rather than against the eschatological healing of all creation.

Main text of review: 2882 words

Wilson Poon is Professor of Condensed Matter Physics at the University of Edinburgh.

¹ Nicholas Lash, *His Presence in the World: a Study in Eucharistic Worship and Theology*, London: Sheed and Ward (1968).

² Hans Schwarz, *Creation*, Grand Rapids & Cambridge: Eerdmans (2002).

³ See, e.g., John Brooke and Geoffrey Cantor, *Reconstructing Nature: The Engagement of Science & Religion*, Edinburgh: T & T Clark (1998).

⁴ Charles Coulson Gillispie, *Genesis & Geology*, Cambridge: Harvard University Press (1951, 1996).

⁵ Letter to the Grand Duchess Christina, translated in e.g., Maurice A. Finocchiaro, *The Galileo Affair: A Documentary History*, Berkeley & Los Angeles: University of California Press (1989), Chapter III.

⁶ For a brief survey, see: David Linberg's essay *Science and the Early Church*, Chapter 1 in David C. Lindberg & Ronald L. Numbers, eds., *God & Nature: Historical Encounter between Christianity & Science*, Berkeley & Los Angeles: University of California Press (1986).

⁷ See Stanley L. Jaki, *Genesis 1 through the Ages*, London: Thomas Moore Press (1992).

⁸ Title of Barbara Tuchman's history of 14th century France.

⁹ Lewis Campbell and William Garnett, *The Life of James Clerk Maxwell*, London: Macmillan (1882), pp. 393-394; available (free) online at <http://www.sonnetusa.com/bio/maxwell.asp>.

¹⁰ Campbell and Garnett, *op. cit.*, p. 405, quoting an incomplete source: 'changing' is my emendation, consistent with the letter to the Bishop of Gloucester and Bristol.

¹¹ See, for instance, Roger Penrose's exposition in his *The Emperor's New Mind*, Oxford: Oxford University Press (1989), which can be read independently of his controversial thesis about consciousness.

¹² Lewis Wolpert, *The Unnatural Nature of Science*, London: Faber (1992)

¹³ Stephen Hawking, *The Universe in a Nutshell*, Bantam Doubleday Dell (2001); see my review in *Third Way*, Feb. 2002, Vol. 25 No. 1, p. 26.

¹⁴ John Barrow and Frank Tipler, *The Anthropic Cosmological Principle*, Oxford: Oxford University Press (1986), p. 682, footnote 123.

¹⁵ Frank Tipler, *The Physics of Immortality*, London: Macmillan (1995).

¹⁶ Margaret Wertheim, *Pythagoras' Trousers: God, physics & the gender wars*, London: Fourth Estate (1997).

¹⁷ For a philosophical critique of the religious rhetoric, see Mary Midgley, *Evolution as a Religion*, and *Science as Salvation*, London: Methuen (1985) and Routledge (1992). Nicholas Wolterstoff's critique of the lack of a utility rhetoric in art can serve as a model for a (reverse) critique of utility-speak in science: *Art as Action*, Grand Rapids: Eerdmans (1980).

¹⁸ For hints on how to begin, see, e.g., Margaret Wertheim, *op. cit.*, Jacques Barzun, *Science: the glorious entertainment*, New York: Harper Collins (1964), and W. C. K. Poon & T. C. B. McLeish, *Theology*, Vol. 102 (1999) 167-196, 'Real Presences: two scientists' response to George Steiner'.