In this issue (full contents on next page):

CONTENTS

NOTES ON CONTRIBUTORS

John Brooke was the first Andreas Idreos Professor of Science and Religion at Oxford University (1999-2006) where he is a Fellow of Harris Manchester College. He is currently President of the Forum.

Michael Fuller is a Senior Teaching Fellow at New College, University of Edinburgh, and an Honorary Canon of Edinburgh Cathedral. He is Vice-President for Publications of the European Society for the Study of Science and Theology and is a Committee member of the Science and Religion Forum

Andrew Hammond has been Chaplain of King's College, Cambridge, since 2015. Previously he served in parishes in London at St Paul's Cathedral. Before ordination he worked in the world of classical music: first as an opera singer, then in management.

Randy Isaac is Director Emeritus of the American Scientific Affiliation and retired IBM Research VP of Systems, Science and Technology, holding a BS in Physics from Wheaton College and a PhD in physics from the University of Illinois at Urbana-Champaign.

Tim Middleton holds degrees in both theology and science, including a PhD in Earth Sciences from the University of Oxford. He is currently a postgraduate student in the Faculty of Theology and Religion at Oxford, where his research focusses on intersections between ecotheology and strands of contemporary philosophy. He is also an Associate of the Faraday Institute of Science and Religion.

John Nightingale is a retired Anglican Vicar. After degrees in PPE and Theology he worked for forty years in pastoral, educational and administrative settings in England and Nigeria. He is currently involved in economic and environmental campaigning.

Michael Poole was among the early members of the then Research Scientists Christian Fellowship, later to be known as Christians in Science. He was the longest serving member of the Committee, on which 'Sam' Berry also served. After teaching physics in a London Boys Comprehensive School for fourteen years, Michael returned to his Alma Mater of King's College London as a member of the Science Education staff in 1970 and remained there in various offices until October 2017.

Michael Reiss is Professor of Science Education at UCL Institute of Education, Visiting Professor at the Universities of Kiel, York and the Royal Veterinary College, Honorary Fellow of the British Science Association and of the College of Teachers, Docent at the University of Helsinki, a Fellow of the Academy of Social Sciences and a Priest in the Church of England. His research and consultancy interests are in science education, bioethics and sex education. He is President of the International Society for Science & Religion and of the International Association for Science and Religion in Schools and writes on the interface of science education and theology.

Neil Spurway is a former chair of this Forum, who set up the series of “Conversations in Science and Religion”. He still writes regularly for "ESSSAT News and Reviews", which he has been involved in editing since 2001.

EDITORIAL

From the Outgoing Editor

After eight years of editing *Reviews in Science and Religion*, the time has come for me to pass on the mantle. When I undertook the role in 2011, I had a hard act to follow. Chris Southgate had been editor for many years and the journal was firmly established as a worthy resource for original and reprinted reviews. Writing my final editorial for this publication leads me to reflect on, and affirm, its value. With more and more books being published, book reviewing is becoming an exponentially important task enabling scholars and other interested readers to keep up to speed and inform their own research. As many readers will know, *Reviews* was founded in 1982 as a guide to some of the newest and most significant books in science and religion. Since then the field has expanded, not just because of developments in science, but due to its deepening interdisciplinary nature. Epistemological debates, post-modern philosophy and the scientific study of religion, for example, have changed the shape of the science-theology conversation. The future calls us to address urgent issues, not least those concerning the environment and the application of our technological advancements, and 'science and religion' is vital for this task because there is nothing more important than interrogating, challenging and sometimes changing the way we think. Ultimately, we cannot begin to wonder how to live an ethical life unless we encounter science and theology at their interface.

With that, I leave *Reviews* in the hands of its new editor Maureen Smith. I am immensely grateful for the support I have been given in this role, particularly by Mike Fuller the outgoing Chair of the SRF and Andrew Robinson, who has formatted and copyedited every edition of *Reviews* I have edited. I also very much appreciate the efforts of all those who have contributed to the journal over the years. Decisions about

copyright and reprints by publishers in recent years means it has become increasingly difficult to reprint reviews from elsewhere. I would like to encourage you, therefore, to work together with Maureen by volunteering original reviews of the new books you find particularly noteworthy. *Reviews* has always been a collaborative venture and it is much stronger for it.

Louise Hickman

From the New Editor

Dear Friends, I am honoured to be accepted as Review's Editor, on behalf of the Science and Religion Forum (SRF) as I have taken over from the lovely Dr Louise Hickman. I look forward to working with the team. My history with Dr Hickman, stems back to 2013, when primarily as a scientist, I enrolled on her Master's programme to gain some insights in theology. Sequentially, this resulted in my award for the Post Graduate Certificate in Contemporary Christian Theology which provided me with a type of knowing about science and religion.

My interest in science and religion was borne out of classroom practice, where in essence, the nature of a perceived conflict between science and religion, would see some students put up types of 'barrier' to learning aspects of science when influenced by their religious beliefs. In some instances, parents have been known to withdraw students from particular topics in science due to sensitive issues. So in aiming to bridge the gap between this perceived conflict and learning in science, I am currently undertaking research as an EdD student at Newman University and I would like to thank all of those involved who have entrusted me with this position.

My joining the SRF committee however has come at sad time with the passing of key players Sam Berry and Mary Midgley. Professor Sam Berry was one of the most eminent biologists of his generation and was widely known as a Chris-

tian apologist. He has numerous scientific papers and he became president of many scholarly societies, including the Linnaean Society. He was editor of many scientific journals and will be greatly missed. Dr Mary Midgley, on the other hand, who became fascinated by studies of animal behaviour, was made an Honorary Vice-President of the Science and Religion Forum (SRF) in 1996 after many years of regular attendance and invited contributions. So whilst I did not know Sam or Mary personally, I am sorry for both the loss and grief of those who did. I can only say that through my observations, both Mary and Sam's contributions have been well received in the science and religion community and this has not gone unrecognised. Both Sam Berry and Mary Migdley have been remembered in this edition of Reviews' with heartfelt Tributes from Michael Poole and Neil Spurway and contributions from John Brooke.

We at the SRF are grateful to Professor Michael Reiss whose article is based on three inspirational talks which he gave at the SRF Conference (2018) in Cambridge. Science, Religion and Education are a recommended read for practitioners or researchers interested in the intersection between science and religion in schools. Professor Reiss provides a comprehensive account of both science and religious education; where key to religious education he constructs new knowledge in the form of six 'Big Ideas'. This is sequential to his piece on education in general. I myself was inspired and enlightened by his interpretation of "March of the Penguins" with lessons learnt about 'love' and 'Perseverance' relevant to his conclusion that formal education plays a key role in helping us to develop as individuals and inducting us to society.

The theme of education was also complimented by Lizzie Henderson and Stephanie Bryant of the Faraday Institute for Science and Religion. We appreciated the presentation they gave and the interactive activities at the SRF Conference in Cambridge highlighting and providing insights of the valuable

work they do across the city by providing insights and developing more awareness about the relationship between science and religion in schools.

This edition also features a range of reviews from books such as Bruno Latour, *Facing Gaia: Eight Lectures on the New Climate Regime* (2017) and Robin Attfield, *Wonder, Value and God* (2018). Tim Middleton provides a review of Bruno Latour's book which is a re-working of Latour's 2013 Guilford Lectures. When describing the book as a 'political theology of the earth, crossing disciplines, and subverting norms in the process', Tim provides an articulate account of its counterparts. Also, in reviewing the work of Robin Attfield, *Wonder, Value and God*, (2018), John Nightingale as he was reminiscing on how reading the book reminded him of walking the Pennine Way. He makes reference to our experiences of the natural world as illustrated by Louis Armstrong's 'It's a Wonderful World' and the programmes of David Attenborough as pointed out by Robin Attfield and thus provides more flavour to this edition.

This edition also includes a review of Paul Copan, Tremper Longman III, Christopher L Reese, Michael G Strauss (gen. eds. 2015) *Dictionary of Christianity and Science: The Definitive Reference for the Intersection of Christian Faith and Contemporary Science*, originally reviewed by Randy Issac, which is now a review reprinted from elsewhere. The book is welcomed for its opening up of the particular context in which the science and religion dialogue has been taking place in recent decades.

Finally, I would like to extend out thanks to Andrew Hammond for us being able to publish his witty conference 'After Dinner Speech' with a narrative well received by all.

Thank You.

Maureen Smith

Messages from SRF Chairs:

Outgoing Chair's message to members, September 2018

Dear Friends and Colleagues,

We have just enjoyed an excellent two-day Conference at Westminster College, Cambridge. I'm delighted that Prof. Michael Reiss's excellent addresses will be published in the next issue of 'Reviews' for the benefit of those who were unable to be there to hear him in person.

This conference also saw some significant changes in the our Committee membership, and I thought it would be helpful to explain these in a message to our members. For the past year this Committee has consisted of:

Michael Fuller (Chair)
Mark Harris (Conference Secretary)
Hilary Martin (Membership Secretary)
Gavin Merrifield (Treasurer)
Fabien Revol
Julie Wearing (Secretary)
Plus Louise Hickman (Publications Secretary),
Gillian Straine (Publicity Officer) and Chris Southgate as co-opted members.

Julie, Fabien and I are stepping down from our respective roles, and Louise has indicated that she wishes to hand her role on before the next SRF Conference. I am delighted that Jennifer Brown is willing to take over from Julie as Secretary, and that Mark Harris is willing to take over from me as Chair; and Maureen Smith is willing to work with Louise on the next issue or two of Reviews, taking over from her thereafter. In addition, Gillian Straine is willing to take over from Mark as Conference Secretary, combining this with her role as Publicity

Officer; and in response to a request for a member to serve on the Committee to deal with issues around safeguarding, GDPR, &c, Finley Lawson has kindly agreed to serve in this role.

These changes to the Committee were all approved at the AGM. The Committee for the coming year will therefore be as follows:

Mark Harris (Chair)
Jennifer Brown (Secretary)
Hilary Martin (Membership Secretary)
Gavin Merrifield (Treasurer and Webmaster)
Gillian Straine (Conference Secretary and Publicity Officer)
Plus Louise Hickman and Maureen Smith (Publications Secretaries), Finley Lawson (Precise title t.b.a.), Chris Southgate and Michael Fuller (past Chair) as co-opted members.

John Brooke will continue to serve as our wise and supportive President.

I look forward to my continued involvement with the Forum, not least as a co-opted member of the Committee in my role as immediate past Chair.

Michael Fuller, September 2018

Incoming Chair's message to members, September 2018

Dear Friends,

I am very grateful to members of the AGM at the recent Conference in Cambridge for electing me to serve as Chair of the Forum; this is a great honour, and I am sorry that I could not be there at the time due to a speaking engagement in the Netherlands. I have heard very positive reports of the Conference, and especially of Prof Michael Reiss's input, and the

speakers from the Faraday Institute, to whom we again express our thanks.

But I wanted to use this short message especially to express my heartfelt thanks to Mike Fuller for his work as Chair since 2013. SRF has changed a great deal in that time, both in terms of the membership and the ways that we operate and see our mission/vision. Throughout, Mike has led us with great skill and sensitivity, and I know that he will be a tough act to follow. I am sure that Mike would want to emphasise the work of Committee members during his time, and I am glad that I take on this new role (for me) as Chair with a similarly-enthusiastic and effective Committee.

One of the most notable changes in SRF that Mike has overseen recently has been the revised pattern to annual meetings that we have adopted, now alternating between September and April, in order to try to broaden our appeal to those who find a late August conference difficult (e.g. students). It is heartening to see that the first conference in this new pattern (at Westminster College, Cambridge) went well, but this means that we will have another very soon (11th – 13th April 2019, in St Johns College Durham). Plans for this are already fairly settled, and we will very soon be taking bookings.

I look forward to seeing you in Durham next April.

Mark Harris, September 2018

OBITUARIES

Robert James "Sam" Berry, MA, PhD, DSc, FIBiol, FRSE

My earliest memory of Sam Berry, about half a century ago, was of going into his office and seeing a poster on the wall, which showed a woman breast-feeding her baby. Underneath was the unexpected caption 'This milk is not fit for human consumption'. Here, surely was someone who thought 'outside the box', as well as within it — and was not afraid to say so. My second recollection was of how fast Sam walked, even when we were in conversation. He was energetic in his work, committed to making the most of every moment in his ever-increasing range of biological investigations and exploring how they might mesh in with his own his strong Christian faith. The significance I have placed on those two recollections was abundantly confirmed as I grew to know Sam better. People often ask why R. J. Berry came to be dubbed 'Sam'. It was because of his ability to recite to his schoolmates the Stanley Holloway monologue 'Sam Sam pickup tha Musket' with a fine Lancashire accent!

If Sam ever appeared brusque, it may have been related to a tragedy experienced when he was a sixth-former who was particularly close to his father. His father took his own life. Sam spells out his cries of 'why?, why? why?', and what followed, in his edited collection *Real Science, Real Faith*, pp 182ff. Within him, nevertheless, was being forged a heart of gold, and testimonies of how he made time to help those in need were forthcoming at a Service of Thanksgiving for his life, at St. Nicholas's Church, Sevenoaks, on Monday 23rd April 2018. In Sam's account of his personal tragedy, he said 'I don't know if I was a real Christian at that time'. A little later, however, he affirmed 'My acceptance of Christ as my Saviour'. He writes 'I heard that the death of Jesus Christ at Calvary … was God's intervention to provide a way back into his purpose for all who accepted him at his word, including me.' His Christian

life grew apace, along with the outworking of his decision to pursue the academic life and to serve actively in his local Anglican church.

Born a Lancastrian in the autumn of 1934, he lived a very full life for over 83 years, which included the overlapping categories; academic, family, the interplay between science and religion (in particular Christianity) and the stewardship of the environment.

Academic

Following a lectureship in genetics and subsequently a Readership and a Chair at the Royal Free Hospital School of Medicine, Sam was appointed in 1974 as Professor of Genetics at University College London. This post he held until 2000, and thereafter was Emeritus Professor. He was awarded a DSc in 1976, made a Fellow of the Institute of Biology and a Fellow of the Royal Society of Edinburgh.

Early on in his career Sam became interested in the part played by genes in development. His PhD in 1959 was entitled *The Inheritance and Development of Two Inherited Conditions in the House Mouse.* He was particularly known for his research on the genetic isolation of islands and the rapid adaptation which can take place within biologically brief times. His investigations took him as far distant as Shetland in the north, and even down to the Sub-antarctic. Mice were a speciality! His 2009 book *Islands* encapsulated much of this work. Even in this geographical field the overlap between academia and family life also featured. Sam had married Caroline Berry, Consultant Medical Geneticist at Guy's Hospital in 1958 and she assisted Sam in a few of his very early expeditions before being either working or looking after the family.

Sam became president of many learned societies, including President of the Linnaean Society on more than one occasion. His scientific papers numbered about two hundred and he was editor of about ten scientific journals.

The Interplay Between Science and Religion & Christianity in particular

This featured in a number of ways. Sam wrote on the methodology of the two disciplines and their respective claims about the nature of evidence. He was willing to engage in controversial issues from his position as a geneticist, an ecologist and a thoughtful Christian who was well versed in the Bible. He was not afraid of controversy, saying 'I have fired some people by putting forward ideas about the feasibility of the Virgin Birth (which among other things, got me involved in a major TV spectacular on the life on Jesus, which was apparently transmitted round the world) and the scientific possibility of 'fitting' the Fall into conventional physical anthropology/palaeoanthropology.'

In 1996 he received a UK Templeton Award for "Long and distinguished advocacy of the Christian faith among scientists"

Responsibility for, and Stewardship of Nature

At a time when there was an emerging concern about looking after the environment, Christians realized that taking a biblical stance on Ethics and the Stewardship of nature are taught as key concerns of humankind and therefore included Sam in what they were doing.

He worked at promoting Ecology and the Christian faith in the long held tradition that the Bible and the natural world were, respectively, the 'Book of God's Words' & the 'Book of God's Works'.

He was influential in the Government's drafting of the Human Fertilisation & Embryology Act and the setting up of a regulatory agency, the Human Fertilisation & Embryology Authority'. He delivered the London Lectures in 1992 on "Genes, Gaia and God"; which were revised and expanded as a Gifford Lecture series in Glasgow 1997-8.

One aspect of the Berrys' involvement in the interplay between science and Christianity, which again illustrates how Sam and Caroline were part of a team, was summarized by Professor Malcolm Jeeves, Emeritus Professor of Psychology at the University of St. Andrews who writes:

> For more than four decades the *Research Scientists Christian Fellowship*, later to become *Christians in Science*, benefited immeasurably from the dedicated leadership and organisational skills of Sam and Caroline Berry. Sam as Chairman of Christians in Science (1967-1988) and President (1993-1995) and Caroline as its Secretary (2000-2008).

He was a founding member of the *A Rocha* Council of Reference from the early 1960s, which promoted care for creation and continuing advocacy of the Christian faith within the world of science. He was also awarded honorary membership of the National Biology Network.

Sam was also one of the founding fathers of the *John Ray Initiative*, in partnership with Sir John Houghton, so that together they represented biological and physical science.

In conclusion, a memorable feature of the Thanksgiving service was a tribute from his colleague Professor Steve Jones —himself a renowned biologist and communicator. Professor Jones's contribution was even more touching, as coming from one who had rejected Sam's faith and yet was able to recognize and celebrate such a well known Christian's scientific achievements.

Sam leaves behind him his widow, Dr Caroline Berry and three children, Andrew and Alison (twins) born in 1963 and Susan, born in 1965, as well as many friends.

Michael Poole

Mary Midgley

Dr Mary Midgley, who was made an Honorary Vice-President of the Science and Religion Forum in 1996 after many years of regular attendance and invited contributions, died on 10th Oct, aged 99 – she had been born in 1919. Her parents were Lesley Hay, the daughter of an engineer, and Rev Tom Scrutton, a chaplain at King's College, Cambridge, and later vicar of Greenford, West London. Her secondary schooling was at Downe House, founded as a progressive boarding school in Charles Darwin's former home, but by Mary's time located at Cold Ash, near Newbury.

Of her schooldays, she wrote in her autobiography, The Owl of Minerva, that "a new and vigorous Classics teacher offered to teach a few of us Greek, and that … was somehow slotted into our timetables. We loved this and worked madly at it, which meant that with considerable efforts on all sides, it was just possible for us to go to college on Classics … I had decided to read Classics rather than English – which was the first choice that occurred to me – because my English teacher, bless her, pointed out that English literature is something that you read in any case, so it is better to study something that you otherwise wouldn't. Someone also told me that, if you did Classics at Oxford, you could do Philosophy as well. I knew very little about this but, as I had just found Plato, I couldn't resist trying it." The world is in debt to those two exemplary schoolteachers!

Going up to Somerville, Mary did indeed read Classical Greats (Classics plus Philosophy). The year was 1938, and only 12 months later a large fraction of the male students were enlisting for the war. "I think myself that this experience has something to do with the fact that Elizabeth [Anscombe] and I and Iris [Murdoch – who would become a life-long friend] and Philippa Foot and Mary Warnock have all made our names in philosophy ... I do think that in normal times a lot of good female thinking is wasted because it simply doesn't get heard."

But she also met in Oxford, just before he in turn joined the army, one Geoffrey Midgley, whom she would marry in 1950. At that date he had just taken up a Lectureship in the Philosophy Department at Newcastle, of which he would ultimately become Head. Geoffrey was described by one of his students, David McNaughten, as "a great, as well as a good teacher", who lived philosophy as well as professing it. He and Mary had three sons in five years. While focusing on motherhood she reviewed adult and children's fiction for the BBC and New Statesman, only returning to teaching philosophy in the mid 1960s alongside Geoffrey in the Newcastle department. And it was not until she was a Senior Lecturer, and approaching retirement, that she began to write the remarkable corpus of books for which she would become so well known. She expressed satisfaction that she hadn't started sooner: "I didn't know what I thought until then". Her last book, What is Philosophy For?, was published just weeks before her death, illustrating what one commentator has described as her rare knack for talking and writing as if the world could not live without philosophy.

What the mature Mary Midgley thought was well away from the style and preoccupations of Oxford's philosophy by that time – mind, language, and the aftermath of logical positivism, overall "a form of highbrow chess for graduate students". Instead, she had become fascinated by studies of animal behaviour, notably the work of Konrad Lorenz and Niko Tinbergen, and of evolutionary theory. Her influential first book, Beast and Man (1978), with its critical investigation into the meaning of "human nature", embodied both these interests, and was for her "the trunk out of which all my later ideas have branched". It was followed by Evolution as a Religion (1985), Science as Salvation (1992; the 1990 Edinburgh Gifford Lectures), Science and Poetry (2001), in which she underlined the role of imagination as an essential element in all our knowledge of the world, and a dozen others, written alongside

involvement in practical affairs – chairing, for example, an RSPCA committee on experiments involving animals. In all her writing, Mary Midgley trenchantly attacked Cartesian reductionism and scientific materialism, criticising the pretence of many fashionable writers that science is omnicompetent. For her, the sciences are experimental disciplines seeking particular forms of knowledge in particular ways, but none of them, individually or as a collective, should constitute a latter-day religion. She would always insist that there are different ways of seeing the world, which do not necessarily conflict. She became known, indeed, as "the scourge of science as religion", and aimed a particularly intense and sustained barrage of criticism at Richard Dawkins, who had committed the to-her-unpardonable sin of contending that small segments of DNA could possibly display the moral property of selfishness – in her eyes a category mistake of astronomical ineptitude. Dawkins would always protest that she wilfully turned a blind eye to the fact that his use of the word selfish was explicitly metaphorical. On the broader idea that all conscious life is dominated by selfishness, she wrote that: "Just as there would be no word for white if everything was white, there could surely be no word for selfish if everyone was always selfish. … Selfishness cannot, then, be a universal condition." IMary Midgley took to task many other writers of semi-popular science (notably E. O. Wilson and Francis Crick) for what she considered over-reaching claims, but Dawkins tried her patience to an exceptional degree; unusually, therefore, she lost her temper with him in print, and was later to apologise: "One should not lose one's temper, and doing so always makes for confused argument ... [but my] basic objections remain." It is suggested in The Guardian obituary (12 October 2018) that she was right to think that the overall message conveyed by Dawkins' language was the misleading idea that our genes, malign and all-powerful, doom us to individual selfishness.

By contrast, Midgley was highly sympathetic towards James Lovelock's Gaia hypothesis, which treats the earth's ecosystems as interacting with their inorganic environment to form a self-regulating system helping to maintain life on the surface of the planet. For her this was "the next big idea". It was "the first time a theory derived from scientific measurements has carried with it an implicit moral imperative – the need to act in the interests of this living system on which we all depend." In diametric contrast to Dawkins, who was attributing (im)moral properties to parts of molecules, Lovelock was urging a moral response by human beings to the world's complexity. In 2001, Midgley became the founding Chair of the Gaia network, which argued that humanity must learn how to "structure social relationships and institutions so that we value social and spiritual life, as well as the natural world, alongside commercial and economic aspects." She edited a book, Earthy Realism (2007), exploring and propounding these ideas. Lovelock wrote the foreword to a valuable anthology of her writings, The Essential Mary Midgley (Routledge 2005).

I myself (NS) first met her during this period. It was at an SRF conference, I think at St John's College, Durham – one of the last of her many appearances at the Forum. Mary had the after-breakfast slot one day, and began by reflecting on having found her room equipped with "your personal bath mat". "I wondered", she said, "what an impersonal bath mat would look like". Such quiet, academic humour was at the heart of her style. (One of her chapter headings was "Knowledge as a weedkiller.") A couple of years later she spoke at a Glasgow society with which I had to do, and stayed with us overnight. In the morning I took her a cup of tea, and retain a clear picture of her sitting up in bed looking owl-like among the pillows. On leaving for her train, she gave us a copy of Myths We Live By (2003), one of her most delightful sets of essays.

Interviewed in The Guardian in 2001, she had said: "I keep thinking that I shall have no more to say - and then finding

some wonderfully idiotic doctrine which I can contradict." That says a great deal about her approach to the discipline – not to construct great systems, but to come down like a ton of bricks on confused and pretentious thinking. She used to liken the philosopher's role to that of a plumber – an activity which people only notice and require when certain rather essential workings have gone wrong. She was a polemicist of sanity, a ferocious opponent, but the warmest, most humane of people. Not only this Forum, but humanity as a whole, has lost a friend.

For certain factual material in this obituary grateful acknowledgement is made to obituaries already published by The Guardian, The Times and the New York Times.

Neil Spurway, with contributions by John Brooke

CONFERENCE ARTICLE

Science, Religion and Education

MICHAEL J REISS

The August 2018 meeting in Cambridge was the fifth Science and Religion Forum at which I have been fortunate enough to speak. In many ways, the one I remember best was back in 1983 when I was doing a post-doc in population genetics and animal behaviour under Tim Clutton-Brock at the University of Cambridge. Tim had been asked to speak on human sociobiology at the SRF Conference that year at the University of Durham. Human sociobiology wasn't really Tim's field and, in any event, Tim has no interest in religion so he suggested me. I can only imagine that the organisers were by that stage desperate as my entire publications list at that time consisted of a four-page article in *New Scientist* and a two-page article in *Biblical Creation*, now known as *Origins*, the journal of the Biblical Creation Trust, in which (from memory) I critiqued a creationist argument.

Anyway, I enjoyed the Durham Conference hugely. I met wonderful people, looked round the Cathedral for the first time in my life, got my paper published in *Zygon* and while I was giving my talk was interrupted by a middle-aged woman shouting 'Rubbish' at one point. I was a confident school teacher at the time so rather enjoyed audience interaction and we had a brief spirited debate part-way through my talk. Afterwards, I sought her out and thus began a lifelong friendship with the remarkable and redoubtable Mary Midgely.

Mark Harris asked me to give all four talks at this Conference under the theme of 'Education' and then, when I accepted, immediately told me he would be out of the country at another Conference. Lizzie Henderson of the Faraday Institute then stepped in to offer to give one of them with Steph Bryant so I gave three and this article presents a tidied-up version of

what I said. The first of my talks dealt with education in general, the second with science education and the third with religious education. My hope, of course, was that there would be something of interest within these, however much most of those present already knew about science and religion and the interactions between them.

Education

If we think of formal schooling, there are at least five important considerations: the curriculum (what is taught); the pedagogy (how the teaching is undertaken); the assessment of learning; the values and ethos of the school; and the resources available. I will concentrate on the curriculum, but will include a bit about values towards the end. Let me start by saying something about the contrasting views of two distinguished professors of education, Michael Young and John White, each of whom, by co-incidence, has been at the Institute of Education, where I work, for over fifty years (Reiss, 2018a).

Michael Young's more recent arguments about the school curriculum have been coherently and powerfully expressed in a number of publications, of which perhaps the core text is his *Bringing Knowledge Back In* (Young, 2008). A key conclusion that Young reaches is that "The curriculum cannot be based on everyday practical experience. Such a curriculum would only recycle that experience" (p.89). He also concludes that "It is important to be cautious about replacing a curriculum based on specialist research and pedagogic communities with one based on the immediate practical concerns of employers or general criteria for employability such as key skills" (p.89).

Michael Young's ideas about the school curriculum have proved to be enormously fertile, leading him to develop and defend his views in numerous keynotes and debates and a range of publications. A convenient presentation of his recent thinking is provided by his *Knowledge and the Future School* co-authored with David Lambert and with inputs from Carolyn

Roberts and Martin Richards (Young *et al*., 2014). In that book, Young is explicit that "the main function of school … is to enable all students to *acquire knowledge* that takes *them beyond their experience* (Young, 2014, p.10). There is much in this short quotation that is notable; here let me allow Young to elaborate:

> The school, for all its tendencies to reproduce the inequalities of an unequal society, is the only institution we have that can, at least in principle, provide every student with access to knowledge. The only alternative to schools for all is to accept that the majority will never have the educational opportunities that the minority has always treated as their right. We must respect and value the experience of pupils, but we can never allow them to depend on their experience alone. To do so would leave them (and us) in the position of out Stone Age ancestors, or worse; we would be no different from animals, who have *only* their experience. (Young, 2014, p.13)

John White's first book, *Towards a Compulsory Curriculum*, was published in 1973 (White, 1973). In it White advanced a number of arguments that he has then developed over many years. There is a central presumption that education must be for the benefit of individual learners and take them as its starting point:

> It is at this point that notions of a 'child-centred' education and an 'integrated' education meet: the child must be at the centre of all he learns; education cannot be 'subject-centred' in this sense. (White, 1973, p.51).

White holds that education is about far more than the acquisition of knowledge about particular subjects. One point stressed in *Towards a Compulsory Curriculum* is that pupils "should finish their education with an understanding of the many different ways of life which they and others may pursue" (White, 1973, pp.43-4). A further argument is that not all

school subjects are of equal worth. This argument connects with the issue of whether all ways of life are of equal worth. In contradistinction to the assumptions of recent UK governments – motivated primarily by a naive set of beliefs about the importance of home-grown science, technology, engineering and mathematics talent for economic growth – White argues that "The humanities have a more central role in the curriculum than the natural sciences … because they alone enable one to weave together a human life" (White, 1973, p.63).

A further development of what a school curriculum might look like if one were to begin with aims rather than subjects is presented in some of White's most recent writing, notably *An Aims-based Curriculum* (Reiss & White, 2013). The intention behind this publication is to provide a framework for the development of a coherent set of aims for the curriculum, some for implementation at national level, others at the level of each school. The argument begins with the premise that the aim of the school curriculum is two-fold: to lead each learner to lead a life that is personally flourishing; and to help others to do so, too. It is then argued that a central aim of a school should therefore be to prepare students for a life of autonomous, whole-hearted and successful engagement in worthwhile relationships, activities and experiences. This aim involves acquainting students with a wide range of possible options from which to choose, though we need to recognise that students vary in the extent to which they truly are able to make such 'choices'. With their development towards autonomous adulthood in mind, schools should provide students with increasing opportunities to decide between the pursuits that best suit them. Young children are likely to need greater guidance from their teachers, just as they do from their parents. Part of the function of schooling, and indeed parenting, is to prepare children for the time when they will need to, and be able to, make decisions more independently.

John White and I went on to argue that we want children to want other people, as well as themselves, to lead fulfilling lives. This means not hurting them, not lying to them, not breaking one's word or in other ways impeding them in this. It also means helping others to reach their goals, respecting their autonomy and being fair, friendly and cooperative in one's dealings with them. Schools can reinforce and extend what parents and others in families do in developing morality in children. Schools can widen students' moral sensitivity beyond the domestic circle to those in other communities, locally, nationally and globally. They can encourage students to reflect on the basis of morality, including whether this is religious or non-religious.

As part of their moral education, schools should help students to become informed and active citizens of a liberal democratic society. This means encouraging them to take an interest in political affairs at local, national and global levels from the standpoint of a concern for the general good, and to do this with due regard to values such as freedom, individual autonomy, equal consideration and cooperation. Young people also need to possess whatever sorts of understanding these dispositions entail, for example an understanding of the nature of democracy, of divergences of opinion about it, and of its application to the circumstances of their own society.

As future citizens, the great majority of students will contribute to the general well-being, as well as to their own, through work. This will often be remunerated, though much of it, e.g., caring for children or elderly relatives, may not be. As autonomous beings, students will eventually have to make choices about what kind of work to engage in. Schools should be helping them in this by making them aware of a wide range of vocational possibilities and routes into them, as well as their advantages and disadvantages. This is a particularly important function of schools as this is something that few parents can provide for their children.

Comparing Young and White

Everyone, including Michael Young and John White, would surely agree that schools need to complement and build up what their students learn from their families and other extra-school sources. When I was about seven years old I got some childhood infection – measles, chickenpox or something – and missed a couple of weeks of school. On the day I returned, I can remember my teacher, with genuine concern in her voice, saying to me "We've started multiplication". "That's all right", I replied; "My mother has taught me that". And so she had. Many parents teach their children to read and start writing (and virtually all teach them to speak) but my mother had taught me at least the rudiments of my times tables.

The point is that it is precisely when some students have been taught something by their parents (or other extra-school sources) and other students have not that schools need, for both pedagogical and social justice reasons, to be quite skillful. If all students know X, then this provides a baseline from which schools can move forward. (Examples of baseline non-academic knowledge that used to be assumed by many primary schools in England for children arriving at school for the first time included being able to go to the toilet by oneself, using a knife and fork and knowing one's name. However, I do know one woman whose primary school initially assumed she was deaf because she did not respond to her name; it turned out that neither of her parents ever used her name at home, simply calling her 'you'.) Equally, if none of the students know almost anything about Y (e.g., the reason why the Periodic Table looks as it does, the past historic in French or the principle of commutativity in mathematics) a teacher can assume a level playing field. The more difficult cases for a teacher to handle are when some students – such as my younger self – do know quite a bit about a topic before it is taught in school.

This of course, raises the issue of what we mean by 'everyday'. To continue on an autobiographical theme, although my parents provided my sister and me with an intellectually rich home life, so that from a young age it was assumed that we would take place in family discussions on issues to do with politics, current affairs, literature, the arts and general ethical matters, and although we read widely and were taken on visits to museums and art galleries, our home was almost entirely empty of music. I cannot remember either of my parents ever singing and although my parents had a small number of gramophone records, beyond one playing of Prokofiev's *Peter and the Wolf*, I cannot recall listening to any music at home, beyond that which one would hear on Radio 4 – to which my mother listened a great deal. Unsurprisingly, both my sister and I were considered to be tone deaf when we arrived at our schools and, on seeing the looks I got from others when I tried to sing, I very rapidly learnt that the wisest course of action was to pretend to sing but to keep quiet.

The point of this touching story is that what is everyday to one student may be exotic to another. This issue is compounded by the fact that today's school students have far more avenues for extra-school learning that was once the case. When once the only way a child obsessed with the Russian Revolution was to get down to a good local library or study *Jackdaw No. 42* (let the reader understand), nowadays a single internet search leads to a huge number of images, texts and video clips of both primary and secondary data. All this makes a teacher's job more challenging but also potentially more fruitful.

The motivational argument for starting from or including the everyday is obvious. For many students, certainly at secondary level, a persistent criticism they voice of much of their schooling is that it's 'not relevant'. By connecting, as a teacher, what one wants one's students to learn with the everyday, one increases the likelihood that they will find it engaging. Of course, the unfamiliar can engage too – the skill of the teacher

in no small measure consists of shifting between the everyday and the exotic, the familiar and the unfamiliar, all the time trying to lead students towards a goal that quite a number of them may not initially appreciate.

Consider how science teachers nowadays quite often use everyday understandings of the properties of ropes when teaching about current in an electric circuit. Here the point is that the everyday (an inelastic rope) serves as an analogy (or model) of electric current (the flow of charge due to the movement of electrons). A standard exercise in many schools is to get a group of, say, a dozen students to pass a loop of rope through their hands. Most students are asked, passively, to let the rope pass through their slightly closed hands (analogous to being part of the conductor in the circuit, e.g., copper wire) but one student has the job of passing the rope along (analogous to being a battery) and another student is asked (health and safety alert) cautiously to tighten their hands so as to impede the passage of the rope (analogous to being a resistor, such as a bulb). Part of the skill of the teacher is subsequently to get students to think both about ways in which the rope differs from as well as is similar to electric current. In such an exercise, knowledge of the everyday is a powerful basis for the knowledge that the teacher wishes the students to acquire.

The values of a school

Let me end this section on 'Education' – before I get to the specifics of 'Science education and 'Religious education' by saying a bit about the values of the school in the context of faith-based education, specifically Quaker education. Anne Watson points out that Quakers, when they write or talk about education, usually focus on things like pastoral care, peacefulness, good citizenship, caring, the value of self-expression, the liberal arts and RE teaching (Watson, 2018). However, Watson is Emeritus Professor of Mathematics Education at the University of Oxford and is therefore also interested in what a

Quaker contribution to mathematics education might be, noting that mathematics is notorious as a school subject for inducing anxiety in some students.

Watson writes about Quaker conceptions of equality and truth in the mathematics classroom. She also writes about love and cognitive care, namely the sort of teaching that does not create anxiety but enhances confidence and self-actualization. She points out that all too often students are required to put aside their own thinking and adopt given methods and truths:

> It is as if teachers coerce students into the required behaviour of passing the tests through hard work, compliance, obedience, tolerance and resilience (all worthy character traits) rather than through interest and love of learning and the subject. While these aims are all important in cognitive care, they do not generate and honest and sustainable relationship with the truths of mathematics. (Watson, 2018, p. 109).

Watson is therefore uncomfortable about educational talk of 'misconceptions' and 'mistakes' and of educational practices that rely on some children giving wrong answers to trigger important teaching points.

Science education

To the bemusement of many science educators in school and elsewhere, and the delight of some, issues to do with religion seem increasingly to be of importance in school science lessons, science museums and some other educational settings. To many science educators even raising the possibility that religion might be considered within science education raises suspicions that this is an attempt to find a way of getting religion into the science classroom for religious rather than scientific reasons. This is not the intention here. In terms of the nature of science, part of the argument is that considering religion can be, on occasions, useful simply for helping learners

better understand why certain things come under the purview of science and others don't (Reiss, 2014).

Another argument for considering religion within science education proceeds much as an argument for considering history in science education might. While science can be learnt and studied in an historical vacuum, there are a range of arguments for examining science in its historical contexts. For a start, this helps one understand better why certain sorts of science were pursued at certain times. Wars, for instance, have sometimes led to advances in chemistry, physics and information science (e.g. explosives, missile trajectories, code breaking), while certain botanical disciplines, such as systematics and taxonomy, have flourished during periods of colonisation. Much biology is studied in the hope that medical advances will ensue, so studies of anatomy have developed into studies of physiology and, more recently, genetics and molecular biology. Then there is the observation that for many learners understanding science in historical context can aid motivation. Science courses that take contexts and applications into account are now quite widespread.

Similarly, while many students enjoy learning about the pure science of genetics and evolution, otherwise are motivated and come to understand the science better if they appreciate something of the diversity of religious beliefs held by such principal protagonists as Charles Darwin, Joseph Hooker, Thomas Huxley and Gregor Mendel and the religious views (including the diversity of religious views) of the cultures in which they lived and worked.

There are a number of places where religion and science interact. Consider, first, the question of 'authority' and the scriptures as a source of authority. To the great majority of religious believers, the scriptures of their religion (the Tanakh, the Christian bible, the Qur'an, the Vedas, including the Upanishads, the Guru Granth Sahib, the various collections in Buddhism, etc.) have an especial authority by very virtue of

being scripture. This is completely different from the authority of science. Newton's *Principia* and Darwin's *On the Origin of Species* are wonderful books but they do not have any permanence other than that which derives from their success in explaining observable phenomena of the material world and enabling people to see the material world through Newtonian / Darwinian eyes. Indeed, as is well known, Darwin knew almost nothing of the mechanism of inheritance despite the whole of his argument relying on inheritance, so parts of *The Origin* were completely out of date over a hundred years ago.

Then consider the possibility of miracles, where the word is used not in its everyday sense (and the sense in which it is sometimes used in the Christian scriptures), namely 'remarkable', 'completely unexpected' or 'wonderful' (as in the tabloid heading 'My miracle baby'), but in its narrower meaning of 'contrary to the laws of nature'. Scientists who do not accept the occurrence of miracles can react to this latter notion of miracles in one of three ways: (i) miracles are impossible (because they are contrary to the laws of nature); (ii) miracles are outside of science (because they are contrary to the laws of nature); (iii) miracles are very rare events that haven't yet been incorporated within the body of science but will be (as rare meteorological events, e.g. eclipses, and mysterious creatures, e.g. farm animals with two heads or seven legs, have been).

Understandings of possible relationships between science and religion

It is clear that there can be a number of axes on which the science/religion issue can be examined. For example, the effects of the practical and ritual dimension are being investigated by scientific studies that examine such things as the efficacy of prayer and the neurological consequences of meditation; a number of analyses of religious faith, informed by contemporary understandings of evolutionary psychology, behavioural ecology and sociobiology, examine the possibility or

conclude that religious faith can be explained by science (e.g. Dennett 2006, Hinde 1999); the narrative/mythic dimension of religion clearly connects with scientific accounts of such matters as the origins of the cosmos and the evolution of life; the doctrinal and philosophical dimension can lead to understandings that may agree or disagree with standard scientific ones (e.g. about the status of the human embryo); and the ethical and legal dimension can lead to firm views about such matters as land ownership, usury and euthanasia.

Perhaps only the social and institutional and the material dimensions of religion are relatively distinct from the world of science (understand as the natural sciences rather than the social sciences more broadly), in that science has little if anything to say about such manifestations of religion – e.g., in Christianity, the Church and such things as religious artefacts.

As is well known, there are a number of ways in which the possible relationships between scientific and religious understandings of the world can be conceptualised. The best known one (conflict, independence, dialogue, integration) remains that of Barbour (1990). I think it can be difficult for those who have never had a religious faith, or have only had one rather tenuously, to imagine what a life is like that is lived wholly within a religious ordering. For such a person, the relationship between science and their faith may be described as 'integrated' though this is to give an epistemological framing to the relationship, whereas what may be going on is that the person has little overt interest in the precise nature of the relationship between science and religion other than that there can clearly be no conflict between them.

Anthropologists provide good accounts of what it can be like to live a life where one's religious faith integrates with every aspect of one's life. One of my favourite such accounts is that of du Boulay (2009) who studied life in a Greek Orthodox Village in the late 1960s and early 1970s. Everything that

happened in the village needs to be understood by reference to Greek Orthodoxy. To give just one instance, the annual liturgical and agricultural cycles intermeshed, so that after the harvest, the sowing of the seed for next year's harvest was closely related to the Christian calendar:

> The main sowing of the wheat is carried into November, and the Archangel Michael, celebrated on 8 November and seen on his icons with drawn sword, is a formidable figure associated with the darkening November days with the leaves being stripped from the trees and the smoke gusting in ashy draughts down the chimneys; but this is a month named after the preeminent agricultural task – 'The Sower' (*Σποριας*). And the Entry of the Mother of God into the Temple on 21 November, soon after the Christmas fast has begun, is also in the village given the character of the time as the 'Mother of God Half-Way-Through-The-Sowing' (*Παναγια Μισοσπειριτσα*). The task of the sowing of the wheat then continues into the time know as 'Andrew's' (St Andrew, whose day is 30 November, but who has given his name to the following month of December), and can go on up to Christmas – and even beyond, if the weather has not been fit. (du Boulay, 2009, p.106).

Evolution and creationism in school science

Until fairly recently, little attention has been paid in the school classroom or the philosophy of education literature to creationism. However, creationism appears to be on the increase, and there are indications that there are more countries in which schools are becoming battlegrounds for the issue. For example, while the USA has had several decades of legal battles about the place of creationism and (more recently) intelligent design in schools (Moore, 2007), school-based conflicts over these issues are becoming more frequent in a range of other countries (Blancke, Hjermitslev & Kjærgaard, 2014).

There was consternation in the UK science education community when, in December 2009, many secondary school and higher education libraries received a complimentary copy of the book by Stephen Meyer et al. titled *Explore Evolution*, which, in the words of its website, sets out:

> to examine the scientific controversy about Darwin's theory, and in particular, the contemporary version of the theory known as neo-Darwinism. Whether you are a teacher, a student, or a parent, this book will help you understand what Darwin's theory of evolution is, why many scientists find it persuasive, and why other scientists question the theory or some key aspects of it.

Such events have led to a growth in the educational literature examining creationism and/or intelligent design (Reiss, 2018b). Most of the literature on creationism (and/or intelligent design) and evolutionary theory puts them in stark opposition. Evolution is consistently presented in creationist books and articles as illogical (e.g., natural selection cannot, on account of the second law of thermodynamics, create order out of disorder; mutations are always deleterious and so cannot lead to improvements), contradicted by the scientific evidence (e.g., the fossil record shows human footprints alongside animals supposed by evolutionists to be long extinct; the fossil record does not provide evidence for transitional forms), the product of non-scientific reasoning (e.g., the early history of life would require life to arise from inorganic matter – a form of spontaneous generation rejected by science in the 19th Century; radioactive dating makes assumptions about the constancy of natural processes over aeons of time whereas we increasingly know of natural processes that affect the rate of radioactive decay), the product of those who ridicule the word of God, and a cause of a whole range of social evils (from eugenics, Marxism, Nazism and racism to juvenile delinquency) – e.g., Baker (2003), Parker (2006) and articles too many to men-

tion in the journals and other publications of such organisations as Answers in Genesis, the Biblical Creation Society, the Creation Science Movement and the Institute for Creation Research.

One approach to understanding the persistence of creationism is the notion of 'worldviews', which can be introduced by considering the film *March of the Penguins* (Reiss, 2009). *March of the Penguins* is a 2005 National Geographic feature film. It runs for approximately 85 minutes and has been an exceptional success. It won an Academy Award in 2006 for Best Documentary Feature and has been the most financially successful nature film in American motion picture history. The reasons for its success are no doubt several: the photography is phenomenal; the emperor penguin's story is extraordinary; the adults are elegant; the chicks are irredeemably cute as they look fluffy, feebly wave their little wings and learn to walk; the way in which the birds survive the Antarctic winter is awesome; the plaintive cries of mothers who lose their chicks in snow storms are heartrending. But one perhaps unexpected reason is that the film has been a great success among the Christian right.

For example, if I enter '"march of the penguins" Christian' into Google, at the time of writing (27 August 2018) there are 91,200 hits. The second of these is a review of the film by Mari Helms (n.d.) on ChristianAnswers.Net, which describes itself as "a mega-site providing biblical answers to contemporary questions for all ages and nationalities with over 45-thousand files" (http://christiananswers.net/). After a fairly detailed summary of the subject matter of the film, the review goes on to discuss the lessons that the film has to teach about love, perseverance, the existence of God and friendship. An extended quotation from the review [underlinings indicate hyperlinks to other pages on the ChristianAnswers.Net website] illustrates the presuppositions of the author:

"March of the Penguins" has lessons to teach about:

"LOVE": According to the film, the penguins take this tremendous journey for "love" and to find a mate and reproduce. The dedication, cooperation, and affection are exemplary between the pair.

PERSEVERANCE: We could learn a lot about perseverance from Emperor penguins. I was quickly reminded of the ant in Proverbs 6:7-8 "It has no commander, overseer or ruler, yet it stores its provisions in summer and gathers its food at harvest." No one is reminding these penguins what to do; they know what to do, and they do it. They are prepared, persistent and committed, much like we are called to be as witnesses for Jesus Christ. 1 Peter 4:15 "Always be prepared to give an answer to everyone who asks you to give the reason for the hope that you have."

The penguins endure treacherous conditions, yet they continue on their journey, focusing on what lies ahead (new life). It may be a bit of a stretch, but I thought of what we, as Christians have to endure to get what lies ahead for us (eternal life). Philippians 3:14 "I press on toward the goal to win the prize for which God has called me heavenward in Christ Jesus."

THE EXISTENCE OF GOD: One year in the life of an Emperor penguin is a great indication of the existence and character of God. Romans 1:20 'For since the creation of the world God's invisible qualities – his eternal power and divine nature – have been clearly seen, being understood from what has been made, so that men are without excuse." He is absolutely perfect! Every detail has been taken into account, and every provision has been made. Witnessing all the love and care that He must have put into creating the penguins is small compared to what He put into creating us. Matthew 6:26 "Look at the birds of the air; they do not sow or reap or store away in barns, and yet your heavenly Father feeds

> them. Are you not much more valuable than they?" Leaving the theater, I was more in awe and in love with my Creator. (Helms, n.d.).

The reason for this long quotation is not to subject it to theological or scientific critique. Rather, the value of the quotation is that in Barbour's (1990) classification, it manifests an integrated relationship. The worldview is one in which it is straightforward to read from penguin behaviour to human behaviour though it is worth noting that the argument is neither entirely anthropomorphic (where non-human behaviour is interpreted as if it was the behaviour of humans) nor one in which the natural world is seen as *the* source of instruction as to how humans should behave. Rather, it is scripture that has primacy; the natural world is held up not so much as a model for us to imitate but as an illustration of how the natural world can manifest that which God wishes for humanity.

The 'worldviews' perspective on creationism suggests that standard ways of addressing the diversity of student views in a science classroom may be inadequate. Creationism can profitably be seen not as a simple misconception that careful science teaching can correct, as careful science teaching might hope to persuade a student that an object continues at uniform velocity unless acted on by a net force, or that most of the mass of a plant comes from air. Rather, a student who believes in creationism can be seen as inhabiting a non-scientific worldview, that is a very different way of seeing the world.

Few countries have produced explicit guidance as to how schools might deal with the issues of creationism or in the science classroom. One country that has produced such guidance is England. In the summer of 2007, after months of behind-the-scenes meetings and discussions, the then DCSF (Department of Children, Schools and Families) Guidance on Creationism and Intelligent Design received Ministerial approval and was published (DCSF, 2007). The Guidance points out that the use

of the word 'theory' in science (as in 'the theory of evolution') can mislead those not familiar with science as a subject discipline because it is different from the everyday meaning (i.e., of being little more than an idea). In science the word indicates that there is a substantial amount of supporting evidence, underpinned by principles and explanations accepted by the international scientific community. The Guidance goes on to state: 'Creationism and intelligent design are sometimes claimed to be scientific theories. This is not the case as they have no underpinning scientific principles, or explanations, and are not accepted by the science community as a whole' (DCSF, 2007). The Guidance then goes on to say:

> Creationism and intelligent design are not part of the science National Curriculum programmes of study and should not be taught as science. However, there is a real difference between teaching 'x' and teaching *about* 'x'. Any questions about creationism and intelligent design which arise in science lessons, for example as a result of media coverage, could provide the opportunity to explain or explore why they are not considered to be scientific theories and, in the right context, why evolution is considered to be a scientific theory. (DCSF, 2007).

This seems to me a key point (OK – I admit, I helped write it) and one that is independent of country, whether or not a country permits the teaching of religion (as in the UK) or does not (as in France, Turkey and the USA). Many scientists, and some science educators, fear that consideration of creationism or intelligent design in a science classroom legitimises them. However, when I was taught physics at school, and taught it extremely well in my view, what I remember finding so impressive was that we could discuss almost anything providing we were prepared to defend our thinking in a way that admitted objective evidence and reasoned argument.

Whatever the subject matter and age range of a class, and the country in which a teacher is teaching, there is much to be said for a teacher bearing in mind that for some students, evolution, creationism and intelligent design are likely to be sensitive issues. Rather less has been written in the philosophy of education literature about sensitive issues than about controversial ones. Death, sexuality, drugs policy and animal experimentation are examples of issues that are sensitive for many students and many teachers are used to dealing respectfully with students when dealing with sensitive issues.

An advantage of shifting the discourse from controversy to sensitivity is that one shifts the focus from epistemology to pedagogy. One can be sensitive with someone in respect of an issue without implying that one shares the same perspective (or worldview) as the person to whom one is being respectful and considerate; different notions of respect are discussed by Rosenblith and Bindewald (2014) who "make a case for an approach to civic education in the public schools that is rooted in engagement" (p. 596). Explicitly accepting the teaching of evolution as controversial is difficult for many science teachers as the distinction between this and evolution as controversial is a fine one and many science teachers are likely to see it as selling out to creationists (cf. Hermann, 2008).

In a school science lesson when teaching evolution there is much therefore to be said for allowing students to raise any doubts they have and doing one's best in such circumstances to have a genuine scientific discussion about the issues raised. The word 'genuine' does not mean that creationism or intelligent design deserve equal time with evolution, nor does it mean that a science teacher should present creationism or intelligent design as valid alternative to the theory of evolution. It is perfectly appropriate for a science teacher to critique arguments for creationism or intelligent design that purport to be scientific. However, in certain classes, depending on the comfort of the teacher in dealing with such issues and the

make up of the student body, it can be appropriate to deal with these issues. If questions about the validity of evolution or issues about creationism and intelligent design arise during science lessons they can be used to illustrate a number of aspects of how science works and how scientific knowledge is built up over time, while always being open to the possibility of refutation and change.

Having said that, teaching about evolution, creationism or intelligent design, in whatever lesson, is often not straightforward. Some students get very heated; others remain silent even if they disagree profoundly with what is said. We need to seriously and respectfully the concerns of students who do not accept the theory of evolution while still introducing them to it. There is much to be said for aiming to get students to understand rather than necessarily to believe or accept the theory of evolution (Smith & Siegel, 2004; Reiss, 2008). While it is unlikely that even respectful teaching will help students who have a conflict between science and their religious beliefs to resolve the conflict, good science teaching can help students to manage it – and to learn more science (cf. Long, 2011).

Religious education

Religious education (RE), even if we set aside debates about worship in schools, is going through quite a tough time in England. The subject was excluded by the Government from the English Baccalaureate and, as a result, GCSE entries have been decreasing pretty rapidly. In addition, while there are many pockets of excellence, it remains one of the least popular school subjects. And yet the case for having RE in schools has perhaps never been stronger, given the increasingly acknowledged fact that we live in a multi-faith society (including those of no faith), while religion is now more in the public sphere than perhaps at any time in my lifetime.

There have been a number of attempts to reform the RE curriculum in schools – RE is the only compulsory school sub-

ject that is not within the National Curriculum and so lacks a national curriculum. One recent approach, in which I have been involved, is called the 'Big Ideas for Religious Education' project (Wintersgill et al., 2017).

Big Ideas are generalised summaries of what we want students to understand by the end of their RE in school. They are common destinations, which can be reached by many alternative routes. Because Big Ideas describe what we want students to understand, they frame the questions that lead to that understanding. They are unable to do this without contexts in which to work and the contexts are provided by content. It is therefore unlikely that students will ever encounter a unit of work with the name of a Big Idea as its title, but in every unit of work the learning outcomes will be defined in relation to them.

Big Ideas are therefore:

- Criteria for the selection and prioritising of subject knowledge in the curriculum. If Big Ideas summarise what students' understanding should be, the content selected must enable students to achieve that understanding.
- Transferable to events outside the classroom. An essential indicator of understanding is the ability to transfer learning to new settings. Religions and non-religious worldviews can only be properly understood when students recognise them as important elements of 21st century life.
- Memorable. If Big Ideas are to have this life-long impact they must be summarised in headlines that are short enough to be remembered but focused enough to act as reminders of their full significance.
- Capable of differentiation so that they may become the basis of progression. Big Ideas can be expressed at increasing levels of complexity and sophistication to describe the understanding expected of different age groups.

They should also:

- Have long term relevance. Big Ideas reflect situations for the foreseeable future so that students will take from their school days understanding of religious and non-religious beliefs, practices and values that will help them understand their personal quest for meaning and the world in which they live.
- Make sense of lots of what might otherwise be confusing information/experiences and isolated facts. An important contributor to understanding is the ability to 'join up the dots', to see how the many different beliefs, practices and values of religions and non-religious worldviews relate to each other. Big Ideas make these connections.
- Act as lenses which, when used to 'view' content, help to clarify it. When used as a 'lens' through which to view a mass of possible content, Big Ideas illuminate what is relevant to RE and hide what is not.
- Taken together, express the core or central concerns of the subject. The essential test of subject knowledge is that as well as meeting the above criteria it reflects what it central to the subject, not what is peripheral.

Big Ideas for RE
We came up with six Big Ideas for RE:

Big Idea 1: CONTINUITY, CHANGE AND DIVERSITY
Religions and non-religious worldviews involve interconnected patterns of beliefs, practices and values. They are also highly diverse and change in response to new situations and challenges. These patterns of diversity and change can be the cause of debate, tension and conflict or result in new, creative developments.

Big Idea 2: WORDS AND BEYOND

Many people find it difficult to express their deepest beliefs, feelings, emotions and religious experiences using everyday language. Instead, they may use a variety of different approaches including figurative language and a range of literary genres. In addition, people use non-verbal forms of communication such as art, music, drama and dance that seek to explain or illustrate religious or non-religious ideas or experiences. There are different ways of interpreting both verbal and non-verbal forms of expression, often depending on a person's view of the origin or inspiration behind them. The use of some non-verbal forms of communication is highly controversial within some religious groups, particularly their use in worship or ritual.

Big Idea 3: A GOOD LIFE

Many religions and non-religious communities strive to live according to what they understand as a good life. Their members share an understanding as to the sort of characteristics and behaviours a good person will seek to achieve, as well as dealing with what is, or is not, acceptable moral behaviour. People have different ideas about how and why we should lead a good life. The ideal is usually presented in the lives and character of exemplary members. There may be considerable agreement across different religions and non-religious worldviews on some matters, and considerable differences on others. Also, there are often major disagreements over the interpretation and application of moral principles between members of the same religion or worldview.

Big Idea 4: MAKING SENSE OF LIFE'S EXPERIENCES

Many people have deeply felt experiences, which they may refer to as being religious or spiritual or simply part of what it means to be human. These experiences may result in their undergoing transformative change and on rare occasions the experience of a single person has led to the formation of a new

religion or worldview. Through religious rituals and other practices people sometimes experience a deep connection with God or gods, nature, their own consciousness or with each other. This can give them a heightened sense of awareness and mystery. Many people find that belonging to religious or non-religious groups with others who share their beliefs, values and traditions gives them a sense of identity and belonging.

Big Idea 5: INFLUENCE, COMMUNITY, CULTURE AND POWER

Religious and non-religious worldviews interact with wider community and cultures. They affect the way communities have come to identify themselves over time by shaping their traditions, laws, political systems, festivals, values, rituals and the arts. The patterns of influence vary significantly in different communities and at different points in time. Some communities are influenced predominantly by one religion. More diverse and plural communities are influenced by several religious and non-religious worldviews, whose appeal to a highly respected authority or vision, whether religious or non-religious, can lead them to make positive and life-changing contributions to their communities. It can also give them considerable power, which may lead to both positive and negative outcomes.

Big Idea 6: THE BIG PICTURE

Religions and non-religious worldviews provide comprehensive accounts of how and why the world is as it is. These accounts are sometimes called 'grand narratives'. They seek to answer the big questions about the universe and the nature of humanity such as 'Does anything exist beyond the natural world?', 'Is there life beyond death?', 'What is the path to salvation?' and 'Do we have one physical life or many?'. These narratives are usually based on approaches to life, texts or traditions, which are taken to be authoritative. People interpret and understand these traditions in different ways.

Progression in Big Ideas

Let me end by indicating, again using Wintersgill et al (2018), how one could envisage a student gaining in understanding through the four key stages of the National Curriculum. The example given is for Big Idea 4:

5-7 years

Some people have amazing, puzzling or mysterious experiences that make them ask big questions about life. Others find deep spiritual meaning in everyday experiences. There are many stories about people's experiences and encounters that have made them change their lives. Some people find that belonging to religious or non-religious groups which share their beliefs, values and traditions gives them a sense of belonging.

7-11 years

Many people have amazing, puzzling or mysterious experiences with the wonders of nature, other people, the arts, or with a power above or beyond the material world. These encounters may be highly affecting, changing their lives in a positive way and sometimes giving them a sense of destiny. Some people account for these experiences by saying that humans have an inner consciousness or spiritual nature. Certain individuals throughout history are said to have had extraordinary insights into the meaning of human life and have passed those insights on to others. In many cases their experiences have had a major impact on religions and non-religious worldviews or have even led to a new one. Many people find that religious rituals and other practices provide opportunities for them to make connections with God or gods and each other, or with what is most important to them. When practised in community with others, these experiences may give them a deep sense of identity and belonging.

11-14 years

Many people find profound meaning at some points in their lives in mystical, religious, spiritual or peak experiences. These experiences may be prompted by encounters with the wonders of nature, beautiful works of art or music or with tragic events. Some people believe that any of these experiences are capable of putting them, or others, in touch with a greater power or powers or with other realms of existence and provide insights into the world and their place within it. Some individuals and groups say that experience of religious rituals and other practices help them make a connection with God or gods and with each other, or with what is most important to them. The experiences of a few key people are believed to have given them extraordinary insights into the nature of reality. They hold important and different places within one or more religions or non-religious worldviews. Some believe that these experiences are related to a spiritual dimension of human beings, which may or may not be associated with religion. Others deny that humans have a spiritual nature, believing that a human being is no more than a complex, highly evolved animal. Whether they see themselves as spiritual, religious or not, many people get a sense of identity from belonging to the same group as others who believe the same things, see the world in the same way, and have the same values. This can develop strong feelings of identity, belonging, loyalty and commitment.

14-16 years

Some believe that consciousness is the key feature of being human. It is believed by some to be God-given, constituting people's spiritual nature, which marks them out from the rest of the animal world and enables them to think beyond their ordinary experience. Some people regard their spirituality as the inner personal dimension of being religious, while others see themselves as spiritual rather than religious because they do not identify with traditional religious institutions or meta-narratives. There are also people who do not identify with

either religion or spirituality. A few individuals are believed to have had exceptional experiences that have resulted in insights into the meaning and purpose of life which they have communicated to others. This can lead to the formation of new religions and non-religious worldviews, something which is still happening today. People from different religions and non-religious worldviews might disagree about the origin and meaning of religious, mystical, spiritual or peak experiences. Some find that religious rituals and other practices may enable them to experience a deep connection with God or gods, nature, their own consciousness or with each other. Membership of groups with whom they share beliefs, values and traditions often gives people a heightened sense of awareness, mystery, identity and belonging, and bring about a transformation in their lives.

Conclusions

Education, including formal education, plays a key role in helping us to develop as individuals and in inducting us into society. Done poorly, it achieves little and can put people off learning for life. Done well, it both introduces learners to the great ideas and activities of humanity and helps them develop those character traits that benefit both themselves and others. Within school, both science education and religious education have great potential to contribute to a high quality education, one that can help students to learn what they would not otherwise learn, to respect others, even when those others have very different ways of understanding the world, and to develop into adults capable of leading flourishing lives and helping others to do so too.

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References

Baker, S. (2003) *Bone of Contention: Is evolution true?, 3rd edn*, Biblical Creation Society, Rugby.

Barbour, I. G. (1990) *Religion in an Age of Science: The Gifford Lectures 1989-1991, volume 1*, SCM, London.

Blancke, S., Hjermitslev, H. H. & Kjærgaard, P. C. (Eds) (2014) *Creationism in Europe*, John Hopkins University Press, Baltimore.

du Boulay, J. (2009) *Cosmos, Life, and Liturgy in a Greek Orthodox Village*, Denise Harvey, Limni, Evia.

DCSF (2007) *Guidance on Creationism and Intelligent Design*. Available at www.teachernet.gov.uk/docbank/index.cfm?id=11890.

Dennett, D. C. (2006) *Breaking the Spell: Religion as a natural phenomenon*, Allen Lane, London.

Helms, M, (n.d.) *Movie review: March of the Penguins* http://www.christiananswers.net/spotlight/movies/2005/marchofthepenguins2005.html.

Hermann, R. S. (2008). Evolution as a controversial issue: a review of instructional approaches. *Science & Education*, 17, 1011-1032.

Hinde, R. A. (1999) *Why Gods Persist: A scientific approach to religion*, Routledge, London.

Long, D. (2011) *Evolution and Religion in American education: An ethnography*, Springer, Dordrecht.

Moore, R. (2007). The history of the creationism/evolution controversy and likely future developments. In: *Teaching about Scientific Origins: Taking account of creationism*, Jones, L. & Reiss, M. J. (Eds), Peter Lang, New York, pp. 11-29.

Parker, G. E. (2006). *Creation: Facts of life – how real science reveals the hand of God*, New Leaf Press, Los Angeles, CA.

Reiss, M. J. (2008) Teaching evolution in a creationist environment: an approach based on worldviews, not misconceptions. *School Science Review*, 90(331), 49-56.

Reiss, M. J. (2009) Imagining the world: the significance of religious worldviews for science education. *Science & Education*, 18, 783-796.

Reiss, M. J. (2014) What significance does Christianity have for science education? In: *Handbook of Historical and Philosophical Research in Science Education*, Matthews, M. R. (Ed.), Springer, Dordrecht, pp. 1637-1662.

Reiss, M. J. (2018a) The curriculum arguments of Michael Young and John White. In: *Sociology, Curriculum Studies and Professional Knowledge: New perspectives on the work of Michael Young*, Guile, D., Lambert & M. J. (Eds), Routledge, Abingdon, pp. 121-131.

Reiss, M. J. (2018b) Creationism and Intelligent Design. In: *International Handbook of Philosophy of Education*, Smeyers, P. (Ed.), Springer, Dordrecht, pp. 1247-1259.

Reiss, M. J. & White, J. (2014) An aims-based curriculum illustrated by the teaching of science in schools. *The Curriculum Journal*, 25, 76-89.

Rosenblith, S. & Bindewald, B. (2014) Between mere tolerance and robust respect: mutuality as a basis for civic education in pluralist democracies. *Educational Theory*, 64, 589-606.

Smith, M. U. & Siegel, H. (2004). Knowing, believing, and understanding: what goals for science education? *Science & Education*, 13, 553-582.

Watson, A. (2018) Equality, truth and love in subject teaching: Cognitive care in the case of mathematics. In: *Faith and experience in education: Essays from Quaker perspectives*, Howe, D. & Watson, A. (Eds), UCL IOE Press, London, pp. 100-118.

White. J. P. (1973) *Towards a Compulsory Curriculum*, Routledge & Kegan Paul, London.

Wintersgill, B., Brine, A., Cush, D., Francis, D., Freathy, R., Henchley, F., Holt, J., Stern, J., Orchard, J., Reiss, M. J., Rudge, L., Schmack, J. & Walshe, K. (2017) *Big Ideas for Religious Education*, University of Exeter, Exeter. Available at http://socialsciences.exeter.ac.uk/media/universityofexeter/collegeofsocialsciencesandinternationalstudies/education/research/groupsandnetworks/reandspiritualitynetwork/Big_Ideas_for_RE_E-Book.pdf

Young, M. F. D. (2008) *Bring Knowledge Back In: From social constructivism to social realism in the sociology of knowledge*, Routledge, London.

Young, M. (2014) Knowledge, curriculum and the future school. In Young, M. & Lambert, D. with Roberts, C. & Roberts, M. (2014) *Knowledge and the Future School: Curriculum and social justice*, Bloomsbury, London, pp. 9-40.

Young, M. & Lambert, D. with Roberts, C. & Roberts, M. (2014) *Knowledge and the Future School: Curriculum and social justice*, Bloomsbury, London.

CONFERENCE AFTER DINNER SPEECH

Andrew Hammond

I came to King's three years ago from a context that could barely be more different, in UK terms at least. I'd been vicar of a parish in north London whose multiple deprivation statistics made it one of the most demanding in the Church of England. It was 'hyper-diverse', as the jargon has it, but actually 95% of my congregation was black, and most of them Caribbean. These were people of simple faith. Not simplistic: they knew (and believed deeply) in the enormity and mystery of God; and they were only too well acquainted with the pain and trauma that daily life could bring. But they used the language of faith with an easy conviction. When they said, in the face of

some fresh horror, 'well Father, it's in the plan', they were not being blithe or naïve.

I rather expected to find the opposite at King's. I imagined that I would be contending with that modern brand of evangelistic atheism popularised by the likes of Dawkins and Hitchens, that angry, so-called humanism: a humanism which is as desiccated and trivial as the Renaissance version was rich and profound.

But not a bit of it. I'm pretty sure the bulk of students don't straightforwardly buy into what they think are the basic metaphysical claims of Christianity, but they don't belabour me about it. The only actual negatives of that kind I might encounter are at High Table (of which more shortly). A goodly majority of students, it seems to me, are not so much hostile to faith as utterly indifferent – and often because they have virtually no knowledge or experience of it. If anything, the only obvious hostility is from those who *do* have some experience of it (and I'm talking hostility to the faith, not to me). Either they have been turned off intellectually; or, much more likely, they have been positively alienated, revulsed, by some of the things the Church (or the more vocal bits of it) is heard saying – wobbly on women, positively poisonous on LGBT+ people. Sweet statements of divine love don't cut it against that foreground.

This makes the student community a very particular kind of virgin territory for a chaplain, then. And the only hostility ***I*** encounter is from the Christian Union, some of whom think I am a 'false teacher'. This is mostly because I dare to suggest that the Bible is a vast library of human attempts to understand God and our relationship with him – not simply a cosmic manual, divinely-dictated; dare to suggest that the quality of love between two people is what matters, not their gender; and dare to suggest that the language of faith is more like poetry than prose, humble rather than assertive, provisional rather than definitive. They don't like it. I got 'Daily Mailed'

last year about some special services I was doing, with words like 'inclusive' used with quote marks that hovered, small and menacing – derisive air quotes in 2D form. The online comments thread and related hoohah was a thing to behold. My favourite was a piece on a conservative Christian website, which said:

> ***Special Support Needed for Young Evangelicals at King's College Cambridge's***
> *Young evangelicals at King's College Cambridge are faced with a chaplain who is personally hostile to orthodox Christianity. In this situation, these Christians need particular pastoral support from Bible-believing local churches …*
> *The Revd Andrew Hammond, … has introduced special celebratory services for homosexual and transgender practices*

—which is an interesting exaggeration of what I was actually doing. You can almost hear his froth hitting the screen. It's laughable, but also really frustrating. Social media has its troughs as well as its peaks.

Most of my interaction with students is pastoral, as part of the welfare team at King's. As you might imagine, there is a lot for us to do, and we are constantly reviewing what we do and how we might do it better. We have recently taken on a CBT psychotherapist for three days a week. Early on, one of the personal tutors said to me, 'a student asked me whether he could come and see you, because he's not Christian'. I said, 'tell them people come to see me not because they're Christian but because I am'. And they all have my mantra ringing in their ears from freshers' week: don't ever hesitate to come and talk, because I'm super-available, super-non-judgmental and super-unshockable. They do try to test me on the last of those, but haven't succeeded yet… though I have learnt some new vocabulary.

Amongst all this the occasional conversation will happen which is actually about faith; about the content of faith, and what we can say we believe. And more and more over the last three years I've found myself thinking just about how we use language: and specifically, thinking about the alleged differences between theological and scientific language. Now this is an after dinner speech, not a paper, so I'm operating at the level of utter simplification here. But I have come to believe that theologians and scientists can both be tempted to misunderstand each other's linguistic style, or genre.

One of the first times I was at High Table I learnt that at King's at least, when you ask your neighbour what they are doing, they will tell you, and quickly get into eye-wateringly technical detail. We're not a place where High Table talk is just gossip. One time I was sitting next to a fascinating pair of identical twins, who told me that they were working in the 11th and 12th dimensions. Since then I've teased mathematicians and theoretical physicists, using this story. 'Don't you criticise theology for being obscure or mystifying,' I routinely say. Seriously, though, I do encounter some very rum notions. Terry Eagleton at his vituperative best nails it in that infamous review of the God Delusion:

> *Imagine someone holding forth on biology whose only knowledge of the subject is the Book of British Birds, and you have a rough idea of what it feels like to read Richard Dawkins on theology. Card-carrying rationalists like Dawkins, who is the nearest thing to a professional atheist we have had since Bertrand Russell, are in one sense the least well-equipped to understand what they castigate, since they don't believe there is anything there to be understood, or at least anything worth understanding. This is why they invariably come up with vulgar caricatures of religious faith that would make a first-year theology student wince. The more they detest religion, the more ill-informed their criticisms of it tend to be. If they were asked to pass judgment on phenomenology or the geopolitics of*

> *South Asia, they would no doubt bone up on the question as assiduously as they could. When it comes to theology, however, any shoddy old travesty will pass muster.*

Come on Terry, tell us what you really think.

Conversely, I think theologians can underestimate the scientist's capacity for *imaginative* complexity. It's a classic trope that there are lots of mathematicians in the CU because they like everything to be crystal clear, black and white. Well having just read Michael Brooks' book 'The Quantum Astrologer's Handbook' – how about that for a title! - which is mostly about Jerome Cardano, I discover that the intricacies of maths and physics are anything but black and white.

Religion and science both need *metaphor*, it seems; and that recognition can be one of threads which weave us together – and which make our quest to understand life and live it well all part of the same mature, if humble journey. Away from the combination room acidities of Eagleton and Dawkins, entertaining as they might be, the wiser and more open-hearted theologians and scientists get this.

It's fanciful to say this, perhaps, but our chapel at King's – you may know it (!) – embodies this wisdom. It manages to weave holy intent with engineering prowess; and in its creation, neither could have done it without the other. I used to work at St Paul's Cathedral, and after only a few months I didn't really notice the building. At King's the chapel never fails to make my heart sing when it comes into view. And to think, as I've often heard punt chauffeurs say, so it must be right – not a lot of people know this, but it was all carved out of a single piece of stone.

August 30th 2018

REVIEWS

Bruno Latour, *Facing Gaia: Eight Lectures on the New Climate Regime* (trans. Catherine Porter) Cambridge, Polity Press, 2017, pp. 327, £18.99 Pbk. ISBN 978-0-745684345.

REVIEWED BY TIM MIDDLETON

For Bruno Latour, 'it all began with the idea of a dance' (1). Stéphanie Ganachaud is scuttling backwards, fleeing whatever adversary is before her. Occasionally, she casts a glance over her shoulder, but it is only when she reaches the end of the room that she is forced to properly turn around. Painfully slowly, she lifts her gaze to find a horror that is infinitely more terrifying than her original foe. Fleeing one problem, she has run headlong into something far worse. For Latour, this monstrosity is none other than our own planet fighting back, the sheer reality of our 'new climatic regime' (3). What *on earth* are we to do?

Facing Gaia is a re-working of Latour's 2013 Gifford lectures. The original six lectures have been expanded to eight, translated into French and back again, and substantially re-worked, but the more whimsical style of oral presentation has been retained. The book is perhaps best described as a political theology of the earth, crossing disciplines, and subverting norms in the process. Indeed, in the first two of the original lectures that Latour delivered in Edinburgh, he fastidiously undermined both natural religion (the topic for all Gifford lecturers) and David Hume (philosophical hero of the city of Edinburgh). But Latour is motivated by the deep sense that theology, politics and science all need to be quite radically transformed if we are to truly face up to the reality of the contemporary ecological crisis. His key concern throughout is to warn against false to-

talities—whether it be God, Science, Nature, Humanity, Modernity, or Economics—Latour pleads for greater humility and a restraining of our utopian ideals. Any claim to be able to access a view from nowhere, whether it is ultimately in the service of environmental protection or not, is, he says, at the root of our current problems.

In lecture one, Latour seeks to convince us of two things. First, current environmental concerns have brought about 'a profound mutation in our relation to the world' (8). Quite simply, we are going mad. Fanatical climate scepticism, hubristic techno-optimism, and bizarrely apathetic quietism are all common, yet crazy, responses to our currently changing climate (11-2). But, secondly, a regressive and hippy 'return to nature' is not the answer (14). 'Nature' is not nearly as stable as it first appears, not least because we cannot just separate ourselves off as if we did not belong to the world. Furthermore, Latour argues, neither 'natural law' nor 'facts of nature' are as reliable as might be supposed for supporting moral judgments or political action. The phenomenon of climate denial neatly illustrates that appeals to the 'natural world' almost never promote agreement or end debate.

The second lecture then pursues our tendency to de-animate this problematic category of 'nature'. Our dreams of control encourage us to over-egg our own agency at the expense of depriving the material world of its own activity. And yet—and this is the crazy part—in the contemporary ecological crisis we are the ones standing by as 'witless objects' whilst nature takes the role of 'active subject' (73).

Enter Gaia. Lecture three picks up, clarifies, and defends James Lovelock's famous concept. It is potentially controversial, yes, but it is not, argues Latour, to be written off too quickly as an improbable superorganism, a pagan goddess, or an inexplicably sentient being (99). Rather, Latour suggests,

Lovelock was tentatively proffering an answer to 'an impossible question,' namely, 'how to obtain effects of connection among agencies without relying on an untenable conception of the whole' (97). Latour urgently wants to avoid the totalising risks of any sort of earth-holism, and his sense is that Lovelock felt the same. But there are undeniable connections between parts, and so, for Latour, Gaia is simply the name we give to this 'muddle' (100). Interestingly, though, our growing awareness of the potentially unstable interactions that make up Gaia has come at a time when globalisation has, 'finally succeeded in universalizing over the whole surface of the Earth' (107). Just when we needed to be most attuned to the impacts of our interconnected actions, the fantasy of human mastery is proclaimed to have come true.

This same theme is pursued in the fourth lecture, where Latour delves into Peter Sloterdijk's philosophical *Spheres* trilogy and his notion of the globe as a problematic symbol of totality:

> 'Whether we are dealing with the idea of the Anthropocene, the theory of Gaia, the notion of a historical actor such as Humanity, or Nature taken as a whole, the danger is always the same: the figure of the Globe authorizes a premature leap to a higher level by confusing the figures of connection with those of totality' (130).

In theological terms, this is idolatry: 'he who looks at the Earth as a Globe always sees himself as a God' (136). Our place in the world is also brought home by the related concept of the Anthropocene, a much-debated new epoch that still requires geological confirmation. Do we see this marker in the rock record as a humanisation of nature (we have finally made our mark) or as a petrification of humanity (people turned to stone)? (118). Have we mastered the earth or has the earth mastered us? A lot turns on our own self-understanding.

Lecture five is really the crux of Latour's argument, and includes a helpful summary table that he initially introduced in the very first of his original lectures (178). If we are to give up our deluded dreams of a secure and universal foundation for our ecological concerns, then we should re-examine what draws people together. Latour does this in anthropological terms: what authority does a group of people believe in; how do they imagine their universe to be governed and structured; what territory do they think they are inhabiting; and what epoch do they think they are living in? This list of questions serves to highlight the remarkable similarity between a certain conception of science and an equally narrow conception of religion. For rigid-minded scientists, 'Nature' is external, unified, de-animated and indisputable; ruled over by the 'laws of Nature'; and discoverable thanks to the radical enlightenment of the scientific revolution. For rigid-minded religionists, 'God' is external, unified and indisputable; sovereign over everything; and discoverable by a radical process of conversion. The only difference is that God is 'over-animated' and full of life, whereas Nature is de-animated and deprived of agency. As Latour writes of these two, equally stubborn viewpoints, 'it is not by adding the word "soul" to an agent that you are going to make it something more, nor by calling it inanimate are you going to make it something less' (172).

Latour prefers two, rather different, much humbler conceptions of science and religion. As his own extensive work in science studies has shown, scientists are real people, embedded in specific locations, partaking in a multitude of scientific disciplines, as part of complex professional networks, and engaged in sometimes controversial debates about their ever-more-numerous publications. Similarly, people of faith are embodied human beings, attending particular places of worship, engaged in real conflicts about the interpretation of their

religious texts, and (in the case of Christianity) following a materially incarnate God. What unites this second view of science and this second view of religion is that they both appreciate that they are, 'in the middle of relations that they have to compose one by one without any means of escaping historicity'. (182) We must build from the bottom up; there is no pre-emptive short-cut to any grand totality.

The sixth lecture then refracts these various possible self-understandings through the prism of apocalypse. Some people think that the apocalypse is still to come, in which case they are either naïvely innocent or simply ignorant of climate science. Some people think that the apocalypse has already been and gone (in that modernity has finally conquered irrationality), in which case they are naïvely hubristic and sleepwalking to annihilation. The only correct apocalypse, says Latour, is apocalypse now, an understanding that we live in the time of the end (217). Indeed, etymologically, apocalypse is the uncovering or revelation of knowledge, a breaking into the present. Only this apocalypse can suitably galvanise the motley assemblage of the 'people of Gaia' (213).

According to rigid-minded scientists and rigid-minded religionists there is no such thing as a real political opponent, only idiots and infidels, those who are not on board with the universal programme. But in Latour's hoped for world of open-minded science and open-minded religion, there is a real place for politics. As lecture seven makes clear, this involves facing up to the reality of disagreement, at times even of war, in order to work together for a more lasting peace. There is no universal, third-party arbiter, no God or Nature to back us up. Real, ecological peace must be composed, assembled and worked towards, not assumed or imposed (238). It is also important to note, though: Latour does not deny us universality *tout court*,

he just wants us to recognise that we have not achieved it yet. (245).

In the final lecture, then, Latour offers his solution: a 'Parliament of Things', which he sees neatly modelled in the 2015 student theatre simulation of the COP21 climate conference. At this contrived precursor to the Paris climate talks democratic representation was drastically expanded: alongside leaders of the various nation states were delegates for 'Oceans', 'Atmosphere', 'Indigenous Peoples', and 'Cities'. Is it really any more strange, asks Latour, to have a president speaking on behalf of 'France' than it is to have an oceanographer, say, speaking on behalf of 'Oceans'? Far from being neutral conduits for mere facts, argues Latour, scientists are actually best placed to be the political representatives of the entities they study (264). Climate scientists cannot and should not avoid political activism.

So, what does Latour accomplish? Are we any more prepared to face the monster we have only just recognised?

There are certainly points on which Latour could be challenged. First, for many in the environmental movement, the nub of the ecological problem is our addiction to capitalist growth. Yet Latour largely sidesteps the ongoing economic debates about 'sustainable development' and 'green growth' in favour of a seemingly more abstract analysis. Secondly, has Latour really got to grips with the psychology of our climatic inertia? The political philosophy might be brilliant, but the conundrum is why we do not seem to be motivated to live by it. Is Latour lacking a sufficiently pragmatic edge for real traction? And third, there will be those for whom Latour's dismissal of certain theological tenets will be troubling; God's transcendence, for example, gets a rough ride. In Latour's view, transcendent claims are too far down the road of preemptive unification.

But there is also much to celebrate about Latour's achievements in this volume. Tired discussions about science and religion are re-vitalised by an anthropological perspective that reminds us of the situatedness of even our strongest convictions. Our ecological debates are also given fresh hope in a truly interdisciplinary fusion of politics, theology and science. The most important reminder, though, is that we are always already in the middle of things. We simply do not have the universal perspective that we so often desire; bottom-up collaboration is the only answer. If anything, it is this humble reconception of democracy that will finally enable us to face Gaia.

Robin Attfield, *Wonder, Value and God.* London: Routledge, 2018. pp. 196, £36.99 Pbk. ISBN: 978-1-138388161.

REVIEWED BY JOHN NIGHTINGALE

Reading this book reminded me of walking the Pennine Way. We left the dales and climbed up through mist and rain, wind and sun, rock and bog, along a ridge, with Lancashire to the left and Yorkshire to the right, over two hundred miles towards Hadrian's Wall and the Scottish border. It was not the easiest or always the most beautiful of journeys but it had variety, made connections and gave lasting satisfaction when complete.

Robin Attfield begins by pointing to our experiences of wonder at the natural world, as illustrated by the cover photo of the Grand Canyon, Louis Armstrong's "It's a Wonderful World" and the programmes of David Attenborough. These, like the fields and well-dressings of the Derbyshire dales, we can all identify with. But once at Edale the path climbs steadily higher. The reader becomes dizzy from questions: what is the source of value in the natural and social world? The qualities it displays? The benefits it brings? Or just that it is there at all? At

least it provides an environment in which we can function, flourish, and take part in meaningful work.

By now we are high on the moors of Bleaklow. The mist comes down and we try to find our way through boulders and bogs. Doubts arise. Are our wondering and valuing just the product of our genes, our chemical, biological or even social imperatives, or are they also the result of our choosing and the activities of our will? Does what we wonder at and admire have value in itself so that we are right or wrong in valuing it? Or do values vanish if there is no one there to value them? Does it matter what the heavens look like if there are no eyes to view them? It is like the Way which runs between Yorkshire sceptics and the more romantic Lancastrians? At this point in the mist inexperienced walkers get out their compasses and set a straight course over the flat hilltop only to find themselves rapidly losing their footing and sliding into a bog. But Robin's book, like a Wainwright guide, takes you from cairn to cairn, until you have left the bleak lands behind and come into more congenial country. The track leads forward towards a worthwhile life, something you might wish for yourself or others might wish for you. The sun comes out and you see other hills and walkers momentarily lit up. Might one, through a process Robin refers to as abduction, successfully argue that this lovely and meaningful pattern so widely seen points to a general ordering which might be thought of as purposive or divine?

We are at the heart of our journey in the limestone massifs around Malham, a place of great beauty. On one side the rocks glow glorious in the sun, an expression of the value in Creation; on the other are the storm clouds and the rain, the suffering it also contains. In a splendid chapter on Disvalue Robin eloquently outlines the evils, natural and moral, which bring some to deny that the cosmos shows any signs of intelligence, let alone benevolence. In response he cites the free will defence and Keats' "vale of soul-making". The author doubts that there could be any world running according to general laws that in-

telligences were evolving to understand which did not have problems of this sort. Our world is certainly not perfect but, for the purpose of developing creative intelligences which a Creative Intelligence might desire, good enough.

In the distance can be seen hills lit up by revelation. However the specific witness of Scripture, whether Christian or from other faiths, is regarded as off track, not relevant to the thesis of this book: that by reflection on common experience it is possible to get an appreciation of what belief in God might mean.

The landscape broadens out as we approach the border country. There is a probing chapter, "Panentheism", on the relationship of God and the world. Is the divine identical with the material world – Pantheism, as some like Spinoza would have it? Or separate, as in the classic statements of the Abrahamic faiths? Or are the two functionally together if notionally separable, like the relationship of a piece of music played with its composer?

Robin goes on to think of the implications of his vision for human life. He sees it involving a discovery of real values with the consequent possibility of plans being changed, both by humans and by God. Creativity builds on the past but leaps forward, with imagination, reflection and feeling; it is part of the image of God and of the purpose for which the universe is made.

At the end of the penultimate chapter the reader has arrived at what seems a natural end, as it were at Hadrian's wall. But no, the path leads on, through hills and forests, until it crosses the border into Scotland and reaches the high Cheviots rolling in all directions. The last and longest chapter on "Fulfilling our purpose" reflects on the idea of "theosis" as employed and popularised by a successor of the Cappadocian Fathers, Maximus the Confessor. The term literally means deification, becoming God, but is here used metaphorically to mean being ethically transformed into the likeness of God as far as is per-

missible for human nature. For the Orthodox theologians this required a belief in the Incarnation, something which Robin, a Unitarian wishes to avoid. However he has a working model of theosis which involves humans taking on all the divine qualities which can be theirs by grace. "Love (the 'agape', or Christian love, of 1 Corinthians 13) is a divine gift and involves every virtue, elevating humanity to the likeness of God 'so far as it is possible for humankind'. Thus, through virtuous exercise of the will, 'human beings become what God is while still remaining creatures'….. Such teaching about human transformation avoids the bleakness of moralism, and escapes the incoherence prone to arise from ignoring human limitations and frailty, while at the same time depicting the spiritual illumination of which human beings are capable." Humanity is seen as a "priest of creation, potentially aware of the Creator's intentions embedded in creatures, and capable of worship and praise". These intentions would involve "flourishing, development of the virtues, a love of the natural world, meaningful work, creativity, understanding, and a sense of wonder"; also awareness of and respect for the purposes of the Creator for the flourishing of other living creatures, who may in their own time come to intelligence, thankfulness and praise.

Readers will have completed a long journey from familiar dales to steep ascents, picking their way through conceptual mists and bogs, buffeted alternately by the shafts of illumination or the storms of despair, and been offered a vision of divine intelligence meriting their cooperation and praise. We are brought to higher lands of doctrine, revelation and worship which it would take further journeys to explore.

Reviews Reproduced from Elsewhere

Giandomenico Boffi and Maryan Sunjic (eds.), ***Science and Christian Faith in Post-Cold War Europe: A comparative analysis 25 years after the fall of the Berlin Wall.*** Vatican City: Lateran University Press, 2015, pp. 146 Pbk. €15.00. ISBN 978-88-465-1045-7.

Reviewed by Mike Fuller

Reprinted with the kind permission of the author and editor from *Science and Christian Belief* (2017) 29:1, pp. 71-73.

As readers of this journal will be well aware, the twenty-first century has seen a steady broadening out of the dialogue between science and religion. There is a recognition that 'religion' is best understood not in monolithic terms, but as a richly-varied phenomenon; and, similarly, there has been an acknowledgment that 'science' encompasses a range of approaches to the natural world which may embrace considerable divergences in practice. Additionally, the particular local context in which the dialogue of science and religion is conducted may contribute its own nuances to the form and content of that dialogue.

The book under review is to be welcomed for its opening up of a particular context in which the science-religion dialogue has been taking place in re cent decades: the European countries of the former Soviet bloc, in the wake of the collapse of communism. The papers it contains have their origin in a work shop which took place in Rome in 2014, bringing together participants from Croatia, Romania, Poland, Russia and Italy. The contributors are all academics, representing different disciplines. Whilst there are similarities in many of the stories told here (the withdrawal of religious freedoms and the state-sponsored promotion of a doctrinaire scientism during the So-

viet era, for example), even in these geographically- and historically-constrained contexts considerable differences also arise.

After a scene-setting introduction by Marijan Sunjic, three papers relate to the situation in Croatia. Stipe Kutlesa paints a bleak picture of that country in communist times, and a scarcely better one of the period since, noting the persistence of the view of science as supporting Marxist ideology and therefore necessarily opposing religion as 'the opium of the people' (28). Despite this, Dalibor Renic notes that according to a 2011 census, the population of Croatia is 84.28% Catholic and just 3.81% atheist. The overall message of these papers, however, is that neither official state institutions nor the Catholic Church currently offer platforms for the constructive engagement of science and religion in Croatia. A fascinating alternative perspective, that of the Orthodox Church in Croatia (4.44%' of the population, according to Renic), is given by Petar Tomev Mitrikeski, who maintains that any antagonistic under standing of science and religion is essentially a Western one, with its roots in scholasticism.

In Romania the situation is different, the proportions of Orthodox to Catholic believers being the reverse of those in Croatia. Magda Stavinschi believes the conditions there to be favourable for dialogue between Orthodoxy and science, and notes the way in which organisations dedicated to pursuing that dialogue have been established over the last decade or so.

Teresa Obolevitch's paper on the situation in Poland presents another very different situation. Here the Catholic Church retained a social presence denied to it in Croatia, so that although it had to contend with restrictions on its freedom and state-sponsored atheist propaganda, the perception of a conflict between science and religion did not take so firm a hold. As a result, the post-cold war situation has seen science and religion in a lively engagement. Well-known scholars such as Michael Heller have also had an important role to play.

Obolevitch observes that in Poland surveys have demonstrated that the belief that science and religion are in conflict is held principally by those coming from a scientific perspective, the attitudes of religious believers being rather more irenic.

In the Russian context, Alexei Bodrov notes that 'during the Soviet period no serious dialogue with religion was possible' (101), due not least to the exclusion of theology from the universities. With the demise of that era, however, there are now 'about 50 theological departments and chairs at state and private universities and approximately the same number of religious studies departments' (103). Although levels of theological literacy in the country re main generally low, the possibility for serious engagement between science and theology is now being pursued, not least through conferences and publications.

The five short concluding papers are all from Italian contributors. They describe the work of SEFIR ('Scienza e fede sull'interpretazione del reale', 'Science and faith in the interpretation of reality'), the sponsors of the conference giving rise to this book (Giandomenico Boffi); note the changing political scene in Italy in the post-cold war era, with the eclipsing of both the Christian Democratic and Communist parties (Piero Benvenuti); present some comments on secularisation theory (Stefano Crespi Reghizzi) and on evolution (Fiorenzo Facchini); and offer a perspective on science-and-religion from the Italian Waldensian Church (Giovanni Pistone).

Collectively, these papers offer some fascinating insights into the development of the dialogue of science and religion in contexts very different from those in which it has been most vigorously pursued to date. Several contributors note the important support which has been offered by the John Templeton Foundation to the pursuit of these aims, through the sponsorship of networks, conferences and publications. It is to be hoped that the shoots being nurtured here will continue to

grow, thereby supporting fresh perspectives that can be offered to the wider science- and-religion community.

Paul Copan, Tremper Longman III, Christopher L Reese, Michael G Strauss (gen. eds.) ***Dictionary of Christianity and Science: The Definitive Reference for the Intersection of Christian Faith and Contemporary Science.*** Grand Rapids, MI: Zondervan, 2017, pp. 704, $60.00 Hbk, ISBN 978-0310- 49605-2.

REVIEWED BY RANDY ISSAC

Reprinted with the kind permission of the author and editor from *Science and Christian Belief* (2018) 30:1, pp. 75-76.

Zondervan have realised their lofty ambition of publishing an embracive compilation of matters relating to Christianity and science. This 700 page reference work merits a slot in the library of anyone even mildly interested in issues of science and faith.

To achieve their goal, Zondervan turned to four experienced editors in the field: Christopher Reese is a freelance editor and writer currently associated with Lexham Press; Tremper Longman III is a professor of Biblical Studies at Westmont College; Paul Copan is a professor of philosophy at Palm Beach Atlantic University; and Michael Strauss is a professor of physics at the University of Oklahoma. These editors solicited an additional 130 contributors to write one or more entries.

The title of the book is somewhat misleading as it bears little resemblance to an ordinary dictionary. It provides no guide for diction and never limits itself to a brief phrase or sentence describing the various uses of a word or phrase. Rather, it is an encyclopedia with three main types of articles: Introductions aim to provide an overview of a topic with

simple explanations and equal treatment of any diversity of views; Essays are longer entries that provide a more detailed synopsis of a topic; Multiple-View Discussions offer the contrasting supportive and critical views of a topic. The 474 entries include 149 individuals, 9 organisations, 4 books, 276 single-view topics, and 17 Multiple-View Discussions. Entries include from 3 to 100 references and bibliographies, which are primarily in technical journals.

The editors set a goal for objectivity and inclusiveness. "Where interpretive questions exist, simple explanations of the most viable options are presented, with equal treatment given to each option" (11). This is most evident in the decision to give both sides of the major divisive issues such as young-earth creationism, days of creation, Adam and Eve, and human evolution. These well-known controversial issues are all given several pages of attention by an advocate of a supporting view and one of a critical view. Unfortunately, these issues are more complex than can be covered by two perspectives and anyone familiar with an issue will likely feel that their own ideas were inadequately expressed. The authors of these views were not given an opportunity to review or comment on the opposing view, so that assertions are at times left unchallenged. Nevertheless, the most commonly held perspectives are given a fair hearing.

For single-view topics, achieving objectivity and inclusiveness was more challenging, especially since many of the authors are well-known advocates of a particular perspective of that topic.

For example, entries for 'Information' by Bill Dembski and for 'Methodological Naturalism' by Casey Luskin would have benefited from a more complete discussion of diverse opinions. Topics ranged from 'Adam in the New Testament' to 'Worldview' but topics such as complementarity and NIODA (Non-Interventionist Objective Divine Action) are only men-

tioned under their advocates Donald MacKay and Robert Russell, respectively.

The individuals presented range from 'Aquinas' to 'Davis Young' but omit Socrates, Richard Bube and many more. The organisations include the 'ASA' and 'BioLogos' and the 'Faraday Institute' but omit Christians in Science and the Research Scientists Christian Fellowship and a host of influential organisations. Of the books included, three are ancient myths such as Gilgamesh Epic, and, oddly, only one modern book, The Mystery of Life's Origins, but not Origin of Species. Perhaps books are best left for a separate bibliography but seminal works of great influence would have been appropriate.

To their credit, the editors conclude the Introduction with an invitation to readers to submit to dcs@harpercollins.com any suggestions for topics to be included in future editions (11). A flood of submissions would be appropriate and would need to be added to achieve the titular claim of being a 'definitive reference'.

It would have been beneficial for the Dictionary to include an index of both topics and of contributors. Though the entries are listed alphabetically, a listing by genre would be a great help for the reader to understand what topics are covered and where a particular discussion might be found. Listing the contributors with the topics they address would also be of great help in perceiving the underlying perspective in any given entry.

The breadth of items addressed and the incisive explanation of each one render this book valuable for every person pursuing science and Christian faith.

BOOKS AVAILABLE FOR REVIEW

Zoe Lehmann Imfeld and Andreas Losch (eds.) *Our Common Cosmos: Exploring the Future of Theology, Human Culture and Space Sciences.* T&T Clark, 2018.

Stephen K. Sanderson, *Religious Evolution and the Axial Age: From Shamans to Priests to Prophets.* Bloomsbury, 2018.

NOTE: This Journal aims to publish original and reprinted reviews of books published in the science-religion area. The Editor regrets that she is not able to publish, or enter into dialogue on, original articles not tied to a book in the field.