Religion and Science in the United Kingdom

with Christopher Southgate, "Science and Religion in the United Kingdom: A Personal View on the Contemporary Scene"; and Peter N. Jordan, "Minimalist Engagement: Rowan Williams on Christianity and Science."

SCIENCE AND RELIGION IN THE UNITED KINGDOM: A PERSONAL VIEW ON THE CONTEMPORARY SCENE

by Christopher Southgate

Abstract. This article considers the current state of the science–religion debate in the United Kingdom. It discusses the societies, groups, and individual scholars that shape that debate, including the dialogue between theology and physics, biology, and psychology. Attention is also given to theology's engagement with ecological issues. The article also reflects on the loss of influence of denominational Christianity within British society, and the impact both on the character of the debate and the role of the churches. Finally, some promising trajectories of development for the future are outlined.

Keywords: Christianity; Simon Conway Morris; evolutionary biology; hermeneutics; natural evil; Arthur Peacocke; philosophy; physics; John Polkinghorne; psychology; theology and science; United Kingdom

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It is a daunting task to summarize the state of an area of academic enquiry, and in doing so in my own context I necessarily run the risk of offending or neglecting valued colleagues. So this article comes with a disclaimer—these are personal, partial perceptions, but no offence is meant by any of these judgments, or by any omissions that may be detected.

The other jeopardy for the summarizer is to produce what is no more than a list of scholars and projects; this will indeed be part annotated bibliography, though I shall also offer various insights into what I see as key areas of current enquiry. I shall concentrate on the interaction between the natural sciences and Christianity, as that is my area of study, but I shall also make a few broader observations. I shall focus very largely on the natural sciences, including ecology, but making reference to social sciences

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 ISSN 0591-2385

where they seem to bear importantly on the questions that "science–religion thinking" seems to raise. I will not discuss here the important work being done in ethics in the United Kingdom, except where that work springs directly out of relevant theological reflection. Nor will I focus on the relation between theology and technology, as that would make this already very general survey impossibly broad.

I begin by discussing briefly the societies and centers through which the debate in Britain is taken beyond the narrow confines of university research. I then consider those scholars in the United Kingdom who seem to me to have influenced the debate significantly in recent years. I then explore some wider societal implications. Finally, I outline some trajectories that seem to have the potential to take the debate in healthy and creative directions in the future.

Societies and Centers

I have been helped in preparing this piece in particular by attending the recent annual conferences of the two major groups operating in the United Kingdom, Christians in Science (hereafter CiS) and the Science Religion Forum (SRF). Of these, CiS is the more theologically conservative, with a specific focus on the Christian faith; SRF has a multifaith emphasis. Both, by coincidence, have just celebrated anniversaries. CiS began as the Research Scientists' Christian Fellowship in 1944, and they held their 70th birthday conference in Oxford in November 2014. SRF recently celebrated 40 years since their first conference in Durham in 1975, which was very much the inspiration of the late Arthur Peacocke. The names of the organizations are important. CiS was founded to give support to working scientists of (especially evangelical) Christian faith, and that continues to be its driving ethos. Typically those who lead the organization are scientists with theological interests, more than theologians who happen to be interested in the questions science poses. CiS is a vigorous body and holds not only a national conference but a student meeting, a northern conference, and regularly convened regional groups. I was most impressed, when I spoke to the Bristol group in January 2015, to find over 130 people gathered to hear about developments in the study of the origin of life.

SRF aims at a broader range of speakers and a broader clientele—in the past it has drawn in a number of teachers of religious education at schools level, and filled a valuable role in briefing them on current academic perspectives. Recent conference themes have included the role of inspiration, the question of the soul, divine action, and the laws of nature; the proceedings are published by Cambridge Scholars Publishing. This series of books, the inspiration of Neil Spurway, former Chair of the Forum, is a particular strength of the Forum's work. Both societies have prizes for essays from young scholars, and CiS has a new Templeton-funded program,

"Equipping and Supporting the Next Generation of Christians in Science," specifically to support students and early-career scientists in exploring these issues. Both societies publish biannual journals—CiS produces *Science and Christian Belief*, SRF issues *Reviews in Science and Religion*.

I have also attended recent meetings of the International Society for Science and Religion in San Diego and Vienna, and note the strong input of British scholars into that organization. Michael Reiss is now the president; Christopher Knight continues as secretary; Fraser Watts remains very active on the committee.

A major contribution to the debate in Britain has been made by the Faraday Institute, based in Cambridge. Under the leadership first of Denis Alexander and more recently of Bob White, the Faraday has mounted an important series of summer schools in which the interface between science and theology is introduced and explored. The attendance is from a wide range of countries and traditions, and the opportunity is taken to allow attenders to pose questions in depth to those who come as speakers. Other courses are also run, for example, to brief journalists with an interest in the area. Hilary Marlow has brought both expertise in biblical studies and a concern with ecological theology to bear on the program. Ruth Bancewicz, who has led the work in disseminating the "Test of Faith" program, an important set of video resources aimed at secondary school level, continues that work while being a senior research associate at the Faraday.

Bancewicz's recent emphasis on the importance of wonder picks up an important theme which is also of interest to Alister McGrath, Andreas Idreos Professor of Science and Religion at Oxford (cf. McGrath 2003). Part of McGrath's role is to lead the Ian Ramsey Centre (IRC), which might be thought of (*mutatis mutandis*) as Faraday's longer established counterpart at Oxford. Since the days of Peacocke, and with valiant organizational work first by Michael Parsons and more recently by Andrew Pinsent, the IRC has run a major seminar series at a high academic level, and also an annual summer conference exploring in depth a major area of current concern. I should also mention here another of Peacocke's legacies, The Society of Ordained Scientists, which is in a way somewhat analogous to CiS, but more Anglican-focused, and seeks to serve the needs of clergy with scientific backgrounds.

Scholars (1): Starting from Physicists and Philosophers

The three scientist-theologians most associated with the development of the science–religion debate between 1970 and the early 2000s were Ian Barbour, Arthur Peacocke, and John Polkinghorne. The last two were both priests of the Church of England. For comparison of their theological emphases see Polkinghorne (1996), Southgate (2011a), and Barbour (2012). Only Polkinghorne is still alive at the time of writing, though as I

implied above the influence of Peacocke remains strong in some of those still working today, including myself.

Polkinghorne's work continues to command attention, and led to impressive dialogues with his peers at the ISSR conference in Oxford in 2010. The proceedings (Watts and Knight 2012) are testament to how many "hares" Polkinghorne has set running over the years. I think in particular of his work on the methodological parallels between the natural sciences and theology (Polkinghorne 1994), his proposal of a "free-process" defense to natural evil (1989, 2012) and of a "revised" natural theology (2008, 61), his bold and controversial suggestions on divine action (1989, 1995, 1998; for refutations of this approach see Murphy 1995; Knight 2007; for a defense see Saunders 2002), his proposal of "dual-aspect monism" in respect of the mind-body problem (1994, 21) and his generative work on eschatology (2002). Polkinghorne's edited book *The Work of Love*, on kenotic creation (2001), remains a classic.

Another senior scholar to have published widely in this area is Keith Ward, formerly Regius Professor of Divinity at Oxford. In 2008, Ward listed what he saw as the 10 big questions in the field. His list (in a book very valuable for student use) is: how did the universe begin; how will the universe end; is evolution compatible with creation; do the laws of nature exclude miracles; what is the nature of space and time; is it still possible to speak of the soul; is science the only sure path to truth; can science provide a wholly naturalistic explanation for moral and religious beliefs; has science made belief in God obsolete; does science allow for revelation and divine action? (Ward 2008a).

Ward's own recent concerns have included a defense of idealism and a rejection of materialism (Ward 2010). This emphasis on the significance of the mental runs counter to the dominant physicalist ethos within the debate. But given the fundamental importance to theology of freedom of will, Ward's approach may yet come to command more support.

In the dialogue inspired by physics two Durham scholars now lead the way. David Wilkinson has used his background in astronomy to reflect on Christian eschatology (Wilkinson 2010). He has gone on to publish a monograph in the area of extraterrestrial life (Wilkinson 2013), a burgeoning interest within the debate as a result of the discovery that exoplanets are very widespread in the universe. That discovery is fascinating, though we should not presume that incontrovertible evidence of extraterrestrial life will be quick to come, still less that intelligent life will be discovered in the foreseeable future. Rather "exotheology" functions currently as a new way of looking at classic themes such as creation and incarnation.

Wilkinson also leads a Templeton-funded project to brief church leaders on important scientific issues. Richard Cheetham, Bishop of Richmond, has been active in promoting the importance of such work. Andrew Briggs, who leads the Templeton World Charities Foundation based in Oxford,

has also been involved in briefing church leaders. The project is co-led by Tom McLeish, a distinguished physicist now writing and lecturing in the field. At times McLeish with his energy of communication, his boldness of thought, and his willingness to submit science to scrutiny along with theology, reminds me of the John Polkinghorne of some years ago. McLeish's *Faith and Wisdom in Science* (2014) is an excellent first foray into the field, all the better for coming fresh to the debate. In beginning with the Wisdom Literature, and in particular a detailed and imaginative consideration of nature imagery in the Book of Job, McLeish moves the debate away from the familiar microcanon that has tended to inform the literature—Genesis 1–3; Psalms 8, 19, 104; a few texts in the Gospels; Romans 8: 19–23; Colossians 1: 15–20; and possibly Revelation 21–22. Of these texts Genesis 1 has assumed extraordinary and arguably disproportionate importance, and its verses are ransacked for material on the physics of origins, the origins of species, and the human vocation. McLeish wants instead, plausibly and creatively, to start from Job. Also welcome is an eminent scientist's willingness for the sciences to learn from theology. And again refreshingly, the application of McLeish's theoretical work proves to be not a rehashing of the Galileo Affair, or the Huxley-Wilberforce Debate, but the controversy around climate change and the application of various technologies in relation to creation care.

All that said, an issue with *Faith and Wisdom in Science*, as with so many in the field, concerns the handling of the Scriptures. More explicit attention to the hermeneutical approach being taken would have paid dividends. The same could be said of many other writers in the science–religion field, too many of whom are guilty of blithe proof-texting without attention to the issues that preoccupy scholars specializing in work on those same texts.

This is where the work of another British theologian with a background in physics is particularly important. Mark Harris, who leads the program on science and religion at the University of Edinburgh's School of Divinity, has published a timely and significant monograph on how the field of science and theology needs to be informed by the sort of thinking biblical scholars do (Harris 2013). Harris would want to direct scientist-theologians to a closer awareness of the character of the texts they cite, and also to the fact that though ancient cosmological texts are not science in the modern sense, they are informed by various versions of science as it stood at the time of writing.

Another example of the same concern in recent years is the "Exeter project" in ecological hermeneutics. This involved first an effort to look at biblical texts and their use throughout the tradition in relation to what we would now call ecological concerns. The ensuing edited book (Horrell et al. 2010a) is a useful resource, with chapters ranging from a treatment of themes from Leviticus, through von Balthasar in relation to ecology, to consideration of the forms that theology takes in the "new apocalyptic" of

North American fundamentalism. But it is the second part of the project that may be more of a model for future work in the field. Under the direction of David Horrell, Cherryl Hunt undertook a systematic study of the exegetical history of the two New Testament texts most cited in ecotheological discussion (Rom. 8.19-23 and Col. 1.15-20) This in turn led to original hermeneutical work on contemporary ecotheological ethics (Horrell, Hunt, and Southgate 2010b). For another example of the combination of biblical scholarship with science-theologians see Barton and Wilkinson (2009).

Also at Edinburgh are David Fergusson, who has made a range of important contributions, for example to the theology of creation (Fergusson 1998, 2007) and to the debate with new atheism (Fergusson 2009), the distinguished ecotheologian Michael Northcott, David Grumett, specialist on Teilhard and de Lubac, and Michael Fuller, currently the Chair of SRF. The science and religion program there is, in my personal view, at present the most creative and vigorous British training ground for new researchers in the science–religion debate.

Durham University meanwhile is involved in a very enterprising project looking back into the thought of Robert Grosseteste (1175–1253). This is a fine example of how modern simulations can bring the mediaeval universe to life. It is also a reminder of how, although almost all the answers that Grosseteste's era gave to questions in cosmology are superseded, the nature of the questions they posed remains important.

Staying for a moment in the area of physics and cosmology, the question of the anthropic principles and whether it is meaningful to think of the universe as "fine-tuned" for life has been important in the United Kingdom as elsewhere. In an important collection of essays on design published in 2003, Neil Manson, a philosopher then at Aberdeen (now at Lancaster), made some incisive observations about the philosophical soundness of probabilistic arguments about the apparently fine-tuned nature of various anthropic coincidences (Manson 2003). Careful philosophical work on areas important to the debate can also be found in Roger Trigg's work—I look forward to reading his new book on why science needs metaphysics (Trigg 2015). The tradition of bringing contemporary philosophy into trenchant and helpful register with debates in science and religion is found in two elderly British philosophers, both still active, Richard Swinburne (2013) and Mary Midgley (2014).

A fine if somewhat technical monograph by Rodney Holder remains a good position from which to approach the question of the anthropic coincidences, and whether it is plausible to describe the universe as fine-tuned for life. This is an issue that has also occupied McGrath (Holder 2004; McGrath 2010a). A further twist to the debate on the anthropic coincidences comes from the recent work on multiverses. Proposals that our own is only one of billions of universes were originally fueled by

a desire among many thinkers to steer the debate away from the theistic implications of apparent fine-tuning (just as earlier in the twentieth century the proposal of a steady-state universe arose at least in part to counter the perceived Genesis-like resonances of Big Bang theory). The debate about fine-tuning was then deadlocked for a while at the level of incommensurable metaphysical presuppositions. However, the fascinating suggestion that there might be empirical, or quasi-empirical, evidence for multiverses alters the character of the debate yet again. Some of this work—modeling the types of universe that would form part of an ensemble of universes and the types that could be fruitful for life—was going on in Durham while the SRF were meeting there in September 2015. I suspect however that even if there is plausible evidence for multiverses the debate will retain two poles—theists wanting to point to the (tuned?) particularity of the ensemble of universes within which we find ourselves, materialists wanting to stress the arbitrariness of our place within an ever-expanding view of reality. The pronouncements of someone who is still surely the most famous name in physics, Stephen Hawking, intriguingly span both these poles. In his *A Brief History of Time*, Hawking (1988) explained that his pre-Big-Bang cosmology had moved the debate away from any seeming consonance with the Book of Genesis; at the same time he cannot quite let go of the question as to what "breathes fire into the equations and makes a universe for them to describe" (Hawking 1988, 184).

Scholars (2): Biology and Theology

I turn now to issues raised at the interface between biology and theology. Until recently, the mainstream debate in the United Kingdom was relatively little affected by young-earth creationism, or its cousin intelligent design. I sense however that rejection of evolution is becoming a badge of orthodoxy in an increasing number of churches independent of the main denominations. It is also a contested area in the curriculum of so-called "free schools," schools independent of the National Curriculum in England and Wales. This very polarized issue is a problem area for school teaching, and even to some extent in higher education. (I recall Michael Negus recounting his experience of teaching Moslem students biology in Birmingham. They would dutifully learn evolutionary theory, but then explain to him at the end of the course that they had not believed a word of it.)

The issue of creationism led to a fraught moment in the public face of the science–religion relationship in Britain back in 2008, when Michael Reiss, Professor at the Institute of Education and an Anglican priest, was removed from his secondment as director of education at the Royal Society because he favored an approach in schools in which creationism was explored, not as alternative science, but as a "world-view" (see Jones and Reiss 2007

for a discussion of these pedagogical issues). Reiss's approach stems from profound academic integrity, and it was much misunderstood (willfully by some) at the Royal Society and in the press coverage of the incident. This misunderstanding was acknowledged in later communications from the Society. Nevertheless the affair is testament to a shift in the ethos of British public life, which I explore further below.

I myself have more or less abandoned dialogue with creationists. Alas I have always found such debate intractably polarized, sterile, and energy-draining, so I myself simply teach the (complex and ever-evolving) array of theories called neo-Darwinism as the best account science can give of the way the biosphere "works," without calling this "evolutionism," as one would have to in most North American contexts, or having to interrogate the alternatives in any detail. Hence, my treatment of the problem of suffering in evolution (Southgate 2008) entailed no prior defense of the general validity of a Darwinian description of the biological world. This approach is still sustainable within a liberal secular university system such as that of the United Kingdom. I do however admire scholars such as Denis Alexander for their willingness to engage more fully with conservative theological positions on creation and fall (Alexander 2008).

Once evolution is taken seriously, two challenges emerge for theists that have grown significantly in importance in the United Kingdom in the last fifteen years. There are also two developing opportunities.

The first challenge is the possibility that religious truth-claims might be explained, and explained away, by reference to evolutionary advantage. Did religious practice simply arise because it conferred social cohesion on tribes, or comfort in the face of mortality? Or was it perhaps a byproduct of other traits that conferred selective advantage? This much-contested (and completely unresolved) area of enquiry was an important concern for the project led by Justin Barrett and Roger Trigg at Oxford on the cognitive science of religion (for an introduction to this field of enquiry see Barrett 2011).

Appeals to paleoanthropology to support models of the development of areas of behavior as complex as religious belief and practice seem strongly underdetermined by data. (Even while I was writing this a major find was announced from South Africa, in which a significant group of hominin skeletons, described as *H. Naledi*, was discovered in a context suggesting ritual burial from an age long before ritual had previously been suspected—Berger et al. 2015.) Atheists will continue to appeal to the power of various evolutionary explainings-away of religion; theists will continue to regard these as greedy reductions, and typically will want to insist on different layers of explanation of the same phenomena (for an innovative approach to understanding reductionism see Southgate, Negus, and Robinson 2005).

The second challenge posed by Darwinian narratives of the development of the biosphere is no more resolvable, though it does admit of the

deployment of more in the way of traditional theological resources. It is the problem of suffering in creatures complex enough to suffer, and arises because of the ubiquity of predation, parasitism, and disease. The problem was well known to Darwin, who famously wrote both that "there is grandeur in this view of life [evolution by natural selection]" (Darwin 1859, 491) and also "what a book a devil's chaplain might write on the clumsy, wasteful, blundering, low and horridly cruel works of nature!" (Darwin 1856). It received surprisingly little attention (though tackled in a characteristically nuanced way by Peacocke 1998; 2001a, b; and Page 1996) until a recent flurry of writings. Contributions within the United Kingdom have included Lloyd (1998a, b), Southgate (2008), Alexander (2008), Messer (2009), Hough (2010), Clough (2011), and Sollereder (2015).

If it is accepted that chronology rules out human sin as the cause of the disvalues in the natural world, the choices then seem to rest between attributing those disvalues to some sort of primordial force in opposition to God's creative purposes—this is the line pursued by Michael Lloyd, Principal of Wycliffe Hall, Oxford, and, differently, by Neil Messer, Professor of Theology at Winchester and David Clough, Professor of Theological Ethics at Chester—and to a "package deal" in which the values cannot be had without the disvalues. The latter is proposed in different ways by Robin Attfield, Professor of Philosophy at Cardiff, by Denis Alexander, by Bethany Sollereder, now attached to Regent's Park College, Oxford, and in my own work (cf. Attfield 2006, chapter 6; Southgate 2008, chapter 3). An extended BioLogos project on the theology of evolution will shortly lead to an edited book on the subject edited by Stanley Rosenberg.

Although I differ from Messer on this matter, I remain very grateful to him for his thinking, and especially for his criteria for what would count as an ethically satisfactory project to pursue in biotechnology. Messer wants to ask:

- "Is the project good news to the poor?"
- "Is the project an attempt to be 'like God', or does it conform to the image of God?"
- "What attitude does the project embody towards the material world (including our own bodies)?"
- "What attitude does the project embody towards past failures?" (Messer 2007, 231–33)

This list of criteria is of great value and can be applied more widely, for instance to ways of treating domestic animals (Southgate 2015b), or proposals for assisted migration of species (Southgate 2009). It is also a telling set of questions for the Christian (or Jewish) theological ethicist

to pose to proponents of projects in transhumanism. For an account of transhumanist values see the work of the Oxford philosopher Nick Bostrom (e.g., Bostrom 2005).

It is always an interesting question where to place Pierre Teilhard de Chardin (1881–1955) in the science–religion debate. For some his strange phraseology, used to extend biological evolution into the realms of the cultural, mental, and spiritual, disqualify him as a scientific voice. For some his alarmingly undiscerning embrace of technologies, including the nuclear, disqualify him as a theologian of nature. For others he remains a prophetic voice, whose anticipation especially of the Internet, a proto-noösphere if ever there was one, is remarkable. He may also be seen as anticipating the transhumanism movement. Enough to say here that perhaps the definitive contemporary account of Teilhard in English comes from a British scholar currently working in Edinburgh, David Grumett (see Grumett 2005).

A sequel to the debate about evolutionary theodicy involves Alexander and the distinguished biologist and Gifford Lecturer R. J. Berry. Berry, while agnostic as to the origin of evolutionary suffering, has advanced a view that retains a literal Adam and Eve, the first representatives of what he calls "Homo Divinus" (Berry 1999, 2003). For Berry, it is perfectly reasonable to suppose that there was a couple who were Neolithic farmers, to whom God entrusted the responsibility of being the first spiritual humans. It was their failure to live up to this vocation that has distorted humans' relationship with the nonhuman creation ever since. A similar model is one of a range that Alexander proposes (Alexander 2008). Berry, incidentally, is editor of two of the most useful collections of essays to emerge in the field in recent years, on stewardship (Berry 2006), and on Darwinian theology (Northcott and Berry 2009). Moreover, the intellectual stature of some British scientists with an evangelical faith, such as Berry, Ghillean Prance, John Houghton, and my own colleague John Bryant, has been very significant in opening up the possibility of an environmentally concerned evangelicalism, both in the United Kingdom and more widely.

As I noted above, strategies of scriptural interpretation are an underexplored area within the debate; indeed, they might be regarded as its Cinderella element. For critiques of "cosmic fall" theories, in which human sin damages the wider cosmos, from within biblical studies, see Bimson 2009 and Sollereder 2015. What seems to me curious, hermeneutically, is that Berry's model seems content to treat most of Genesis 1–2 as a (profoundly important) creation myth, while wanting to contrive a way of reading chapter 3 literally. I mention this because I see this desire to retain an element of literalism as quite a widespread preference within evangelicals in the United Kingdom. I speculate that one of the motives may be that of being seen to accord full worth to the Holy Bible, but another may be the desire to preserve a "U-shaped curve" of narrative in which created harmony is

ruined by the sin of humans. See Paul Fiddes's *Freedom and Limit* for an important rejection of Northrop Frye's assertion that this curve is *the* basic narrative line of the Bible (Fiddes 1999, 47–64). My own sense, as I seek to develop evangelical theology that faces to the full the impact of science on our understanding, is that Christian explorations are held back until they face to the full God's responsibility for the disvalues within an evolutionary creation (Southgate 2014).

Two new opportunities for theological reflection on the evolutionary narrative are provided by convergent evolution and the role of cooperation within evolution. First convergent evolution. Simon Conway Morris, a distinguished paleontologist working at Cambridge, has been eloquent in suggesting that certain properties are almost bound to emerge within evolution, even on widely different trajectories and within very different biological groups. Vision is the classic example, and the sort of intelligence found in primates a more challenging but nevertheless intriguing case. For Conway Morris, this suggests that the possibility space of evolution can be seen to possess certain attractors, toward which evolutionary trajectories will naturally be drawn (Conway Morris 2003, 2008, 2010). (Another such attractor, perhaps less appealing to the theist, might be predator–prey arms races.) If it could be established that such attractors did exist (and I sense the science is at rather an early stage) then it would be suggestive to some at least of a designedness to evolution that might be congenial to theologians of creation. (Interestingly one of McGrath's many projects in the last few years has been a reexploration of the work of William Paley, the status of whose natural theology was so damaged by the advent of Darwinism; McGrath 2011. These putative attractors of Conway Morris's might rather seem to remind the historian of science, not of Paley, but of Richard Owen's anatomy based on archetypes).

At this point it may be worth mentioning that John Dupre, a prominent philosopher of biology, has a large group at Exeter. Dupre's dismissive attitude to the truth-claims of religion can be found in some of his early work (e.g., Dupre 2003). He has been associated with the Stanford School in philosophy, of which Nancy Cartwright is also a member. Cartwright, now attached to Durham (as well as San Diego), has had a project at the London School of Economics, developing her conviction that the world of nature is far more "dappled," and less reducible to a small set of knowable laws, than most natural philosophers since the age of Newton have been willing to concede (Cartwright 1999, 2015). I look forward keenly to the book *Rethinking Order*, coedited by Cartwright and Keith Ward, due from Bloomsbury in June 2016. Dupre's group has been exploring a developmental-systems view of biology, which likewise subverts the sense of a hierarchy of processes stemming from a few simple principles. I mention this here because it seems in strong counterpoint to the direction of Conway Morris's argument, and to have a more random and atheistic tenor

to it. Yet this may be one of those cases where apparently conflicting schools both have true instincts—the attractors may exist, and yet we may lack the tools to demonstrate them within the drift of evolutionary processes, and hence be unable reliably to draw strong theological inferences from them.

A judicious caution in drawing theological inferences from some very exciting new science characterized Sarah Coakley's (2012) Gifford Lectures. The Gifford Lectures were endowed by Lord Gifford in 1885 and remain a very important series in the general area of natural theology (very broadly interpreted). They rotate among the older Scottish universities, and are now all available online. Another significant series, more narrowly focused on natural theology, is the Boyle Lectures, revived in London in 2004 by Michael Byrne (see ReManning and Byrne 2013). The other editor of the Lectures for 2004–2013, Russell ReManning, now at Bath Spa University, has done important work organizing projects both on natural theology (ReManning 2013) and on emergence.

To return to the Giffords, Coakley, Norris-Hulse Professor of Divinity at Cambridge, reflected in her 2012 Lectures on the work of Martin Nowak on strategies of cooperation in biology. Nowak's mathematical modeling at Harvard suggests there can be a surprising extent of long-term advantage to strategies that at first sight look almost sacrificial. Coakley spent time in Nowak's lab and knows the work well. The theme of sacrifice is one of a number of important aspects of her theology. Her Giffords (Coakley 2012), available online, reflect fascinatingly on the possibility (no more than that) that evolution might look more consonant with Christian themes than is often supposed. Working in the context of mid-nineteenth century thought, Darwin found it expedient to stress the competitive elements of his theory, the "war" as he terms it in the last paragraph of *The Origin of Species*. (The projects at Cambridge putting both Darwin's published works and his correspondence online will be of great assistance to researchers who may wish to follow up this rhetorical analysis. See also David Livingstone's 2014 Gifford Lectures on the contextual dependence of the reception of Darwinism; Livingstone 2014.) Coakley sensitively uses Nowak's work to suggest, in effect, that this balance be adjusted, and the element of sacrifice reconsidered.

That said, the logic of natural selection remains in force. Cooperation may change the character of the "winning" individuals or groups; apparent sacrifice of interests may lead to a surprising degree of eventual "success." But these terms in inverted commas remind us that there are always "losers" in evolution, individuals and species whose characters and behaviors prove in the end nonadaptive. Insofar as "losing" involves for many individuals trauma and suffering, and for species extinction, the fascinating advances in the area of cooperation do not in my view dull the edge of the theodical charge posed by disvalues in evolution (as discussed above).

Scholars (3): Animals and Psyches

An interesting development in the theology of biology is recent work in the subdiscipline now called "animal theology." This received much of its impetus in the United Kingdom from Andrew Linzey's work at Oxford, focusing largely on animals under human control—either in domestication or under experimentation. Linzey's theological moves to underpin his conviction that humans should not use other animals for humans' own purposes (Linzey 1994, 1998) remain of great importance. That work is complemented by the theology of David Clough. Clough's adventurous efforts to combat theologies of human uniqueness, and to consider whether the "image of God" should be extended to other species (Clough 2011), force other theologians to consider time-honored positions with more care. However, I remain unpersuaded by Clough's sense that the category of sin can also be extended beyond humans. There may indeed be protomorality on other species, but sin involves a more sophisticated and reflexive knowing of the right and nevertheless choosing the wrong, as well as the sense (however undeveloped) that there is personal accountability to the forces of the good. Clough's thought experiments remain, however, a very important addition to the field. For an early collection of essays exploring the area of animal theology see Deane-Drummond and Clough (2009).

Psychology occupies an interesting place in the science–religion debate, spanning as it does "hard" neuroscience and much "softer," more qualitative accounts of human being, and that of other animals. Its place in the U.K. debate has been assured through the efforts of Fraser Watts, first Starbridge Lecturer in Theology and Natural Sciences at Cambridge. Watts, a former President of the British Psychological Society, and also an Anglican priest, has worked in a diverse range of areas from sleep to glossolalia to forgiveness (on the last see Watts and Gulliford 2004). Watts' insistence on the careful application to the debate of the disciplines of his own subject has provided a model from which many can learn. For a summary of some of the issues psychology raises see Watts (2002, 2010) and Watts and Dumbreck (2011). In the debate about human nature and the meaningfulness of the concept of the soul Malcolm Jeeves, Emeritus Professor of Psychology at St Andrews, has been prominent (see e.g., Jeeves and Brown 2009). In contrast to the resolute substance dualism of Swinburne (Swinburne 2013), Watts himself prefers, helpfully in my view, the notion that to use "soulish" as an adjective is more constructive than looking for an entity that can be identified as the soul.

I am convinced that data from neurophysiology will, over the next twenty years, have a profound effect on our understanding of belief (the steady advance of its data is in marked contrast to the erratic sequence of discoveries of paleoanthropology). So, it is interesting to see the distinguished Cambridge neuroscientist Alasdair Coles, who works among other

areas on that tragic condition multiple sclerosis, contributing Christian apologetic material to the "Test of Faith" initiative.

On the increasingly pressing pastoral issue of dementia, and how it might be understood theologically, John Swinton has taken a lead (Swinton 2012). In the area of neuroscience itself one of the most vexed areas concerns near-death experiences, which sharply polarizes opinion. For a neurophysiological approach skeptical that the evidence will prove to reveal anything about life beyond death see the work at Oxford by Michael Marsh (Marsh 2010).

Watts's careful contribution across the areas covered by psychology reminds me of John Hedley Brooke's equally careful work on the history of the science–religion debate (see especially Brooke 1991; Brooke and Cantor 1998). Brooke has provided a useful intellectual autobiography in a recent article (Brooke 2014), which in charting the evolution of his own interests has a great deal to say about the evolution of the debate in the United Kingdom. Brooke too has insisted on the careful application of the disciplines of his subject to motifs that are often oversimplified. He has helped us, for example, to see that there is no single science–religion relationship, but only a complex and ever-shifting relationship between each science and the particular manifestation of the religion in question in the context under discussion. He has also helped us to see the interesting and neglected role of chemistry in the history of this matrix (Brooke 2002). Brooke has done vital work surveying the field in its very different contexts throughout the world (Brooke and Numbers 2011). He also (sparing his blushes) brought a much needed academic stature and rigor to his tenure of the first Chair to be endowed in the debate in a British university, the Idreos Chair at Oxford. Important historical work has followed from Brooke's successor, Peter Harrison (sadly now largely lost to the British scene though still a Senior Research Fellow at the Ian Ramsey Centre), and others such as Thomas Dixon (Dixon, Cantor, and Pumfrey 2010). Harrison's 2011 Gifford Lectures have now been published as *The Territories of Science and Religion* (Harrison 2015).

A U.K. Scholar Abroad

The one British scholar working abroad without which this account could not be complete is Celia Deane-Drummond. It may be objected that she is an ecotheologian, rather than a scholar of science and religion as usually understood. But Deane-Drummond's current Chair at Notre Dame is concurrent between the Department of Theology in the College of Arts and Letters and the College of Science. Also, she has made many contributions to the study of the relationship between theology and biology, and more recently in theological anthropology. Furthermore, this objection would reproduce one of the more damaging errors to have afflicted the debate,

namely the dissecting out of ecological issues and their assignment to a separate area of enquiry.

There is important work to do to tease out the reasons for this faultline between theological work with the "hard" natural sciences (especially physics and evolutionary biology) and engagement with ecological issues. One explanation in recent years has been the preference of significant funders, one in particular. But there is another, subtler, reason. Those reflecting on ecology have a natural suspicion of the human technologies that science has made possible, and the damage such technologies have done to the environment. And much of the theology that has been done has majored on the recovery of reverence for the Earth, as "sacred," or at the very least in need of "reenchantment." For a skillful study of the complexity of the narrative of the disenchantment of nature see the work of Bronislaw Szerszynski, Reader in Sociology at Lancaster University (Szerszynski 2004).

Science does not tend to be seen as promoting this recovery of reverence. There is therefore a little-studied "conflict" syndrome at work in ecotheology. A parable of this is the fate of the Gaia Hypothesis, developed by the British inventor and atmospheric scientist James Lovelock in the 1970s (Lovelock 1988, 2007, 2009). The name "Gaia," connoting a mythic Earth goddess, combined with some rhetorical personifications semi-mischievously introduced by Lovelock himself (calling Gaia "no doting mother tolerant of misdemeanors . . . but stern and tough . . . ruthless in her destruction of those who transgress"; Lovelock 1988, 212) transformed a strictly scientific hypothesis—that the surface and atmosphere of the Earth could be regarded as a homeostatic system akin to a living being—into the focus of very widespread and sometimes wild mythologization. Lovelock's own approach to religion seems distinctly whimsical, as in this quotation: "What if Mary is another name for Gaia? Then her capacity for virgin birth is no miracle, it is a role of Gaia since life began. She is of this Universe and, conceivably, a part of God. On Earth, she is the source of life everlasting and is alive now; she gave birth to humankind and we are part of her" (Lovelock 1988, 203). This might seem rather vague and visionary, but it is a common enough a type of talk within the more "alternative" elements in British culture. Suffice it to say here that this is an example of how, in the effort to put them in contact with spiritual discourse, scientific descriptions can lose the rigor and precision that made them important in the first place.

Barbour's Gifford Lectures epitomize the split noted above between the conversation between theology and the harder sciences on the one hand, and that with ecology on the other. He followed his well known lectures on science and religion with a second series, published as *Ethics in an Age of Technology* (1992). These latter are I suspect little read today. Because they appeared in print separately, and did not follow up the taxonomic format of the first series, they contributed to the sense that

issues involving human use of technology (of which the current ecological crisis is such a dramatic instance) are set apart from science–religion issues. Deane-Drummond, arguably, has been able to work across the fault line mentioned above because her own ecological disposition is inclined to the valuing of the scientific, important though a spirituality of wonder remains for her. Human beings are tasked, in her work, not so much with earth-worship as with the Thomist virtue of prudential wisdom, but it is a wisdom that must be informed both by the data and the wonder of science (Deane-Drummond 2006).

Deane-Drummond's extensive explorations of ecotheology include her secondment to the Catholic charity CAFOD at the time of the Copenhagen Summit in 2009 (Deane-Drummond 2011). Disappointing as was the outcome of that summit, she continues to press the question: how can theology interact with the public sphere? (Deane-Drummond and Bedford-Strohm 2011). More recently, Deane-Drummond has led an important program at the Institute of Advanced Study at Princeton Seminary, on the subject of human evolution. Her own work in the area is the subject of a monograph called *The Wisdom of the Liminal* (Deane-Drummond 2014). It combines two of her important influences—Aquinas in relation to wisdom, and von Balthasar on theo-drama. Both of these importations have been judicious and telling. The motif of theo-drama reminds us that Christian doctrine is not a static edifice of propositions, but a way of giving systematic shape to a story, in which believers find themselves caught up, as creatures being redeemed and sanctified.

Deane-Drummond's role as an ecotheologian is complemented by the ecohermeneutical work of Horrell's group as already noted, the powerful prophetic work of Michael Northcott, and the careful, biblically nuanced writings of Richard Bauckham (Northcott 2007; Bauckham 2010; Horrell 2010 provide good ways into this literature). All of these make an important contribution to the science–religion debate, more broadly conceived. I write this as another climate change summit is about to take place in Paris. This is a reminder that the sciences tell human civilization a very "inconvenient truth" (in Al Gore's phrase) about the effects of greenhouse gas emissions on the future climate of the planet. The science of climate change is very well supported, and if anything seems to suggest that the crisis is deepening more rapidly than was envisaged even ten years ago. The report of the British economist Nicholas Stern remains a significant marker in the progress of the debate, as does the chilling analysis of Mark Lynas as to the extent of the measures required to limit the damage (Lynas 2007; Stern 2007). An interesting meta-question, with wider ramifications, concerns the reasons for climate change denial. Why is a clearly emerging pattern of prediction so strenuously resisted by so many? Here the work of Mike Hulme at King's College London is important (Hulme 2009); see the section of the December 2015 issue of this journal devoted to his work.

For a brief account of 33 possible reasons see Gifford (2015). Further investigation of this issue might also give insights into the dynamics of evolution denial.

New Atheism and the Teaching of the Science–Religion Debate

I now want to note the contribution to the field of the thinker who might be termed the high priest of "evolutionism," Richard Dawkins, former Professor of the Public Understanding of Science at Oxford. It may seem odd to be considering such a passionate critic of religion, especially of the Abrahamic faiths, in the context of the science–religion debate, but he has been a regular contributor to that debate, and he and his fellow "new atheists" (in the United Kingdom Dawkins himself, Christopher Hitchens, and in a different and very telling way the novelist Philip Pullman; Dawkins 2006; Hitchens 2007; Pullman 2010) have elicited a range of responses from British theological writers including Ward, McGrath, and Michael Poole (McGrath 2005; Ward 2008b; Poole 2009). The significance of the new atheists for the wider science–religion debate is partly rhetorical—it is important to notice how they tend to use science to claim an intellectual authority which is then deployed to give weight to a range of other types of critique of (especially the Abrahamic) religions. Poole's is one of a sequence of careful comments he has made on the field, aimed particularly at the general reader and the educator; he has also been active for many years in addressing helpful ways to address the debate within school curricula (see Poole 2008a, b).

It was a disappointment to me to see so little evidence of interest in science and religion teaching in the "Common Awards" curriculum for Anglican ministerial training that came onstream in 2014 (devised by the Church of England but available to ecumenical partners). Ironically, the decline in the visibility of the "new atheists" in the public imagination may be a contributing factor in the paucity of treatment of the science–religion debate in Common Awards. Dawkins at the height of his fame was always a good pretext for a vicar to strike up a conversation in the pub. However, Common Awards, validated by Durham University, does offer the opportunity for further development. There is a consortium of scholars working to develop "blocks" and "snippets" of teaching material that could be inserted into other modules (for example, blocks on Big Bang cosmology for modules on creation). This strategy may be of interest to educators more widely, as a way to allow scientific considerations to become intrinsic to theological debate, rather than being confined to a few specialist modules.

Many courses were set up in universities around the world in response to the Templeton initiative of the mid-1990s known as the Science and

Religion Course Awards. A large proportion of these no longer exist, though the impetus of that initiative can still be found in the textbook project *God, Humanity and the Cosmos*, which by 2011 was in its third edition (Southgate 2011b). A very good shorter introduction to the field at undergraduate level is McGrath (2010b). But I particularly want to welcome the persistence of science–religion teaching at Newman University College in Birmingham, one of the original Templeton courses, and now taught by Louise Hickman, the editor of *Reviews in Science and Religion*. At Newman too is Fern Elsdon-Baker, principal investigator on a new project to investigate public perceptions of the science–religion relationship, with particular reference to evolution. Importantly, this includes study of Moslem perceptions of evolution and science. Further information can be found at http://sciencereligionspectrum.org.

A "Creative Mutual Interaction?"

The innovative work of my Exeter collaborator Andrew Robinson represents an interesting exercise in methodology at the science–theology interface. Robinson began from science, and an honest contemplation of the problems that a Darwinian schema poses for a Christian theological framework. He then found in the philosophy of Charles Sanders Peirce (1839–1914) a way in which generative thinking could be attempted in both disciplines. So a philosophical underpinning (in particular in relation to Peirce's approach to semiotics) provided the basis for Robinson's work across a range of areas. He has since been able to:

(i) make scientific proposals in origin of life studies (Robinson and Southgate 2010a; Southgate and Robinson 2010) and submit them to testing using computer models (Lui et al. 2010) and an experimental system based on catalytic RNAs (Lehman et al. 2014);

(ii) make theological proposals in relation to the Incarnation (Robinson and Southgate 2010b; *cf.* also Southgate 2015a). Thinking in fundamental ways about signs, and the way Peirce classified signs, enabled Robinson to ask such original questions as: what sort of sign of the life of God was Jesus? And what, in the culture into which Jesus was born, enabled those "with eyes to see" to perceive the quality of his life as a sign of the divine?; and

(iii) beyond this, construct a "semiotic model of the Trinity" (Robinson 2010, 2014), which maps the Peircean categories directly onto the life of God as revealed in the Christian tradition.

(iv) Also, and importantly, Robinson's theological explorations led him to novel proposals in paleoanthropology (Robinson and Southgate 2010c). The evolution of sign-use in hominids seems to Robinson to be best thought of in terms of the combination of

attributes in a matrix, rather than a hierarchical ladder of attainment.

This was a fine example of what Robert J. Russell has called "creative mutual interaction," not just the one-way traffic from scientific advance to theological response that is more familiar in the field. Importantly, the catalyst for this was the recovery of the thought of a significant philosopher from the past, just as it had been for the Aristotle-influenced philosophical theologians of the Middle Ages (Islamic and Jewish as well as Christian).

Work in Faiths Other Than Christianity

The contribution of the former Chief Rabbi, Jonathan Sacks, to British public life has been very considerable, and it is interesting that he has also dipped his toe into the science–religion debate with a book entitled *The Great Partnership: God, Science and the Search for Meaning* (Sacks 2011). Jewish approaches to the relationship between science and religion have much in common with Christian but bring their own characteristic flavor to issues such as theodicy. The relation between Islam and science has been an important one since the religion's earliest years, but repeated efforts by Christian scholars to find conversation partners in Islam willing to conduct the debate in a "Christian-like" way have in my experience consistently failed. It was a privilege to serve on the SRF Committee with Mawil Izzi Dien, Professor in Islamic Studies at the University of Wales and author of a book on the environmental dimensions of Islam (Izzi Dien 1997), but the speakers invited to represent Islam at the Forum's conferences have not, for all their distinction in their own fields, brought the debates into register. No doubt the difficulties are on both sides. I suspect there are deep-lying reasons for these difficulties, cultural to a degree, but also hermeneutical. For the efforts of some scholars to find contemporary science prefigured in the Qur'an, as well as a survey of other approaches see Negus 2011. "Creative mutual interaction" between the world faiths sometimes seems a distant prospect indeed. However, the conversations about the spiritual experience of scientists in the initiative "Science and the Spiritual Quest" (1996–2003), in which the prominent Quaker and astronomer Jocelyn Bell Burnell took part (cf. Bell Burnell 2013), along with other British scholars such as the glycoprotein biochemist Pauline Rudd (Rudd 2012), seem a more promising approach to interfaith dialogue.

Some Broader Perspectives

The sociological research of Elaine Ecklund among working scientists points to the United Kingdom as having a higher proportion of scientists who see a conflict between science and religion than the other countries

sampled—the United States, Italy, and India (Ecklund 2010). That this antireligious constituency is not only numerous but influential at the higher echelons of the profession was shown by the Reiss Affair, mentioned above. This secularity of British professional life manifests itself in various ways.

First, the Dawkins phenomenon in relation to ideas at a popular level. Richard Dawkins's great skills as a communicator and polemicist mean that his ideas (some of them not now typical of the mainstream of evolutionary biology) reach a wide public. Although as I made clear above he does not lack for theological rebutters, his polemic against religion is regarded benignly by the scientific establishment, and by those who give him "air time." Critiques of religion, especially Christianity given the perceived sensitivities and risks attached to critiquing Islam, gain credence through being delivered by scientists.

Second, at the level of authority within national life. We have seen that Michael Reiss's careful and academically sound approach to issues of pedagogy in relation to evolution triggered a very antagonistic approach within the Royal Society. This antagonism was not only, I suspect, to the views themselves but—for some at least—to a Christian priest occupying his role. It is notable too how little weight the recent representations of archbishops in respect of issues such as adoption and marriage now carry. (One may compare this with the influence of the Archbishop of Canterbury on the abdication crisis of 1936, or yet the influence of reforming bishops on the legalizing of male homosexual acts in 1967). The very longstanding Anglican assumption that the Church of England sits naturally, and without any explicit justification, close to the civil power is now in rapid retreat. (This retreat sits within a wider process of cultural change, importantly documented by sociologists such as Grace Davie and Linda Woodhead; Woodhead and Catto 2012; Davie 2015.) If the Church wishes to have a voice in shaping society, it will in the future have to earn that voice with demonstrable expertise; this makes the Wilkinson-McLeish project to brief church leaders on scientific issues all the more important.

Beyond that, I suggest that this loss of authority in denominational Christianity is having an impact on the directions being taken with the academic science–religion debate. The debate as structured in the English-speaking world by Barbour, Peacocke, and Polkinghorne presupposed that theology and science were critical-realist disciplines with comparable access to truth (though with different data sets). Much more weight now attaches to scientifically informed investigations of the character of religion (viz. the growth of the field of cognitive science of religion, and the willingness to find evolutionary explanations for the origin and persistence of faith).

This in my view makes it all the more important that the successor to Fraser Watts as Starbridge Lecturer at Cambridge is Andrew Davison. Davison represents an approach to theology that is unashamedly cosmic, after the manner of Augustine and Aquinas. All reflection about God and

creatures falls within its scope, and what the sciences can tell us about creatures is an interesting conversation within that larger enquiry. This metaphysical boldness is timely and refreshing, and acts as a welcome counterpoint to the trend identified above, whereby religion becomes an object of study by science. My only caveat about this is that some thinkers from this tradition tend in my view to underrate what has been learned since the Middle Ages. Our view of human being can never be the same since the insights of Darwin and Freud. Augustine and Aquinas are not of course to be blamed for lacking these insights, but their work must be regarded as less complete on that account. That said, I look forward very much to the rich contributions Davison and his students will make to the debate in the United Kingdom. One very welcome recent Cambridge initiative is the placing of three postdoctoral theologians in scientific laboratories (presumably on the model developed by Coakley in Nowak's laboratory). This involvement in the grain of working science, as a rich human activity rather than merely a set of published texts, promises to be very generative (along the lines of the Science and the Spiritual Quest work mentioned above).

Two other initiatives about which I learned at the SRF Conference were the work of Gillian Straine on including a scientific dimension in pastoral work with cancer sufferers, and the ministry of Jennifer Brown as a "science missioner" in Oxford Diocese, in an area in which many scientific establishments are situated. Straine has also published a new introduction to the debate (Straine 2014).

The young scholar Michael Burdett, based both at Oxford and St Andrews, was asked at the recent SRF Conference to articulate the areas of the field in need of development. His list was a telling and eminently plausible one. It included the broadening of the debate to include many faiths, the importance of dialogue with the social sciences, the need to consider the technological possibilities opened up by science (or sometimes preceding science), and the need to open up more engagement with other subjects in the humanities, including the creative arts. I detect seeds of all these trends in the British scene, some much more developed than others.

On that positive note I conclude this overview, noting the new and creative energy that is coming into the debate, and welcoming both the energy itself and the revolutions that it may cause.

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